



Preview – Information



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Workbook Preview



Grade 4 – Science Unit

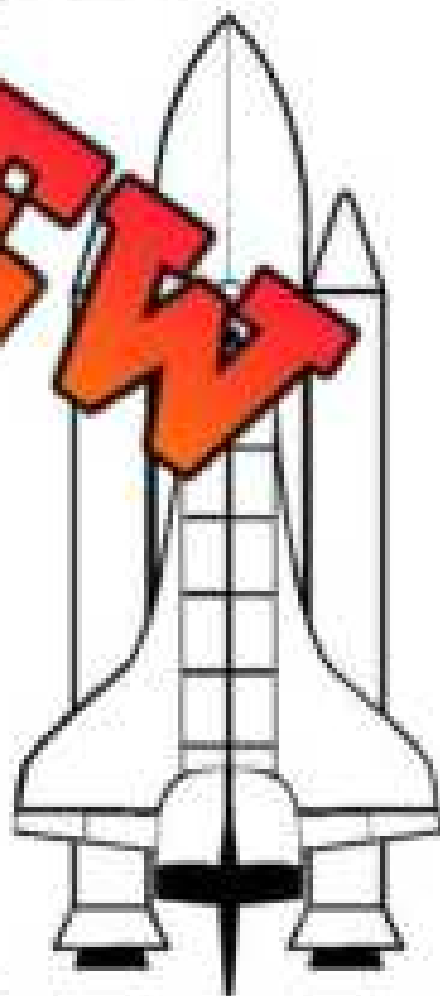
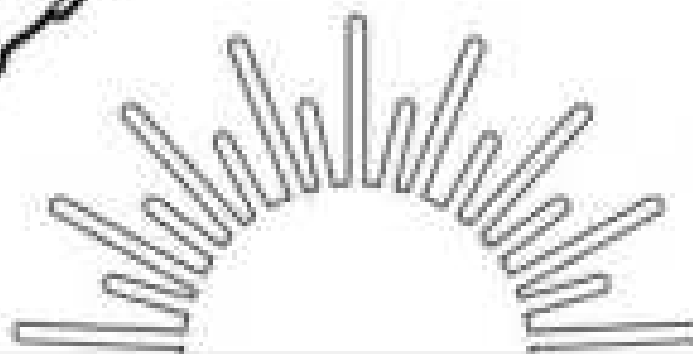
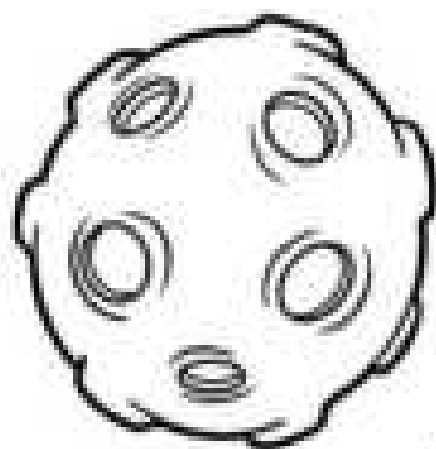
Organizing Idea: Space: Understandings of the living world, Earth, and space are deepened by investigating natural systems and their interactions.

Guiding Question: How do objects in space impact daily life?

	Learning Outcome - Students investigate and describe objects in space in connection to daily life.	Pages
SA.1	The universe includes all of space and everything in it. Objects in space include the Moon, the Sun (a star), stars and their planets, planets and their moons.	7-23
SA.2	Most objects in space are more easily observed at night.	24-25
SA.3	Technologies for viewing objects in space include binoculars.	26-30
SA.4	Preview of 75 pages from this product that contains 132 pages total.	
SA.5		
SA.6		
SA.7		
SA.8	Earth's daily rotation and yearly revolution around the Sun causes the constellations to appear in different locations at different times. Polaris, the North Star, shows the approximate direction of the North Pole. The Orion constellation can be used to find the South Pole.	40-46
SA.9	The Moon has been used throughout history to measure time. Some cultures may use a lunar calendar in addition to the international standard calendar. Lunar calendars follow patterns of the Moon for timekeeping.	45-46 60-79
SA.10	The international standard (Gregorian) calendar is based on the amount of time it takes Earth to revolve around the Sun. Most people follow the international standard calendar in daily life.	80-86
Computer Science		
CS.1	Students examine and apply design processes to meet needs.	54-59, 85-86

NAME _____

Space



The Universe

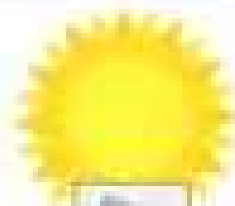
What is the Universe?

The **universe** is everything we can touch, feel, sense, measure, and detect. This means it is everything that is living, planets, galaxies, dust clouds, light, and even time.

Before the universe was created, time, space, and matter did not exist.



Planet



Star

What is a Galaxy?

A **galaxy** is a mass of gas, dust, and billions of stars and their solar systems, all held together by gravity.



Natural Satellite

We live on the planet Earth, a part of our solar system. Our solar system has eight planets and is only a part of the Milky Way Galaxy. When we look up at night and see the stars, we are seeing stars in the Milky Way. Scientists estimate that the Milky Way has 400 billion stars. Most of these stars have at least one planet orbiting them. In our solar system, the sun is the star and the eight planets orbit around it.

The Universe - An Unimaginably Large Entity

This picture was taken by the Hubble Space Telescope. It shows thousands of galaxies as each of the tiny dots are galaxies.

Each galaxy has upwards of 400 billion solar systems. Our solar system has 8 planets and one Sun, which means our Milky Way Galaxy could have upwards of 3.2 trillion planets and 400 billion Suns.

It is also estimated that there are approximately 2 trillion galaxies that we can see from our planet. That's a lot of stars, solar systems and planets!

The universe is home to many celestial bodies. A **celestial body** is an object in space. Celestial bodies include stars, planets, natural satellites (moons), comets, asteroids, galaxies, and meteors or meteorites.



Meteor

Name: _____

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Guided Reading
Book

Questions

Answer the questions below using evidence from the text.

1) What is the difference between a solar system and a galaxy?

2) How big is the universe? Explain using the terms: galaxies, stars, and solar systems.

Visualizing

Draw what you remember from what you were reading. Explain the picture.



True or False

Circle whether the statement is true or false.

1. Galaxies are larger than the Universe	True	False
2. A galaxy can have upwards of 400 billion solar systems	True	False
3. A solar system has 100 billion planets in it	True	False
4. The universe has around 2 trillion galaxies	True	False
5. There could be 3.2 trillion planets in our galaxy	True	False

Solar System – Size, Structure, Age

What is a Solar System?

Our solar system is the collection of eight planets and their moons in orbit around the Sun. It also includes the smaller bodies in the form of asteroids, comets, and meteoroids.

Age of Solar System

Our solar system is about 4.6 billion years old. It is believed that 4.6 billion years ago, gravity pulled a

cloud of dust and gas together to form the Sun. The massive concentration of dust and gas created a molecular cloud that eventually formed the Sun. With the birth of the Sun, the planets began to form 100 million years around it.



Size and Structure of the Solar System

The image above shows the size and structure of our solar system. As you can see, the size of the Earth is small compared to the size of Jupiter, Saturn and Uranus.

The furthest object that we can see in our solar system is Sedna, which is 143.73 billion km away from the Sun. This means the diameter of the solar system is 287.46 billion km.

There are eight planets in our solar system and one sun that each planet orbits around. An **orbit** is a regular, repeating path that one object takes around another. Therefore, all the planets orbit the Sun, as they all travel in a circle around the Sun. Since planets are further away from the Sun, it takes them longer. In fact, it takes Neptune 165 years to orbit the Sun once! Earth orbits the Sun every 365 days. Earth is the 3rd planet from the Sun, or some refer to it as the 3rd rock from the Sun.

Name: _____

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Questions Answer the questions below using evidence from the text

1) What is our solar system? When was it formed?

2) What is _____ of our solar system? Did anything surprise you about the size of the planets?

Questioning Write 3 questions about the reading

1)

2)

3)

True or False Is the statement true or false?

1) The Sun orbits around the planets	True	False
2) All the planets orbit the Sun every 365 days	True	False
3) The Sun is the largest object in our solar system	True	False
4) The Earth orbits the Sun every 365 days	True	False
5) Our solar system was formed 4.6 billion years ago	True	False

Exit Cards

Cut Out

Cut out the exit cards below and have students complete them at the end of class.

Name: _____

Mark

Is the statement true (T) or false (F)?

1) The Sun is older than every planet in the solar system.	T
	F
2) A planet's orbit changes shape based on its size.	T
	F
3) Sedna marks the smallest distance in the solar system.	T
	F
4) Earth takes longer than Venus to travel once around the Sun.	T
	F

Name: _____

Mark

Is the statement true (T) or false (F)?

1) The Sun is older than every planet in the solar system.	T
	F
2) A planet's orbit changes shape based on its size.	T
	F
3) Sedna marks the smallest distance in the solar system.	T
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	F

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	F
3) Sedna marks the smallest distance in the solar system.	T
	F
4) Earth takes longer than Venus to travel once around the Sun.	T
	F

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2) A planet's orbit changes shape based on its size.	T
	F
3) Sedna marks the smallest distance in the solar system.	T
	F
4) Earth takes longer than Venus to travel once around the Sun.	T
	F

Name: _____

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Diagram of our Solar System

Diagram of our Solar System

Label the solar system using the word bank

Word Bank

Mercury

Uranus

Earth

Jupiter

Saturn

Neptune

Mars

Venus

Sun



What are Moons?

What are Moons?

Moons are natural objects that orbit planets. Scientists call moons "natural satellites" because a satellite also orbits a planet. Most people think satellites are just machines we send into space to orbit a planet, but satellites can be natural too.

Planets and asteroids orbit the Sun, but moons orbit planets. Moons come in different shapes and sizes and are made of rock. Most moons are airless, but some have atmospheres and even oceans. We know a lot more about the moon because in 1969, Americans landed on the moon and took rock samples back to Earth to study them.

Moons and Planets

The Earth has one moon. There are 214 moons in our solar system. Most of the moons orbit around Jupiter and Saturn. Smaller planets usually have less moons, Mars has two, and Venus and Mercury don't have any. Although scientists aren't 100 percent sure, they believe Jupiter has 79 moons.

It was discovered in 2019, that Saturn has more moons than scientists didn't know about. This gives Saturn a total of 82 moons. Saturn's moon Titan is larger than the planet Mercury! Check out the size comparison in the photo below. Titan is larger than Mercury, but Titan is larger than our moon.

The Earth's moon can be seen by us each evening on a clear night, but it's really far away! It is 384,399 kilometres from the Earth! It took the American astronauts 3 days travelling at an average speed of 3,280 kph.

How was Earth's Moon Formed?

There are many theories that try to explain how the moon was formed. No one knows for sure! The most accepted theory is that the moon formed when the Earth and another small planet collided. The debris from the collision began to orbit the Earth. Over time, the debris collected to form a moon.



Questions

Answer the questions below using evidence from the text

1) What are moons? Do all planets have moons?

2) How was Earth's moon formed?

Summarize

What is the main idea and supporting details

True or False

Circle whether the statement is true or false

1. Moons are natural satellites because they orbit planets	True	False
2. Moons orbit around the Sun, not around planets	True	False
3. Scientists know exactly how many moons there are in our solar system	True	False
4. Most moons have atmospheres (air) and oceans	True	False
5. Moons are made of rock materials	True	False

Moons in our Solar System

Moons in our Solar System

There are over 200 different moons in our solar system. Many of these moons are similar, but some are different. Research 4 different moons from 4 different planets, and write about what is known about these moons (what it's made of, size, atmosphere, oceans, etc.)

Research

Learn more about some of the moons in our solar system

Moon's Name	Draw the Moon	Information (atmosphere, volcanos, oceans, size, temperature, etc.)

Name: _____

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Research

Learn more about some of the moons in our solar system

Moon's Name	Planet the Moon Belongs to	Draw the Moon	Information (atmosphere, volcanoes, oceans, size, temperature, etc.)
PREVIEW			

Planetary Systems In Space

What are Planetary Systems?

A planetary system is a group of celestial bodies, including a star and everything that orbits it. Here are some key points:

- The star acts like the parent of the family. Its gravity makes the other bodies orbit it.
- Planets are like the star's kids, and they travel around the star in paths called orbits.
- Some planets have moons, which are smaller bodies that orbit the planets.

The TRAPPIST-1 System: A Closer Look

TRAPPIST-1 is a planetary system located about 40 light-years away from us (that's 40 years for light to travel there)! What does it look like? Find out!

The Star: TRAPPIST-1

At the center of this system is the star TRAPPIST-1. It's a lot smaller and cooler than our Sun. In fact, it's called an "ultra-cool dwarf" star.

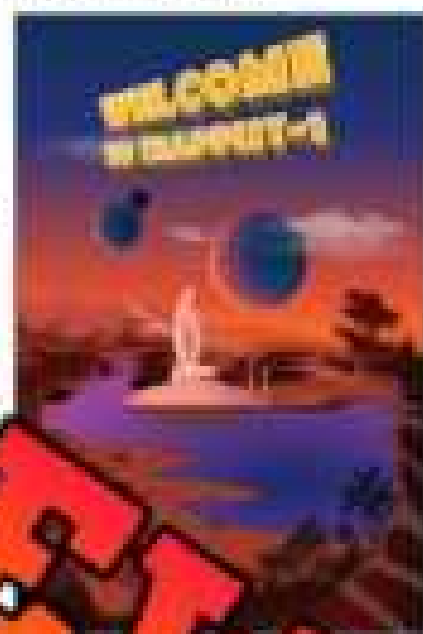
The Planets

TRAPPIST-1 is famous for its seven Earth-sized planets. These planets are TRAPPIST-1b, 1c, 1d, 1e, 1f, 1g, and 1h. Here are some fun facts:

- All 7 planets are a similar size to Earth. They could have rocky surfaces just like ours!
- Three of the planets (1e, 1f, and 1g) are in the "habitable zone." This means they could potentially have liquid water on their surfaces.
- The planets are so close to each other that if you stood on one of them, you could see some of the other planets in the sky, just like we see the Moon from Earth!

Other Features

- The TRAPPIST-1 system is too far away for us to know if it has moons or comets. But, astronomers are using powerful telescopes to learn more about it every day.



Questions

Answer the questions below using evidence from the text

1) Why is the star important in a planetary system?

2) What is special about the planets in the TRAPPIST-1 system? Write 3 things

1)

2)

3)

Draw

Draw your own diagram of _____ with the information you have

Multiple Choice

Circle the correct answer

1) Is TRAPPIST-1 a star or planet?	Star	Planet
2) How many planets does TRAPPIST-1 have?	7	8
3) Is TRAPPIST-1 bigger or smaller than our Sun?	Bigger	Smaller
4) Are all seven TRAPPIST-1 planets in the habitable zone?	Yes	No
5) Is our Solar System a planetary system?	Yes	No

Exit Cards

Cut Out Cut out the exit cards below and have students complete them at the end of class.

Name: _____

Mark

Circle the correct answer.

1) What is at the centre of TRAPPIST-1?	Star
	Planet
2) What keeps the planets moving around TRAPPIST-1?	Gravity
	Wind
3) How many planets orbit TRAPPIST-1?	Three
	Seven
4) What tool do astronomers use to study TRAPPIST-1?	Microscopes
	Telescopes

Name: _____

Mark

Circle the correct answer.

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Activity: Galaxy in a Bottle

Objective

What are we learning more about?

To help students understand the vastness and diversity of the universe in a fun and creative way.

Materials

What do we need for our experiment?

- ✓ Clear plastic bottle with a cap
- ✓ Different colored glitter (each color represents a different element or celestial body)
- ✓ Cotton balls
- ✓ Water
- ✓ Food coloring (optional)

Procedure

How do we do it?

- 1) First, talk to the students about the universe. Show them pictures of stars, galaxies, and different elements. Explain how each color of glitter will represent a different element or type of celestial body, for instance, yellow for the sun, blue for planets, and silver for asteroids.
- 2) Take the clear bottle and add a bit of water just to wet the cotton balls.
- 3) Stretch out some cotton balls and push them into the bottle until it is covered.
- 4) Sprinkle the first color of glitter on top of the cotton balls. This represents one element or celestial body in the universe.
- 5) Add another layer of cotton balls, pressing down so that the glitter gets encased between the layers. This is to show how the universe is layered.
- 6) Repeat the process with different colors of glitter and more cotton, creating multiple layers in the bottle.
- 7) Once the bottle is full, put the cap on tightly. Now you have your own little universe!
- 8) Students can shake the bottle to see how the "universe" changes, just like our actual universe is always in motion.



Name: _____

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Galaxy Connection
54.3

Observations

What do you see?

1) Can you see individual "stars" or "planets" or do they all blend together?

2) How does the look of your galaxy change when you hold it up to the light?

Results

Answer the questions 3)

1) How is our actual universe similar to your galaxy? (both)

2) Order the space components in order from smallest to larger:

Planets

Galaxies

Stars

Solar System

Moons

Universe

Space at Night vs During the Day

Observing Space Objects: Why is it Easier at Night?

Space is full of exciting objects like stars, planets, and galaxies. But, have you ever wondered why these objects are more easily observed at night? Let's explore why.

Light from the Sun

During the day, the Sun is the most dominant object in our sky. It outshines most other celestial objects, making it difficult to see other objects in the sky.



Darkness of the Night

When it's nighttime, the Earth is facing away from the Sun. Without the Sun's light, the sky gets dark. This darkness provides a backdrop for observing other objects in space because there's no sunlight washing them out.

Absence of Skyglow

Skyglow refers to the brightness of the night sky in populated areas, caused by artificial lighting and can make it more challenging to see distant objects. However, during the darkest parts of the night, the skyglow reduces, making it easier to see these objects.

List of Objects Easier to See at Night

- **Stars:** Other than the Sun, stars are the most visible objects in the night sky.
- **Planets:** Planets like Venus, Mars, and Jupiter can be seen with our eyes at night.
- **The Moon:** The Moon is very visible at night, especially during its full phase.
- **Meteor Showers:** These are best observed in the darkest parts of the night.
- **Galaxies:** With a good telescope, you can see galaxies at night.

Questions

Answer the questions below using evidence from the text.

1) Why are most objects in space easier to observe at night?

2) What is skyglow and how does it affect our observation of space objects?

Making Connections

How does the light from the Sun affect our observation of space objects during the day? How about at night?

True or False

Is the statement true or false?

1) The Sun outshines most objects in the sky.	True	False
2) We can only see space objects during the day.	True	False
3) Skyglow is caused by natural light.	True	False
4) Planets like Mars can be seen at night.	True	False
5) We can see galaxies at night with a telescope.	True	False

Technologies for Viewing Space

Technologies for Viewing Objects in Space

Welcome to our report about the exciting technologies used for observing objects in space. We will talk about three main tools – binoculars, telescopes, and planetariums. These are instruments that astronomers, scientists, and even everyday people use to explore the wonders of our universe.

Telescopes

Telescopes make things look closer and bigger. They can show more details and see farther than the eye can. They come in different sizes, from ones you can use in your backyard to big ones in observatories even in space like the Hubble telescope. With a telescope, you can see Saturn's rings, far galaxies, and nebulae (clouds of dust and gas in space).

Binoculars

Binoculars are like two small telescopes that you hold up to your eyes. They're often the first thing beginners use to look at space. They're easy to use and can carry them around. You can see the moon, planets like Jupiter and Saturn, and even faraway star groups and galaxies with them.

Planetariums

A planetarium is a special room where you can see pictures of the night sky on a big dome ceiling. They use high-tech projectors to display images of the night sky onto a dome overhead. They simulate the motion of the stars and planets to recreate the sky at any point in time. Planetariums are great for people to learn about the objects in the sky without needing their own viewing equipment.



Explain

Describe the technologies below.

Telescope	
Binoculars	
Planetarium	

Making Connections

How are these technologies related?

True or False

Is the statement true or false?

1) Binoculars are like small telescopes.	True	False
2) You can't see planets with binoculars.	True	False
3) All telescopes are the same size.	True	False
4) Telescopes can see farther than binoculars.	True	False
5) A planetarium shows a live view of the actual night sky.	True	False

Hubble Telescope

What is the Hubble Telescope?

The Hubble Telescope is a big telescope that's not on Earth, but in space! It was named after a famous scientist named Edwin Hubble.

Why is Hubble Special?

The Hubble Telescope is special because it's above the Earth's atmosphere. This means it can see things that telescopes on Earth can't. It can take really clear pictures of stars, galaxies, and planets.

How Hubble Works

The Hubble Telescope gets its power from the sun through two solar panels. It can't go wherever it wants in space. It has a path called an orbit. It's about 550 kilometres above Earth. That's higher than any airplane can fly.

People on Earth control Hubble. They use computers to tell Hubble where to look and when to take pictures. Then Hubble sends the pictures back to Earth so scientists can study them. So even though Hubble is very far away, it's always connected to us here on Earth.

What Has Hubble Seen?

Hubble has seen a lot of amazing things. It has looked at faraway galaxies, bright stars, and even the birth and death of stars. It has also taken pictures of planets in our solar system.

Cool Facts About Hubble

- It was launched into space in 1990.
- Hubble has traveled more than 4 billion miles in space!
- Hubble doesn't need a driver, it is controlled by people on Earth.

Think

Write 5 things you learned about the Hubble Telescope

1)

2)

3)

4)

5)

Draw

Draw the Hubble Telescope

True or False

Is the statement true or false?

1) The Hubble Telescope is on Earth.

True

False

2) Hubble was named after a scientist.

True

False

3) Hubble can see better than Earth telescopes.

True

False

4) Hubble gets power from the moon.

True

False

5) Hubble can go anywhere in space.

True

False

Safe Sun Viewing

Looking at the Sun Safely

The Sun gives us light and warmth. But, did you know looking directly at the Sun can hurt your eyes? It's so bright that it can cause damage. But don't worry! We can still observe the Sun safely with the right tools and rules.

Why We Can't Look at the Sun

The Sun is very hot, but it is extremely bright. It's so bright that our eyes can't handle it. The Sun gives us a lot of light, including types we can't see like ultraviolet (UV) light. This is really harmful. If it gets into our eyes, it can hurt them.

It's like how your skin can get burned if you stay outside too long without sunscreen. Your eyes can get burned, too. This is not like a normal burn. It can cause a lot of pain and even make you go blind. That's why it's very important not to look directly at the Sun, especially without protection.

Using Safety Equipment

Special equipment is needed to look at the Sun. One of these tools is "solar viewing glasses." These glasses have super dark lenses that protect your eyes. You can't use regular sunglasses because they don't block enough sunlight.



Another way to look at the Sun safely is by using a "pinhole projector." It's something you can make yourself. It lets you see the Sun without looking at it directly.

Following Safety Rules

- 1) Never look directly at the Sun, even if the Sun doesn't seem very bright
- 2) Only use safe equipment. Regular sunglasses or binoculars are not safe

Questions

Answer the questions below using evidence from the text

1) Why can looking directly at the Sun hurt your eyes?

2) What sort of equipment can we use to look at the Sun safely?

Making Connections

What does this tell you about you or?

True or False

Is the statement true or false?

1) We can't see ultraviolet light.	True	False
2) Regular sunglasses are safe for Sun viewing.	True	False
3) Our eyes can get "sunburned" by the Sun.	True	False
4) Binoculars are safe for looking at the Sun.	True	False
5) It's safe to look at the Sun if it doesn't seem bright.	True	False

Experiment – Pinhole Projector

Objective

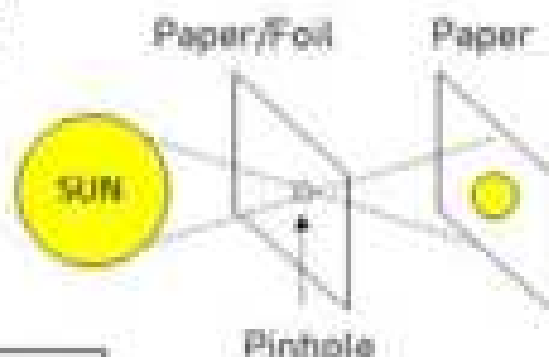
What are we learning about?

To create a simple pinhole projector that allows you to safely observe the Sun.

Materials

What do we need for our experiment?

- 1) Two pieces of cardboard
- 2) A small piece of aluminum foil
- 3) A pin
- 4) A sunny day



Method

How do we perform the experiment?

- 1) **Prepare the Projector:** Start by taking a piece of cardboard. In the center of this cardboard, cut a small square hole that measures about 1x1 inches.
- 2) **Create the Pinhole:** Next, take a small piece of aluminum foil. Cut it so it's just a bit larger than the hole you've cut in the cardboard. Then, place the aluminum foil securely over the square hole. Ensure it's flat and covers the hole completely.
- 3) **Make the Pinhole:** Now, it's time to make the actual pinhole. Use a pin to carefully poke a tiny hole right in the center of the aluminum foil.
- 4) **Set Up for Viewing:** To use your pinhole projector, first make sure your back is towards the Sun. You should be facing away from the Sun, not towards it.
- 5) **Position the Projector:** Hold the piece of cardboard with the foil above your shoulder or to your side. Make sure the Sun is shining directly onto the foil side of the cardboard.
- 6) **Position the Screen:** Hold the second piece of cardboard (this will be your screen) in front of you, in the shadow of the first cardboard piece.
- 7) **Observe:** You should see a small, round, bright spot of light appear on the second piece of cardboard. This is the projected image of the Sun. Adjust the distance between the two pieces of cardboard to focus the image.

Observations

What do you see?

1) Describe what you saw using your projection. Explain the shape and colour.

2) What happens to the Sun's projection if you move the second piece of cardboard closer to the screen?

Results

Answer the questions below

1) Why is the projection of the Sun the shape that it is?

2) Why can you look at the projection of the Sun, but not directly at the Sun itself?

Celestial Object in the Night Sky

What is a Celestial Object?

A **celestial object** is a natural object which is located outside of the Earth's atmosphere. The Moon, the Sun, an asteroid, planet or star are all examples of celestial objects.

We can see the same celestial objects in our night sky, between sunset and sunrise. If the sky is clear or with no clouds, many celestial objects can be seen with an unaided eye, binoculars or telescope. Sometimes, we can only see certain celestial objects during certain times of the year. This is because we are orbiting the Sun and other planets are also orbiting the Sun, travelling at different speeds, but these speeds, orbits, and rotations are predictable which gives scientists the ability to understand when certain celestial objects will be visible.

List of Celestial Objects

- **The Moon** – Can be observed almost every night if the sky is clear.
- **Jupiter** – Jupiter is the largest planet in our solar system. It is very bright and exciting to observe. It is best observed just hours before sunrise but the visibility of it lessens when the sky gets brighter.
- **The 5 Visible Planets** – the five planets that are closest to the Sun can be easily seen in the night sky with the naked eye. These planets from closest to the Sun are – Mercury, Venus, (Earth), Mars, Jupiter, Saturn. With a telescope, you can see dynamic features like Jupiter's cloud belts, Saturn's rings and Mars' ice caps.
- **The Big Dipper** – The best known constellation – collection of stars that consists of seven stars.



Questions

Answer the questions below using evidence from the text.

1) Why are some celestial bodies only visible during certain times of the year?

2) Why is _____ visible? When should we look to see Jupiter?

Making Connections

How is _____ a celestial body? Explain.

True or False

Is the statement true or false?

1. The Earth is a celestial body	True	False
2. The Big Dipper is a collection of 7 stars	True	False
3. Uranus is part of the 5 visible planets	True	False
4. Jupiter can be seen with the naked eye	True	False
5. We see stars and planets randomly on random days throughout the year	True	False

What Are Constellations?

What Are Constellations?

When you look up at the night sky, you can see a lot of stars. A constellation is a group of stars that make a special shape. People long ago started noticing these shapes in the stars and gave them names. It's kind of like a big dot-to-dot in the sky!

Where Do Constellation Names Come From?

The names of constellations come from many different places. Many constellations have names from ancient Greek myths. These myths were told by people like the Greeks and Romans. The constellation Orion was named after a great hunter in Greek mythology.

But not all constellations come from Greek stories. Some constellations have names that come from the shape they make in the sky. For example, "Ursa Major" means "Big Bear" and "Ursa Minor" means "Little Bear" because people thought these constellations looked like bears.

Are Stars in a Constellation Close Together?

When you look at a constellation, you might think the stars are close to each other. But, that's not true! Stars in the same constellation can be very far away from each other, even millions of kilometers apart. They only seem to be close together because we are so far away from them.

Cool Facts About Constellations

- There are 88 recognized constellations.
- Different cultures around the world have different constellations.
- Constellations can help us know which way is north or south.

Questions

Answer the questions below using evidence from the text.

1) What are constellations?

2) Are the stars in a constellation close together? Explain why they look close.

Draw

Draw the two constellations Ursa Major and Ursa Minor

Ursa Major	Ursa Minor

Multiple Choice

Circle the correct answer

1) What is a constellation?	Shape	Star
2) Where do constellations get their names from?	Scientists	Stories
3) What does "Orion" represent in mythology?	Hunter	Bear
4) "Ursa Major" means what in English?	Little Bear	Big Bear
5) What makes stars in a constellation seem close together?	Size	Distance

Earth's Movements and the Changing Sky

Earth's Daily Spin

Every day, Earth spins around in a circle. We call this spin "rotation." It's why we have day and night. When your part of Earth is facing the Sun, it's daytime for you. When your part of Earth is facing away from the Sun, it's nighttime.

ROTATION

VS

REVOLUTION



24 / 1
HOURS / DAY



365 / 1
DAYS / YEAR

How Rotation Changes the Sky

The spinning of Earth makes it appear to move in the sky. As Earth spins, different stars come into view. That's why the night sky changes over time. It's not that the stars are moving. Instead, it is us spinning that allows us to see different stars in the sky.

Earth's Yearly Journey Around the Sun

But Earth doesn't just spin. It also moves around the Sun. This movement is called "revolution." It takes a year for Earth to complete one revolution around the Sun.

How Revolution Changes the Constellations We See

This yearly journey changes the night sky too. As Earth moves around the Sun, the nighttime side of Earth faces different directions in space. That means we get to see different stars at different times of the year.

Summer Constellations:

- 1) Cygnus (The Swan)
- 2) Lyra (The Lyre)
- 3) Aquila (The Eagle)
- 4) Sagittarius (The Archer)
- 5) Scorpius (The Scorpion)

Winter Constellations:

- 1) Orion (The Hunter)
- 2) Taurus (The Bull)
- 3) Gemini (The Twins)
- 4) Canis Major (The Greater Dog)
- 5) Cassiopeia (The Seated Queen)

Questions

Answer the questions below using evidence from the text.

1) Explain how Earth's rotation causes us to see different stars at night.

2) Why do we see different constellations at different times of the year?

Draw

Draw your own diagram of how the Earth moves.

Earth's Rotation	Earth's Revolution Around the Sun

Multiple Choice

Circle the correct answer.

1) What is Earth's daily spin called?	Rotation	Revolution
2) Why do we have day and night?	Rotation	Revolution
3) Do stars move in the sky?	Yes	No
4) What is Earth's yearly journey around the Sun called?	Rotation	Revolution
5) Why do we see different stars at different times of the year?	Rotation	Revolution

Exit Cards

Cut Out

Cut out the exit cards below and have students complete them at the end of class.

Name: _____

Mark

Match each term to what it means.

Rotation ☐

☐ Earth moving around the Sun

☐

☐ Earth spinning in place

Name: _____

Mark

Match each term to what it means.

Rotation ☐

☐ Earth moving around the Sun

Revolution ☐

☐ Earth spinning in place

Name: _____

Mark

Match each term to what it means.

Rotation ☐

☐ Earth moving around the Sun

Revolution ☐

☐ Earth spinning in place

Name: _____

Mark

Match each term to what it means.

Rotation ☐

☐ Earth moving around the Sun

Revolution ☐

☐ Earth spinning in place

Experiment – Rotating Earth

Research Question

Why do we have day and night?

Why do we have a day with light and a night with no light?



Materials

What do we need for our experiment?

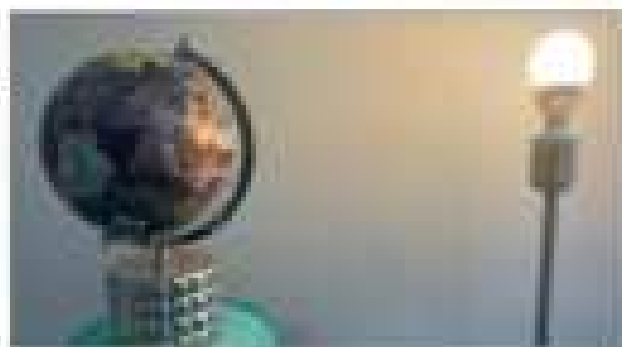
- 1) Globe
- 2) Lamp or flashlight
- 3) Dark room



Method

How do we complete the experiment?

- 1) Take the lamp shade off the lamp
- 2) Put the globe about 20 centimetres away from the lamp
- 3) Point the globe so that Canada is being lit up. Notice that the rest of the world are dark while Canada is light.
- 4) Spin the globe slowly. Notice if some parts are now a bit lit up and some places are now in the dark.
- 5) Keep spinning the globe until Canada is now in the dark. Which countries are now lit up?
- 6) Now switch the position of the lamp and the globe. Notice when you repeat the steps above that Canada is either further or closer to the Sun. This creates our seasons.





Observations

Answer the questions below

1) When it is light in Canada, which countries are in the dark?

1)	
2)	
3)	
4)	
5)	

2) When Canada is positioned so that it points closer to the Sun, which season is it?

Summer	Winter	Spring
--------	--------	--------

3) When Canada is positioned so that it points away from the Sun, which season is it?

Summer	Winter	Fall
--------	--------	------

4) Why do we have seasons? Describe the relative locations of the Sun and the Earth during each season.

Summer	
Fall	
Winter	
Spring	

Using Stars to Find Our Way

Using Stars for Navigation

For a long time, people have used stars to find their way.

This is called navigation. Before we had compasses or GPS, sailors would look at the stars to figure out where they were. The North Star was like their compass, always pointing them North.

Orion the Hunter

If you're in the Northern Hemisphere, you can use the Orion constellation to help find the North Star. Orion is easy to find because it has a pattern of stars that look like a belt. If you draw an imaginary line through Orion's belt, this line points to the North Star.

Polaris, the North Star

There is a special star in the sky that always points North. It's called Polaris, or the North Star. It's not the brightest star, but it has a special position. Where you are, if you can find Polaris, you can find North. This is because Polaris is located almost directly above the North Pole of the Earth.

Local Names for the North Star

Different cultures and people have given the North Star their own special names. In Canada, many Indigenous groups have their own unique names about this star.

For example, the Inuit people refer to the North Star as "Nigirtsuitug." It means "the one that never moves." It describes the North Star's special position in the sky, always in the north, unmoving.

The Cree people call the North Star "Atchegos Iskerew," which means "Star Woman." This name comes from a story about a woman who travelled to the sky and became a star.



Name: _____

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Starlight Connections
Book 1

Questions

Answer the questions below using evidence from the text.

1) How does the North Star help people find their way?

2) Do all of the people call the North Star the same name? Explain.

Draw

Draw the constellation Ursa Major



Multiple Choice

Circle the correct answer

1) Which hemisphere can Orion be seen in?	Northern	Southern
2) Which star can show us which direction is south?	Orion	Polaris
3) Is Polaris the brightest star in the sky?	Yes	No
4) Does the North Star move in the sky?	Yes	No
5) Which constellation is Polaris part of?	Ursa Major	Ursa Minor

Constellations

What are Constellations?

A **constellation** is a group of visible stars that we can see from Earth. A constellation forms a pattern that often takes the shape of an animal, mythological creature, a man, a woman, or an inanimate object like a compass, microscope, or crown.

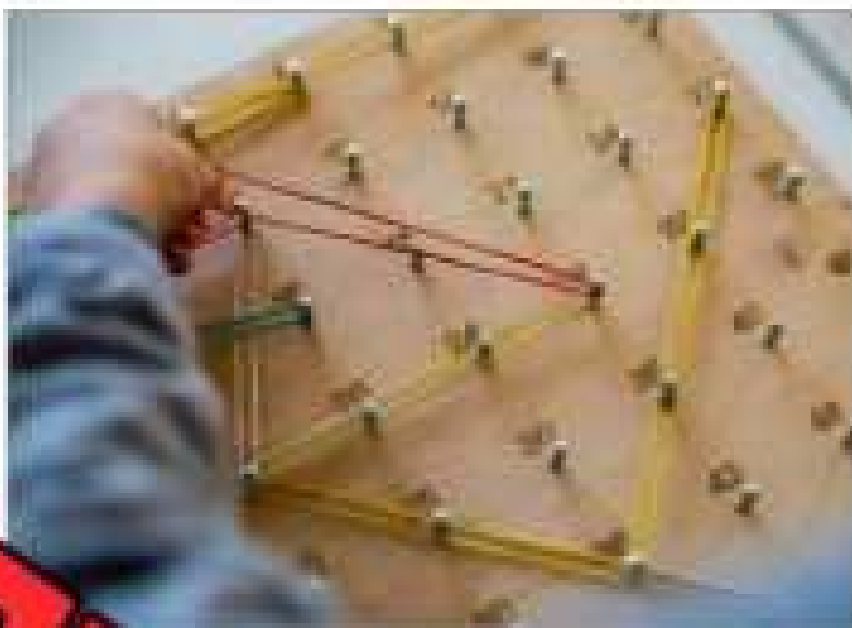
Research

Learn more about the major constellations. Draw a picture and write down interesting information you learned about the constellation.

Constellation	Drawing	Information
The Big Dipper		
The Little Dipper		
Orion		
Taurus		
Gemini		

Experiment – Geoboard Constellations

Use a geoboard to represent 4 constellations. You can research your own, or choose from the options provided. Once you created your geoboard constellation, draw it using dot paper.



Materials

- Paper with dot paper
- Geoboard
- Elastics
- Constellations

Procedure:

How you perform the experiment

- 1) Research or choose 4 constellations from the options provided to you
- 2) One at a time, represent a constellation using elastics on the geoboards. You likely won't be able to represent it perfectly, but do your best!
- 3) Draw each constellation on the dot paper before moving on to the next constellation



Hercules Constellation

Examples

Below are some examples of constellations you can use.

Draco Constellation

Ursinus Constellation

Serpens Constellation

Crus Constellation

Triangulum Constellation

Scorpius Constellation

Perseus Constellation

Pegasus Constellation

Orion Constellation

Experiment – Geoboard Constellations

Draw

Draw each constellation you decide to represent on your geoboard

Constellation Name	Drawing	How Many Stars

Constellation Name	Drawing	How Many Stars

Indigenous Constellation Story - Great Bear Hunt

Many Indigenous groups, including the Cree, Mikmaq, Haudenosaunee, and Haida share a story relating to the Big Dipper constellation.

The Great Bear Hunt

It is about a huge bear called Mista Muskwa, who roamed over the lands. All living things were afraid of him because it was big, mean and powerful.

One day, all the animals decided to meet and plan to get rid of the bear. If the best hunters were chosen, they could kill the bear.

The best hunters and animals were the Robin, Chickadee, Moose-bird, Blue Jay, Pigeon, Horned Owl and Screech Owl.

The ravens did not like the plan. They liked the bear because they followed it around and ate the bear's left-overs. So, the ravens told all Mista Muskwa about the plan to get rid of him.

Mista Muskwa was mad when he found out. He told his hunters to go and scare them. But, when the hunters were not afraid, the bear told them this is what bullies do when confronted.

As he left, the hunters attacked and left Mista Muskwa bleeding. Mista Muskwa shook off the blood, like a wet dog shakes off water. As he did, the blood landed on the earth and painted the leaves red. That is why the leaves change colours in the fall season.

As he shook, he also splattered a drop of blood on the Robin's chest. Now, all robins have a red chest. To remind us all about bullies, Mista Muskwa was placed in the sky along with seven birds.



Yes/No

Is the answer to the question yes or no?

1) Do constellations tell a story to the First People?	Yes	No
2) Was Mista Muskwa a nice and kind bear?	Yes	No
3) Did the ravens want to protect Mista Muska?	Yes	No
4) Were the hunters who stopped Mista Muskwa the biggest animals?	Yes	No
5) Does the Robin have a red chest?	Yes	No

Question Answer the questions below using evidence from the text

1) Summarize the Great Bear Hunt.

2) What lessons can be learned from the story?

Making Connections

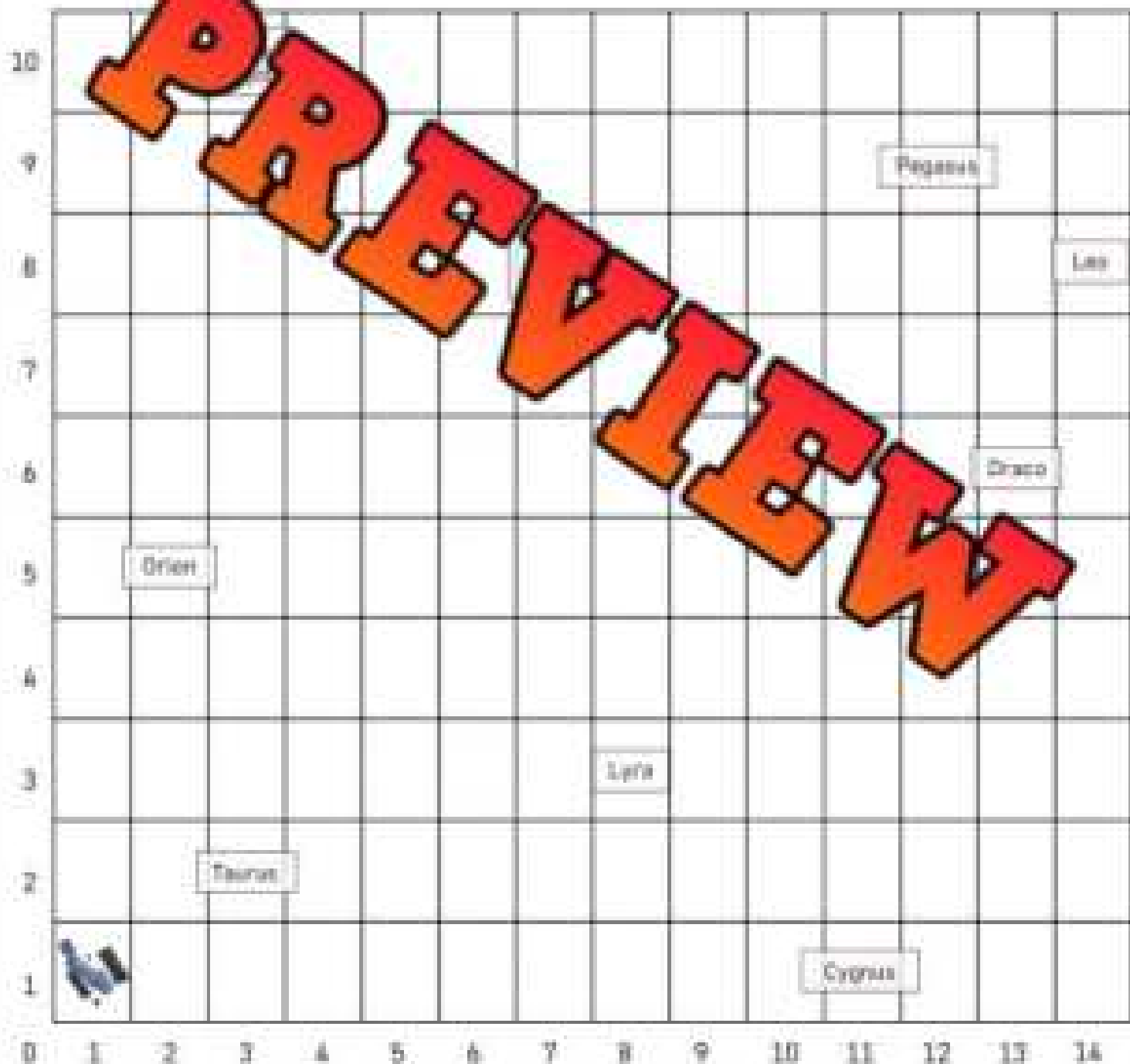
What does this story remind you of?

Coding - Hubble Telescope And Constellations

The map below shows where certain constellations can be found. The Hubble Telescope is controlled by humans on Earth, but we need to tell it where to look. Use the map to move the Hubble Telescope to where it needs to be pointed.

Mapping

Use this map to write the code on the next page



Coding

Write code that points the telescope at all constellations in alphabetical order. Have the telescopes take pictures of each constellation.

**Code****Question**

Why do you think the Hubble Telescopes gets better images of space than telescopes on Earth?

STEM Assignment - Designing a Space Telescope

Create your own telescope that can see deep into space.

What tools does your telescope need?

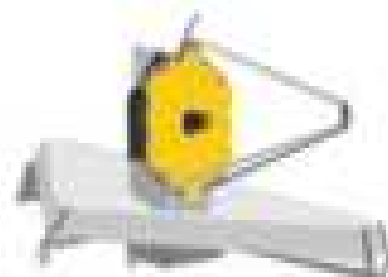
- Solar panels, lenses, engine so it can move, propeller, antenna to communicate with Earth, etc.

What is your telescope capable of doing?

- Can it see anywhere in space, or does it orbit?
- Can it move quickly?
- Can it see things that are hard to see?
- Can it see things that are not visible to the naked eye?

What was your telescope designed to do?

- Will it check for other planets?
- Will it look for planets that are habitable?



Questions

Answer the questions about your telescope below.

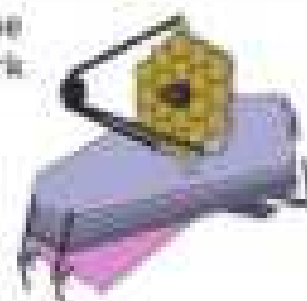
1) What is the name of your telescope?

2) What tools will your telescope have?

3) What is your telescope capable of doing?

4) What will your telescope be designed to do? What is the goal of using the telescope?

Write simple If/Then statements so that the controller of the telescope can send instructions for the telescope to follow. For example, to work a movement of the telescope, the code could look like this.



If the left arrow button is pressed

THEN turn left

IF/THEN Write code for each tool that your telescope has so that you can control the tools.

IF

IF

THEN

IF

THEN

IF

THEN

IF

THEN

IF

THEN

IF

THEN

Name: _____

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Super Simple Science
V.1.1

Draw

Draw your telescope. Make sure it has the tools you included in your plan.

PREVIEW

Name: _____

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Guided Reading
12.1

Your space telescope has just been launched. You are at the controls. What did you discover on your first three days? Write down your observations in your journal entries below.



Journal

Write your three journal entries below

Day 1 - Journal Entry

PREVIEW

Day 3 - Journal Entry

Measuring Time Using The Moon

The Moon: Our Ancient Calendar

Long before we had clocks or calendars, people kept track of time by looking at the Moon. The Moon has been used to measure time for thousands of years. Let's learn more about how this works!



Moon Phases

Have you ever noticed how the Moon looks different at different times? Sometimes it's full and round, and other times it's a thin crescent. These are what we call the Moon's "phases." The Moon goes through these phases every month, from a New Moon (when it looks like there's no Moon) to a Full Moon and back again.

Using the Moon to Measure Time

Because the Moon's phases repeat about every month, people began to measure time. This is where the word "month" comes from, which means "one month," which means the amount of time it takes for the Moon to go through all its phases. It takes about 29.5 days, but we round it up to 30 or 31 days for our calendars.

Lunar Calendars

Some cultures even created lunar calendars based on the Moon's cycles. For example, the Haida calendar uses the phases of the Moon to measure time. Each new month begins with the sighting of the New Moon.

The Moon's Impact Today

Even today, the Moon still helps us keep track of time. We divide the year into 12 months, which roughly lines up with the number of times the Moon orbits Earth in a year. The Moon's phases can also help farmers know the best time to plant crops.

Questions

Answer the questions below using evidence from the text.

1) Explain in your own words how the Moon was used to measure time.

2) Why is the "month" based on the Moon?

Questioning

Write 3 questions about the reading

1)	
2)	
3)	

Multiple Choice

Circle the correct answer

1) The word "month" comes from which word?	Moon	Moonth
2) How long does it take for the Moon to go through all phases?	29.5 days	31 days
3) What calendar uses the phases of the Moon to measure time?	Haida	Gregorian
4) How many months do we divide the year into?	10	12
5) Which of these is a phase of the moon?	Blue Moon	Crescent

Phases of the Moon

What are the Phases of the Moon?

Have you ever noticed that the shape of the moon changes? Some nights the moon is a full circle, while other nights it is a small sliver. Astronomers have figured out that we have 8 main phases of the moon, meaning we have 8 different shapes of the moon that we can see on any night.

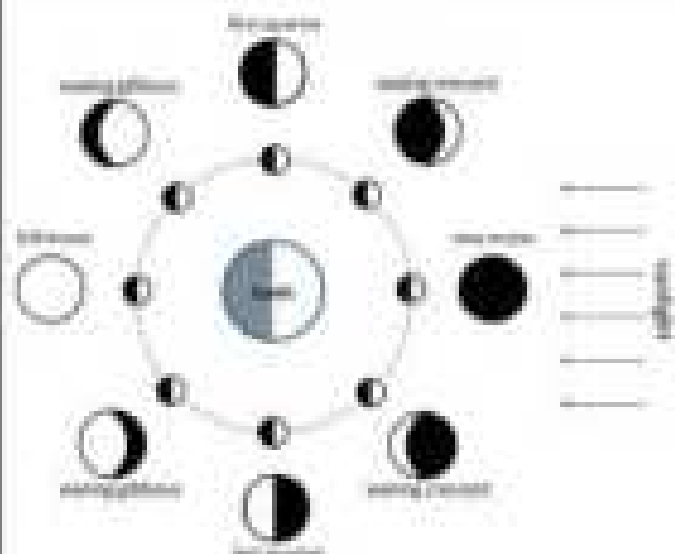


Why does the Moon change shape?

The Moon is shaped like a sphere, and it orbits the Earth. The Moon takes about 4 weeks to finish one orbit around the Earth. Orbit means to travel in a repeated path around the Earth. Since the orbit is repeated over and over again, we can predict exactly what phase of moon we will see in the future.

The moon will go through the 8

phases in the 4-week orbit. This is called the **lunar cycle**. We see a different shape because the Sun lights up different parts of the moon as it orbits around the Earth. A new moon can't be seen, while a full moon is completely visible on Earth. The Sun always lights up half of the moon, but what we see depends on where the Moon is in its orbit around the Earth.



Name: _____

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Mrs. J. A. Smith**Diagram**

Draw each of the phases of the moon

Waxing Crescent	First Quarter	Waxing Gibbous	Full Moon	Waning Gibbous	Last Quarter	Waning Crescent	New Moon

Questions

Answer the questions below using evidence from the text.

1) Why do we have different phases of the moon?

2) What is the lunar cycle? If we see a full moon how long will it take until the next full moon?

True or False

Circle whether the statement is true or false.

1. There are 9 phases of the moon	True	False
2. The lunar cycle is 28 days long	True	False
3. The Earth orbits around the moon	True	False
4. The sun always lights up half of the moon	True	False
5. We cannot see a new moon	True	False

Exit Cards

Cut Out

Cut out the exit cards below and have students complete them at the end of class.

Name: _____

Mark

Draw two phases of the Moon and label them.

Name: _____

Mark

Draw two phases of the Moon and label them.

Name: _____

Mark

Draw two phases of the Moon and label them.

Name: _____

Mark

Draw two phases of the Moon and label them.

Experiment – Moon Phases

Recreate the moon phases using Oreo cookies. Follow the instructions below to complete the activity.

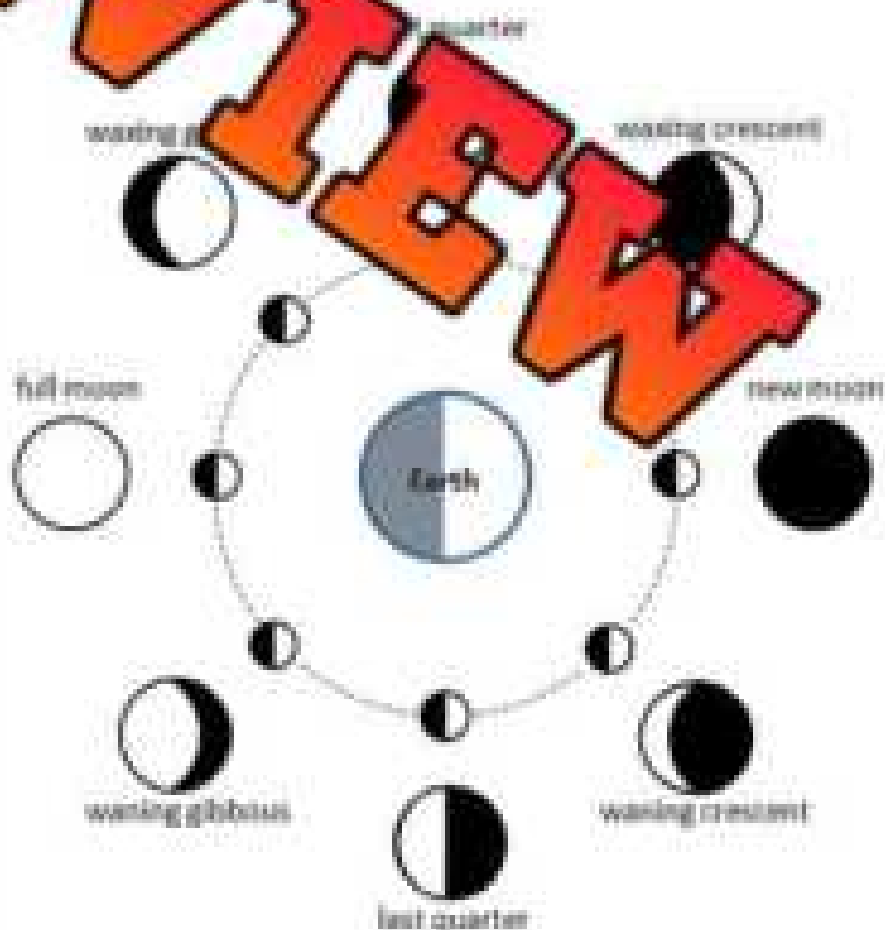
Materials What you need:

- 8 Oreo cookies
- Popsicle sticks
- A popsicle stick for scraping the icing off the cookies



Procedure How you do it:

- 1) Separate the cookie so that the icing is on one side of the cookie and not the other. Twisting the cookie a bit works to achieve this.
- 2) Use the popsicle stick to create each phase of the moon.
- 3) Glue the phase of the moon onto the paper plate. Make sure to put them in order.
- 4) Label the moon phases with their official name.



Results

Answer the questions below

1) Does the Moon emit light or reflect light?

2) Does the Moon move around the Earth or does the Earth move around the Moon?

3) Why do we see different phases of the moon?

4) Why are the phases of the moon different? How do astronomers know what moon phase we will have a month from now?

5) Go online and search "Moon Phase Calculator". Find out what moon phase we will have on your next birthday. Then find out the moon on your 30th birthday. What about your 60th birthday?

Date	Name of Moon	
Next Birthday		
30 th Birthday		
60 th Birthday		

Moon Calendar of Alberta's Indigenous Groups

Moon Calendar of Alberta's Indigenous Groups

Indigenous groups in Alberta, Canada have been looking at the Moon for thousands of years to understand the changing seasons and to keep track of time. This way of measuring time is often called a "lunar calendar". Let's learn how it works!



moon phases

What is a Lunar Calendar?

A lunar calendar is a type of calendar that's based on the Moon's cycles. Just

like how our calendar is based on the Sun, a lunar calendar is based on the Moon. Just like our calendar has "years", a lunar calendar has "moons".

How does the lunar calendar work?

In Alberta, many Indigenous groups used the lunar calendar. The Cree and Blackfoot used the lunar calendar. Each moon in the calendar represents what happens in nature during that time. Check out the examples below!

Blackfoot Moons:

- Cold Maker Moon (January): This moon marks the coldest time of the year.
- Snow Moon (February): This moon appears when the snow is deep.
- Rain Falling Moon (March): The moon of the first rain.
- Flowers Blooming Moon (May): This moon marks the beginning of spring.
- Long Days Moon (June): The moon of the longest days of the year.
- Black Cherries Moon (August): This is when chokecherries are ripe.

Cree Moons:

- Birch Moon (April): This moon comes when the birch sap starts flowing.
- Raspberry Moon (July): The moon when raspberries are ripe and ready to pick.
- Leaves Changing Colour Moon (September): The moon when leaves change colour.
- Flying Ducks Moon (October): This moon appears when ducks start their migration.
- Frost Moon (November): The moon when the first frost typically occurs.
- Freezing Moon (December): This moon presides over the coldest time of the year.

Questions

Answer the questions below using evidence from the text.

1) How do the moons throughout the year relate to the environment changing?

2) What moon is right now according to the Blackfoot/Cree Lunar Calendar? Explain what is happening in nature this month?

True or False

Is the statement true or false?

1) A lunar calendar is based on the 5 moon cycles.	True	False
2) A lunar calendar is based on months.	True	False
3) 'Cold Maker Moon' marks the coldest time.	True	False
4) 'Flowers Blooming Moon' indicates flower bloom.		False
5) 'Flying Ducks Moon' signifies ducks hibernating.		False

Visualizing

Draw what you were picturing while you were reading. Explain the picture.

Story - Little Bear and the Lunar Calendar**Draw**

Illustrate the story by adding pictures to the book.

Little Bear and the Lunar Calendar

Once upon a time, in the vast lands of Alberta, there lived a young Cree boy named Little Bear. Little Bear was curious and loved to learn about the world around him. His grandmother, a wise and respected elder in their community, often shared stories about the night sky. Little Bear loved these stories, but what he loved most were the moons that shone brightly above them.

In January, during the coldest winter, his grandmother pointed to the sky and said, "Look, Little Bear, it's the Frost Moon." Little Bear looked up and saw the full moon's bright glow against the snowy landscape. He learned that in this cold time, the frost could be so thick that the trees pop and crack.

When April arrived, the snow had begun to melt, and life was returning to the forest. One night, his grandmother pointed upwards again, "That's the 'Goose Moon.' It's a sign the geese are returning south." Little Bear had heard nothing of geese over the winter, so he was surprised when he had arrived.

By June, the days were long and warm. "See the 'Goose Moon,'" Little Bear's grandmother asked. Under the full moon, he could hear the faint peeping of baby birds in their nests. The moon was telling them that it was a time of birth and growth.

When August came, his grandmother said, "Now is the time of the 'Flying Up Moon.' Look at the young birds learning to fly." Little Bear watched as small birds fluttered awkwardly, trying out their new wings under the moonlit sky.

In September, the leaves started changing. His grandmother pointed to the 'Leaves Changing Color Moon.' "The moon is full, and the leaves are changing again, Little Bear. Winter is not far away now."

PREVIEW

December finally arrived, bringing with it the "Little Spirit Moon." His grandmother explained, "This is a time for us to be thankful for what we have and to think about the year that has passed."

Little Bear found comfort in the constant cycle of the moons. Each one brought changes to the world around him, but also, each one brought new learnings and experiences. The moons were his guide throughout the year, always reliable and enlightening.

Cree Story - Wesakechak

Once upon a time, long, long ago, in the days when the Earth was young, there was a Cree tribe living in the region now known as Alberta.

The tribe loved to tell stories, and their favorite story was about Wesakechak, the trickster god, and how he brought the Sun and the Moon into the sky.

According to the story, there was a time when the Earth was very dark. The people could not see, and they slept by one another. They asked Wesakechak for help.

Wesakechak was a mischievous god who loved to help people but also enjoyed a good joke. He decided to help the people and had a bright idea.

He traveled far away to the east, where he found a large glowing ember from a mighty fire. It was as bright and warm as the fire it came from. He took the ember and threw it high into the sky, where it stuck and became the Sun. It lit up the world and brought warmth to the people.

The people were happy but soon realized the Sun was too hot and not to be in the sky all the time. They could not rest, and it was too bright. Again, they asked Wesakechak for help.

Wesakechak then traveled to the west, where he found a beautiful pebble by a cool stream. He tossed the pebble into the sky where it stuck and became the Moon. The Moon was cooler and softer than the Sun, perfect for when the people needed to rest.

The people were finally happy. They had the Sun to warm and light their days, and the Moon to cool and softly light their nights. And that is how Wesakechak gave the Cree people the Sun and the Moon.

From then on, every time the Cree people saw the Sun rise and the Moon glow, they would remember Wesakechak and the great gifts he had given them.



True or False

Circle whether the statement is true or false.

1) Wesakechak was a Cree god.	True	False
2) Wesakechak found the Sun in the west.	True	False
3) The Sun came from a glowing ember.	True	False
4) The people were unhappy with the Sun.	True	False
5) The Sun and the Moon were both gifts from Wesakechak.	True	False

Questions Answer the questions below using evidence from the text.

1) Describe how the Sun was created according to the story.

2) What problem did the people face after the Sun was placed in the sky and how was it resolved?

Visualizing

Draw what you were picturing while you were reading. Explain the picture.

	_____

What is the Gregorian Calendar?

What is the Gregorian Calendar?

Did you know that there are many types of calendars? The one most of us use today is called the Gregorian Calendar. This is our international standard calendar.

How Does the Gregorian Calendar Work?

The Gregorian Calendar is based on the Earth's journey around the Sun. This journey is what makes about 365.25 days for the Earth to complete this journey. But, we can't have a quarter of a day on our calendar, can we?

What Are Years, Leap Years?

So, we say a year has 365 days, but what about that extra quarter day? Well, we save them. After 4 years, we have an extra day from those quarter days. We add this extra day to our calendar. This year with an extra day is called a leap year, and it has 366 days. This day is February 29th.

The complete list of leap years in the first half of the 21st century is therefore 2000, 2004, 2008, 2012, 2016, 2020, 2024, 2028, 2032, 2036, 2040, 2044, 2048, 2052, 2056, 2060, 2064, 2068, 2072, 2076, 2080, 2084, 2088, 2092, and 2096.

Using the Gregorian Calendar in Daily Life

Everyone around the world uses the Gregorian Calendar in daily life. It helps us know what day it is, when to celebrate holidays, and even when to start school. So, the next time you look at a calendar, remember that it's not just a bunch of squares and numbers. It's a tool that helps us keep track of our trip around the Sun!



True or False

Circle whether the statement is true or false.

1) Gregorian Calendar is our international standard.	True	False
2) The Earth's journey around the Sun is called a year.	True	False
3) The Earth takes 365.25 days to orbit the Sun.	True	False
4) A leap year has 367 days.	True	False
5) The Gregorian Calendar is based on the Moon's cycles.	True	False

Guess the answers to the questions below using evidence from the text

1) What is the _____ and how does it work?

2) Why do we need leap years?

Think

How many days are in each of the years below?

	Year	Days
1)	2024	
2)	2026	
3)	2028	
4)	2030	

	Year	Days
5)	2048	
6)	2064	
7)	2072	
8)	2099	

Comparing Calendars: Lunar vs Gregorian?

What is a Lunar Calendar?

A lunar calendar is a type of calendar based on the cycles of the moon. Here are some key points about lunar calendars:



What is the Gregorian Calendar?

The Gregorian calendar, also known as the international standard calendar, is based on the Earth's orbit around the sun. Here's what you need to know:

How are They Similar?

Both the lunar and Gregorian calendars are used to keep track of time. They both have cycles (months and years) and are based on repeating events involving celestial bodies.

How are They Different?

- **Based on Different Things:** The lunar calendar is based on the moon's cycles, while the Gregorian calendar is based on the Earth's orbit around the sun.
- **Length of Months:** In a lunar calendar, each month is about the length of the moon's cycle (approximately 29.5 days), matching the moon's cycle. In the Gregorian calendar, months can have 28, 30, or 31 days.
- **Starting the Year:** Lunar calendars often start the year based on a particular phase of the moon. The Gregorian calendar starts the year on January 1, no matter what the moon looks like.
- **Usage:** Lunar calendars are often used for cultural or religious reasons. The Gregorian calendar is used for everyday activities and schedules worldwide.

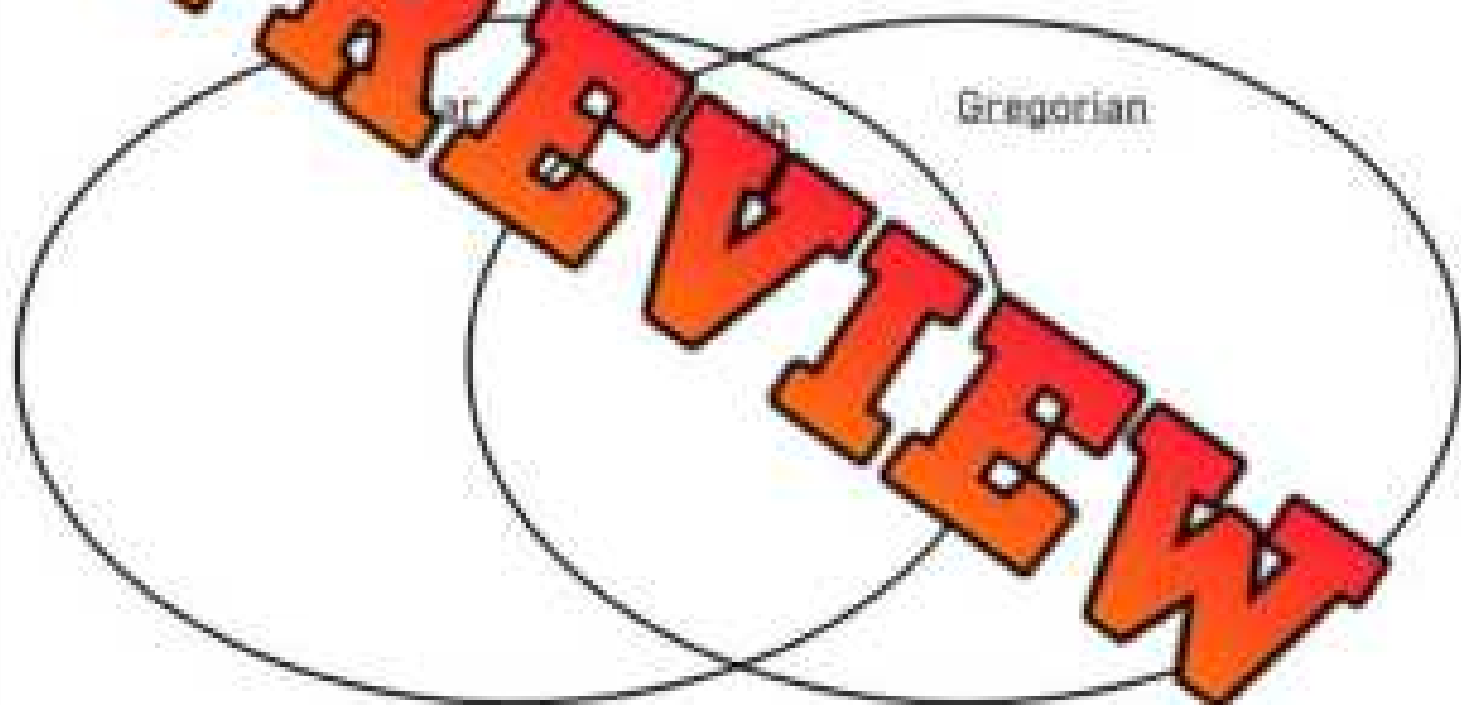


True or False

Circle whether the statement is true or false.

1) Lunar calendars are based on the sun.	True	False
2) Gregorian calendar has 10 months.	True	False
3) Both calendars have repeating cycles.	True	False
4) Gregorian calendar months vary in length.	True	False
5) The Gregorian calendar always starts the year on January 1.	True	False

Compare the Lunar Calendar and Gregorian Calendar



Question

Which calendar do you prefer? Explain.

Paper Gregorian Calendar Code Wheel

Objective

What are we learning about?

Through this offline coding activity, students will enhance their understanding of the Gregorian calendar, including the sequence and length of each month.

Materials

What do we need for our experiment?

- 1) Two circles of cardstock or thick paper
- 2) A brad or pushpin
- 3) Scissors or a craft knife
- 4) Scissors
- 5) Ruler
- 6) Pencil



Method

How do we complete the experiment?

- 1) Cut two circles from the cardstock paper. One circle should be larger than the other one. The larger one will represent the months of the year. The smaller one will represent the days in a month.
- 2) On the outer edge of the larger circle, write the names of the months. Divide the circle equally so that each month has its own section.
- 3) On the outer edge of the smaller circle, write the numbers 1 to 12. Divide the circle equally so that each number has its own section.
- 4) Put the smaller circle on top of the larger one, lining up the 1 on the smaller circle with January on the larger one.
- 5) Push the brad through the centers of both circles to hold them together. This will let you spin the circles around.
- 6) Now you have a "Gregorian Calendar" code wheel! You can spin the smaller circle to see how many days are in each month. Remember, some months have 30 days, some have 31, and February has 28 or 29.
- 7) As a coding activity, the teacher can give each student a date (e.g., "April 5" or "October 23"). The student will then have to spin their "Gregorian Calendar" code wheel to find the given date.

Name: _____

86

Student Connection
(2.1)

Results

Answer the questions below

1) Which months have 31 days?

2) Which months have 30 days?

3) How many days does February have? Why is it different?

4) Can you find your birthday on the code wheel? What about other dates like Halloween or New Year's Day?

Important Dates

Birthday: _____

New Year's Day: _____

Halloween: _____

Valentine's Day: _____

Easter: _____

Canada Day: _____

PREVIEW

Name: _____

Date: _____

Unit Test - Space

Multiple Choice

/10

1) Which planets are beside the Earth? a) Mars and Jupiter b) Mercury and Mars c) Venus and Mars d) Jupiter and Mars	2) Which is the largest? a) The Earth b) The Milky Way Galaxy c) Our Solar System d) The Universe
3) What do most people follow? a) Lunar b) Solar c) Gregorian d) None of the above	4) What is a Gregorian calendar based on? a) Sun b) Moon c) Earth d) Stars
5) What does Earth's rotation cause? a) Day and night b) Seasons c) Both d) None of the above	6) What is Earth's movement around the Sun called? a) Season b) Rotation c) Revolution d) Rotation
7) Which star always points to the North? a) Sirius b) Orion c) Polaris d) Vega	8) The Earth orbits the Sun in _____. a) 24 hours b) 12 hours c) 30 days d) 365 days
9) What does a Full Moon in the lunar calendar signify? a) New month b) End Month c) Mid Month d) New year	10) Which telescope is in space? a) Planetarium b) James Webb Telescope c) Gregorian Telescope d) Hubble Telescope

Definitions

What does each term mean? (1 mark each)

Term	Definition (what does it mean)
Universe	
Moon	
Constellation	

Short Answer

Answer the questions

Each question is worth 2 marks

1) What technologies can be used to study objects in space?

2) Why should we never look at the Sun?

3) Why can we see space objects only at night and not during the day?

Long Answer

Answer the long answer questions. Each question is 5 marks

1) What are the differences between the Gregorian Calendar and Lunar Calendar?

2) Describe the North Star. What is its proper name? What constellation is it part of? How far apart are the stars in the constellation? Why is the North Star important for travelers?



Workbook Preview



Grade 4 – Science Unit

Organizing Idea: Living Systems: Understandings of the living world, Earth, and space are deepened by investigating natural systems and their interactions.

Guiding Question: In what ways do the structures of organisms support survival?

	Learning Outcome - Students analyze organisms and relate external structures to functions.	Pages
LS.1	Organisms are living things that respond to stimuli and include plants, humans, and other animals.	6-11
LS.2	Organisms can be classified in various ways, including by appearance habitat structures	12-21, 23-33
LS.3	Preview of 90 pages from this product that contains 207 pages total. Functions of external structures in an organism include eating moving protecting sensing reproducing	47-49, 94
LS.4	Plants can detect sensory stimuli, such as light, gravity, temperature, and touch, which help them grow and survive.	95-111
LS.5	Sensory organs of animals include ears eyes nose tongue skin Sensory organs in animals help them meet their needs in various ways, such as by detecting food other animals danger temperature	112-138
Computer Science		
CS.1	Students examine and apply design processes to meet needs.	22, 44-46, 50, 131-133

NAME: _____

LIFE SYSTEMS

PREVIEW



Ecosystems – Organism, Species, Community

Ecosystems

An **organism** is a single plant or animal. Therefore, you are an organism.

A **population** is a group of organisms of the same species. Yes, you are a member of a species, and you are part of a population. Other examples of single organisms include a single daisy or a single oak tree.

Other examples of species include dogs, cats, birds, and fish. You are not a species. You are a type of animal.

A **community** is a group of different species living in the same area. This means that you live in a community with other humans and animals, like dogs and squirrels, as well as different plant species.

An **ecosystem** is the community of plants and animals living in an area and the non-living things there too. Ecosystems have the basic needs for the organisms that live there. The non-living things in ecosystems include water, air, and rocks.

For example, humans live in areas where food can grow and where water can be found. No humans live in Antarctica because the habitat in Antarctica does not give the basic needs humans need to survive.

COMPONENTS OF THE ECOSYSTEM

ORGANISM



POPULATION



COMMUNITY



ECOSYSTEM



Definitions

What do each of the terms below mean?

Organism	
Species	
Community	
Ecosystem	

Questions

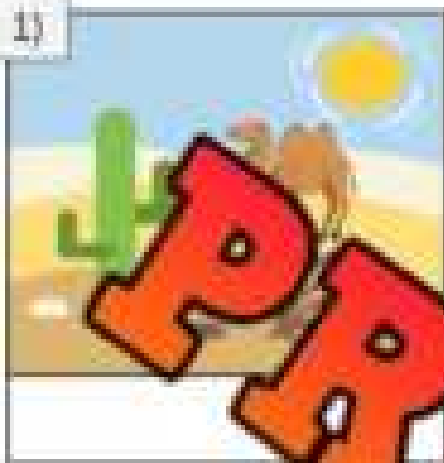
Answer the questions below using evidence from

1) What animal species live in the ecosystem around you?

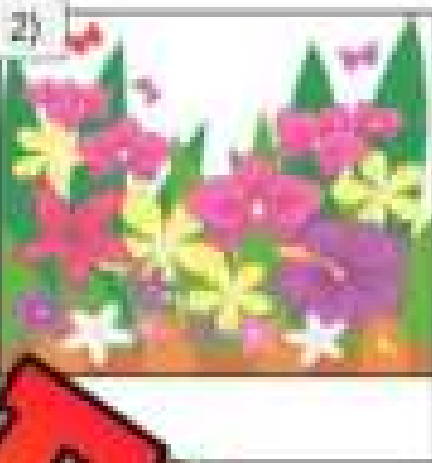
2) What kinds of non-living things can you find in your ecosystem?

Organism, Species, Community, Ecosystem**Label** Is the picture an example of an organism, species, community or ecosystem

1)



2)



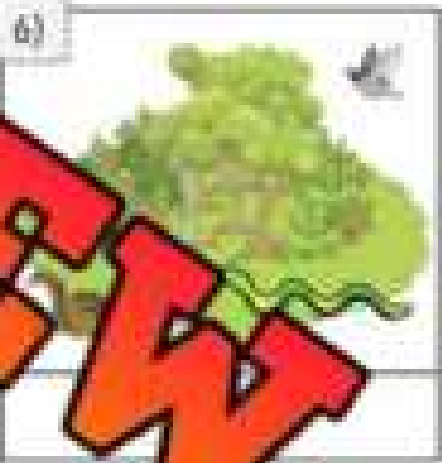
3)



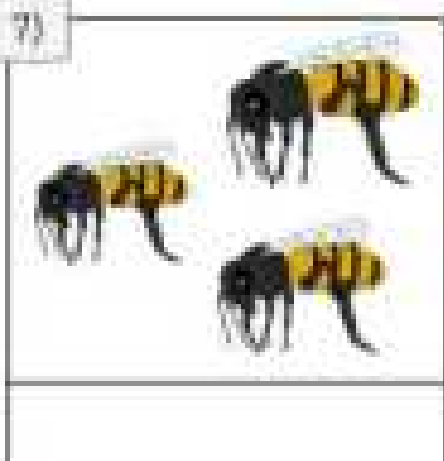
4)



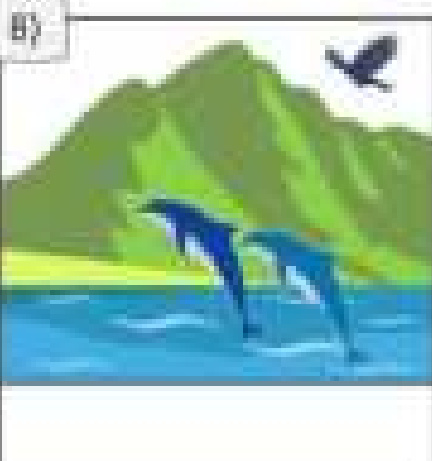
5)



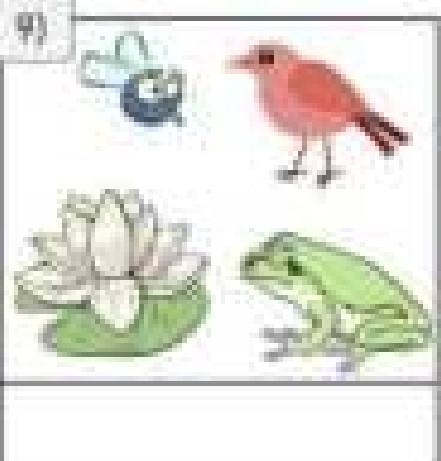
7)



8)



9)



Living Things In Your Area

**Animals**

What animals live in your area? Can you think of 20 you commonly see?

1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

11	
12	
13	
14	
15	
16	
17	
18	
19	
20	

Plants

Plants are living things too. What plants do you see?

1	
2	
3	
4	
5	



6	
7	
8	
9	
10	

Scavenger Hunt – Finding Common Plants

Directions:

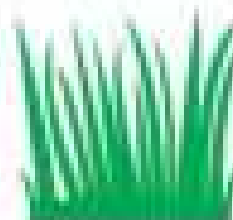
Look around your school yard for the common plants below.
Put a check if you find the plant.



Mushroom



Dandelion



Grass



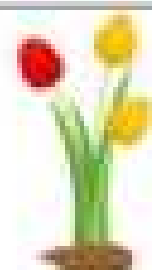
Daisy



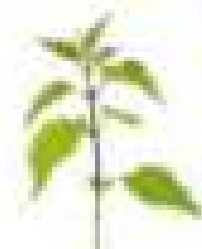
Clover



Buttercup



Tulip



Orchid



Thistle



Maple Tree



Yarrow



Ivy

PREVIEW

How We Sort Living Things

How We Sort or Classify Living Things

Have you ever wondered how we know a dog is a dog or a rose is a rose? It's because scientists classify, or sort, all living things, called organisms, into different groups. They do this by looking at their appearance, where they live (habitat), and their structures.

Classifying by Appearance

The way an organism looks, or its appearance, is one of the simplest ways to classify it.

- ❖ Animals with Feathers: Birds like sparrows, eagles, and penguins.
- ❖ Animals with Furry Skin: Mammals like cats, and bears.
- ❖ Plants with Flower: Plants like roses, and sunflowers.
- ❖ Plants with Needles: Plants like pine trees.



Classifying by Habitat

Where an organism lives, or its habitat, is another way to classify it.

- ❖ Jungle Creatures: Animals like monkeys and parrots. Plants like orchids.
- ❖ Desert Dwellers: Animals like camels, snakes, and lizards. Plants like cacti.
- ❖ Ocean Life: Animals like whales, dolphins, and sharks. Plants like seaweed.
- ❖ Mountain Movers: Animals like mountain goats, eagles, and snow leopards. Plants like evergreen trees and edelweiss.



Classifying by Structures

We can classify organisms by their special parts, or structures.

- ❖ Organisms with Wings: Animals like birds, bats, and butterflies.
- ❖ Organisms with Fins: Animals like fish, dolphins, and sharks.
- ❖ Organisms with Roots: Plants like trees, grasses, and flowers.
- ❖ Organisms with Antennae: Animals like insects, lobsters, and snails.

Draw

Draw organisms with the characteristics below. Use ones from the reading or think of your own.

Organisms with an Antennae

Desert Organisms

Organisms with an Antennae

Animals with

Plants with Roots

Animals with winds

Exit Cards

Cut Out Cut out the exit cards below and have students complete them at the end of class.

Name: _____

Classify the following living things.

1) Fish with fins are classified by?	Appearance
	Structures
2) Animals with fur are grouped by?	Appearance
	Structures
3) Animals with wings like bats are by?	Structures
	Habitat
4) Frogs living near ponds are by?	Structures
	Habitat
5) Plants with bright flowers are by?	Appearance
	Habitat

Name: _____

Classify the following living things.

1) Fish with fins are classified by?	Appearance
	Structures
2) Animals with fur are grouped by?	Appearance
	Structures
3) Animals with wings like bats are by?	Structures
	Habitat
4) Frogs living near ponds are by?	Structures
	Habitat
5) Plants with bright flowers are by?	Appearance
	Habitat

Name: _____

Classify the following living things.

1) Fish with fins are classified by?	Appearance
	Structures
2) Animals with fur are grouped by?	Appearance
	Structures
3) Animals with wings like bats are by?	Structures
	Habitat
4) Frogs living near ponds are by?	Structures
	Habitat
5) Plants with bright flowers are by?	Appearance
	Habitat

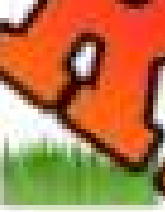
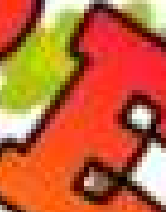
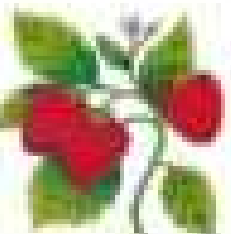
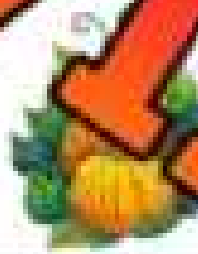
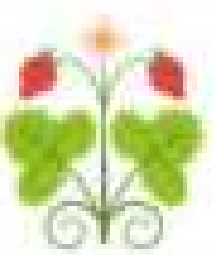
Name: _____

Classify the following living things.

1) Fish with fins are classified by?	Appearance
	Structures
2) Animals with fur are grouped by?	Appearance
	Structures
3) Animals with wings like bats are by?	Structures
	Habitat
4) Frogs living near ponds are by?	Structures
	Habitat
5) Plants with bright flowers are by?	Appearance
	Habitat

Sorting Common Plants**Directions**

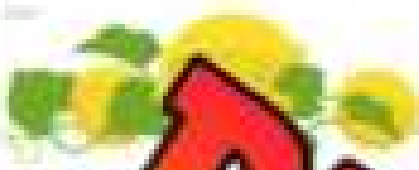
Circle the examples of the common plant types below

Shrubs	    
Trees	    
Creepers	    
Climbers	    
Herbs	     

Creeper or Climber

Directions

Circle the examples of the common plant types below



Creeper	Climber
Melon	



Creeper	Climber
Grapevine	



Creeper	Climber
Zucchini Plant	



Creeper	Climber
Passionflower Vine	



Creeper	Climber
Pumpkin	



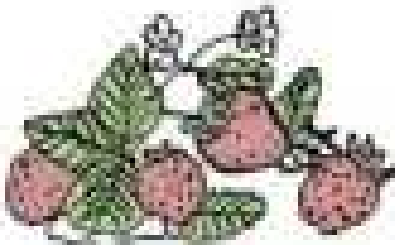
Creeper	Climber
Cucumber	



Creeper	Climber
Watermelon	



Creeper	Climber
Bitter Gourd	



Creeper	Climber
Strawberry	

Classifying Animals – Vertebrates and Invertebrates

Animal Kingdom – Vertebrates vs Invertebrates

We can split the animal kingdom into two groups: Vertebrates and Invertebrates. Vertebrate animals have a backbone, while invertebrate animals do not.



Grouping Animals – Vertebrates

Vertebrate animals include mammals, reptiles, birds, amphibians, and fish. Each of these animals have backbones.

What are Backbones?

A backbone is a series of bones that are joined together. We have a backbone that runs from the back of our head, down our neck and back, and into our hip. Humans have around 33 bones in our spines. These bones are called vertebrae.

Snakes are reptiles and they have backbones, too. A snake has way more bones than we have. Snakes have between 200 and 400 bones in their backbones!



True or False

Is the statement true or false?

1. Humans have more backbones than snakes	True	False
2. Snakes have between 200-400 bones	True	False
3. Mammals, fish, reptiles, birds, and amphibians all have backbones	True	False
4. Humans are not vertebrates	True	False

Explain

What is the difference between vertebrates and invertebrates?

Types of Animals - Mammals

Mammals

A mammal is a type of animal. We know if an animal is a mammal if it can:

- Breathe air
- Has a backbone
- Grows hair or fur
- Give birth to live young
- Drink from their mothers



Mammals are the most common animals on earth. We are mammals. You were born from your mother, not from an egg. We are warm-blooded, and have a backbone. Almost all humans have hair and we all have breasts. We could make us milk when we were babies.

Examples of Mammals

There are over 6,000 different types of mammals. Here is a list of some mammals: humans, gorillas, rats, mice, dogs, cats, whales, lions, tigers, bats, horses, and more!

Fill in the Blanks

Write the missing words in the blanks.

1. There are more than _____ types of mammals.
2. Mammals are the _____ animals on earth.
3. Mammals are born from their mothers, not from an _____.
4. Mammals are warm-blooded _____ animals.



Think

Write 3 things you learned about mammals.

1)	
2)	
3)	

Types of Animals – Reptiles

What are Reptiles?

Reptiles are vertebrate animals that share these things in common:

- Four legs (snakes do not, but use to)
- Most lay eggs but some have live young
- Are cold-blooded
- Have scales for skin, not fur or hair
- Breathe with their lungs
- Have dry skin



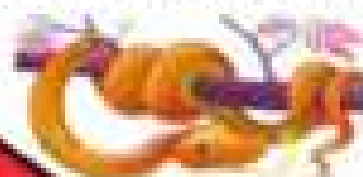
What Do Reptiles Hunt?

Most reptiles are **predators** and eat mostly insects. Larger reptiles like lizards and snakes will hunt birds and small mammals. Some snakes kill their prey with venom before they eat them.

When some reptiles are **predators** they will hide or camouflage themselves to look like their surroundings. Some reptiles can change the colour of their skin to hide from predators.

Examples of Reptiles

There are about 10,000 types of reptiles. Some examples are lizards, turtles, snakes, crocodiles and even dinosaurs.



Think

Write 3 things you learned about reptiles.

1)	
2)	
3)	

Multiple Choice

Circle the best answer

1. Do reptiles have dry or moist skin?	Dry	Moist
2. Reptiles are cold or warm blooded?	Cold	Warm
3. Reptiles eat mostly...	Mice	Insects
4. There are how many types of reptiles?	2,000	10,000
5. Which animal changes their colour?	Snakes	Chameleons

Types of Animals - Amphibians

What are Amphibians?

Amphibians are vertebrate animals that are born in the water. As amphibians get older, they will grow lungs that allow them to breathe outside of the water. This means that adult amphibians can live on land or in the water.

Amphibians are animals that have these things in common:

Cold-blooded	Lay eggs	Moist skin	Webbed feet
--------------	----------	------------	-------------

Amphibians are cold-blooded

Like most reptiles, amphibians are cold-blooded. Being cold-blooded means their bodies don't automatically change their temperature. They need to use their surroundings to cool off or warm up. Warm-blooded animals, like humans, can change their body temperature. This means our bodies change our temperature to keep it at a certain level. When we get too warm, we release water as sweat to cool our skin.

Examples of Amphibians

- Frogs, salamanders, newts, and toads

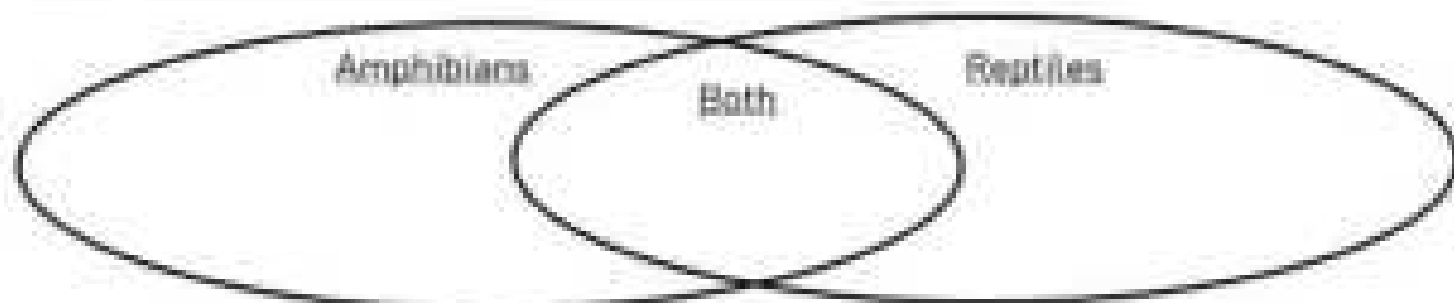
True or False

Is the statement true or false?

1) Amphibians are born on land	True	False
2) Amphibians are born with lungs	True	False
3) As amphibians get older, they can breathe outside of water	True	False
4) Snakes are amphibians	True	False

Compare

Compare reptiles with amphibians.



Types of Animals - Fish

What are Fish?

Fish are animals that live in the water. Fish come in many different shapes and sizes. All fish have these things in common:

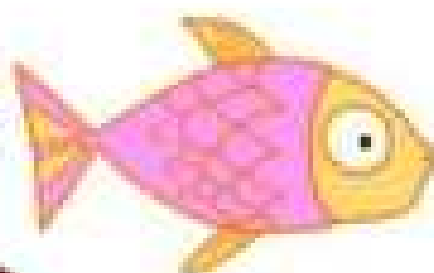
Cold-blooded	Vertebrates - have backbones	Have fins
Have scales, not fur	Breathe underwater using gills	Lay eggs

How Fish Breathe

All fish breathe. How do they breathe? How do they get oxygen? When we breathe, we use our lungs to breathe oxygen. Fish use their gills to do the same thing. Fish still need oxygen to live, but they get that oxygen from the water.

Fun Fish Facts

- The longest fish is the blue whale, which is over 40 feet long
- The smallest fish is the dwarf minnow, which is only 1 inch long
- Fish are great pets
- Whales can't swim backwards



Think

Write 3 things you learned about fish.

1)	
2)	
3)	

Visualizing

Draw what you were picturing while you were reading. Explain the picture.

Types of Animals - Birds

What are Birds?

Birds are very cool animals that are a lot different than other animals. There are over 9000 different types of birds. Birds have these things in common:

- ✓ Have feathers
- ✓ Warm-blooded
- ✓ Lay eggs
- ✓ Have wings but not all birds fly
- ✓ Vertebrates - have backbones

How Do Birds Fly?

Almost all birds can fly because they have wings. Birds flap their wings to change the air pressure around their wings. This gives them lift, just like an airplane.

The peregrine falcon is one of the fastest birds. It can fly at speeds of over 160km per hour! Some birds can fly very high.

Examples of Birds

- Parrots, penguins, hummingbirds, robins, crows, swallows, herons, woodpeckers, eagles, owls and geese.



Question

What do all birds have in common?

1)	
2)	
3)	
4)	
5)	

Multiple Choice

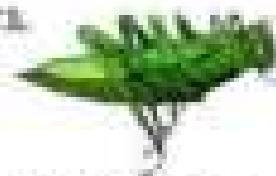
Circle the best answer.

1) Which bird cannot fly?	Toucan	Penguin
2) Which bird is one of the fastest?	Peregrine Falcon	Eagle
3) All birds have	Feathers	Scales
4) All birds have	Fins	Wings
5) Birds can fly because of changing	Air pressure	Weather

Types of Animals - Insects

Insects

Insects make up the largest group of animals in the world. There are over 1 million species of insects! Insects have no backbone. This means they are invertebrates. Insects have exoskeletons instead of backbones. Examples of insects are grasshoppers, dragonflies, and butterflies.



Exoskeleton

Insects do not have bones like we do. Instead, they have exoskeletons that protect their inside organs. The hard shell that keeps the insect's organs safe.

Insect Body

An insect has three main body parts: the head, thorax,

and abdomen. The head is the front part of the insect.

The head contains the brain, mouth, and eyes. Insects do not have ears.

Insects use their antennae to feel their way.

They use them to feel the temperature, and find friends. The thorax is the chest of an insect. It connects the head to the abdomen. The

abdomen is the back part of the insect. All insects have 6 legs. Some have 4 wings.



Multiple Choice

Circle the best answer.

1. An exoskeleton is...	Hard	Soft
2. An example of an insect is a...	Lizard	Dragonfly
3. The middle of an insect is the...	Abdomen	Thorax
4. How many legs does an insect have?	2	6
5. Insects are the largest or smallest type of animal?	Largest	Smallest

Draw

Draw a picture of an insect. Label its head, thorax, abdomen, wings, and legs.

Types of Animals - Spiders

What are Spiders?

Spiders are small animals that are like insects because they both have exoskeletons.

Spiders move differently than insects and have a different body. Read this list of things all spiders have in common:

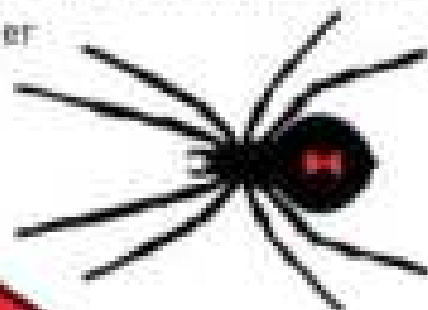
8 Legs	Cold-blooded	Lay eggs	Invertebrates - no backbone, just an exoskeleton
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Spider Webs and Spiders Hunt

A spider's web is what spiders make to trap their prey. Spiders mainly eat insects. When insects fly or crawl on the silk web, they get stuck and the spider eats them. Spiders spin silk to make webs. The strength of spider silk is stronger than steel when compared to the same amount of material.

Examples of Spiders

There are over 40,000 types of spiders, such as tarantulas, brown recluse spiders, and black widow.



True or False

Is the statement true or false?

1. Spiders have no backbone, just an exoskeleton	True	False
2. All spiders have 6 legs	True	False
3. Spiders are warm-blooded	True	False
4. A spider's silk is stronger than steel	True	False
5. Spiders have the same bodies as insects	True	False

Questioning

Write two questions you have after reading the text.

1)	
2)	

Types of Animals - Worms

What are Worms?

A worm is a long, creeping animal that has a soft body. There are over 2,700 types of worms. All worms have these things in common:



No arms, legs, or eyes	Cold-blooded	Lay eggs
Have holes in their skin that allow them to move	Have no lungs, but breathe through their skin	

Important

We can't live without worms! Worms break down organic matter to make our soil better. Organic matter is things like old food and even animal poo. We need worms to turn these things into rich, fertile soil. Without good soil, we can't grow food! That's why we need worms!

Interesting Facts about Worms

- Worms can eat their body weight in food each day.
- If a worm's skin dries out, it will die so they can't live in dry places.



True or False

Is the statement true or false?

1) There are over 5,000 types of worms.	True	False
2) Worms are not necessary for good soil.	True	False
3) Worms can eat twice their body weight in food each day.	True	False
4) Worms break down organic matter.	True	False
5) Worms are warm blooded organisms	True	False

Explain

Have you seen a worm before? Where and when did you see it? Explain.

Experiment - Vertebrates Vs Invertebrates

Research Question

What are we learning more about?

Can invertebrates or vertebrates support more weight?



Materials

What do we need for our activity?

- 1) Clay enough to make two animals
- 2) One pipe cleaner
- 3) Weights – wooden blocks will work



Method

How do we complete the experiment?

- 1) Make an animal like the one in the picture
 - i. Make 4 legs
 - ii. Make a body
 - iii. Attach the legs to the body
 - iv. Put a head on the body
- 2) Make another animal using the same steps as above
- 3) Put a pipe cleaner through the body to act as a backbone
- 4) Put one block on each animal and observe
- 5) Keep adding blocks until one of the animals collapses



Observations

How many blocks did each type of animal hold?



	Number of Blocks
Vertebrates	
Invertebrates	

**Results**

Answer the questions below

1) Which type of animal can hold more weight?

Invertebrates

2) Which type of animals do you think are usually bigger?

Vertebrates

Invertebrates

3) Why do you think the difference between vertebrates and invertebrates?

4) If an invertebrate animal gained a lot of weight, what do you think would happen?

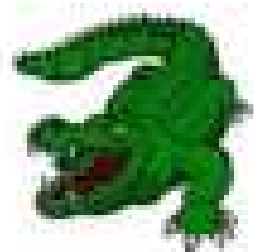
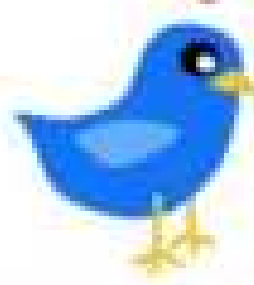
5) Write a list of animals that are invertebrates and vertebrates

Invertebrates

Vertebrates

Vertebrates or Invertebrates?**Backbone or Not?**

Circle whether the animal is a vertebrate or invertebrate

Vertebrate
Or
InvertebrateVertebrate
Or
InvertebrateVertebrate
Or
InvertebrateVertebrate
Or
InvertebrateVertebrate
Or
InvertebrateVertebrate
Or
InvertebrateVertebrate
Or
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Or
InvertebrateVertebrate
Or
InvertebrateVertebrate
Or
Invertebrate

Physical Characteristics of Animals

Word Search

Find the words from the word bank



☐ Animals	☐ Invertebrate	☐ Vertebrate	☐ Backbone	☐ Insects
☐ Mammals	☐ Reptiles	☐ Birds	☐ Worms	☐ Spiders

C J N R U W C M H T A Q M E F J Y T
 P P I S E C T S P I D E R S X E D
 S P Y N L Z L I M G N W V K K V
 I N V E A T E X G J H G J O W
 W O R M S P T J F G P A X B
 H A H J B A C B H V W T B L H I
 R E P T I L E S I Q N I M A L S R
 V E R T E B R A T E F M A L S D
 O E W G H K H V Q V Z A F X S
 Y A S I G J J U K K G U C A Z U

Word Scramble

Unscramble the words from the word bank

MMAAMLS		VBRETREATE	
AMINLAS		IECTNSS	
WROSM		BROIS	
RLPTEIES		ITREAENRTBYE	
BBOACKNE		SQIRPES	



Meeting Our Needs - Locomotion

Meeting our Needs

Locomotion means how people move from one place to another. Animals have body parts that allow them to move in a certain way. The number of legs an animal has affects how it moves.

1) Legs - moving using legs

Most animals have legs to move. Animals can have a different number of legs. Some have thousands of legs. Snails have no legs while some can have one thousand legs!



Humans are **bipedal** - walking on two legs. Penguins and humans are the only bipedal creatures that walk on two legs.

A **quadruped** animal walks on four legs. Most mammals and reptiles are quadruped. Some examples are deer, cows, lizards, lions, moose, cats, and dogs.



2) Limbleless - moving without legs using their bodies

Animals that are limbless have no legs. These animals use their bodies to move them around. They have skin that can move in waves back and forth. They use the waves to push them forward or backwards. Examples of limbless animals are snakes, slugs, snails, worms, and even seals!



3) Rolling - rotating the body over the land

Some animals will move their bodies into a loop. They do this so they can roll down a hill or let the wind roll them. Examples of animals that roll are hedgehogs, armadillos, and caterpillars.

True or False

Circle whether the statement is true or false.

1) A bipedal animal has 4 legs	True	False
2) A bear only has two legs	True	False
3) Snails have no legs	True	False
4) Hedgehogs will roll to move fast	True	False
5) Penguins are bipedal animals	True	False

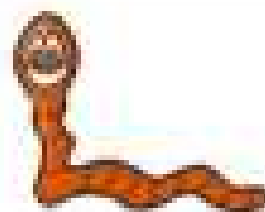
Making Connections

What does this reading remind you of in your life?

PREVIEW

Locomotion

Circle the locomotion.



Legs	Roll	Limbless
------	------	----------



Legs	Roll	Limbless
------	------	----------



Legs	Roll	Limbless
------	------	----------



Legs	Roll	Limbless
------	------	----------



Legs	Roll	Limbless
------	------	----------



Legs	Roll	Limbless
------	------	----------

Tracking Animals - Animal Tracks

Tracking Animals - Animal Tracks

Humans aren't the only ones who leave evidence of their actions as they move around. Just like we can analyze the footprints of humans, we can also track animals based on the animal tracks they leave in the ground. An animal track is an imprint left in the soil, snow, mud, or ground surface by an animal walking across it. Animals are tracked by hunters to track their prey and by naturalists to identify animals.



If the animal is a carnivore, the species of the animal can be determined based on the combination of features of the feet. Some features we can look for in an animal track are:

- **Width/length** - A fox print is much smaller than a bear print.
- **Number of Toes** - Bears have five toes, while foxes and deer have four.
- **Nails** - Canines tend to leave a nail print while felines don't since they can retract their nails.
- **Depth** - The heavier the animal, the deeper the print will be. A moose track will be deeper than a deer track.
- **Webbing** - Webbing is usually found on animals that swim a lot in the water.
- **Stride and Straddle** - The stride length can set animals apart. A stride is measured from the heel of one print to the heel of the next print on the same side. Straddle is the width of the steps taken. It is measured from the outside of the right track to the outside of the left track.



True or False

Is the statement true or false?

1. Hunters and naturalists track animals using their prints/tracks	True	False
2. A track is an impression left in the ground by an animal	True	False
3. Straddle is a measurement of the stride length of an animal	True	False
4. Tracks are left in snow, soil, mud, or other ground surface	True	False
5. A deer will leave a deeper impression in the ground than a moose	True	False

Visualizing _____ you were picturing while you were reading. Explain the picture.

Questions

Use information from the text to answer.

1) What is an animal track? Why are animal tracks evidence of animals?

2) How can hunters and naturalists figure out which animal left a track? What do they look for in the track?

Experiment – Animal Tracks

Research Question

How are animal tracks different from each other?

When animals walk, they create tracks in the ground that are unique to that animal community. We can track animals if we know their tracks/footprint.

Materials

What do we need?

- ✓ Parchment paper
- ✓ Toothpicks
- ✓ Animal tracks guide or your own research guide



Method

How do we complete the experiment?

- 1) Use the "Animal Tracks Guide" or take time to research the tracks of your favourite animals.
- 2) Draw the tracks on the back of this page.
- 3) Take a small piece of clay and roll it into a ball.
- 4) Flatten the ball into a cookie shape. Make one cookie for each track you want to make.
- 5) Place the flattened clay on a piece of parchment paper.
- 6) Use your finger and toothpick to create the animal tracks.
- 7) Set the tracks aside so they can dry.

Plan

Draw some animal prints you want to make

Research

Answer the questions below

1) Why is it helpful for scientists to be able to track animal tracks? How do they use them to understand a species' community?

2) Make a connection – What animal tracks do you see in your neighbourhood?

Adapting Species

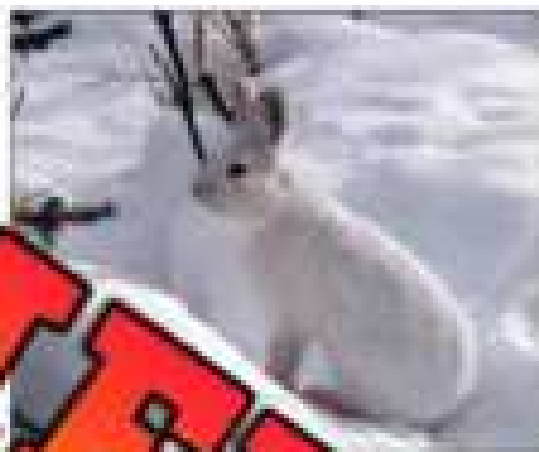
What Does Adapting Mean?

Plants and animals are designed to live and thrive in their habitat. They have **adapted**, which means their bodies have changed to allow them to survive in the conditions they live in.

Over time, species will change so they have characteristics that help them survive. Evolution is a theory that explains how animals adapt. Evolution is the process by which different species develop and change into more advanced versions that allow them to survive in the conditions they live in.

Charles Darwin

In 1859, Charles Darwin published his theory of evolution. He believed that evolution occurred through natural selection. **Natural selection** is the process where certain individuals of a species are better at surviving than others and will therefore, survive and have more children (reproduce).



When they have children, their children are like them. For example, rabbits live all over and have dark or white fur. In places where there is a lot of snow, it would be an advantage as the rabbits could hide from predators easily. Only the white rabbits surviving in places with heavy snowfall, more white-furred rabbits have babies and their babies will also have white fur. Eventually all the rabbits living in a cold place will have white fur as they are the ones who survive.

Survival of the Fittest

The phrase **survival of the fittest** refers to the animals who are best able to survive in their environment. The white-furred rabbits are the fittest bunnies for an environment that receives heavy snowfall.

The white-furred rabbit has adapted to its habitat. Its **adaptation** is its white fur.

True or False

Circle whether the statement is true or false

1. Adapting to an environment means animals change so they can survive	True	False
2. Not all plants and animals can survive in all environments	True	False
3. A white furred rabbit will survive best in desert environments	True	False
4. Charles Darwin came up with his theory of evolution in 1859	True	False
5. All animals of the same species are the same (all rabbits are the same)	True	False

Question Write your questions about your machine below

How do animals adapt to survive in their environment?

Instructions

Which beaks would be best for digging, cracking seeds or grabbing?

**Medium
Ground Finch****Warbler Finch****Tree Finch**

Adaptations of Young Animals

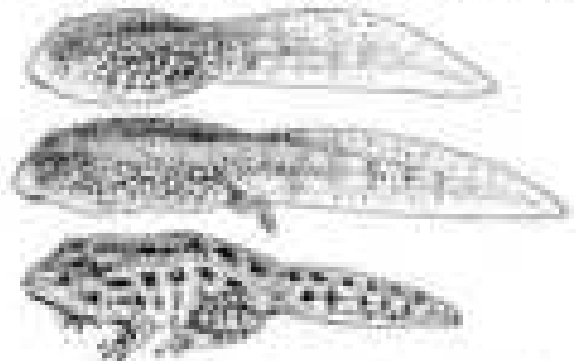
Animal Adaptations

While an animal grows during its life cycle, it needs to be able to survive in its environment. The good news is that animals have adapted to survive in their environment. **Adapted** means that their bodies have changed over time to make sure they can survive in the environment that they are in.

Example

Tadpoles

A tadpole has adaptations that allow it to survive in the water. It has a tail that allows it to swim. Tadpoles can grow their tails longer if there are a lot of predators near them. This allows them to swim faster and look bigger.



Tadpoles also have a body that is adapted to cut through the water. These adaptations have allowed tadpoles to survive in their aquatic environment.

Frogs

A frog adapts to its new life on land and in the water. If a frog lives on land and in the water, they will have very strong legs. They need strong legs to jump so they can escape predators or catch prey. Some frogs that swim a lot have webbed feet. This allows them to swim faster and longer. Frogs have adapted to be able to survive in both environments.



They have lungs that allow them to breathe through their skin. They cannot breathe underwater, but they can hold their breath for 4-7 hours!

Frogs have changed colour over time as well. Frogs that live near ponds are green with dark spots. Some frogs are brighter green, depending on the habitat they live in. This allows them to blend in with their surroundings.

True or False

Circle whether the statement is true or false.

1. An animal adaptation means the animal changed so it can survive.	True	False
2. Tadpoles are good at living in the water.	True	False
3. Frogs are better at living under water than on land.	True	False
4. Frogs need strong legs to jump on land.	True	False
5. A tadpole has a square body that makes it hard to cut through water.	True	False

Visualize _____ were picturing while you were reading. Explain the picture.

Questions

Use information from the text to support your answers.

1) Why is a tadpole good at living in the water? How can it change to live better?

2) Why are frogs good at living on land and in the water?

Terrestrial Habitat - Desert

Terrestrial Habitats

Desert habitats are areas of land that do not get much precipitation (rain or snow). Desert habitats are therefore **barren**, meaning they have little to no plants growing. Because of this, not many animals live in desert habitats as most animals need plants and water to survive.

The animals that can survive in the desert have adaptations that give them an advantage to surviving in desert conditions.



Hot and Cold Deserts

Since deserts receive very little precipitation, desert habitats are in cold climates as well as hot climates. The Arctic is a desert because it receives little snow.

Characteristics of a Hot Desert Habitat

Temperature	Hot all year long. Temperatures between 22 - 40° C
Precipitation	Very little rainfall, around 25 cm per year
Plant Life	Cactus, Tumblweed, Wildflowers, Mesquite, Saguaro
Animals	Bat, Quail, Armadillo, Coyotes, Camel, Snake
Adaptations	• Long roots go deep underground to get out water • Plants like cacti can store water in their stems • Animals like camels can store water in their bodies • Animals burrow underground to escape the heat

Characteristics of a Cold Desert Habitat

Temperature	Cool summers and freezing winters. Temperatures between 10 to -40° C
Precipitation	Very little rain or snow, around 20-40 cm per year
Plant Life	Pearlwort, Rice Grass, Sagebrush, Saltbush, Black Sage
Animals	Moles, Weasels, Arctic Fox, Penguins, Jerboas, Snow Leopard, Camels
Adaptations	• Plants can grow in dry soils that have a lot of salt in the soil • Plants grow in groups so they can stay warm and sheltered • Animals have thick furs that keep them warm and store water • Some animals like polar bears have antifreeze proteins in their blood keeping them warmer in freezing temperatures

Questions

Answer the questions below using evidence from the text.

1) What is a desert? Is a desert always hot?

2) What are plants made to survive in the desert? List 3.

Draw

Draw a desert habitat with organisms you found in your habitat.

Terrestrial Habitat - Grasslands

What are Grassland Habitats?

A **grassland habitat** is an area of land that is wide open, with mostly grasses and flowers and not many trees.

Grasslands do not get as much rain as forests, but they get more rain than deserts. This is why some low growing plants can survive, but very few tall trees can grow. Because there are no tall trees, there are no forests in grassland habitats.



Examples of Grassland Habitats

Grasslands are found between deserts and forests. They are located all over the world but have different names depending on where they are located.

- **Prairies** - In North America, grasslands are called prairies. In Canada, the prairie grasslands are located in Alberta, Saskatchewan, and Manitoba. The Prairies are great areas for farming because they are flat and have rich soil.
- **Steppes** - In Russia, Asia, and Ukraine, the steppe is a dry, open, and grassy habitat. They also have no trees and tend to have shallow soil.
- **Pampas** - The grasslands in South America are called Pampas. Pampas have flat lands with no trees and really tall grass, as tall as 3 metres!

Characteristics of Grassland Habitats

Temperature	Depending on the latitude and season, temperatures can range from -20°C to 30°C .
Precipitation	Average rainfall, with amounts ranging from 25 cm to 100 cm.
Plant Life	Various grasses including purple needlegrass, blue grama, buffalo grass, blue fescue, rather grass, and lemon grass.
Animals	Tiger, deer, lion, hyena, cheetah, zebra, bison, kangaroo, elephant
Adaptations	• Animals need speed because they can be seen from long distances • Camouflage because animals can be seen from long distances • Burrowing skills because animals cannot hide in trees • Plants need to be able to survive in windy conditions • Grasses have narrow leaves to minimize water loss

True or False

Circle whether the statement is true or false.

1) There are no grasslands in Canada	True	False
2) Grasslands are home to lions, tigers, and zebras	True	False
3) Lions live in the prairie grasslands in Canada	True	False
4) Prairie grasslands are good for farming	True	False
5) Pampas grass is very short	True	False

Questions Write questions you have after reading the information?

1)	
2)	

Questions

Use information from the text to answer the questions.

1) What is the climate (temperature and precipitation) like in the prairie grasslands?
2) What adaptations do animals in grasslands have that help them survive?

Exit Cards

Cut Out

Cut out the exit cards below and have students complete them at the end of class.

Name: _____

Mark

2 Truths and a Lie - Can you find the one that's not true?

	In Russia, Asia, and Ukraine, the steppe region is a dry and grassy habitat.
	The grasslands in South America are called the pampas. They also have no trees and tend to have short grasses.
	In North America, grasslands are called prairies. In Canada, they are located in Alberta, Saskatchewan, and Manitoba.

Name: _____

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Grassland Organisms And Their Parts

Grassland Animals

Grasslands are wide, open spaces filled with, you guessed it, grass! Even though this might seem like a simple environment, it takes some amazing adaptations to survive here.

Prairie Grass: The Root of Survival

Prairie grass is a common plant found in grasslands. Here's how it thrives:

- **Deep Roots:** Prairie grass has incredibly deep roots, some going down 5 meters into the soil. These roots help the grass reach water deep underground and survive fires because the roots are safe below ground.
- **Flexible Stems:** The stems of prairie grass are flexible and can bend in the wind, preventing them from breaking during the strong winds that often sweep across grasslands.

African Elephants: The Giants of the Grasslands
African Elephants are the largest animals on land and are often found in the grasslands. They have several adaptations that are built to survive:

- **Big Ears:** Elephants have large ears which they use to keep themselves cool in the hot sun.
- **Trunks:** An elephant's trunk is a wonderful tool. It can be used for grabbing food, drinking water, and even as a snorkel when swimming!
- **Tusks:** Their long tusks, which are actually overgrown teeth, help them to dig for water and strip bark from trees for food.

Prairie Dogs: The Underground Engineers

Prairie dogs are small, burrowing animals native to the grasslands of North America. Here's how they adapt:

- **Sharp Claws:** Prairie dogs have sharp claws that are perfect for digging. They live in underground burrows that provide protection from predators and harsh weather.
- **Alertness:** Prairie dogs are very alert and communicate with each other using a complex system of barks and chirps to warn about approaching danger.
- **Small Size:** Their small size helps them move quickly and escape from larger predators.



Draw

Draw the organism and label its parts that help it survive. Then explain why it can survive in its environment.

Prairie Grass

Prairie Dog

Basic Needs of Plants

What Do Plants Need To Survive?

Plants are very similar to us. They need certain things to live and grow. We call the things you must have, **survival needs**. Plants need 5 basic things: **light, water, air, space,** and **warmth**.

Light

Without light, plants will starve. Plants need light so they can make their own food through **photosynthesis**.



Water

Plants need water to survive. Water is found all around the plant.

Water moves from the roots of the plant up the stem, and into the leaves. The water carries nutrients from the soil all the way up throughout the plant.

Air

Plants need air to make food. Plants use air to take in the **carbon dioxide** through **photosynthesis**. They use the carbon dioxide in the air to make **sugars and starches** for the plant to eat.

Space

All plants need space to grow in order to survive. The leaves on branches need not grow without room. The roots also need space to grow. If plants are too close, the roots cannot grow enough, and the plant will not grow as big.

Warmth

Plants grow well in certain temperatures, depending on the plant.

Some plants can survive in colder temperatures, like cedar trees.

Others can survive in warmer temperatures like the desert. Either way, both need some heat in order to survive because if it gets too cold, the plant begins to shut down.



Questions

Use information from the text to support your answer.

1) What are the 5 basic survival needs for a plant?

2) Why do plants need space in order to survive?

Making Connections

How does this remind you of?

True or False

Circle whether the statement is true or false.

1. Light is needed for plants to create their own food	True	False
2. Plants can grow in any temperature	True	False
3. Cedar trees can survive in cold temperatures	True	False
4. Plants need space for their leaves and roots to grow	True	False
5. All plants need some heat	True	False

Exit Cards

Cut Out Cut out the exit cards below and have students complete them at the end of class.

Name: _____

Mark

What do the 5 basic needs do for plants?

Light	
Air	
Space	
Warmth	

Name: _____

Mark

What do the 5 basic needs do for plants?

Light	
Water	
Air	
Space	
Warmth	

Name: _____

Mark

What do the 5 basic needs do for plants?

Light	
Water	
Air	
Space	
Warmth	

Name: _____

Mark

What do the 5 basic needs do for plants?

Light	
Water	
Air	
Space	
Warmth	

Name: _____

76

Science, Literacy
Unit 1

Parts of a Plant

Diagram

Label the parts of the plant below and then colour the picture

Plants have 5 main parts that allow them to meet their basic needs. Each part needs to be working for the plant to grow and survive.

Word Bank

Stem

Roots

Flower

Leaf

Seeds



Parts of a Plant – Roots

What is the Root?

The root of a plant is the part that is underground. The bigger the plant, the bigger the root will be.



Roots Three Main Jobs

The roots of a plant are important for these reasons:

- 1) The roots bring water and nutrients up out of the soil for the plant to use
- 2) The roots hold the plant in the ground and keep it upright
- 3) The roots store food for the plant



Eating

Yes, we eat root vegetables. These plants grow underground.

Commonly eaten root vegetables are potatoes, carrots, ginger, garlic, potatoes, and beets.

True or False

Is the statement true or false?

1) A carrot is a root vegetable because it grows underground.	True	False
2) Strawberries are root vegetables that grow underground.	False	False
3) The larger the root, the larger the plant will be.	False	False
4) Roots bring water from the soil up to the plant.	True	False
5) A roots only job is to hold the plant upright.	True	False

Explain

What are the 3 main things that roots do for plants

1)	
2)	
3)	

Parts of a Plant - Stem

What is the Stem?

The stem of a plant is the part that comes out of the soil. A stem has **nodes** where branches grow. The stem between each node is called the **internode**.

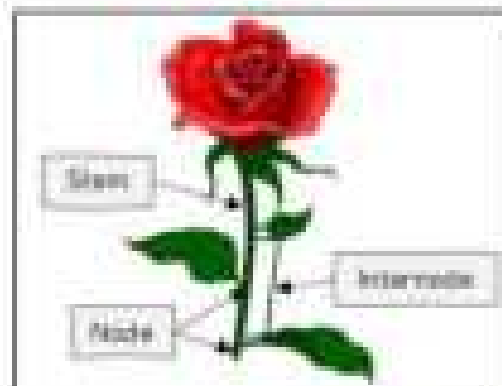
Stem - Main Jobs

The stem has **four** jobs. They are:

1. To hold the plant so it can be upright
2. Carry water and nutrients up and down to all parts of the plant
3. Store nutrients
4. Grow new parts so the plant can grow bigger

Eating Stems

Stems are edible. Many people like to eat stems. But, the most popular stems we eat are celery, asparagus, and rhubarb. Yum!



Question

Answer the question below.

Why is the stem important? List at least 3 jobs they do.

Visualizing

Draw what you were picturing while you were reading. Explain the picture.

Parts of a Plant - Leaves

What Are Leaves?

Leaves are an important part of the plant that hang off the stem and petioles of a plant. Leaves have little holes in them that allow water and air to come and go.

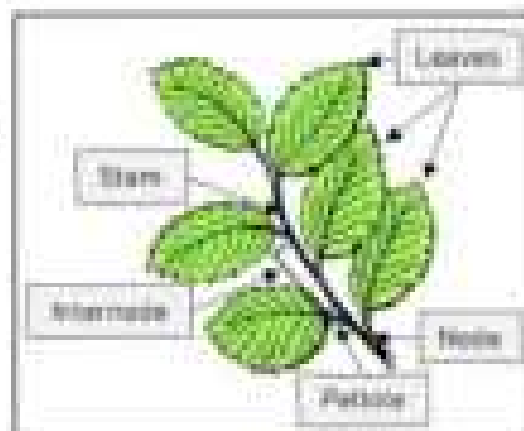
Main Jobs of Leaves

Leaves make food for the plant. They do so by:

1. Bring in sunlight because they are flat
2. Bring in water into the plant
3. Make food from sunlight and carbon dioxide through the process of photosynthesis

Eating Leaves

You should not eat leaves from a plant, but some are good for us. Spinach, mint, and lettuce are all examples of leaves that we can eat.



Word Search

Find the words!

Leaf	Stem	Node	Petiole
Internode	Light	Food	Water

M	G	N	W	V	K	K	V	X	G
J	H	G	J	O	P	W	P	U	Z
N	B	E	D	L	E	P	T	J	D
S	O	F	G	I	T	P	A	O	F
T	X	D	H	G	I	A	O	A	W
E	H	J	E	H	O	F	E	H	A
M	V	W	T	T	L	L	B	L	T
E	H	I	X	O	E	O	F	G	E
I	N	T	E	R	N	O	D	E	R
O	E	W	G	H	K	H	V	Q	V

Questions

1) How do leaves make food?

2) Can we eat leaves? Explain.

Parts of a Plant – Flower

What Are Flowers?

A flower is the part of the plant that makes seeds. Flowers have petals that are nice to look at. The flowers attract pollinators, like bees, bats, butterflies, and birds.

Main Jobs of Flowers

1. Make seeds
2. Attract bees, bats, butterflies and birds
3. Make fruit with seeds. Without seeds, we would have no new plants.



Eating Flowers

We do eat some flowers. Humans do eat hibiscus, dandelions, and lavender. In addition, we eat the fruits that flowers make. The most popular fruits eaten in Canada are bananas, apples, strawberries, oranges, and raspberries.

Fill in the blanks

What word is missing?

1. The flower is the part of the plant that makes _____.
2. Flowers have _____ that help attract _____.
3. Flowers make _____ with _____ in _____.
4. We eat some flowers, but not all are _____ to eat.

Questioning

Write two questions you have about flowers

1)

2)

Parts of a Plant - Seeds

What Are Seeds?

Seeds are little cases with a baby plant inside. In flowering plants, the flower produces the seeds that are later spread on the soil surrounding it. Seeds are important because plants grow from seeds. Without seeds, we wouldn't have plants in the first place!

There are 3 main parts of a seed:

- 1) Seed Coat - the hard case that protects the embryo inside
- 2) Embryo - the baby plant inside the seed coat
- 3) Stored Food - the food the embryo eats the stored food



Eating Seeds

When you eat a fruit, you are eating the seeds inside. For example, a watermelon has many seeds inside, which is why it is a fruit. You can eat these seeds with no problems. Other fruits have unflower seeds, sesame seeds, flaxseeds, pumpkin seeds, and chia seeds. These seeds are really good for you!

Multiple Choice

Circle the correct answer

1) Seeds are little cases with a baby what inside?	Flower	Plant
2) The seed coat protects the	Embryo	Seeds
3) The stored food is eaten by the	Embryo	Seeds
4) The embryo is a tiny	Plant	Seed
5) Seeds grow into _____ when planted in soil.	Animals	Plants

Questions

Answer the questions below

1) Why are seeds so important?

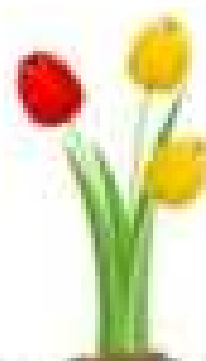
2) What is the important part inside a seed? What will happen to it if it is given food?

Investigating Plants

Directions

Find a plant and label its parts.

Draw the plant and label its parts

**Word Bank**

- 1) Stem
- 2) Petal
- 3) Leaf
- 5) Petiole
- 6) Flower
- 7) Roots
- 8) Fruit

Describe

Describe the plant's characteristics

all these
parts visible

Colour	
Size	
Shape of Leaves	
Shape of Flower	

Seed Plant – Life Cycle

Seeds vs Bulbs

All plants begin their life as seeds, however, some plants will live underground in the form of a bulb. A **bulb** is a plant that lives underground and has its leaves grow up through the surface. Garlic is an example of a bulb. All other forms of plants are seed plants.



Most plants live one or two seasons and most bulb plants are perennials, which live for more than 2 seasons. This is because they have different life cycles.

Life Cycle of a Seed

1. **Seed** – The plant will begin its life as a seed. The seed has a hard shell that protects the embryo inside.



2. **Germination** – The seed falls into the soil where it receives water and warmth from the air and the soil. This starts the process of germination, which is when a plant grows from a seed to a sprout. The seed will split in the soil and a sprout will form.



3. **Growth** – The plant will keep growing through the process of photosynthesis. The plant provides its own food and will grow if it receives its basic needs.



4. **Reproduction** – The flowers on a plant will produce seeds when they have been pollinated. In fruit producing plants, fruit will grow on the flowers at this stage.



5. **Spreading Seeds** – The seeds from the fruit or from the flowers will spread as animals eat them or as the wind blows them away. This begins the life cycle of a plant all over again!



Questions

Use information from the text to support your answer.

1) What is the difference between a bulb plant and a seed plant?

2) What does germination of a seed mean?

Ordering

Put the pictures in order from first to last - 1 to 5

**True or False**

Circle whether the statement is true or false

1) Germination is when the seed coat splits open	True	False
2) A seed plant will continue to grow year after year	True	False
3) A perennial plant is a plant that grows for more than 2 seasons	True	False
4) A plant will continue growing even if it doesn't have its basic needs met	True	False
5) Only the wind spreads seeds on the soil	True	False

Seed Plant – Describe and Draw

Explain

Describe each stage of a seed-plant's life cycle



Seed	
Germination	
Growth	
Reproduction	
Spreading Seeds	

Draw

Draw each stage of a seed-plant's life cycle

Seed	Germination	Growth	Reproduction	Spreading Seeds

Lab - Germinate Seeds on a Window**Research Question**

What are we trying to learn more about?

Will a seed germinate (sprout) without soil if it is given sunlight and water?

Hypothesis

What do you think will happen?

Materials

What do you need for this experiment?

- Small plastic zipper storage bag
- Dried, uncooked beans
- Paper towels
- Water

Procedure

What do you need to do?

1. Cut the paper towel in half and fold it a few times so it fits into the zipper storage bag.
2. Soak the paper towel in water and slide it into the bag. Squeeze out the extra water.
3. Put two beans or seeds about three centimeters from the bottom of the bag, on one side of the paper towel. Make sure they don't fall to the bottom of the bag or else they will sit in the water. You can roll up a piece of paper towel and put it on the bottom of the bag if the beans/seeds keep falling to the bottom.
4. Seal the bag part way, leaving an opening near the top so the growing plants can get some air.
5. Tape the bag to the window so that the beans are facing indoors, so you can watch them grow.
6. Optional - do the same experiment but put the plastic bag in a dark closet. See if this grows better or worse.



Name: _____

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Guided Inquiry Connections
1.2.3

Observations

Write how many days it has been and draw what the seed looks like

Day	What is happening to the seed?

Day	What is happening to the seed?

PREVIEW

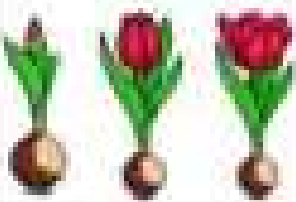
Bulb Plants – Life Cycle

Bulb Plants

A bulb plant lives through the winter inside the ground. A bulb will continue to grow year after year until it is harvested (pulled out of the ground). Bulb plants complete their life cycle underground.



Life Cycle of Bulb Plants – Stages

1) Dormant 	The bulb prepares for winter by forming roots in the ground. It gathers energy from the soil around it. The bulb is in the half-asleep state as they don't grow in size or shape above the ground. But, they do quietly work away at growing roots.
2) Waking Up 	As the temperature warms in the spring, the bulb begins to grow. You will see the shoot grow through the soil.
3) Bloom 	The bulb blooms after spending the winter and several months gathering energy. It has rested and gotten enough light, water, and warmth to bloom. This means it will turn into a plant that we can see above the ground.
4) Falling Asleep 	The bulb plant will fade into the ground as the temperatures get colder. The bulb is not dying! It is saving and gathering energy so it can grow again next year.

Matching

Write the letter from the description beside each stage



	Dormant	a) The bulb feels the warmer weather. It will grow a shoot.
	Waking Up	b) The bulb prepares for winter. It is half asleep as it doesn't grow.
	Bloom	c) The plant grows bigger. The flower will open up.
	Falling Asleep	d) The bulb feels the cold air and the shorter days.

Question

Answer in 1-2 sentences

1) Where does a bulb plant go to overwinter? _____

Underground _____

2) What is the difference between a bulb plant and a seed? _____

Visualizing

Draw what you were picturing while you were reading. Explain the picture

How Seeds Spread

How are Seeds Distributed?

When a plant grows into an adult plant, it is ready to make new plants. The plant produces seeds that are spread naturally in the environment. The wind and animals both spread seeds around so that plants can grow all over our environment.

How the Wind Spreads Seeds

Seeds that are very light. They can be carried long distances by the wind. Some plants have "winged" seeds that are shaped like helicopters. These seeds float easily to new places as they fall.



A samara is a winged seed. If these seeds fell straight down under a tree, they wouldn't have enough space to grow.



How Animals Spread Seeds

Animals spread seeds in a few different ways.

1. The most common way is when animals eat them. When the animal travels to a new area, they poop out these seeds. The seeds will germinate in the new area and grow there.
2. Animals can also spread seeds by collecting them and bringing them to new locations. This can happen accidentally when seeds have hooks on them that attach to animals. An animal might brush up against a plant and the seeds can attach to the animal who then brings it to a new place, where they fall off.
3. Squirrels have a special relationship with oak trees. Squirrels eat acorns, which contain the seed of an oak tree. They take acorns and bury them in different places all over. They do this so they can eat these acorns later. Quite often, they forget where they buried the acorns and they end up growing into oak trees.



Questions

Use information from the text to support your answer.

1) How are seeds spread throughout our environment?

2) Why do squirrels need each other?

What Squirrels Get

What Oak Trees Get

Questioning

Write two questions you have about the _____.

1)

2)

True or False

Circle whether the statement is true or false.

1) The acorns squirrels bury sometimes grow into oak trees

True

False

2) A samara is a winged seed that spins like a helicopter

True

False

3) Acorns under an oak tree often grow right beside the tree

True

False

4) Dandelion seeds are light and blow easily with the wind

True

False

5) Seeds are spread mostly by people

True

False

Plants Responding to Light

How Do Plants Respond To Light?

Plants need light in order to grow and stay alive. They will respond to light by growing towards light. This concept is known as phototropism.

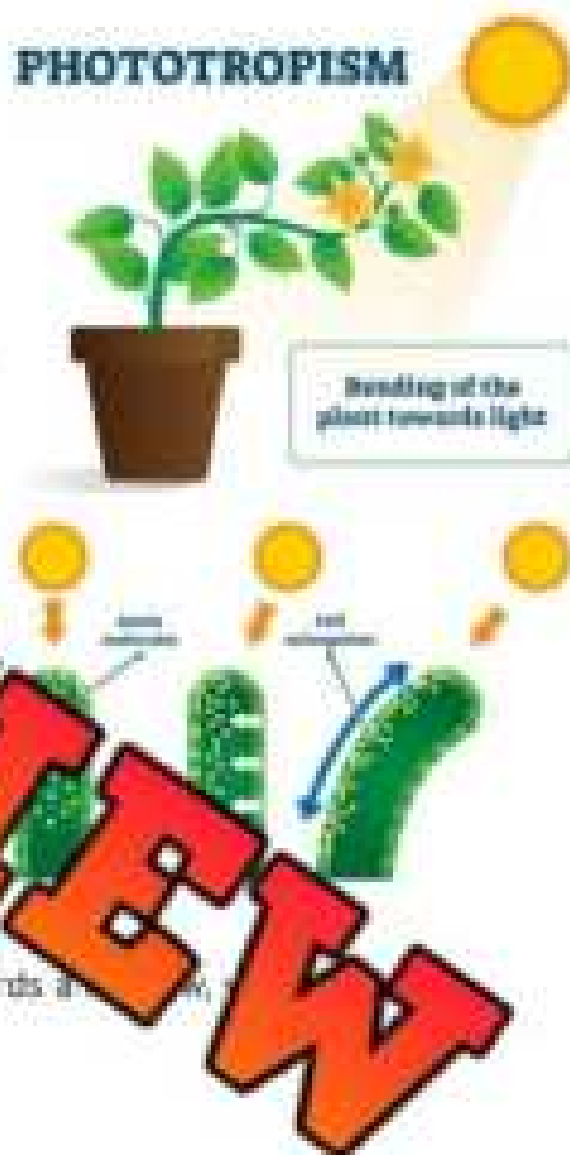
What is Phototropism?

Phototropism is when a plant grows towards light. Just like you need to look at something that interests you, plants have a way of knowing where light is, and they grow towards it. This helps them get the energy they need from the sun to survive.

The hormone auxin, is found on the shaded side of a plant. It makes the plant longer on that side, so it can stretch further. This causes the plant to bend towards the light.

So, the next time you see a plant growing towards a window, you'll know it's because of phototropism!

PHOTOTROPISM



Why Do Plants Grow Towards Light?

There are a few reasons why plants grow towards light:

- 1) **Photosynthesis:** Light is needed for the process of photosynthesis, where plants use energy from the sun to convert carbon dioxide and water into glucose (a type of sugar) and oxygen. This is how plants make their own food and energy.
- 2) **Survival:** By growing towards light, plants can maximize their chances of survival by getting as much energy from the sun as possible.

True or False

Is the statement true or false?

1) Plants tend to grow away from light	True	False
2) On the shaded side of plants, you will find the auxin hormone	True	False
3) Auxin causes plants to stretch and get longer	True	False
4) Plants will bend and grow towards light	True	False
5) Plants need light as water is more important	True	False

Visual

What were you picturing while you were reading? Explain the picture

Questions

Answer the questions below using your notes

1) What is phototropism? Why does it happen?

2) If plants didn't grow towards light, would they grow as well?

Activity – Plants Responds to Light

Objective

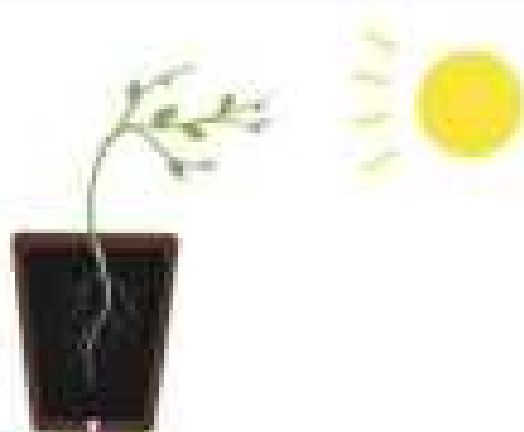
What are we learning more about?

To understand how plants respond to light and understand the concept of phototropism.

Materials

What do we need?

- ✓ Potted plant
- ✓ Cardboard box
- ✓ Scissors
- ✓ Tape



Method

How do we complete the experiment?

- 1) Cut a small hole (around 2 inches in diameter) on one side of the cardboard box.
- 2) Place the potted plant inside the box and tape the box shut, leaving the hole open.
- 3) Place the box near a window where it will receive sunlight. The sunlight should only be able to enter the hole on the side of the box.
- 4) Observe the plant every day for one week. Make sure to keep watering the plant as you normally would.



Activity – Plants Responds to Light**Observations**

What changes have happened to the plant each day

Time	Description of the Plant
Day 1	
Day 2	
Day 3	
Day 4	
Day 5	

Results

What happened? Describe the changes to the plant

Plants Responding to Water

Responding to Water

Just like we need water to stay hydrated and healthy, plants also need water to grow and thrive! But did you know plants have special ways to interact with water? They can even move and change depending on where water is.

1) Hydrotropism: Following the Water Trail

Imagine how you stretch your arm to reach a glass of water from across the room.

Well, plants do something similar through a process called hydrotropism!

In areas where water is hard to find, like deserts, cacti have developed an amazing ability. Their roots grow downward to find water sources hidden deep in the ground. This is how they find the water they need to survive in the hot sun.

But it's not just deserts that have plants that use hydrotropism.

Willow trees near rivers also send their roots towards the water. This way, they're always sure to get a drink!

2) Transpiration: The Plant's Water Cycle

Plants need to drink, but did you know they also sweat? They lose water through a process called transpiration.

During transpiration, plants suck up water from the soil through their roots. The water then travels up the stem and reaches the leaves. Here, it evaporates from tiny openings called stomata, cooling down the plant.

3) Germination: The Birth of a New Plant

Have you ever noticed that seeds need water to start growing? This is called germination. When a seed soaks up water, it begins to sprout and starts the growth of a new plant. Think about a bean seed you might plant in a cup at school. Once it gets water, it starts to grow roots and then a tiny stem. This is the start of a new bean plant, all thanks to water!



True or False

Is the statement true or false?

1) Willow trees have roots that grow towards water, like a river	True	False
2) Cacti don't need water, so they do not respond to it	True	False
3) Some plants have roots that grow towards water	True	False
4) When you water a seed, it will germinate and sprout	True	False
5) Water can enter plants through transpiration	True	False

Visualizing _____ you were picturing while you were reading. Explain the picture.

Questions

Answer the questions below using _____ from _____ text.

1) How do plants respond to water?

2) How does a willow tree growing near a river respond to water?

How Plants Respond to Temperature

How Plants Respond to Temperature

Imagine if you wore a heavy winter jacket on a hot summer day! You'd feel uncomfortable, wouldn't you? Just like us, plants too respond to temperature. They have a way of knowing whether it's hot or cold and they change their behaviour accordingly.

A Warm Plant: Responding to the Heat

When the temperature is high, plants have to adjust to survive. Here's how they do it:

- **Transpiration:** Plants cool their leaves to cool down, like how we sweat when it's hot! Cacti, however, lose water very slowly to save water.
- **Growing Slowly:** Some plants grow very slowly to save energy. Bermuda grass is one such plant. It stays low to the ground during summers.
- **Shrinking Leaves:** Some plants, like the desert mesquite, shrink their leaves to reduce water loss when it's hot.

Bundling Up: Plants in the Cold

When the temperature drops, plants have their own ways to keep warm.

- **Going Dormant:** Many trees, like oak and maple, drop their leaves and go into a "sleep" mode during winter. This is called dormancy.
- **Growing Hairs:** Some plants grow extra 'hairs' on their leaves to keep warm, like the 'woolly' leaves of the Lamb's Ear plant.
- **Huddling Together:** Snow tussock grass in cold places like New Zealand grows in bunches to help protect itself from the cold wind.

TRANSPIRATION



True or False

Is the statement true or false?

1) Transpiration is like plant sweat.	True	False
2) Bermuda grass grows fast in the heat.	True	False
3) Plants can sleep, which is called going dormant.	True	False
4) All trees go dormant in the winter.	True	False
5) Cacti release water quickly when it's hot.	True	False

Visualize _____ you were picturing while you were reading. Explain the picture.

Questions

Answer the questions below using _____ from _____.

1) How do plants respond to rising temperatures? Give two examples.

2) What happens to many trees like oak and maple when the temperature drops, and why?

Experiment - How Plants Respond

Research Question

What do plants need to survive?

How do plants respond to light, water, and temperature?



Materials

What do we need for our experiment?

- 1) 6 small cups to plant seeds
- 2) Soil
- 3) Water
- 4) Seeds
- 5) Shredded paper
- 6) Seeds - Broccoli, cauliflower and cauliflower germinate the fastest



Method

How do we conduct our experiment?

- 1) Fill 5 cups with soil
- 2) In the 6th cup, do not add soil. Instead, add shredded paper
- 3) Add your seeds to the soil, about 2 cm (1 inch) deep (about 1/2 of the seed)
- 4) In one of the cups with soil, add a lot of seeds (about 1/2 cup)
- 5) Place one cup in a closet, where it won't get sun
- 6) Place another cup in the fridge, where it is cold
- 7) Place four cups in a window where it will get the most sun. One of the cups should be the one with a lot of seeds and one should be the shredded paper.
- 8) Water each of the cups two times a day. Do not water one of the two cups that are in the window (you should water the one cup with a lot of seeds)
- 9) Monitor the results by checking the cups each day

Hypothesis

In which cup will the seed(s) grow the fastest?

Cup 1 In the Closet	Cup 2 In the Fridge	Cup 3 A lot of Seeds	Cup 4 Window with Water	Cup 5 Window no Water	Cup 6 Shredded Paper

Experiment – Basic Needs of Plants

Observations

Have any of the seeds sprouted? Put a (S) or an (X)



Day	Cup 1	Cup 2	Cup 3	Cup 4	Cup 5	Cup 6
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
15						
20						

PREVIEW

Results

Explain what happened after the 20 days for each cup.
Explain why the cup either grew a plant or did not.



Cup 1
In the Closet

In the Fridge

Cup 3
A lot of Seeds

Cup 4
Window with
Water

Cup 5
Window no Water

Cup 6
Shredded Paper

PREVIEW

Animal Senses

Animal Senses: The Amazing World of Sensory Organs

Animals use their ears, eyes, noses, tongues, and skin to experience the world around them. Every animal, including humans have different abilities for sensing the world. That is why some animals can see or hear better than others.

Ears: The Sound Catchers

Let's start with ears, which animals use to hear sounds. Ears pick up sound waves and send signals to the brain, which interprets them as different sounds. Dogs, for instance, have excellent hearing and can hear things far away that humans can't hear at all!

Eyes: The Sight Pro

Next are eyes, which let animals see the world around them. Some animals, like owls, have fantastic eyesight and can see in the dark. Meanwhile, rabbits have eyes on the sides of their heads to watch for danger in all directions.



Nose: The Smell Detectors

A nose helps animals smell. This is really important for many animals. For example, a bear has such a good sense of smell that it can find food miles away! Dogs use their noses to recognize their friends and find their way home.

Tongue: The Taste Explorers

The tongue helps animals taste. Taste buds on the tongue let animals know if something is sweet, salty, sour, or bitter. Cats, for example, have fewer taste buds than humans, which is why they don't like sweet food.



Skin: The Touch Sensors

Finally, skin helps animals feel things through touch. Some animals, like dolphins, have very sensitive skin and can feel the smallest changes in water temperature. Even snakes, which don't have skin like ours, can feel vibrations through the ground with their bellies.

True or False

Is the statement true or false?

1) Dogs have poor hearing.	True	False
2) Owls have excellent eyesight.	True	False
3) Rabbits have eyes on the front of their heads.	True	False
4) A bear can smell food from miles away.	True	False
5) Cats like sweet foods.	True	False

Visual _____ were picturing while you were reading. Explain the picture.

Explain

Write 3 things you learned about animals.

1)	
2)	
3)	

Super Hearing Animals

Super Hearing Animals

1. Dogs

Dogs have large, floppy ears that can move in the direction of sounds. They have more ear muscles than humans, which allow them to turn their ears in a pinwheel dish to focus on sounds.



2. Cats

Cats also have ears that turn towards sounds. The shape of a cat's ear funnels sound into the ear canal, helping them to hear. They also have a large amount of tiny hair cells in their ears which are highly sensitive to sound vibrations.



3. Bats

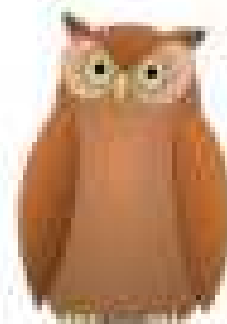
Bats have large ears compared to their body size which helps them capture sound. They use these sounds to make maps of their surroundings. This is called echolocation.

4. Dolphins

Dolphins have small ear openings on the sides of their heads, but their main hearing organ is inside their heads. They receive sounds through their lower jaw which conducts the sound vibrations to their inner ear.

5. Owls

Owls have asymmetrical ears. One ear is higher than the other, which helps them locate sounds in multiple dimensions. The feathers around an owl's face also help direct sound into their ears.



Explain

How does each animal hear better than humans?

Dog	_____ _____
Cat	_____ _____
Dolphin	_____ _____
Bat	_____ _____

True or False

Circle whether the statement is true or false.

1) Bats use echolocation to navigate their surroundings.	True	False
2) Dolphins hear best through their ear openings on their heads.	True	False
3) Owls have ears at the same height.	True	False
4) Dogs can rotate their ears to focus on different sounds.	True	False
5) Cats have tiny hair cells in their ears for hearing.	True	False

Think

Which animal's hearing would you want to have? Explain.

_____ _____ _____ _____

Many animals can hear better than humans because of the position and size of their ears. Choose an animal to draw and make changes to their ears and body that will help them be able to hear better.

Examples include:

- | | |
|------------------------------|-------------------------|
| 1) Bigger ears | 4) Ears on top of head |
| 2) More ears | 5) Ears that fold |
| 3) Ears at different heights | 6) Echolocation ability |



Draw

an animal with super hearing. Explain the animal's hearing below

PREVIEW

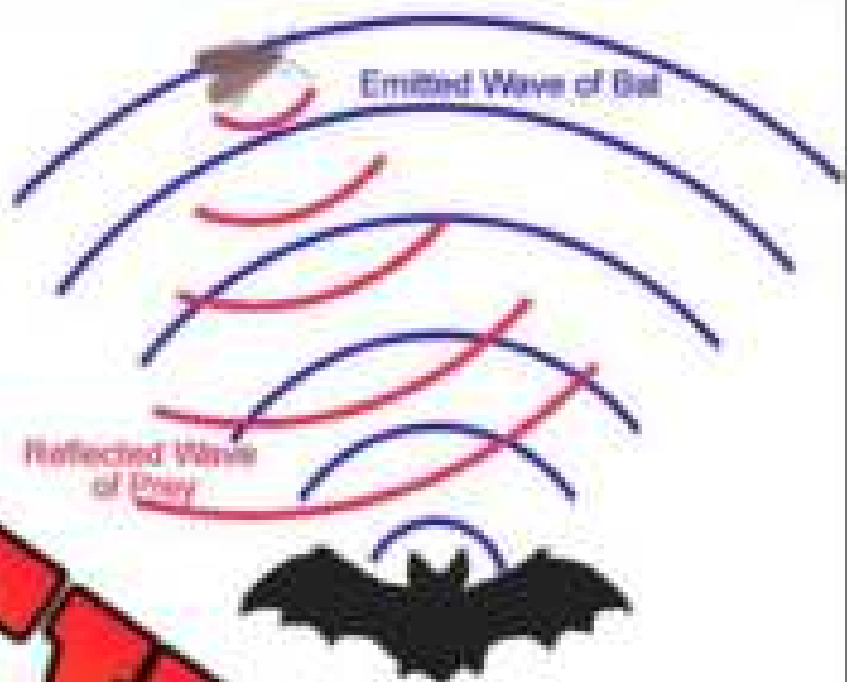
Echolocation

What is Echolocation?

Echolocation is how animals emit calls out to the environment and listen to the echoes of those calls when they bounce off various objects nearby.

Animals use echolocation to tell them where they are, help them navigate, and tell them how far away an object is. They can tell how far away from an object by measuring how long it takes for the sound they emit to return.

The relative intensity of the sound is used to tell them where their surroundings are. This means if they make a loud sound, if a quiet sound returns to them, then the object is further away. Echolocation allows animals to see without vision.



What Animals Use Echolocation?

The most notable animal that uses echolocation are bats. Other animals like toothed whales and dolphins also use echolocation. It is mainly used by birds and more specifically, cave dwelling birds.

Humans also use echolocation, but we need machines to do it as our ears and brains cannot process the calculations. When humans use echolocation, we call it **sonar**. Sonar devices are often used on boats to detect fish, structures, and anything under the boat. Sonar is used to detect things that have fallen to the bottom of oceans, such as aircrafts and sunken ships.



Questions

Answer the questions below using evidence from the text

1) What is echolocation? Why is it used?

2) What animals use echolocation?

Draw

Draw a picture of an animal that uses echolocation to navigate

Wordsearch

Find the words from the word bank

Word Bank

Echo

Location

Reflect

Sound

Waves

Sonar

Bats

Dolphins

N	W	V	D	O	L	P	H	I	N	S	K	K	V	X	G	J
L	O	C	A	T	I	O	N	H	G	S	J	O	W	P	U	B
Z	B	E	D	P	T	J	S	F	G	O	P	A	X	H	A	A
H	J	H	V	W	T	B	E	L	E	N	H	E	I	X	Q	T
Q	F	G	O	E	W	G	V	H	K	A	H	C	V	O	V	S
S	O	U	N	D	E	I	A	O	T	R	X	H	L	Y	F	A
R	E	P	L	E	C	T	W	X	Y	A	S	O	I	G	J	J

Infrared Sensing

What is Infrared Sensing?

Infrared radiation is a type of electromagnetic radiation with longer wavelengths and lower frequencies than visible light. Infrared radiation is emitted by all objects. Infrared radiation is all around us, and we are constantly exposed to it. It is emitted by the sun, fire, light bulbs, ovens, heaters, and our own bodies.

Infrared sensing is the ability to detect infrared radiation. Some animals have infrared vision, which means they can see the infrared radiation coming off objects. This helps them see what is moving as they can see energy waves flowing off moving objects. Humans cannot see infrared radiation, but some other animals can.

Animals That Use Infrared

Mosquitos

Mosquitos and other blood-sucking insects like bees use their infrared vision to find their food. Mosquitos use their infrared vision to feed themselves. They use infrared sensing to see the body heat we emit in the form of infrared radiation. Since most mosquitos are nocturnal, they need to UV light to see at night.

Mosquitos have two "pit organs" on the sides of their head. These are infrared sensors, meaning they can sense the radiation we give off.

Vampire Bats

A vampire bat uses infrared sensors on their lips to locate blood vessels in their prey. Vampire bats are the only mammals to feed only on blood. Therefore, they need to be able to find blood in the blood vessels of their prey.

They are nocturnal animals, needing to see at night. They use their infrared sensors to see the carbon dioxide moving through the blood vessels. They often sneak up on sleeping cows, goats, or birds to suck the blood from their prey.



True or False

Is the statement true or false?

1) For nocturnal animals, infrared sensing isn't important	True	False
2) Many blood-sucking insects have infrared sensing	True	False
3) The pit organs that mosquitoes have help them see infrared radiation	True	False
4) Humans can see infrared radiation everywhere	True	False
5) Infrared radiation only comes off really hot objects	True	False

Visualize _____ you were picturing while you were reading. Explain the picture:

Questions

Answer the questions below using evidence from the video.

1) Why do nocturnal animals benefit from infrared sensing?

2) How do vampire bats use infrared sensing? Why do they need it?

Magnetoreception

What is Magnetoreception?

Magnetoreception is the ability of some animals to sense and respond to the Earth's magnetic field. Imagine the Earth is like a big magnet, and it has north and south poles, just like a bar magnet you might have played with when you were a kid. Some animals, like birds, sea turtles, and fish, have special parts in their bodies that can sense which direction the magnetic field is pointing. They use this information to help them navigate and find their way around.



It's like having a compass in your body that helps you find your way, even when you can't see the sun or stars. Pretty cool, right?

Animals That Use Magnetoreception

- ☐ Birds use magnetoreception to navigate during migration, allowing them to fly in the correct direction even when they can't see the sun or stars. They also use it to find food and suitable breeding grounds.
- ☐ Sea turtles use magnetoreception to navigate the ocean and find their way back to the beach where they were born.
- ☐ Fish use magnetoreception to navigate rivers and streams, and to find their way back to their home waters.
- ☐ Migratory insects, such as butterflies and beetles, use magnetoreception to navigate over long distances.
- ☐ Some mammals, like bats, use magnetoreception in combination with echolocation to navigate their environment.



True or False

Is the statement true or false?

1) Humans have magnetoreception	True	False
2) An animal with magnetoreception has a compass inside them.	True	False
3) Magnetoreception is when animals use the magnetic field for directions	True	False
4) All animals use magnetoreception	True	False
5) Fish use magnetoreception to find their way back home	True	False

Visualize Draw a picture of what you were picturing while you were reading. Explain the picture.

	_____

Questions

Answer the questions below using a short, direct answer.

1) What is magnetoreception?

2) How do animals use magnetoreception?

Writing Code Activity – Animals Responding

Objective

What are we learning more about?

Understand how animals respond to different situations (danger, food, or temperature) and represent these responses using offline coding.

Materials

What do we need?

- ✓ A large sheet of paper or poster board
- ✓ Coloured markers
- ✓ Small animal cutouts or pictures (optional)
- ✓ Small cutouts of danger, food, and temperature symbols (can be drawn on paper and cut out)



Method

How do we complete this activity?

- 1) **Introduction to Coding:** Explain to students that coding is a way of giving instructions to a computer. When we code, we write specific commands. For this activity, we'll be doing 'offline coding', which means we won't be using a computer.
- 2) **Identify the Variables:** Explain that animals respond to different conditions. For example, they might respond to danger, food, or temperature in different ways. Use a different colour for each condition - a lion for danger, an apple for food, and a sun or snowflake for temperature.
- 3) **Create a Coding Legend:** Decide on simple 'code' commands for the animal movements. For example, an arrow pointing up could mean 'move forward', an arrow pointing right could mean 'turn right', and so on. Draw these commands in a 'Legend' on the side of the paper.
- 4) **Set the Scene:** Place or draw the animal at one side of the grid. Randomly place the danger, food, and temperature symbols on different squares of the grid.
- 5) **Coding the Animal's Path:** The aim is to 'code' a path for the animal to react to the symbols and reach the other side of the grid. For example, when the animal encounters a 'food' symbol, it might 'move forward' to eat. When it encounters a 'danger' symbol, it could 'turn right' to escape.

Method

How do we complete the experiment?

- 6) **Writing the Code:** In a column next to the grid, write down the 'code' for the animal's path, using the commands from your legend. Each time the animal moves or turns, a new command is written down.
- 7) **Test the Code:** Once the 'code' is complete, follow the instructions from the beginning, moving the animal according to the coded commands. Did the animal react appropriately to the danger, food, and temperature symbols?

Plan

I will complete the coding activity

1) What animal will you use in your activity?

2) What variables will you use in your activity? Examples include a lion for danger, an apple for food, and a sun/snowflake for temperature.

3) How will you code your way through the grid? Write or draw the commands you will use. Examples include an arrow pointing up could mean "move forward" and an arrow pointing right could mean "turn right".

Coding Grid

Draw the variables and animals on the grid below. Then write the code.

**Code****Legend**

Name: _____

Date: _____

Units Test – Living Systems

Multiple Choice

/10

1) Vertebrate animals have...	2) Birds...
a) No backbone	a) Have fur
b) A backbone	b) Lay eggs
c) 2 legs	c) Are cold-blooded
d) More than 4 legs	d) None of the above
3) Animals on 2 legs are...	4) A frog is part of which animal group?
a) Quadrupedal	a) Amphibian
b) Bipedal	b) Insect
c) Unipedal	c) Reptile
d) Tripedal	d) Mammal
5) Which animal uses echolocation?	6) When plants grow thick roots, they are responding to...
a) Bears	a) Touch
b) Lions	b) Light
c) Dolphins	c) Gravity
d) Rats	d) Growth
7) A plant responds to heat by doing what?	8) When a plant grows back after being cut, it is called...
a) Phototropism	a) Reproduction
b) Transpiration	b) Perennials
c) Photosynthesis	c) Spreading Seeds
d) Gravitropism	d) Germination
9) A group of organisms that have similar characteristics is called a...	10) An individual living thing is called a...
a) Species	a) Species
b) Organism	b) Organism
c) Population	c) Population
d) Community	d) Community

Definitions

What does each term mean? (1 mark each)

Term	Definition (what does it mean)
Organism	
Vertebrate	
Desert Plant	

Short Answer

Answer these questions

Each question is worth 2 marks

1) List 3 similarities/differences between a snake and a reptile.

2) What organisms live in the desert? How can they survive there?

3) What body parts do carnivore animals have? How do they help them survive?

1) How do plants respond to light and water? Give examples and explain why they respond that way.

PREVIEW

2) Do all animals have the same sensory organs? How do animals sense the world differently? Give examples of animals with different senses.

PREVIEW



Workbook Preview



Grade 4 – Science Unit

Organizing Idea: Energy Understandings of the physical world are deepened by investigating matter and energy.

Guiding Question: How can forces affect objects from a distance?

	Learning Outcome – Students investigate how forces can act on objects without contact.	Pages
NCF.1	Non-contact forces occur between objects that are not in direct contact.	7-13, 23-37, 59, 65-66, 70-72, 75-76
NCF.2	Gravity on Earth is a non-contact force that pulls objects toward the ground.	14-22
NCF.3	Preview of 70 pages from this product that contains 124 pages total.	D, 50
NCF.4		54
NCF.5	Magnetic force is strongest at the magnetic poles. Magnets have two magnetic poles, known as north and south. Opposite magnetic poles attract each other and like magnetic poles repel each other. Both magnetic poles attract magnetic material.	41-47, 60-64
NCF.6	Some materials can become magnetized by interacting with a magnet.	55-58
CS.1	Students examine and apply design processes to meet needs.	48-49, 67-69, 73-74

NAME: _____

NON-CONTACT FORCES



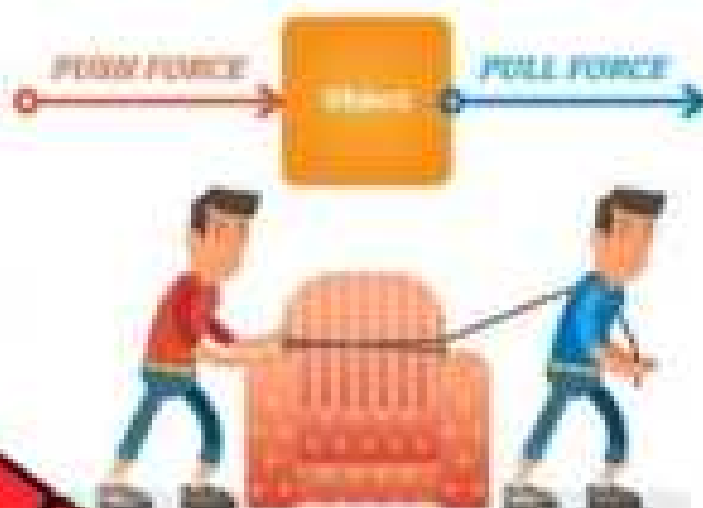
Forces - Push and Pull

What is a Force?

A **force** is any push or pull that causes an object to move. Think about it, if an object moves, a force must have acted on the object.

A boy has pushed a book across the table, or you, or maybe they pulled a rope on a yo-yo string. These are two examples of push and pull forces that caused the objects to move.

PUSH & PULL



Pushing Force

A **push** is when we move an object away from us. The child on this swing is the object being pushed. If an adult is pushing the child using a pushing force, the child will swing. If not apply enough pushing force, the child won't swing far. They won't swing very far!

Pulling Force

A **pull** is when we move an object closer to us. A fun game of tug of war is an example of two teams using pulling forces. The team that uses the most pulling force will win. Check out more examples below:



- Lifting a bag – we pull the object closer to us
- Opening a drawer – we pull the drawer open

Name: _____

8

Science, Semester
ACT 1

Push or Pull Is the example a push or pull force?



1) Shooting a basketball into the net	Push	Pull
2) Plugging in a cord to an outlet	Push	Pull
3) A tow-truck towing a car behind them	Push	Pull
4) Kicking a ball	Push	Pull
5) Climbing	Push	Pull

Think Can you give an example of a push and a pull force?



Push	
Pull	

Visualizing Draw what you were picturing while you were reading the picture.

Exit Cards

Cut Out Cut out the exit cards below and have students complete them at the end of class.

Name: _____

Mark

Check only the true statements.

Statement	✓
A force is only a push, not a pull.	
Lifting a bag is an example of pushing force.	
Without force, nothing can move.	
Opening a drawer uses pull.	
A force can cause objects to move or slide.	
A swing needs pushing force.	
Pushing always moves things away.	
If an object moves, some force acted on it.	
The team with the strongest pull wins tug of war.	

Name: _____

Mark

Check only the true statements.

Statement	✓
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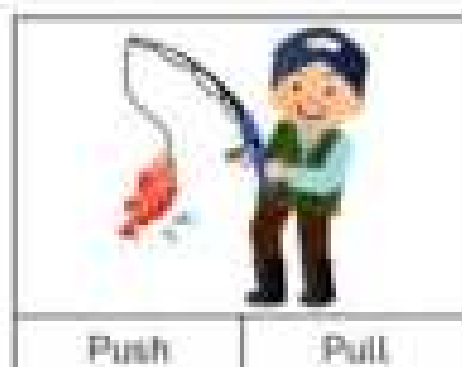
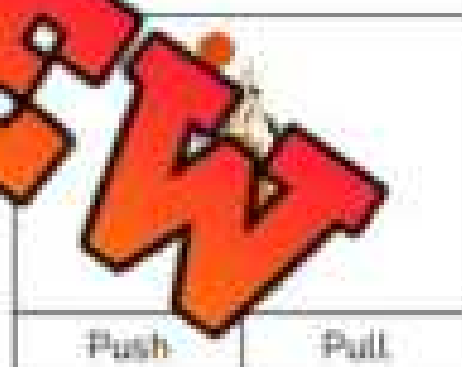
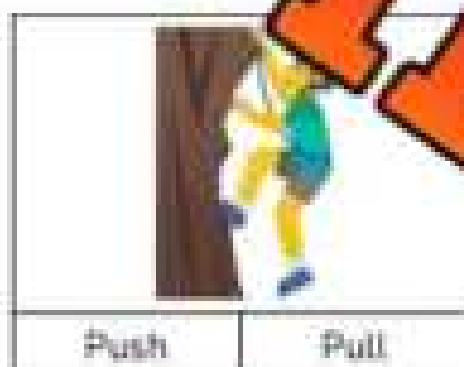
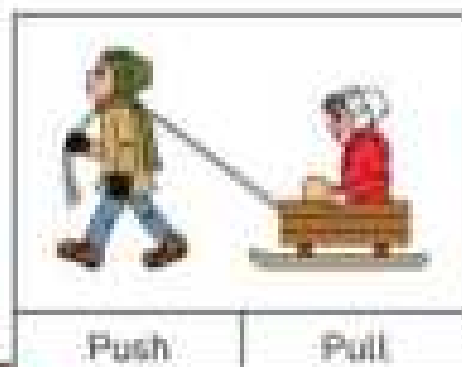
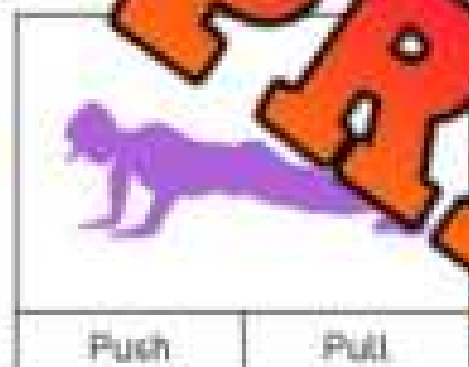
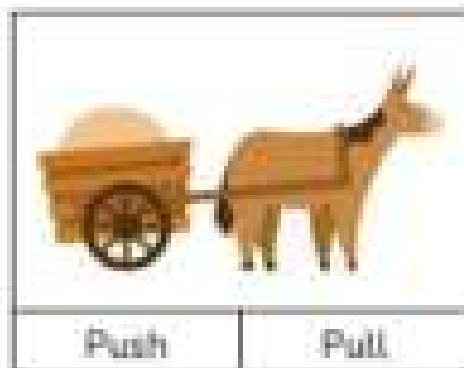
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Without force, nothing can move.	
Opening a drawer uses pull.	
A force can cause objects to move or slide.	
A swing needs pushing force.	
Pushing always moves things away.	
If an object moves, some force acted on it.	
The team with the strongest pull wins tug of war.	

Name: _____

10

Activities, Games
ACT 1

Directions: Is the picture a push or pull?



Non-Contact Forces

Contact and Non-Contact Forces

Forces are a push or a pull that causes the movement of an object.

Forces can be **non-contact** or **contact** forces.

Non-Contact

A **non-contact** force is a force that acts on an object without touching it.

Examples of non-contact forces are gravitational force, electric force, and magnetic force.

When an object moves without being touched, a non-contact force has acted on the object.

Gravity is the most common non-contact force. It is the force that keeps all of us right now! **Gravity** is the pulling force that keeps us on the ground. A magnet can also push or pull an object towards it or away from it. Magnetic force is a non-contact force. Lastly, electric forces are non-contact. An example is static electricity. It might move your hair on a trampoline without touching it!

Contact Forces

A **contact force** is any force that uses contact to move an object. If you see something move, was it touched by something else? Perhaps it was the wind moving a tree branch, or someone kicking a soccer ball. Either way, these are contact forces as something touched the object to make it move.

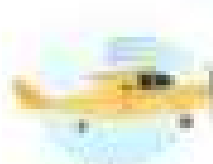
TYPES OF FORCES



APPLIED FORCE



SPRING FORCE



BUOYANT FORCE



FRICTIONAL FORCE



NORMAL FORCE



CONTACT FORCE



ELECTRIC FORCE



GRAVITATIONAL FORCE



Definition What do the terms below mean?

Non-Contact Force	
Contact	

Push or Pull Which picture shows a push or pull force?

Leaves Falling 	Net 	 Ball Moving
Contact Non-Contact	Contact Non-Contact	Contact Non-Contact

Making Connections Give an example of when you have seen the force below

Non-Contact Force	
Contact Force	

Gravity - A Pulling Force

What is Gravity?

Gravity is the force that pulls objects to the centre of the Earth. Without gravity pulling us, we would fall right off the Earth's surface and float away!

Gravity is also the reason why when you throw a ball into the air, it comes back down. When you throw a ball, you are applying an upward force by pushing it into the air. But gravity is much stronger than your push, so the ball will come back down. The higher and higher,



Gravity and our Weight

Our weight is based on gravity. Weight is the measure of the force of gravity pulling us down. This means our weight is how much gravity is pulling us towards the Earth's surface.

On other planets or on the moon, we weight a different amount because their gravitational pull is stronger or weaker. Someone weighing 100 pounds on Earth would weigh only 16 pounds on the moon.

This means that gravity's force is not very strong on the moon. If you applied a pushing force into the ground by jumping, you would go a lot higher on the moon because there is less pulling force bringing you back to the moon's surface.

Gravity in our Lives

When you spill a drink, gravity pulls the liquid as far towards the centre of the Earth as it can. The same with a pencil that fell off a desk. Gravity is a non-contact force that never stops!



Name: _____

15

Guided Reading
Unit 2

Making Connections

What does this remind you of in your life?

Questions 1-4. Answer the questions below using evidence from the text.

1) What is gravity?

2) How is the force of gravity different on the Earth and on the Moon?

Word Scramble

Unscramble the words below using the word bank.

Gravity	Force	Non	Contact	Pulling	Spill	Drop	Fall
---------	-------	-----	---------	---------	-------	------	------

ACOCNT		NLULPIG	
LLFA		ITYARVD	
DECFR		PODR	
LSLIP		ONN	

Exit Cards

Cut Out Cut out the exit cards below and have students complete them at the end of class.

Name: _____ Mark:

--

Is the statement true or false?

1) Gravity helps measure our weight.	True
	False
2) Gravity only works on heavy things.	True
	False
3) Gravity is a contact force.	True
	False
4) Spilled water falls due to gravity.	True
	False
5) On the Moon, a person weighs the same as on Earth.	True
	False

Name: _____ Mark:

--

Is the statement true or false?

1) Gravity helps measure our weight.	True
	False
2) Gravity only works on heavy things.	True
	False
3) Gravity is a contact force.	True
	False
4) Spilled water falls due to gravity.	True
	False
5) On the Moon, a person weighs the same as on Earth.	True
	False

Name: _____ Mark:

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3) Gravity is a contact force.	True
	False
4) Spilled water falls due to gravity.	True
	False
5) On the Moon, a person weighs the same as on Earth.	True
	False

Name: _____ Mark:

--

Is the statement true or false?

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2) Gravity only works on heavy things.	True
	False
3) Gravity is a contact force.	True
	False
4) Spilled water falls due to gravity.	True
	False
5) On the Moon, a person weighs the same as on Earth.	True
	False

Gravity - Science Experiment

Information

What is this experiment about?

What affects the forces of gravity? If we drop two objects that weigh the same but are different in shape, which will fall first? What if the objects are different weights but have the same shape?

Research Question

Out of the objects we chose, which item will fall the fastest (have the strongest gravitational pull)? Which will fall the slowest?

Hypothesis List objects in order of how fast they will fall.

Materials

1. 5 different objects - choose items that have no air resistance (no feathers)
2. Stopwatch
3. High point to stand on

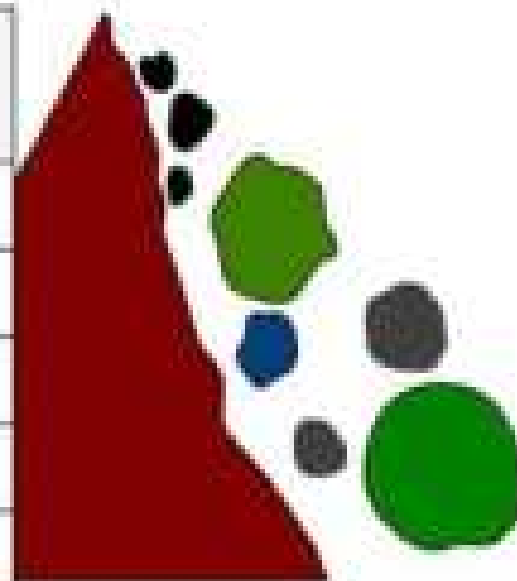
Procedure

1. Move to the high point where you will drop your object
2. Have a friend ready with a stopwatch
3. The stopwatch operator says go when they are ready, and the person up high drops the object
4. When the object hits the floor, the stopwatch operator clicks stop
5. Do this for all 5 objects and record your times in the chart below

Object	Time

Rank Rank the objects in order of how fast they fell.

Rank 1 - Fastest 5 - Slowest	Object
1	
2	
5	

**Result** Answer the questions below to show how you did on the experiment.

1) Was your hypothesis correct? Why or why not?

2) What did you notice about the results? Does the weight of an object affect the gravitational pull on the object? Does the shape of the object affect the results?

3) Why do you think you saw these results?

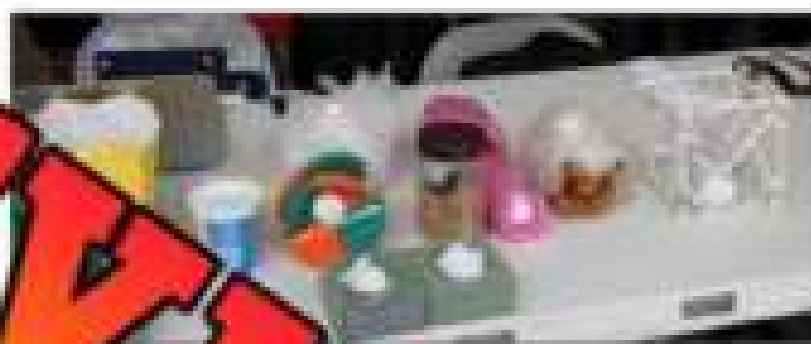
Experiment - Egg Drop

Research Question What are we learning about?

The egg drop experiment is a classic science experiment that demonstrates the principles of physics, particularly the concepts of force, gravity, and Newton's Laws of Motion. The goal of the experiment is to create a contraption that will protect an egg from breaking when dropped from a certain height.

Materials What you will need for the experiment

- ☐ A raw egg
- ☐ A variety of materials such as straws, paper, foam, cardboard, string, rubber bands, glue, etc.
- ☐ A high surface such as a stairway, a ladder, or a bleachers to drop the egg from.



Method How you will complete the experiment

- 1) **Gather materials:** Provide each group with a raw egg and the materials they can use to create their egg-protecting contraption.
- 2) **Plan and design:** Allow each group to plan and design their contraption. They can use any combination of the materials they were provided with. They can also watch an egg drop experiment online to find ideas for creative contraptions.
- 3) **Build:** Once the group has a plan, they can begin to build their contraption. They should be careful to use the materials to protect the egg, not to overbuild or overweight the egg.
- 4) **The Final Drop:** After the group is satisfied that their contraption is successful, each group can take turns dropping their egg from the highest point (stairway, ladder, or bleachers) to test their contraption.
- 5) **Observation and conclusion:** Observe the results, and examine how their contraption worked, what materials protected the egg best, and how they could improve their design.

Plan Answer the questions below to plan your egg holder

1) What materials will you use to support your egg?

2) Draw a diagram of your egg holder. Label the materials.

Results What happened with your car? Answer the questions below

1) What was pulling the egg down to the ground? Was the force strong at all heights?

2) If you could make the egg holder again, what would you do differently? Explain.

Research - Isaac Newton

Research Learn more about Isaac Newton

1) What year was Isaac Newton born?

2) Where was he born?

3) What happened when he sat under an apple tree?

4) Why did the apple fall on his head? Why didn't it move sideways or up?

5) What theory did Isaac Newton come up with? What does it help explain?

6) How does the theory of gravity help explain the world around us? Give examples.

PREVIEW

Isaac Newton - Gravity**Colour** Colour the picture of Newton below

Electrostatic Force

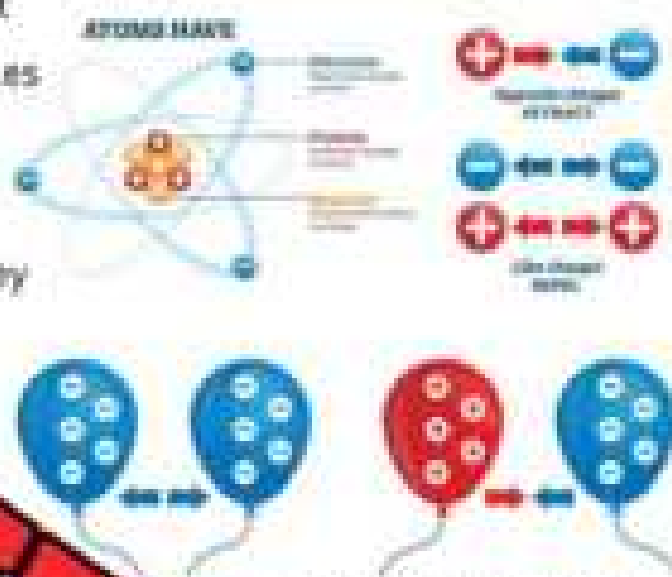
Electrostatic Force

Everything is made up of tiny particles that are too small to be seen. These tiny particles can have an electrical charge, either positive or negative.

When charges are the same, they repel (push away) each other. If they are opposite, they attract (pull) each other.

Most objects are neutral, meaning they have the same number of positive and negative charges. When two objects touch or nearly touch, charged particles can move from one object to the other and can affect whether the object will repel or attract the other. When objects move due to their charge, it is called an electrostatic force.

STATIC ELECTRICITY



The Cat

This poor cat has been stuck to it. This is an example of

electrostatic force. The styrofoam and cat have opposite charges, which means they are attracted to each other.

This is a non-contact force because the styrofoam is moving without being touched. The styrofoam is being pulled towards the cat's body. You may have experienced this on a trampoline when your hair moves and sticks straight up.

Questions Answer the questions below using evidence from the text

1) What does electrostatic force mean?

2) What is happening with the cat in the photo? Explain.

3) What do the terms mean?

Repel

Attract

Word Search Find the words in the wordsearch

Static	Repel
Attract	Object
Positive	Negative
Cat	Charge
Pull	Particles

X	N	Y	E	K	K	B	O	T	I	C	S	R	P	
Y	O	F	C	E	D	P	B	O	C	F	C	H	R	E
H	Y	K	G	S	C	O	J	T	E	I	H	U	I	V
V	Y	D	C	V	F	U	E	R	T	I	F	S	A	I
C	S	P	W	R	C	Z	C	A	E	B	T	C	T	T
Q	A	P	Q	R	Y	C	T	E	L	P	O	Q	T	A
R	Q	T	T	V	X	S	P	M	A	V	E	G	R	G
P	O	S	I	T	I	V	E	U	V	X	I	L	A	E
C	H	A	R	G	E	R	J	O	L	I	K	P	C	N
P	A	R	T	I	C	L	E	S	J	L	G	E	T	E

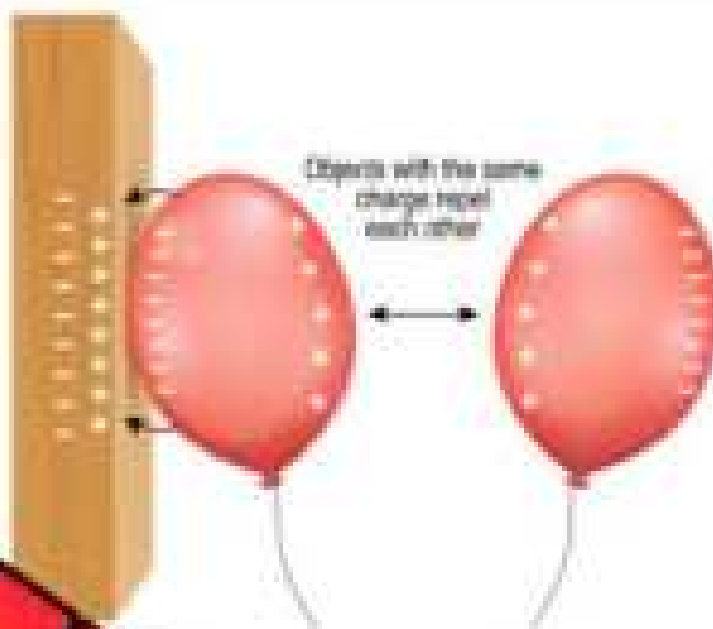
Static Electricity

Static Electricity

When electrical charges move from one object to another, they can cause static electricity. Picture this, you rub your hair on a balloon. The negative charges on your hair move to the balloon and the negative charges in the balloon move to the balloon.

The extra negative charges on the balloon create a static buildup of negative charges.

You can't see the extra negative charges but hanging that balloon near a wall. The extra negative charges in the balloon are attracted to the positive charges in the wall and they will stick together.



This is painful because our nerves do not like the electricity passing through us. You might feel pain, tingling, numbness, or weakness when you get a shock.

Zap - Static Shock

When you shake your hand, or touch a door handle, you may feel a zap or a shock due to static electricity.

This happens because the electrical charges are jumping from one object to the other. Ouch!



Questions

Answer the questions below using evidence from the text

1) Why does static electricity happen?

2) What happens with the electrical charges when you feel a zap?

Visualizing

Draw what you think you were reading. Explain the picture

Multiple Choice

Circle the correct answer

1) Objects with the same charge will	Attract	Repel
2) Objects with difference charges will	Attract	Repel
3) We sometimes feel a shock because of static	Electricity	Movement
4) Which will stick to your hair because of static?	Rock	Balloon
5) When we feel a shock, electric charges are	Staying	Jumping

Exit Cards

Cut Out Cut out the exit cards below and have students complete them at the end of class.

Name: _____

Circle the word that fits on the blank.

1) When electrical ____ move, they cause static electricity.	currents
	charges
2) Extra ____ charges move from hair to the balloon.	negative
	positive
3) A zap or shock happens due to ____ electricity.	magnetic
	static
4) Charges on the balloon make it ____ to surfaces.	stick
	bounce
5) A zap feels like tingling, numbness, or ____.	weakness
	strength

Name: _____

Circle the word that fits on the blank.

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2) Extra ____ charges move from hair to the balloon.	negative
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	static
4) Charges on the balloon make it ____ to surfaces.	stick
	bounce
5) A zap feels like tingling, numbness, or ____.	weakness
	strength

Experiment - Magic Spoon

Research Question What are we learning about?

Can I pick up salt and pepper grains using static electricity? Do I need to touch the salt and pepper or can I move the grains using a non-contact force?

Materials What do I need to do the experiment?

- ✓ 1 Teaspoon of salt
- ✓ 1 Teaspoon of pepper
- ✓ Plastic spoon
- ✓ Dish cloth
- ✓ Black piece of paper (optional)

Method How do we complete the experiment?

- 1) Put the salt and pepper on the black piece of paper
- 2) Rub the spoon on a dish cloth for about 10 seconds
- 3) Hold the round part of the spoon up to the salt and pepper mixture
- 4) Watch for the particles to jump from the paper up to the spoon



Observations

What did you notice?

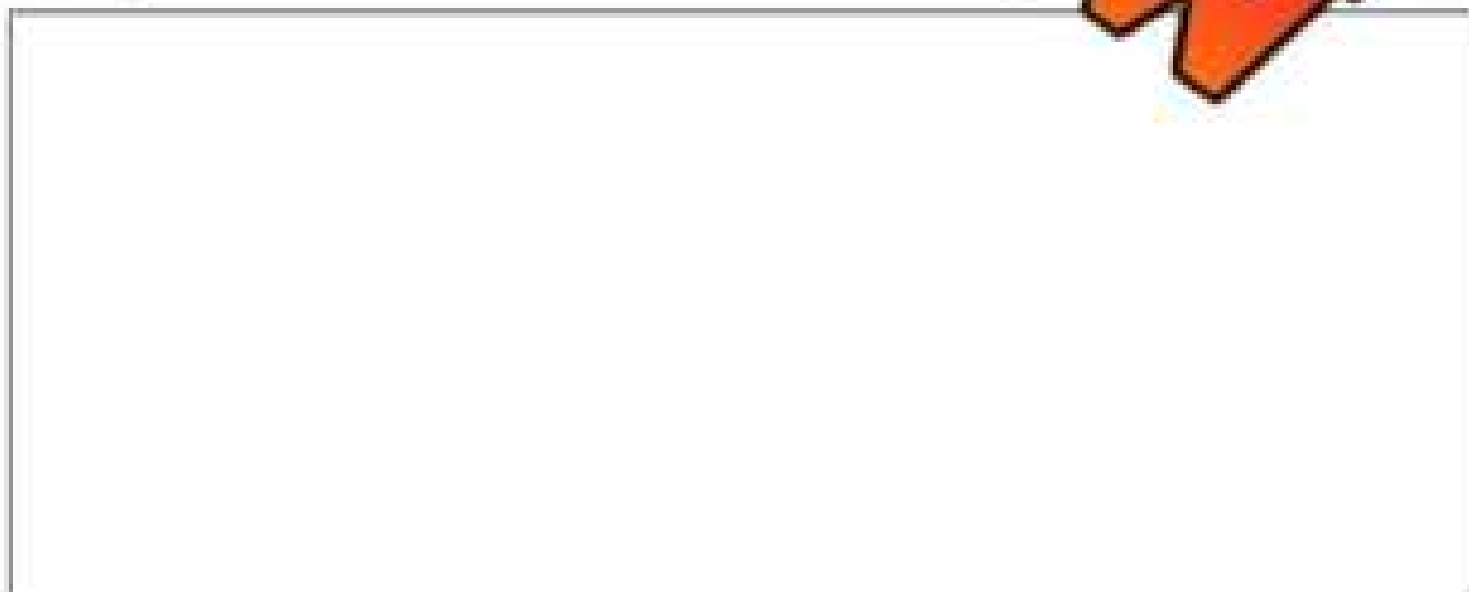
1) What happened to the salt and pepper when you put the spoon over the mixture?

2) Did more salt or pepper cling to the spoon? Why might that be the case?

3) How could you use this to separate mixtures?

Draw

Draw a diagram of what happened. Label the spoon, salt, and pepper.



Experiment - Bending Water

Research Question

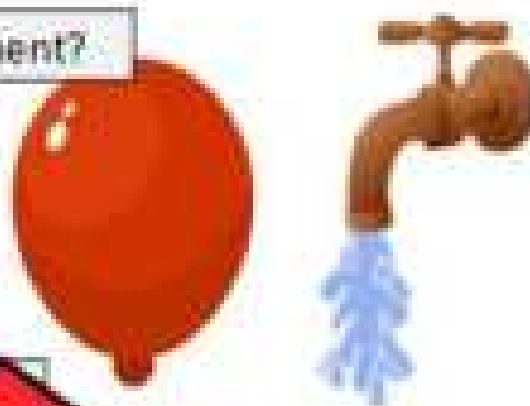
What are we learning about?

Can I bend water using static electricity? Will the non-contact force be able to move the water without touching it?

Materials

What do we need to do the experiment?

- ✓ 1 balloon
- ✓ Sink with faucet



Method

How do we complete the experiment?

- 1) Rub your hair with the balloon
- 2) Run a small stream of water. The smaller the better, but it needs to be a full stream, not just drips.
- 3) Hold the balloon near the stream but not touching it.
- 4) Watch the stream of water bend



Observations

What did you notice?

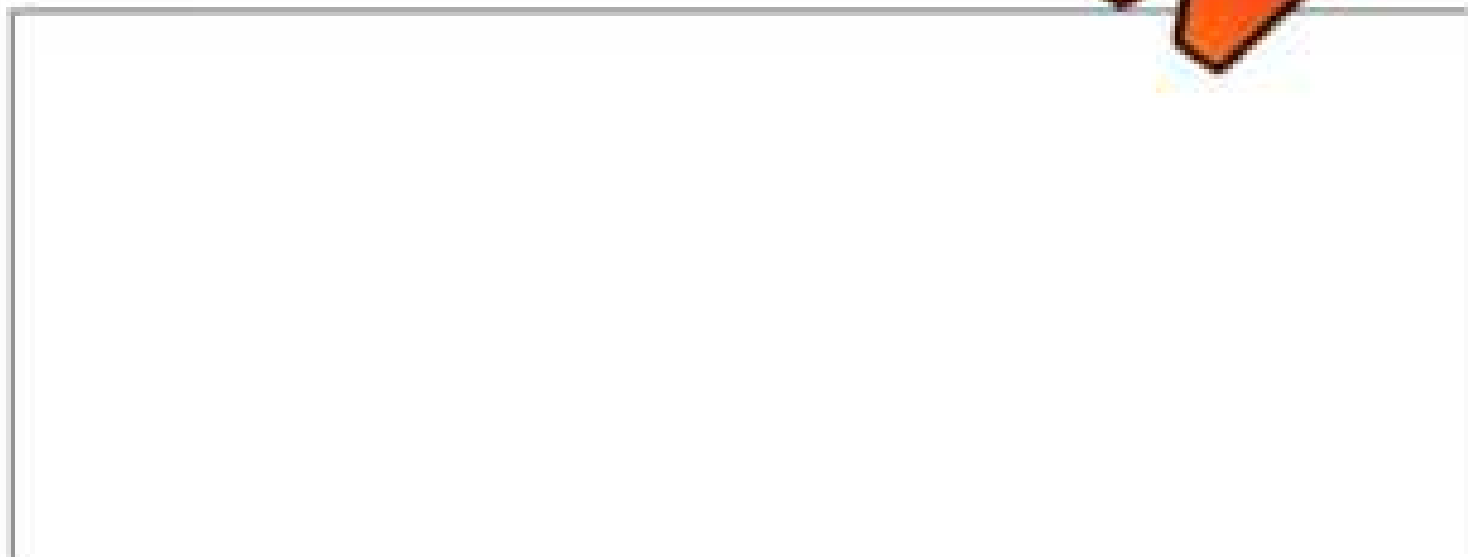
1) What happened when the balloon went near the stream of water?

2) Why did the water bend?

3) Did the water move closer to the balloon or further away? Explain.

Draw

Draw a diagram of what happened. Label the balloon.



Experiment - Rolling a Can

Research Question What are we learning about?

To learn about static electricity by making a can roll without touching it.

Materials What do I need to do the experiment?

- ✓ An empty soda can
- ✓ A flat surface
- ✓ A balloon or piece of hair
- ✓ Tape - optional
- ✓ Tape - optional



Method How do we conduct the experiment?

- 1) Make sure the soda can is empty.
- 2) Place the soda can on its side on a flat table.
- 3) Blow up the balloon and tie it closed.
- 4) Rub the balloon quickly back and forth on the hair or clothing. This will create static electricity!
- 5) Hold the balloon close to the soda can without touching it. What happens?
- 6) Optional: create a start and finish line using tape. Then have students time how long it takes for them to get the can from the starting line to the finish line.



Observations: What did you notice?

1) What happened to the can when you brought the balloon near it?

2) Why do you think the can moved without being touched?

3) What happens if you touch the balloon?

4) How can we make the can move faster or slower?

5) What do you think would happen if we used a bigger or smaller can? Would it move the same way?

PREVIEW

Dangers of Static Electricity

Problems of Static Electricity

Static electricity can be problematic and dangerous in our day to day lives. Static can be a nuisance when dust and dirt are attracted to insulators such as computer monitors or TV screens.

It can be a problem when our clothes cling to each other or to our hair. Often, clothes are static after they've been in a tumble dryer.

Some use anti-static sprays, liquids, and clothes to prevent the build-up of charge. They work by allowing charges in the clothing to jump to the spray or liquid. This neutralizes the charge on the clothing.

Dangers of Static Electricity

The most dangerous example of static electricity is lightning. Lightning is caused when static electricity builds up in clouds and causes a discharge to form between the ground and the clouds. The result is a lightning strike that is really just the flow of charges through the air.

Examples of the Dangers of Static Electricity

Some objects will have a large electric charge on it, like a live wire with electricity flowing through it. If you touch a live wire, the charge will flow through your body causing an electric shock.

Most of the time, static electric shocks result in a small zap that doesn't hurt too bad. But sometimes, this can cause burns or even stop your heart. People have died from static electric shocks!



Questions

Answer the questions below using evidence from the text

1) Why is static electricity dangerous?

2) How can you stop static electricity?

Visualizing

Draw what you think you were reading. Explain the picture

Word Scramble

Unscramble the words below using the word bank

STATIC	DANGER	SAFE	LIGHTNING	CLING	CLOTHING
GLIINTGHN			EGDRAN		
TASCTI			HGTNODIL		
LNCIG			EFSA		

Magnetic Force

Magnetism

You've seen magnets and how helpful they can be. We use them for many purposes, including sticking things on our fridge. They work because of magnetism.

Magnetism is an invisible force that happens when magnets either attract or repel each other.

Magnetism is a force because it pulls or pushes objects if they are made of a magnetic material. Magnetic materials are metals made from iron, nickel, cobalt and many more.

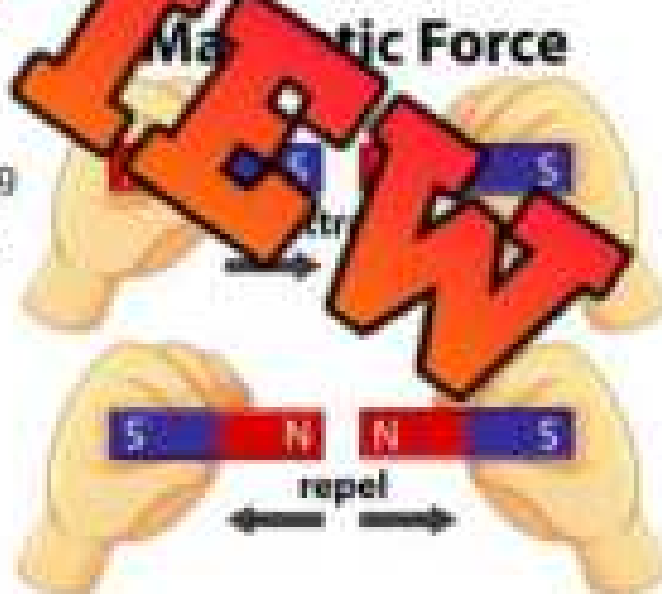
If you try to move a magnet close to an object that is not made of a magnetic material, it will not have any effect on it. Magnetic materials have tiny particles called electrons. When the electrons move in the same way, they will attract or repel other magnets depending on how they are positioned.

Magnets

Magnets use magnetism, which is a non-contact force. A magnet can pull something towards it or push something away from it without touching it. This means magnets can create a force that moves another object.

A **magnet** is an object that can attract or repel other magnets. We sometimes say someone is magnetic if they attract a lot of friends.

Magnets have a north and a south pole. You can attach two magnets by putting opposite poles together. If you try to put the same poles together, they will repel each other.



Questions

Answer the questions below using evidence from the text.

1) Why is magnetism an example of a non-contact force?

2) What is a magnet? Which materials are magnetic?

True or False

Is the statement true or false?

1. Magnets are made from plastic materials.	True	False
2. The south pole of a magnet will be attracted to another south pole.	True	False
3. Magnetism is an invisible force that pushes and pulls objects.	True	False
4. Iron is a metal that has magnetic properties.	True	False
5. Magnets have 2 poles – a north and south pole.	True	False

Word Search

Find the words in the wordsearch.

Magnetic	Repel
Attract	Poles
North	South
Fridge	Force
Metal	Iron

S	P	R	I	D	G	E	F	P	K	K	U	H	C
G	T	F	M	N	N	T	O	R	L	N	L	Q	Z
P	O	L	E	S	N	O	R	T	H	C	O	P	W
A	T	T	R	A	C	T	C	R	E	P	E	L	Y
N	K	J	T	Y	I	A	E	E	D	Y	N	F	H
B	G	F	S	G	R	S	G	M	P	O	Q	N	I
S	O	U	T	H	O	M	A	G	N	E	T	I	C
K	F	Z	K	H	N	B	M	E	T	A	L	Y	R

Exit Cards

Cut Out Cut out the exit cards below and have students complete them at the end of class.

Name: _____

Circle the correct force.

1) Opposite poles of magnets will?	Repel
	Attract
2) Magnets that push apart will?	Repel
	Attract
3) North and south poles always?	Repel
	Attract
4) Magnets pulling objects closer is called?	Attract
	Repel
5) Same poles of magnets will?	Attract
	Repel

Name: _____

Circle the correct force.

1) Opposite poles of magnets will?	Repel
	Attract
2) Magnets that push apart will?	Repel
	Attract
3) North and south poles always?	Repel
	Attract
4) Magnets pulling objects closer is called?	Attract
	Repel
5) Same poles of magnets will?	Attract
	Repel

Name: _____

Circle the correct force.

1) Opposite poles of magnets will?	Repel
	Attract
2) Magnets that push apart will?	Repel
	Attract
3) North and south poles always?	Repel
	Attract
4) Magnets pulling objects closer is called?	Attract
	Repel
5) Same poles of magnets will?	Attract
	Repel

Name: _____

Circle the correct force.

1) Opposite poles of magnets will?	Repel
	Attract
2) Magnets that push apart will?	Repel
	Attract
3) North and south poles always?	Repel
	Attract
4) Magnets pulling objects closer is called?	Attract
	Repel
5) Same poles of magnets will?	Attract
	Repel

Attract or Repel**Magnets**

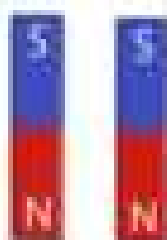
Will the magnets attract or repel each other?

1)



Attract

2)



Attract

Repel

3)



Attract

Repel

4)



Attract

Repel

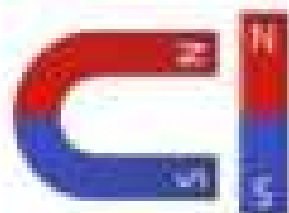
5)



Attract

Repel

7)



Attract

Repel

8)



Attract

Repel

9)



Attract

Repel

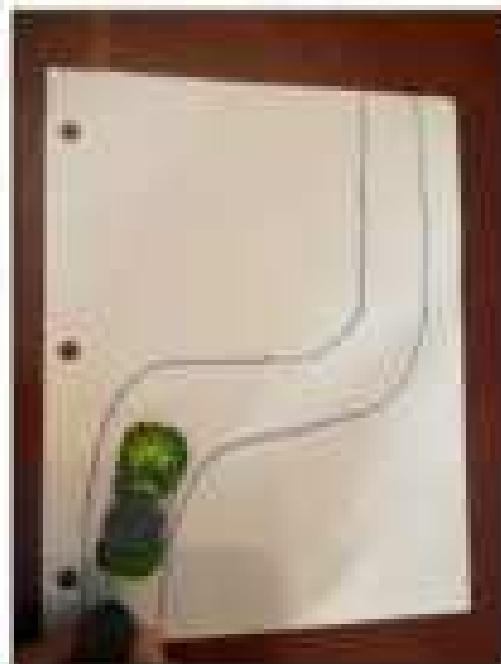
Experiment - Magnetic Car

Research Question What are we learning about?

Can I create a car that I can move using magnets?

Materials What do we need?

- ✓ 2 magnets - one magnet and another strong magnet as a test.
- ✓ A toy car
- ✓ Tape
- ✓ A racetrack - you can use the provided or make your own.



Method How do we complete the experiment?

- 1) Tape the bar magnet to the toy car.
- 2) Use the other magnet to pull the car. You will need to adjust how far you hold the magnet away from the car.
- 3) Now that you know how to move your car, try moving it around the racetrack. You may need to flip the magnet to repel or attract the car. We found it easier to repel the car around the track.



Maglev Cars: Zooming into the Future!

What are Maglev Cars?

Have you ever seen a car floating in the air? Sounds like something from a science fiction movie, right? But guess what? It's real! There are cars called 'Maglev cars' that can do just that. Maglev is short for "Magnetic Levitation," which means these cars float above the track instead of rolling on wheels.



How Do They Work?

Maglev cars work using a principle of magnets. Remember, how two like poles of magnets repel each other? That's exactly how Maglev cars work! They have magnets on both the car and the tracks they run on. These magnets are set so the like poles face each other, and as you might remember, similar poles repel. This repulsion lifts the car, making it float in the air.

Benefits of Maglev Cars

- **Speedy:** Maglev cars are really fast because there's nothing to slow them down.
- **Smooth Ride:** No wheels also mean no bumps. So, the ride is super smooth.
- **Less Noise:** Since there's no contact with the track, Maglev cars are very quiet.
- **Eco-friendly:** They use electricity instead of fuel, so they are better for the planet.

Drawbacks of Maglev Cars

- **Expensive:** Building tracks for Maglev cars is pricey.
- **Limited Use:** They can only go where tracks have been built. You can't just drive one anywhere like a regular car.
- **Power Hungry:** They use a lot of electricity, which can be a problem if there isn't a strong enough power supply.

Name: _____

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Curriculum Connections
ACT 6

Questions Answer the questions below using evidence from the text

1) What is a Maglev Car? How does it work?

2) What are the benefits and drawbacks of a Maglev Car?

Draw Look up pictures of a Maglev Car online and draw your own

Multiple Choice Circle the correct answer

1) Maglev cars are _____	Expensive	Inexpensive
2) Maglev cars are _____	Fast	Slow
3) Maglev cars use _____	Gravity	Magnets
4) The car magnets _____ the track's magnets	Repel	Attract
5) A maglev car has lots of friction, so it is _____	Loud	Quiet

Exit Cards

Cut Out Cut out the exit cards below and have students complete them at the end of class.

Name: _____

What is one benefit and one drawback of Maglev cars?

Benefit	
Drawback	

Name: _____

What is it like observing space objects during the day and during the night?

Benefit	
Drawback	

Name: _____

What is it like observing space objects during the day and during the night?

Benefit	
Drawback	

Name: _____

What is it like observing space objects during the day and during the night?

Benefit	
Drawback	

Coding - Maglev Cars

Maglev cars can be self-driving. The driver enters where they want to go, and the car moves to that location. The car interacts with the track to pull it to where it needs to go. If the car needs to go forward, the magnets in the track in front of the car turn on, attracting it. If it needs to go backwards, the magnets behind the car turn on.

This is a self-driving maglev car	Right makes it turn right	Left makes it turn right	Forward makes the car move forward by the number shown
			
It understands 3 commands		Left	Forward 2

Directions Write code to get the car to school, to the store, and then back home.

Codes - Forward, Turn Left, Turn Right		
Line 1		
Line 2		
Line 3		
Line 4		
Line 5		
Line 6		
Line 7		
Line 8		
Line 9		

Directions

Write code to get the car to the school, to the arena, to the store,
and then back home.

Codes - Forward, Turn Left, Turn Right

Line 1

Line 2

Line 3

Line 4

Line 5

Line 6

Line 7

Line 8

Line 9

Line 10

Line 11

Line 12

Line 13

Line 14

Line 15

Line 16



Magnetic or Not?

A magnetic material will be strongly attracted to a magnet. A magnet is a material or object that produces a magnetic field with a north and south pole. Test to see if the following materials are magnetic or not. If the material is magnetic, it will be attracted or repelled by the magnet.

Procedure

What to do

1. Gather materials in the table below and a magnet.
2. Make a guess whether the material will be magnetic or not.
3. Test with the magnet and fill in whether it was magnetic or not.



Material	Estimate - (Magnetic or Not)	Magnetic or Not
Pencil		
Coin		
Paper		
Cardboard		
Paperclip		
Eraser		
Popsicle Stick		
Rubber Band		
Brad Nail		
Scissors		

Questions

Use information from the text to support your answer.

1. From the experiment you just did, what types of materials are magnetic?

2. Did any of the results surprise you or were all your estimates correct? Explain.

Experiment - Magnetic Strength and Distances

Research Question What are we learning about?

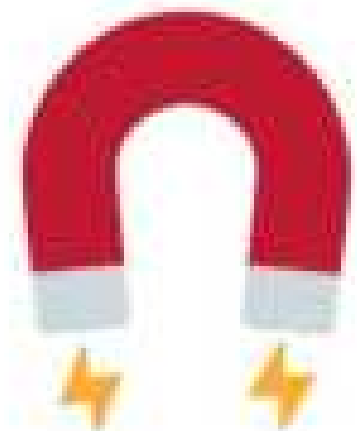
To understand how the strength of a magnet changes with distance.

Materials What do we need?

- ✓ Magnets (all sizes and strengths)
- ✓ Ruler or tape measure
- ✓ Small metallic objects (e.g., paperclips)

Method How do we complete the experiment?

- 1) Lay the ruler or tape measure flat on a surface.
- 2) Place the magnet at one end of the ruler.
- 3) Begin by placing a paperclip at the same end as the magnet. Slowly move the paperclip away from the magnet until it is no longer attracted to the magnet. Record the distance at which the paperclip is no longer attracted to the magnet.
- 4) Repeat this process with the other paperclips. Each time, start the paperclip closer to the magnet and move it away slowly until it is no longer attracted. Record each distance.
- 5) Repeat steps 3 and 4 at least three times to get an average distance for each paperclip.



Observations What happened?

Paperclip	Distance – in CM
Paperclip 1	
Paperclip 2	
Paperclip 3	
Paperclip 4	
Paperclip 5	
Average	
(Add up the 5 distances and divide by 5)	

Results What happened?

1) How does the distance between the magnet and the paperclip change the strength of the magnetic force?

2) If you were trying to pick up a heavy magnetic object, where would you put the magnet?

Experiment - How Materials Affect Magnets

Research Question What are we learning about?

To understand how different materials can affect the strength of a magnet.

Materials What do we need?

- ✓ Same size and strength)
- ✓ Size of the magnet
- ☐ Cardboard
- ☐ Paper
- ☐ Plastic
- ☐ Glass
- ☐ Metal - Aluminium
- ✓ Metallic objects (such as a paperclip)

Method How do we complete the experiment?

- 1) Start by placing a magnet and a paperclip on a flat surface so that the paperclip is attracted to the magnet.
- 2) Slowly move the paperclip away from the magnet until it is no longer attracted to the magnet. Measure this distance and record it as the base measurement.
- 3) Place one of the materials (let's start with cardboard) between the magnet and the paperclip. Move the paperclip closer to the magnet until it is attracted again. Measure this distance and record it.
- 4) Repeat this process with each of the different materials, always measuring the distance at which the paperclip is attracted to the magnet.
- 5) Compare the measurements for each material to the base measurement.



Observations

What happened?

Object We Are Measuring	Distance It Attracted The Paperclip
Paperclip 1 – Nothing in Between	
Paperclip 2 – Cardboard	
Paperclip 3 – Paper	
Paperclip 4 – Glass	
Paperclip 5 – Plastic	
Paperclip 6 – Metal	

Results

What happened?

1) What materials affected the magnet the most, which the least?

The Most

The Least

2) Why do you think these materials affected the strength of the magnet the most?

3) What other factors might affect the strength of the magnet more than what the material is simply made of?

Magnetizing an Object

How to Magnetize Objects

Magnetizing objects means that you make an object become a magnet.

A paperclip is not magnetic, but if you use one of the following techniques, you can turn a paperclip into a magnet for a short period of time.



Rubbing

If you rub a magnet in one direction along a metal object, you can make the object magnetic. You must rub it in the same direction because you are lining up all of the atoms in the object in the same direction.

When you are done, the object will be magnetic as the object will be attracted to other magnetic materials. Your new magnet will only last for a short period of time until the atoms line up in their original spots.

Striking

To perform this technique, align your object so that it is pointing along the north-south axis of the Earth. You can use a compass to find out which direction this is. Strike the object with a hammer repeatedly. This shakes the atoms out of their original spots, causing them to realign to the Earth's magnetic field.

Now your object will become a magnet that attracts other magnetic materials. Eventually the object will lose its magnetic powers as the atoms line up in their original spots.



Name: _____

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Curriculum Connections
SC.7.E.6.1-1**True or False** Is the statement true or false?

1. You can turn metal objects into magnets.	True	False
2. Metal objects will become magnets forever.	True	False
3. Rubbing a magnet along a metal object makes it magnetic.	True	False
4. Objects have atoms in them.	True	False
5. You can turn a metal object in any direction and it will be magnetic.	True	False

Questions Answer the questions below using evidence from the text.

1) How can you turn a metal object into a magnet?

2) Can any object become magnetic? Explain.

Word Scramble Unscramble the words below using the word bank.

Magnet	Striking	Rubbing	Atoms	Particles	Metal	Objects	Direction
SAMTO				NBUGBIR			
TLMEA				GETMNA			
TIGNISRK				STEBJCO			
ITNREDICO				RSCLAEPTI			

Experiment - Magnetizing an Object

Research Question What are we learning about?

To understand how objects can be magnetized using a permanent magnet

Materials What do we need?

- ✓ Steel bar magnet
- ✓ Steel nails
- ✓ Small metal objects (like paper clips)

Method How do we conduct the experiment?

- 1) Start by explaining to the students that certain types of metals (like iron, nickel, and cobalt) can become magnets when they are exposed to a magnetic field.
- 2) Give each student a steel nail and a bar magnet.
- 3) Ask the students to rub the bar magnet along the length of the nail in one direction, from the head to the point. Do this about 20-30 times. This aligns the tiny magnetic fields within the nail with the magnetic field of the bar magnet.
- 4) Once done, ask students to test if their nail has been magnetized. They can do this by seeing if it can pick up small metal objects like paper clips.



Results**What happened?**

1) What happened when you struck the metal nail with the magnet?

2) Why does the nail become magnetic?

3) Does the nail become more magnetic as you rub it longer? Try only 30 seconds versus 1 minute of rubbing. Which works better?

4) How long does the nail stay magnetic? Will it be magnetic forever now?

PREVIEW

How a Compass Works

What is a Compass?

A compass is a navigational tool that tells people which direction they are going. The compass was invented in 1300 by an Italian explorer named Flavio Gioia.

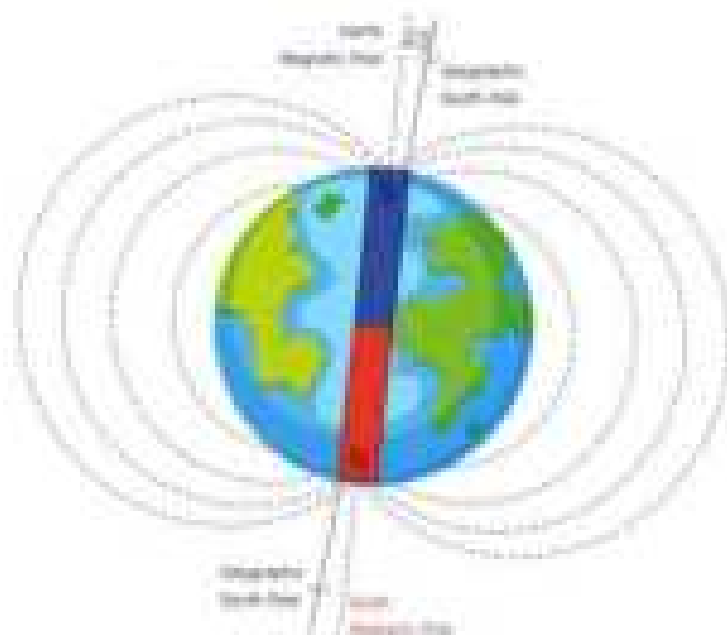
Combined with a map, a compass was very important for sailors to know the direction they were going. This is because when you are in the middle of an ocean, you cannot see any land or the sun. Therefore, it is impossible to know which direction you are going!



How a Compass Works

We have learned that the Earth is like a magnet that has its own magnetic field. Deep in the Earth's core, there is an imaginary pole that attracts and repels other magnets.

EARTH'S MAGNETIC FIELD



A compass needle from a magnet is used to point to the directions North, South, East, and West. When you hold a compass, the poles inside of the magnet will be attracted or repelled by the Earth's poles.

Depending on how you hold the compass, the needle will move so that the north pole is attracted to the Earth's south pole. The movement of the needle will show you which direction you are facing.

Name: _____

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Compass, Continued
ACT 2

Making Connections

What does this remind you of in your life?



Questions

Answer the questions below using evidence from the text

1) Why were compasses important to sailors?

2) How does a compass tell us which direction we are in?

Draw

Draw a picture of a compass. Label it N, E, S, W

Exit Cards

Cut Out Cut out the exit cards below and have students complete them at the end of class.

Name: _____

Mark

What is a compass and why is it useful?

Name: _____

Mark

What is a compass and why is it useful?

Name: _____

Mark

What is a compass and why is it useful?

Name: _____

Mark

What is a compass and why is it useful?

Magnets Harmful Effects on Technology

Magnets Effect on Magnetized Objects

Many great technologies use magnetism in order to work. Credit cards and hard drives store information using the force of magnetism. Read below how you can damage these objects by touching a magnet to them.

Magnets and Computers

A computer has a hard drive that holds information about the computer, including documents and games you download. The hard drive works because of a component called a magnetic head. This means the hard drive uses magnetism to store information.

If you hold a strong magnet up to a computer, it could ruin the magnetic field in the hard drive. This will wipe the hard drive clean and delete all your information. It could also break the hard drive.



Magnets and Credit Cards

The thin strip on a credit card uses magnetism to store information about the card.

If a strong magnet touches the magnetic strip on the credit card, it can erase all of the information about the card.

This happens because the electrons change their charge when a magnet is put close to it. This is just like when we rub metal with a magnet, we can change the metal's magnetic ability.



Questions: Answer the questions below using evidence from the text

1) How does a magnet affect a hard drive?

2) What would a magnet do to a credit card?

True or False Is the statement true or false?

1. A hard drive makes a computer run faster.	True	False
2. A hard drive stores information using magnets.	True	False
3. The thin strip on a credit card uses magnetism.	True	False
4. Touching a magnet to a computer can wipe clean a hard drive.	True	False
5. You can wipe a hard drive clean using a weak fridge magnet.	True	False

Word Search Find the words in the wordsearch

Magnet	Damage
Harmful	Technology
Hard	Drive
Clean	Wipe
Credit	Card

Q	T	B	C	O	C	F	H	A	R	M	F	U	L
R	D	S	A	C	B	R	N	C	D	T	T	I	Z
N	Z	B	B	D	L	C	E	E	C	E	Q	V	E
D	A	M	A	G	E	E	V	D	N	A	I	N	P
W	V	C	X	L	W	I	A	G	I	B	R	A	I
E	H	X	X	U	R	J	A	N	D	T	R	D	W
O	R	J	R	D	B	M	V	N	W	F	I	B	V
T	E	C	H	N	O	L	O	G	Y	H	A	R	D

Devices Using Non-Contact Forces

Devices that Use Magnetism

Magnets are used in the following devices:

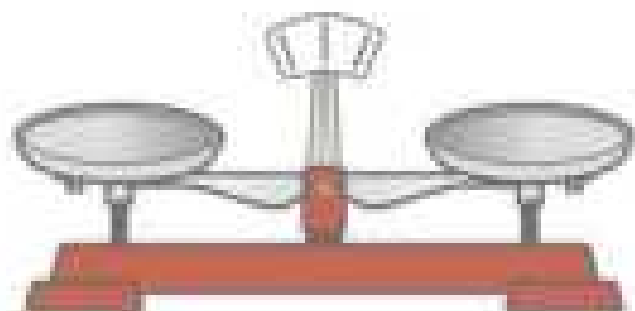
- ☐ Computer hard drives to store information
- ☐ Microphones, speakers, headphones, and telephones all use magnets to create a magnetic field that allows sound waves to travel loudly
- ☐ Drones use magnets to move a plate that comes in contact with another plate to make a sound.



Devices Using Electrostatics

An electrostatic mop is used in schools because it is made of polyester and polyamide materials that make a static electricity when they spin on the ground.

As they build-up static in the mop, the mop just like a balloon attaches to the hair on your head. You may notice when handling these mops that you will get small shocks!



Devices Using Gravitational Forces

A balance is used to find out how much an object weighs. It works by placing the object on the platform.

The heavier the object, the more gravity will pull it down. This will exert more force on the platform and will raise the other side up higher.

Questions

Answer the questions below using evidence from the text

1) Which invention that uses these forces do you think is the most important?

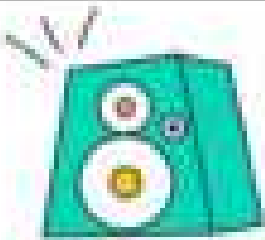
2) Can you think of another invention that uses one of these forces? Explain.

Visualizing

Draw what you picture in your mind as you were reading. Explain the picture

Which Force?

Write the force that is used in the devices below

Coding - Bank Cards and Magnets

Magnets and Bank Cards

Bank cards have a magnetic strip that stores codes on it. The codes link to a bank account. When you swipe your card, the card reader detects the magnetic code in the card. It connects to your bank account so that the transaction can be made. A transaction is when money is taken from the card's bank account and sent to the store owner's bank account.



The code uses an IF/ELSE statement.



Directions

If there is enough money in the bank account, it will say approved.
If there is not, it will say declined.

	Cost of Purchase	Money in Account	IF/ELSE	Approved or Declined?
1)	\$50	\$150		
2)	\$120	\$95		
3)	\$209.99	\$210		
4)	\$318.75	\$318.75		
5)	\$452.25	\$385.99		
6)	\$491.50	\$492.10		
7)	\$509	\$511		
8)	\$750.99	\$750.97		
9)	\$825.75	\$825.50		
10)	\$999.99	\$999.99		

Research - Bank Cards and Magnets

Research

Learn more about the invention of bank cards



1) Who invented the first bank card?

2) What was the Charge-It card? How did it work?

3) What is an ATM?

4) ATM's were made before online debit cards. Do ATMs connect to your bank account?

5) What is a debit card? How does it work?

PREVIEW

Research

Learn more about the invention of bank cards



6) Make a connection – do you or anyone you know have a debit card? Have you used it? Explain.

7) What would happen if we didn't have debit cards?

B) Draw a debit card below

PREVIEW

How Hard Drives Work

What is a Hard Drive?

A hard drive is like the brain of your computer. It's where all your documents, pictures, and software live when you're not using them. But it's not magic—it's magnets!



How Does a Hard Drive Work?

A hard drive stores information on a round piece called a disk. This disk is coated with a special kind of paint that can be magnetized. The disk is a circle with millions of tiny spots on it. Each spot can be a '1' or a '0'. This is called binary, and it's the language computers use.

Role of Magnets in Hard Drive

Now, here is where the magnets come in. There is a part called the read/write head, which hovers above the disk. This head has a tiny magnet on it. When your computer wants to write a '1' or '0', it moves the head over the spot and uses the magnet to change that spot's magnetism. If the magnet is pointing one way, the spot is a '1'. If it points the other way, it's a '0'.

When your computer wants to read the information, it does the opposite. It moves the head over the spot and checks which way the magnetism is pointing. That way, it knows if the spot is a '1' or a '0'.

Spinning and Searching

The disk in the hard drive is always spinning very fast, like a merry-go-round. The read/write head can move in and out, just like you might move towards the center or edge of the merry-go-round. Between the spinning and the moving head, the computer can find any spot on the disk super quickly!

Questions

Answer the questions below using evidence from the text

1) What is a hard drive? Why do we need them?

2) How do hard drives use magnets?

Making Connections

What does this remind you of _____?

How do you use hard drives? Do you want a big hard drive or a small hard drive? Do any of your gaming systems, tablets, or computers use hard drives?

Exit Cards

Cut Out Cut out the exit cards below and have students complete them at the end of class.

Name: _____ Mark:

--

Is the statement true or false?

1) A hard drive is like the brain of a computer.	True
	False
2) Hard drives use magnets to store information.	True
	False
3) The read/write head touches the disk directly while spinning.	True
	False
4) The disk in a hard drive spins very slowly.	True
	False
5) Binary code uses 1s and 0s to store information.	True
	False

Name: _____ Mark:

--

Is the statement true or false?

1) A hard drive is like the brain of a computer.	True
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	False
5) Binary code uses 1s and 0s to store information.	True
	False

Coding Activity - Hard Drive

Leah is working on her computer. To find the information she has saved on her hard drive, the arm will move to the correct binary code. To find the binary code, use ordered pairs. Start with the x-axis (horizontal number →) as the number you will write as the first ordered pair. Use the y-axis (vertical number) as the second number in the ordered pair.



Code Write the binary code to find the files below on the hard drive.

File	Ordered Pair – Binary Code
	(00000, 000)
	
	
	

File	Ordered Pair – Binary Code
	
	
	
	

Questions Answer the questions below.

1) Why do you think a computer uses binary code and not

2) What files do you save on computers you have used?

Forces - Activities

Word Search

Find the word bank words in the puzzle!



Word Bank

- ☐ Force
- ☐ Push
- ☐ Pull
- ☐ Object
- ☐ Electrostatic
- ☐ Magnet
- ☐ Charge
- ☐ Repel
- ☐ Attract
- ☐ Gravity
- ☐ Movement
- ☐ Metal
- ☐ Iron
- ☐ Nickel
- ☐ North
- ☐ Mining

Word Scramble

Read the clue and then unscramble the word

ROTELSTCCETA		JOBCTE	
REFOC		ETAMNG	
KNIELC		LPERE	
ETMLA		SHUP	
HRCGAE		TEVARYI	

Name: _____

Date: _____

Unit Test - Forces

Multiple Choice

/10

1. An example of a pulling force is...	2. A ball comes back down to the Earth because of...
a) Kicking a ball	a) Electrostatic Force
b) Punching a punching bag	b) Gravity
c) Playing football	c) Friction
d) Pushing a child on a swing	d) Muscular Force
3. Light is an example of which force?	4. How many poles are there on a magnet?
a) Electrostatic	a) 1
b) Gravity	b) 2
c) Friction	c) 3
d) Muscular Force	d) 4
5. A balloon sticks to our hair because of...	6. Which material is magnetic?
a) Static electricity	a) Glass
b) Magnetism	b) Iron
c) Friction	c) Nickel
d) None of the above	d) Wood
7. A compass works because of?	8. Bank cards use which force?
a) Electrostatic Force	a) Electrostatic Force
b) Gravity	b) Gravity
c) Friction	c) Friction
d) Magnetism	d) Magnetism
9. Photocopiers work using...	10. Who came up with the theory of gravity?
a) Electrostatic Force	a) Galileo Galilei
b) Gravity	b) Thomas Edison
c) Friction	c) Isaac Newton
d) Magnetism	d) Ben Franklin

Definitions - What does the term mean (1 mark each)

/3

Term	Definition (what does it mean)
Gravity	
Electrostatic Force	
Magnetism	

Short Answer

Answer the questions. Each question is worth 3 marks

1) What is a non-contact force? Give examples.

2) How can you make a steel nail magnetic?

3) How does the distance from a magnet to a magnetic object affect the strength?

Magnets

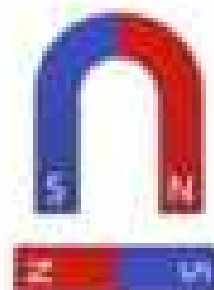
Will the magnets attract or repel each other?

1)



Attract

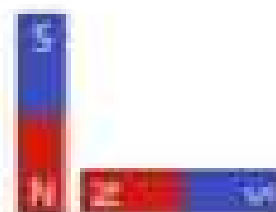
2)



Attract

Repel

3)



Attract

Repel

Long Answer

Answer questions below - Each question is worth 5 marks

1) How does a computer monitor work? How does it use?

2) Who is Isaac Newton? What theory did he made? How does it work around us?



Workbook Preview



Grade 4 – Science Unit

Organizing Idea: Matter: Understandings of the physical world are deepened by investigating matter and energy

Guiding Question: How can materials be managed safely?

	Learning Outcome - Students investigate the management of waste and dangerous materials and describe environmental impacts.	Pages
M.1	Methods of waste management that can negatively impact the environment include using landfills and burning.	9-17, 19-22, 59-66
M.2		67-75, 102
M.3	Waste materials may be solids, liquids, or gases.	6-8, 92-97
M.4	Dangerous materials include natural and processed materials that can be harmful to the health of individuals. Symbols are used to identify dangerous materials. Hazard symbols are used to identify dangerous materials, including those that are explosive flammable corrosive poisonous	76-88
Computer Science:		
CS.1	Students examine and apply design processes to meet needs.	18, 23-25, 53-55, 89-91

Preview of 80 pages from
this product that contains
139 pages total.

NAME: _____

WASTE



What is Waste?

What is Waste?

Waste is anything that we don't need or want anymore. We call it trash, rubbish, or garbage. But did you know waste isn't just old food or crumpled paper? Waste can also be a liquid or a gas. Let's learn more!



Solid Waste

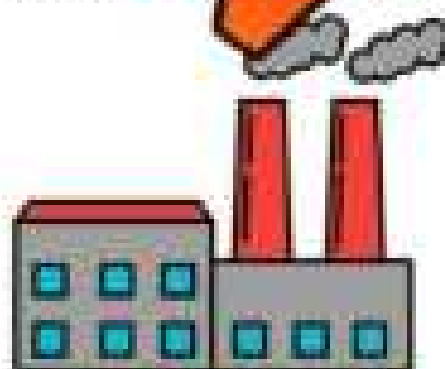
When we think of waste, we often picture solid waste. Solid waste is stuff we can touch and see. It includes old toys, food scraps, or a broken pencil. This is the kind of waste you might find in your trash bin at home. Sometimes, if we recycle, solid waste like plastic bottles can be turned into something new!

Liquid Waste

Next, there's liquid waste. This is waste in the form of liquids. Bottled soda or used cooking oil are examples of liquid waste. But not all liquid waste is actually from our bathrooms. When we flush the toilet, the wastewater is waste too. It needs to be cleaned at a water treatment plant before it goes back into the environment.

Gas Waste

Lastly, there's gas waste. This one's tricky because we can't see or touch it. But it's very real! When we burn fuels like gas, oil, or coal, it creates waste gases. These gases can pollute our air and harm our environment. Even burping cows create a gas waste called methane!



Name: _____

7

Secondary Extension
6-7

Type

Which type of waste is it – solid, liquid or gas?

1) Soapy water

2) Smoke from cars

3) Used tires

4) Old clothes

5) Paper

6) Sewage

7) Pet waste

8) Smoke from a factory

9) Burp from a cow

10) Oil spill

11) Old table

12) Food scraps

13) Old coffee

14) Fumes from gas

Draw

Identify the waste

Solid Waste

Liquid Waste

Gas Waste

Questions

Answer the questions below using evidence from the video.

1) What is waste?

2) What things have you thrown out as waste in the last day or two?

Exit Cards

Cut Out Cut out the exit cards below and have students complete them at the end of class.

Name: _____

Which type of waste is described.

1. Old toys and food scraps	Solid
	Gas
2. Spilled soda	Solid
	Liquid
3. Smoke from burning coal	Solid
	Gas
4. Used cooking oil	Gas
	Liquid
5. Burping cows release methane	Gas
	Solid

Name: _____

Which type of waste is described.

1. Old toys and food scraps	Solid
	Gas
2. Spilled soda	Solid
	Liquid
3. Smoke from burning coal	Liquid
	Gas
4. Used cooking oil	Gas
	Liquid
5. Burping cows release methane	Gas
	Solid

Name: _____

Which type of waste is described.

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	Gas
2. Spilled soda	Solid
	Liquid
3. Smoke from burning coal	Liquid
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4. Used cooking oil	Gas
	Liquid
5. Burping cows release methane	Gas
	Solid

Name: _____
Which type of waste is described.

1. Old toys and food scraps	Solid
	Gas
2. Spilled soda	Solid
	Liquid
3. Smoke from burning coal	Liquid
	Gas
4. Used cooking oil	Gas
	Liquid
5. Burping cows release methane	Gas
	Solid

Composting

What is Compost?

Compost is decomposed organic material. This means that compost is broken down dead stuff! When something dies, like a plant, it will break down slowly into soil. The soil is actually compost, which is rich soil.



Decomposers

Decomposers are fungi, and other living organisms that eat dead plants and animals. They break down decaying matter so that it turns into soil to be used by plants.

When they break down dead plants and animals, they release nutrients and mineral salts that go into the soil. This makes the soil rich in nutrients for plants to grow. Examples of decomposers are molds, fungi, and worms that reuse and recycle materials that were formerly living.

Decomposers are alive. They get their energy from the nutrients in dead matter. Worms take in food through their mouths and pass a 'cast' through their rear end. The cast is very valuable fertilizer for the soil.



What to Compost

As a general rule, you can compost things that were once growing but are now dead. Some examples include fruits, vegetables, paper, coffee, tea, and eggshells. You shouldn't compost cheese, medicines, or glass.

When you compost the right things, decomposers will begin to break down the dead matter, so it turns into good soil!

Questions

Answer the questions below using evidence from the text

1) What are decomposers? How do they help create compost?

2) What can you compost and what shouldn't you compost?

Making Connections

How does this remind you of?

Word Scramble

Unscramble the words below using the word bank

Compost	Soil	Worms	Bacteria	Fungi	Decay	Break	Down
IETCARAB				SWMRO			
DACEY				EKARB			
LOIS				DOTPSMO			
WNDO				NIFGU			

Not all organic material can be composted. Check out the infographic below to learn more about the organic material that can be composted.



Making Connections

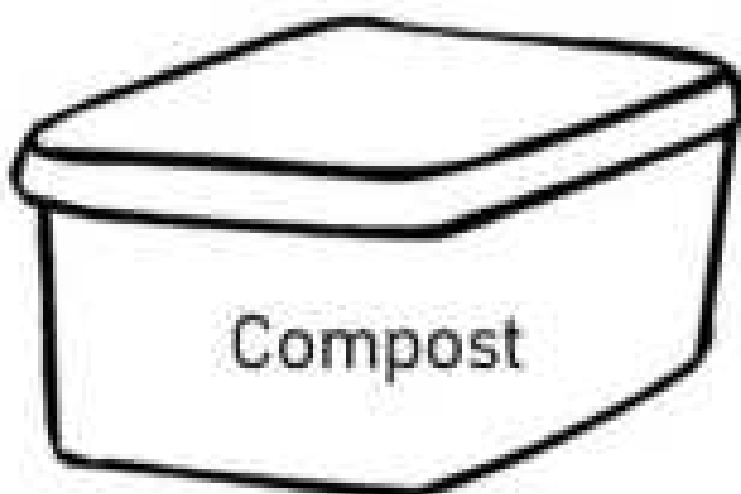
Share your experiences with composting below

1) Have you ever used a composter? If so, what do you compost?

2) What kinds of things can you not compost? Why do you think you can't compost those things?

Directions

- 1) Colour the pictures that can be composted
- 2) Draw a line from the pictures that can be composted to the bin



Pop Bottle Composter

Background

What is this experiment all about?

How is compost made? How long does it take for organic material to turn into compost? These are the questions we will answer after our experiment is complete!

Materials

What will you need for this experiment?

- Empty 2-litre soda bottle
- Soil
- Leaves, grass, twigs, or other fruits or vegetables
- Anything else you will need to see completed

Method

How you will complete the experiment

1. Cut the top off the 2-litre soda bottle.
2. Remove the label so you can see inside the bottle.
3. Start with a layer of soil on the bottom.
4. Add a layer of compostable material.
5. Continue this process by alternating soil and organic material until the bottle is nearly full.
6. Add water to the bottle to start the composting. The water will help rot the organic material.
7. Put the composter in a place where it won't tip over and where it will get enough sun. The sunlight will also help rot the organic material.
8. Monitor the progress of the composter by checking it once a week. As an option, you could take a picture each week to record what is happening.



Diagram

Draw a diagram of your bottle with each layer. Label the diagram.



PREVIEW

Questions

Answer the questions below.

1) Why won't the composter work if you don't add water to it? **PREVIEW**

2) What did you notice happened to the organic material you put in the composter? What happened to it over time? How long did it take for anything to decay?

Name: _____

10

Scratch - Composting
(2.1)

Writing Code – Composting



Direction

Write code to move the waste to the compost bin.
Example: move down 3, move right 6.

Banana

run program

Cheese

run program

Fish

run program

Fish

run program

Chip Bag

run program

Nuts

run program

Types of Packaging

Different Types of Packaging Materials

Almost everything we buy comes in a package. Food, toys, electronics and more are usually wrapped in some form of package that protects the product inside. The problem is that all packaging is waste. This is because we don't buy the product for the packaging. The packaging is extra and unwanted. Some types of packaging are better for the environment than others. Check out the list below.



Plastic

Advantages Plastic has a low cost, is durable, lasts a long time, is light-weight, and is used in many different ways (shrink wrap, hard plastic covering, etc.).

Disadvantages Plastic is non-biodegradable, which means it won't break down naturally. It contributes to much plastic pollution. Some plastics can leak chemicals into the environment.

Advantages

Cardboard is a low-weight material for people to carry. Businesses can print their logo on cardboard. Cardboard can be easily recycled. Cardboard is biodegradable.

Disadvantages

Cardboard isn't as durable as plastic. It can be damaged by water (rain). Cardboard does not protect contents as well because it can be damaged (deformed) easily.

Aluminum

Advantages

Aluminum is 100 percent recyclable. It can be recycled back in a store in as little as two months. Aluminum has a recycle rate at 68 percent. It is also inexpensive.

Disadvantages

Aluminum is a non-renewable resource, which means when we run out of aluminum, it is gone forever. To make aluminum, a lot of energy is burned. Some research suggests that aluminum could be bad for our health.

Glass

Advantages

Glass keeps the contents fresh. No chemicals will leech into the food or drinks. Glass can store contents for a long time. Glass is 100 percent recyclable. They can be washed and reused as well.

Disadvantages

Glass costs a lot, which means the product costs more. It can be broken easily when being moved around. If glass is not recycled, it can take up to 1 million years to fully decompose.

Questions

Use information from the text to support your answer.

1) What is packaging? What are the four main types of packaging?

2) Why is choosing packaging materials an important choice? Explain some of the advantages and disadvantages in your answer.

Reflection

Which packaging material is the best?

True or False

Circle whether the statement is true or false.

1. Plastic is biodegradable and will break down naturally	True	False
2. Some plastics can be harmful to eat and drink out of	True	False
3. Cardboard is biodegradable and will break down naturally	True	False
4. Glass is biodegradable and better for the environment	True	False
5. All packaging needs to be recycled, especially glass, plastic, aluminum	True	False

STEM Assignment - Product Packing Machine

Today, companies are trying to make everything as automated as possible. This means they want robots to do as much of the work as they can.

Your task is to create a robot that can measure the size and weight of a product and then package it accordingly.

For example:

IF the product has a volume less than 100 cm^3

THEN package the product in a bag

IF the product has a volume between 100 cm^3 and 200 cm^3

THEN package the product in a small box



IF/THEN

Write your own

If the product has a volume less than 100 cm^3

THEN

If the product has a volume between 100 cm^3 and 200 cm^3

THEN

If the product has a volume between 200 cm^3 and 400 cm^3

THEN

If the product has a volume between 400 cm^3 and 800 cm^3

THEN

If the product has a volume greater than 800 cm^3

THEN

Name: _____

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Student Connection
(2.1)

Draw your packaging machine. Make sure you have:

- ✓ A place to put the product
- ✓ Where the packaging types will be stored (box, bag, etc.)
- ✓ A screen to tell you what is happening
- ✓ A start button
- ✓ A place for the package to go



PREVIEW

Questions

Answer the questions about your machine below.

1) How does your packaging machine work?

2) How will you use code? Write one example line of code for the machine to pack product.

3) How much does it cost to make your machine?

4) Who will you sell your machine to?

5) How much will you sell it for?

6) If you sell 5 machines today, how much money will you make? Remember to subtract how much the machine costs to make!

Decreasing Waste - The Three R's

Decreasing Waste

We all know that waste is not good for our environment. When waste ends up in our environment, it is pollution that affects our air quality as well as our ecosystems. Plants and animals suffer when we produce too much waste. That is why we all need to work together to decrease the amount of waste we produce.

The Three R's

To keep the planet healthy, Canadians and people around the world have been learning about the three R's: reduce, reuse, recycle. By following the three R's, we can decrease the amount of waste we produce.

Reduce

We can reduce waste by buying less. The less we buy, the less waste we will have. When we do buy things, make sure we use them and try to choose packages that are biodegradable or reusable. For example, buying plastic water bottles and then throwing them away is terrible for the environment.

We should reduce the amount of things we purchase by buying a reusable water bottle. We can also think about how many things we are buying. Sometimes we buy things we don't really need, and then we don't use them. Most of the time, these things end up as waste.

Reuse

Reusing items instead of throwing them away is another way to reduce waste. When we buy new items, we throw out our older stuff, which adds to the landfills and causes pollution. You should consider reusing or repurposing items before buying new. For example, you can reuse paper by writing on the back of a page or using scrap paper for less important things.

Recycle

Recycling is making new products out of already used materials that would have been otherwise thrown away. When we recycle materials, they are sent to factories to be sorted and eventually reused for new products. The recycled materials like plastic, cardboard, and metal are made into new products. This means those plastics, cardboards, and metals never end up as waste, since they are always being used.



Questions Use information from the text to support your answer

1) What can we do to decrease the amount of waste we make?

2) Which of the three R's do you need to work on the most?

Summarize What is the rest of the text about? Summarize using the important details

True or False Circle whether the statement is true or false

1. We need to decrease our waste to keep our environment healthy	True	False
2. Doing the three R's will decrease the amount of waste we make	True	False
3. We should recycle everything we are getting rid of	True	False
4. We can reduce the amount of things we buy	True	False
5. We don't need to worry about which type of package a product comes in	True	False

Activity - Build a Recycled Bird Feeder

Objective What are we learning more about?

To learn about recycling, repurposing, and helping animals.

Materials What do we need for our activity?

- 1) An empty plastic bottle
- 2) Two wooden spoons
- 3) String or yarn
- 4) Birdseed
- 5) Craft paint (optional)

Method How do we complete this experiment?



- 1) Clean the plastic bottle and remove any labels.
- 2) Ask an adult to help make two pairs of holes, one pair near the top and the other halfway up the bottle, large enough for the spoons to fit through.
- 3) Push the spoons through the holes so that they form an 'X' inside the bottle. The spoon handles will act as perches for the birds, and the birdseed will fall onto the handles.
- 4) Make two small holes near the top of the bottle and thread the string through them. This will be used to hang the bird feeder.
- 5) Fill the bottle with birdseed until the seeds are level with the spoons.
- 6) Screw the cap back onto the bottle.
- 7) If you want, you can paint and decorate the outside of the bottle with craft paint.
- 8) Find a tree in your backyard or a park and hang the bird feeder on a branch.
- 9) Watch and see what kinds of birds come to visit your bird feeder!

Plan Draw your bird feeder below**Questions** Answer the questions below

1) What materials did you reuse?

2) How did you help the environment with your bird feeder?

Beyond the Three R's

Beyond the Three R's

Waste is a big problem and the three R's are a great start to solving it. But there is more we can do to stop how much we are wasting. We should consider the new 7 R's! Calgary is the world's cleanest city, and they do it by having their residents follow the 7 R's. Beyond the three r's, we can add 4 more - Refuse, Repair, Regift, and Recover.

Refuse

The term refuse means all things left over after use. It is similar to waste, but waste means things that cannot be recycled. When we buy things, we should consider the packaging that will be leftover after we use the item. We should ask questions:

- Is this product available elsewhere with less packaging?
- Do I need this product?
- Is this product recycled?

Repair

We quite often buy new things because old things have stopped working. To cut down on waste, we should consider repairing what we already own. For example, our old shoes can have new soles put on them to allow them to last longer. We could also get old machines fixed before buying new ones.

Regift

If we have items that we don't like anymore, we shouldn't just throw them in the trash. Instead, we can regift them to someone who will appreciate them. If you post these items for free, you will quite often find someone who will love them. This means the item did not end up in the trash and it is helping someone else.

Recover or Rot (Compost)

We need to remember that organic waste is helpful for our environment. We should never throw away food scraps, glass clippings and other organic waste because we can compost it. Composting organic waste means the waste becomes nutrient rich soil. Allowing organic waste to rot in composters is good for our environment.



Questions Use information from the text to support your answer.

1) What can we do beyond the 3 R's?

2) Does the town you live in have thrift shops? Can you easily regift or sell some of your old stuff?

Making Connections What does reading tell you of in your life?

True or False Circle whether the statement is true or false.

1. Letting organic material rot is good for our environment	True	False
2. Throwing out old food is okay because it is old	True	False
3. We can reduce waste by regifting or reselling our old stuff	True	False
4. Refuse is only the leftover waste that can't be recycled	True	False
5. You can repair your old things so you don't have to throw them away	True	False

Exit Cards

Cut Out Cut out the exit cards below and have students complete them at the end of class.

Name: _____

Which type of waste is described?

1) Ben gives his old shoes away.	Regift
	Repair
2) Maya fixes her broken washing machine.	Refuse
	Repair
3) Liam posts free toys online.	Rot
	Regift
4) Ava composts fruit peels at home.	Rot
	Refuse
5) Emma says no to extra packaging.	Rot
	Refuse

Name: _____

Which type of waste is described?

1) Ben gives his old shoes away.	Regift
	Repair
2) Maya fixes her broken washing machine.	Refuse
	Repair
3) Liam posts free toys online.	Rot
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	Refuse

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	Repair
3) Liam posts free toys online.	Rot
	Regift
4) Ava composts fruit peels at home.	Rot
	Refuse
5) Emma says no to extra packaging.	Rot
	Refuse

Reselling – Online Marketplace Assignment

Objective What are we learning more about?

Have you ever heard the saying, "one person's trash is another person's treasure?" Well, it is true! We shouldn't throw our old things away. Instead, we can post these things for free or even for sale by using an online marketplace.

Instruction How do we complete the activity?

- 1) Ask each student to think of one item they have at home that they no longer need or want. It should be something that still in good condition and could be useful to someone else.
- 2) Discuss with students how to create a listing. Emphasize how this helps our community and also help other people.
- 3) Once they have chosen their item, have the students create an online marketplace post. They should include:
 - A title for their listing (e.g., "Gently Used Bicycle for Sale")
 - A description of the item, including its condition, color, size, and any other important details.
 - A reason why someone else might want or need this item.
 - A 'pretend' price or, if they choose to give it away, they can list it as 'Free'.
 - They can also draw a picture of their item to go with their listing.
- 4) Once they've created their listings, have the students present their items and explain why someone else might want or need them.
- 5) Discuss how the activity can be applied in real life and the benefits of reusing, recycling, and regifting.



Plan

Plan your sale item posting

1) What will the title of your listing be? Example: "Gently Used Bicycle for Sale"

2) A description of the item, including its condition, colour, size, and any other important details

3) Why might someone want to buy it?

4) What is the price for it?

5) Which city are you in?

6) Draw the object below.

PREVIEW

Name _____

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Listing

Create your listing below

Title	
Price	
Location	

Picture

PREVIEW

Seller's Description

Condition	New	Used – Like New	Gently Used	Used	Damaged
 Message	 Share	 Save	☒ Report Listing		

Role-Play: The 7 Rs

Objective

What are we learning about?

Students will show how the 7 Rs reduce waste in daily life. By acting out short scenes, they will choose actions that protect the environment and explain why their choices matter.

Materials

What do we need for our activity?

- Scenario cards (different situations) (provided)
- Props or costumes (optional)
- Timer or stopwatch



Instructions

How will we complete our activity?

- 1) Divide the class into small groups of 4 to 5 students.
- 2) Provide each group with a scenario card that outlines a realistic situation related to the topic being studied.
- 3) Give out roles to each student in the group, assigning them a character within the scenario, or let them decide and take roles.
- 4) If available, distribute props or costumes that may help students embody their roles more effectively.
- 5) Set the timer to allocate a specific amount of time for the groups to discuss and act out their scenarios.
- 6) Allow each group to present their role-play to the class.
- 7) After all groups have presented, initiate a class discussion to reflect on the different approaches and outcomes observed during the role-plays.
- 8) Distribute reflection sheets for students to express what they learned and felt during the activity.

Criteria

Use the criteria below to complete the activity.

Criteria	Description
Show the R	Your scene clearly shows one of the 7 Rs (reduce, reuse, recycle, refuse, rot, repair, regift). Say or show why it is the best choice.
Voice	Speak clearly and loud enough for all to hear. Use a voice that fits your character and the situation.
Actions & Props	Use simple, safe props and body movements to make the R easy to see and understand.
Stay in Role	Stay in your character from start to finish. Do not break role until the teacher says so.
Teamwork	Work on your own turns, and help each other. Start and finish on time.

Scenario Cards

Cut out these by _____

Scenario	Description
1 Reduce – Class Party Planner	The class plans a party. They have 3 choices: 1) big bins of drinks and tiny snack bags, or big pitchers and tiny snack bags. Students compare how much packaging each choice creates. Choice 1: much less packaging, lower cost, fewer bins to empty. Cons: no planning for allergies, someone must portion out everything. Decide which choice reduces waste the most and why.
2 Reuse – Art Club Supplies	The art club needs containers and trays. Instead of buying new, students collect jars, yoghurt tubs, and boxes from home. They wash and peel off labels. Pros: saves money, keeps items out of the bin, sturdy containers last. Cons: sticky glue, time to clean, some lids don't fit or aren't safe for paint water. Choose which items can be safely reused.

Scenario Cards

Cut out the topics below

3	Recycle - Sports Day Stations	After Sports Day, bins fill up with cans, paper programs, and food wrappers. Students run "recycling stations" and sort items using the town rules. Pros: metal, paper, and some plastics get made into new products. Cons: wrong items (like greasy pizza boxes) can spoil a whole bin; containers must be rinsed; not every plastic is accepted. Teams practise reading bin signs and fixing mistakes.
4	Refuse - Café and Fair Challenge	On a field trip, a café offers plastic straws and lots of napkins. At the fair, vendors hand out free tiny toys. Students practise polite ways to refuse. Pros: "No thanks, I don't need that." Cons: less clutter, less waste, less money to businesses. Cons: may feel awkward, sometimes no reusable items are available. Role-play refusing kindly and politely.
5	Rot (Compost) - School Garden Loop	The class starts a compost loop for the school garden. They sort banana peels, apple cores, tea bags into the green bin; foil and wrapper into the garbage. Pros: rich soil, less smell in garbage, fewer landfill trips. Cons: need a mix of greens and browns, can attract fruit flies. Cons: meat and dairy are not allowed. Plan how to keep it safe.
6	Repair - Backpack Rescue	A student's favourite backpack has a broken strap. The group checks a repair kit, watches a quick video, and decides what they can fix. Pros: keeps a loved item, saves resources and money. Cons: takes time and tools, some repairs need an adult or a shop, a fix might not last forever. Choose repair steps and when replacement is the better choice.
7	Regift - Winter Warm-Up Drive	Families clean closets for a community clothing drive. Students sort clean coats, boots, and mittens to match sizes and needs. Pros: items get a new life, helps neighbours, reduces buying new. Cons: must be clean and safe, not every item is needed, some things (like used helmets) shouldn't be regifted. Decide what to regift, what to recycle, and what to discard.

My Role

Draw a picture of what your character did during the role-play.

PREVIEW

Name _____

A3

Character Connection
4.3**Rubric**

How did you do on the activity?

Criteria	1 Point	2 Points	3 Points	4 Points
Show the R	R not shown or wrong; no reason.	R shows a little; reason unclear.	R is clear with a simple reason or example.	R is very clear; strong reason and a useful real-life tip.
Voice	Too quiet or hard to hear.	Sometimes clear; not steady.	Clear and fits the character.	Loud, clear, and very expressive.
Action Props	Some actions; props not used.	Some actions; props helped a bit.	Actions matched the R; props helped understanding.	Many clear actions; props used safely and very well.
Stay in Role	Left role sometimes.	Sometimes in role.	Mostly stayed in role.	In role the whole time.
Teamwork	Did not help or listen.	Helped a little; stayed on.	Helped, shared, stayed on.	Included everyone, shared, listened, and kept the group on time.

Teacher Comments**Student Comments – What Could You Do Better?**

How Long Does Garbage Take To Decompose?



Questions

Answer the questions below

1) What surprised you about how long garbage takes to decompose?

2) How does this graphic show the importance of recycling? What happens when we don't?

[illegible]

The Journey of Recycled Plastic

The Journey of Recycled Plastic

Have you ever wondered what happens to the plastic bottle after you toss it into the recycling bin? It goes on a fantastic journey to become something new!

Step 1: Collection

Our recycling journey begins at your house! When you throw a plastic bottle into the recycling bin, a recycling truck comes to pick it up. Recycling trucks go around your neighborhood to pick up all the recycled waste.

Step 2: Sorting

Next, the collected waste goes to a recycling center. Here, workers and machines sort out different materials like plastic, glass, and metals. Our plastic bottle is grouped with other plastic.

Step 3: Cleaning

Now, it's bath time for the plastic! The plastic waste has to go through a cleaning step! It's important to have clean plastic for the next step!

Step 4: Shredding

Once the plastic is clean and dry, it goes into a big machine that shreds it into tiny pieces. These pieces, or flakes, are easier to handle and process.

Step 5: Melting and Reshaping

The flakes are melted in a big oven. The melted plastic is then shaped into small pellets. These pellets can be used to make all sorts of new things!

Step 6: Making New Products

Finally, the pellets are sent to factories. There, they can be used to make new products like clothing, toys, and even new plastic bottles!



Name: _____

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Environmental Education
Unit 1

Poster

Draw a poster below that outlines the steps plastic takes to be recycled

PREVIEW

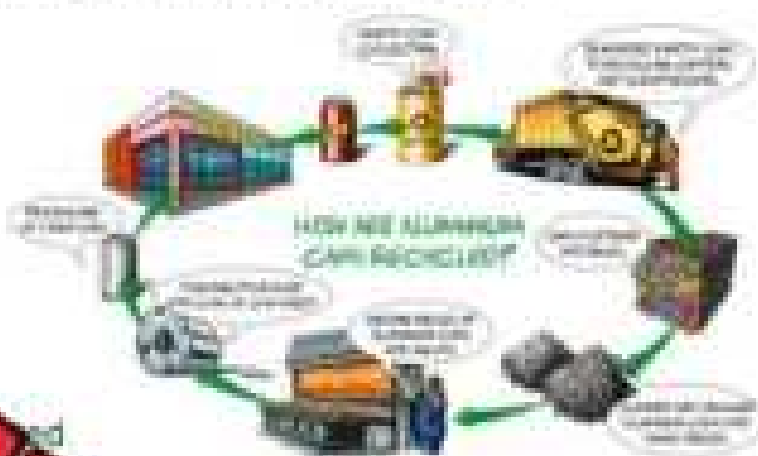
The Journey of Recycled Metal

The Marvelous March of Recycled Metal

Metal is an amazing material that can be recycled over and over again without losing its strength. Let's see how a piece of metal goes from trash to treasure!

Step 1: Collection

The adventure begins at home! When you finish with a metal item like a soda can, it goes into your recycling bin. A special recycling truck will come to your door and take all the cans to a recycling center.



Step 2: Sorting

At the recycling center, the metal is sorted from other materials. Different types of metal, like aluminum, steel, or copper, are separated. This is important because different types of metal need different recycling processes.

Step 3: Shredding

The sorted metal items are shredded into smaller pieces. This makes it easier to process and melt down. It's kind of like how it's easier to melt a small ice cube than a big one!

Step 4: Melting

The shredded metal is then placed in a large furnace and melted. Different metals melt at different temperatures. For example, aluminum melts at a lower temperature than steel.

Step 5: Purification

The melted metal is then purified. This step removes any remaining impurities so that we have clean, pure metal ready to be made into new things.

Step 6: Forming

The clean, melted metal is then poured into moulds where it cools and hardens. The metal might be shaped into big blocks called ingots, or into thin sheets, or even into wire.

Step 7: Making New Things

The new metal pieces are then ready to be used to make brand new items! This could be new soda cans, parts for a car, or even parts of a bicycle!

Name: _____

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Environmental Studies
Unit 1

Poster

Draw a poster below that outlines the steps metal takes to be recycled

PREVIEW

STEM Assignment - Recycling Sorting Machine

Much of the sorting of recyclables is done by machine. Here is how.

- 1) All recycling moves by magnets. The magnets separate the metal before being sent to the metal pile.
- 2) Cameras with artificial intelligence can separate paper from the rest
- 3) The rest of the materials are put in water. Glass will always sink to the bottom, which separates it from floating materials
- 4) Some things will float and others will sink. Therefore, the rest of the materials will be plastic.
- 5) Glass and other materials on the bottom will be separated by humans.

Imagine a machine that sorts recyclables. Finish the If/Then statements below to explain where the recycling will go and how it will be moved. Perhaps air jets?

IF/THEN

Write code for your program.

If the recycling is magnetic

THEN

If the cameras detect paper

THEN

If the recycling sinks to the bottom of the floatation tank

THEN

If the recycling floats

THEN

If the human detects glass

THEN

ELSE

Draw your invention or sorting assembly line. Make sure you have:

- ✓ A place to put the recycling
- ✓ Where the recycling will go
- ✓ The magnets, floatation tank, and cameras to separate the recycling



PREVIEW

Questions

Answer the questions about your machine below

1) How does your recycling sorting machine work?

2) How does your machine use code? Write one example line of code for the machine to sort the items.

3) How much does it cost to make your machine?

4) Who will you sell your machine to?

5) How much will you sell it for?

6) If you sell 3 machines today, how much money will you make? Remember to subtract how much the machine costs to make!

PREVIEW

Waste Management Issues

Waste Management

With the global population growing, the waste we produce is also growing, but at a much higher rate. People now have access to more material goods that they consume and then need to dispose of.

This is a serious problem for our environment, as the amount of waste is getting out of control. Waste management refers to the methods we use to handle the waste.



Waste Disposal Site

In many countries around the world, waste is collected at the source (home, business) and sent to a waste disposal site. The most common waste disposal site is most often incineration. Incineration means the garbage is burned. Many of the incinerators around Canada burn up to 200 truckloads of garbage a day. It is reported that up to 50% of the waste that goes into the incinerator is recycled.

Landfill Sites

Most people call a landfill site a dump. This is the opposite of a sanitary landfill. It involves dumping the garbage in a huge pile. The issue with landfill sites is that they are often fire hazards that can cause wildfires and forest fires. Dumps are also the ideal feeding grounds for rats who carry diseases that can spread to humans.

Sanitary Landfill

The other way the garbage is dealt with is through the use of sanitary landfills. At a sanitary landfill, a thin layer of waste is put into a trench alongside a layer of soil. This layering continues until the trench is full. A full trench looks like a large hill. Once the sanitary landfills are full, these places can be repurposed as golf courses or toboggan hills because of the hilly landscape.

Questions

Use information from the text to support your answer.

1) Why is waste management needed? Why is it becoming more challenging?

2) What do you think is the best way to manage waste?

Visualizing

Draw what you picture while you were reading.

Multiple Choice

Circle the correct answer.

1. Landfills can be repurposed for	Golf	Ponds
2. Most garbage is	Incinerated	Piled
3. Sanitary landfills layer garbage and	Waste	Soil
4. A landfill site is commonly called a	Heap	Dump
5. Dumps are feeding grounds for	Rats	Deer

Environmental Effects – Incinerating Waste

Why Do We Incinerate Waste?

We incinerate waste mainly because it helps reduce the amount of garbage we send to the landfill, and it can also produce energy. The process of burning waste, or incineration, can convert waste into heat energy.

This heat energy can be used to make electricity that powers homes and cities!



How Do We Incinerate?

Incineration works in three big steps:

- 1) First, trucks take the waste to the incinerator.
- 2) The waste is then put into a furnace, where it gets burned. This burning turns the waste into ash and gases.
- 3) The ash falls to the bottom of the furnace and is then moved to be put in a landfill. The gases rise into the atmosphere.

What Happens to the Environment?

Incineration can be helpful because it makes a lot of waste disappear. For example, burning 3 bags of trash can create just 1 bag of ash! But incineration also has some problems. Here are a few:

- **Air Pollution:** Even though the gases are cleaned, some pollution can still escape into the air. This pollution can include chemicals that are bad for our health and the health of animals.
- **More Waste:** The ash from incineration still needs to go somewhere, usually a landfill. So, we're still making waste.
- **Energy Use:** Incineration needs a lot of heat, which means using a lot of energy. This energy often comes from burning fossil fuels, which can add to climate change.

Exit Cards

Cut Out Cut out the exit cards below and have students complete them at the end of class.

Name: _____

Circle the word that fits on the blank.

1) We _____ waste to make less garbage.	incinerate
	recycle
2) Burning waste can produce _____ for cities.	compost
	energy
3) Incineration turns waste into _____ energy.	heat
	light
4) This _____ can make electricity for homes.	heat
	light
5) Some _____ pollution can still escape.	water
	air

Name: _____

Circle the word that fits on the blank.

1) We _____ waste to make less garbage.	incinerate
	recycle
2) Burning waste can produce _____ for cities.	compost
	energy
3) Incineration turns waste into _____ energy.	heat
	light
4) This _____ can make electricity for homes.	heat
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	air

Name: _____

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	light
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	air

Name: _____

Circle the word that fits on the blank.

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	energy
3) Incineration turns waste into _____ energy.	heat
	light
4) This _____ can make electricity for homes.	heat
	light
5) Some _____ pollution can still escape.	water
	air

Landfills - Benefits and Drawbacks

What are Landfills?

Landfills are like giant bins for our waste. They are places where we put things that we don't want or need anymore. From old toys to food scraps, lots of different waste can end up in a landfill.

The Benefits of Landfills

Landfills have some good things about them, too. Here are a few:



- ☑ **Space for Waste:** Landfills provide a place to put our garbage. Without landfills, our garbage might pile up in places where we live, work, and play.
- ☑ **Energy Production:** Some landfills collect and use the gas produced by rotting garbage to make electricity, which can power our homes and cities!

The Drawbacks of Landfills

But landfills also have some not-so-good things about them. Here are a few:

- ☑ **Takes up Space:** Landfills use a lot of land, and waste can take up more space than other things, like parks or homes.
- ☑ **Pollutes the Environment:** As garbage rots, it can make harmful gases. If these gases aren't collected, they can escape into the air and hurt the environment.
- ☑ **Harmful to Wildlife:** Landfills can be dangerous for animals. They might eat things that are bad for them or get stuck in the garbage.

Conclusion

Landfills play a big role in handling our waste. They have benefits, like providing space for our garbage and sometimes making energy. But they also have drawbacks, like taking up land and hurting the environment and wildlife. So, remember to reduce, reuse, and recycle to help cut down the amount of waste we produce!

Think What are the advantages and disadvantages of using landfills?

Advantages	Disadvantages

Making Connections How do you get rid of trash? Where does it go?

True or False Is the statement true or false?

1) Only food scraps can end up in a landfill.	True	False
2) Landfills don't use much land.	True	False
3) As garbage rots, it can make harmful gases.	True	False
4) Landfills are safe for animals.	True	False
5) Landfills can't be used for making energy.	True	False

Exit Cards

Cut Out Cut out the exit cards below and have students complete them at the end of class.

Name: _____

Mark

What are the benefits and drawbacks of landfills?

Benefits	
Drawbacks	

Name: _____

Mark

What are the benefits and drawbacks of landfills?

Benefits	
Drawbacks	

Name: _____

Mark

What are the benefits and drawbacks of landfills?

Benefits	
Drawbacks	

Name: _____

Mark

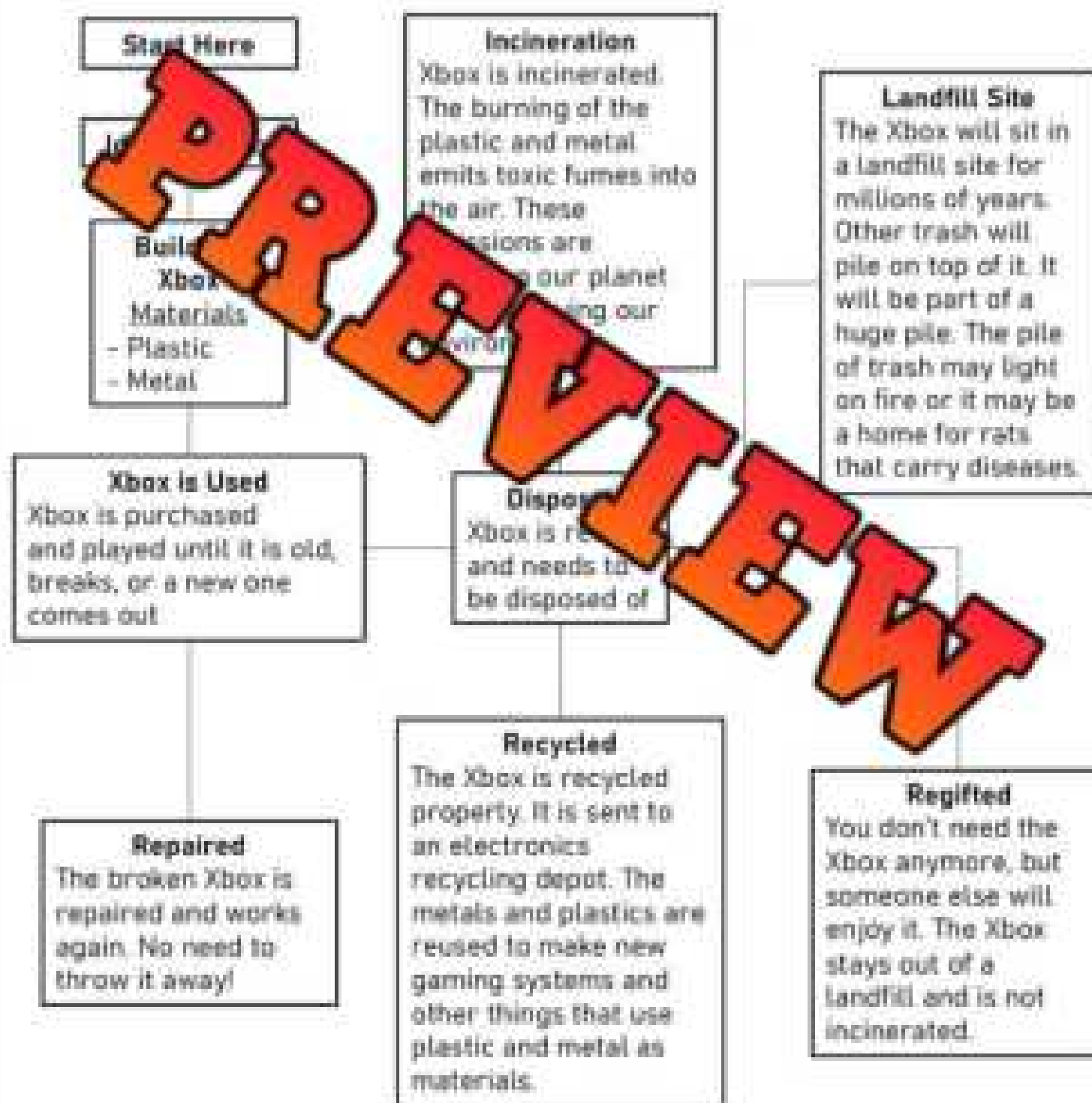
What are the benefits and drawbacks of landfills?

Benefits	
Drawbacks	

Life of a Consumer Product - Flowchart

Life of a Consumer Product

Check out the flowchart below to see the life of a consumer product (Xbox). Notice the different disposal methods.



Name: _____

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Instructions

Create your own flowchart like the one about the Xbox. Choose your own consumer product and be creative with your flowchart.

PREVIEW

Story - Journey of Robo the Robot

Draw

Illustrate the story by adding pictures to the book

The Journey of Robo the Robot

Once upon a time, there was a shiny robot named Robo. Robo was made from all sorts of parts like plastic, metal, and even some special electronic parts.

Robo had a friend, a girl named Emma. Emma loved to play with Robo. They would go on many adventures together, solve puzzles, and sometimes, Robo would help Emma with her homework.

As the years passed and Robo grew older, he started to break. First, it was Robo's screen that went blank. Then, his gears started to grind, and finally, one day, Robo just stopped working altogether. Emma was very sad.

PREVIEW

But Emma was a smart girl. She knew that tossing Robo was the best solution. Emma knew that if Robo was thrown away, he could end up in a landfill, where he would sit and rot for hundreds of years. Not only that, but the harmful substances inside Robo could leak into the ground and harm our earth. Emma also knew that incinerating, or burning Robo, would release toxic gases into the air. She didn't want Robo to harm the environment in any of these ways.

So, Emma and her mom decided to take Robo to a special place called the electronics recycling center. There, they met a kind lady who explained to Emma how they would help Robo start a new life.

Robo was first sorted based on its materials: the plastic was separated from the metal and the electronic parts were taken out. Then, these materials were cleaned and processed. The plastic was melted and turned into pellets, which could be used to make new toys or household items. The metal was also melted and could be used to make new electronics or even parts of a car.

Robo's electronic parts were the most special. They were carefully taken apart to remove precious metals like gold, silver or copper which can be used again in new electronics.

PREVIEW

PREVIEW

In this way, even though Robo was broken, its parts didn't end up in a landfill or get burned in an incinerator. Instead, they were given a new life in new products.

Emma felt happy knowing that Robo was helping to create new things and not harming the environment. She knew that Robo's adventure was not over, but it was just beginning anew. This made Emma understand the importance of recycling and how it helps to keep our environment clean.

Spelling Bee: Waste Management Vocabulary

Objective

What are we learning about?

Students will learn and spell key words about waste and waste management (e.g., landfill, recycle, compost, e-waste, incinerator). This builds vocabulary, supports understanding of how we handle waste, and increases confidence speaking in front of others.

Materials

What do we need for our activity?

- Pre-prepared word list (provided)
- Bell or buzzer to indicate correct spellings
- Timer (optional)

Instructions

How will we complete the activity?

- 1) Prepare a list of key words that connect to waste management. (provided)
- 2) Divide participants into teams or have them compete individually, based on class size and dynamics.
- 3) Clarify the rules, including turn-taking, scoring, and handling of mistakes.
- 4) Begin the bee by having the first participant spell a word from the theme list, noting their attempt on the board.
- 5) Use a signal device to indicate correct or incorrect responses and display the correct spelling for any mistakes.
- 6) Progress through participants, allowing multiple attempts and cycling through the word list.
- 7) Tally correct spellings to determine scores for each participant or team.



Spelling Terms

List of words for the Spelling Bee

Easy	Moderate	Hard	Very Hard
waste	landfill	incinerate	gasification
trash	rubbish	incinerator	pyrolysis
garbage	refuse	leachate	sustainability
compost	organic	hazardous	circularity
bin	composting	contamination	responsibility
bag	sorting	biodegradable	municipality
dump	collection	recycling post	conservation
reuse	sorting	hazardous	decontamination
reduce	cleanup	disposal	regulation
recycle	battery	microplastics	pollution
sort	sewage	photodegrade	sequestration
paper	methane	stewardship	remanufacture
plastic	dumpster	segregation	biodegradation
glass	upcycle	recovery	incineration
compost	odour	remediation	reclamation

Toxic Waste

What is Toxic Waste?

Waste is anything we need to get rid of. **Toxic waste** is any waste that is harmful to people, plants, or animals. When we get rid of toxic waste, we need to be careful as it could hurt other living things.

Toxic waste is often made by factories, construction sites, hospitals, and homes. Toxic waste can be flammable, corrosive, or reactive.

- **Flammable** - will catch fire easily. Examples: gas, oil, grease
- **Corrosive** - will burn, rot, or eat through materials. Example: battery acid
- **Reactive** - will explode easily. Examples: explosives, pressurized cans

Examples of Toxic Waste in our Households

At home, it is important to be careful with toxic waste. Do not throw away old batteries in the garbage or dump oils down the drain. Do not pour chemicals down the drain. These materials can cause fires, explode, or cause burns and rusting.

When living things in our environment come in contact with toxic waste, they can get sick by consuming it.

Cleaning supplies are usually forms of hazardous waste. Most cleaners are chemicals that are not natural. They do not break down in our environment and they can get into our drinking water and make humans and other animals sick. When we pour chemicals down the drain, we are making our drinking water toxic!



Name: _____

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Environmental Literacy
Unit 2

True or False

Is the statement true or false

1) Throwing out bread is toxic waste	True	False
2) Old batteries are toxic waste	True	False
3) Many house cleaners are toxic waste	True	False
4) Toxic waste can make living things sick	True	False
5) We should throw out toxic waste	True	False

Toxic?

Is it toxic or not?



Yes	No
-----	----



Yes	No
-----	----



Yes	No
-----	----



Yes	No
-----	----



Yes	No
-----	----



Yes	No
-----	----

Visualizing

Draw what you were picturing while you were reading. Explain the picture

Exit Cards

Cut Out Cut out the exit cards below and have students complete them at the end of class.

Name: _____ Mark: _____

Is the waste toxic? Yes or No? ☐

Old batteries	Yes	No
Banana peels	Yes	No
Leftover paint in a can	Yes	No
Used motor oil	Yes	No
Plastic water bottle	Yes	No
Broken glass jar	Yes	No
Empty pesticide bottle	Yes	No
Food scraps	Yes	No
Old medicine pills	Yes	No
Bleach from cleaning bottles	Yes	No

Name: _____ Mark: _____

Is the waste toxic? Yes or No? ☐

Old batteries	Yes	No
Banana peels	Yes	No
Leftover paint in a can	Yes	No
Used motor oil	Yes	No
Plastic water bottle	Yes	No
Broken glass jar	Yes	No
Empty pesticide bottle	Yes	No
Food scraps	Yes	No
Old medicine pills	Yes	No
Bleach from cleaning bottles	Yes	No

Name: _____ Mark: _____

Is the waste toxic? Yes or No? ☐

Old batteries	Yes	No
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Name: _____ Mark: _____

Is the waste toxic? Yes or No? ☐

Old batteries	Yes	No
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Broken glass jar	Yes	No
Empty pesticide bottle	Yes	No
Food scraps	Yes	No
Old medicine pills	Yes	No
Bleach from cleaning bottles	Yes	No

Medicine - Types and Disposal

Liquid and Solid Medicines

Most medicines come in liquid and solid forms. We take medicine when we don't feel well. The type of medicine we take depends on how we feel. When we have a headache, we might take a pain reliever. When we have a bad cough, we might take cough syrup. If we have a runny nose, we could take allergy medicine.

Taking Medicine Safely

There are two types of medicines - prescription medicine and over-the-counter medicine.

Prescription Medicine

When we get medicine from a doctor, it is called prescription medicine. You cannot buy prescription medicine from a store without a prescription saying you need it. It would be very dangerous to take a prescription medicine without a doctor telling you to.

It could make you very sick because the amount, strength, and type of medicine was not made for you. This is why you should never take medicine without a trusting adult.

When we get rid of a prescription medicine, we should not just throw it out. Instead, we should take it to a drug take back program. If we throw it in the garbage, someone else could find it and take it. Also, when it rains, the medicine will dissolve into the water. This means our drinking water could have medicine in it.

Over the Counter Medicine

When you get a cough or a headache, your parents might give you an over-the-counter medicine that they can buy from the store. This medicine can still be dangerous to take if you do not need it. Most medicines say to take it for only a few days because it can harm you if you use it everyday.

Never take an over-the-counter medicine without a trusting adult. There may be side-effects to taking it without food or taking too much. An adult can help you.



Name: _____

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Learning Objectives
10.1

True or False Is the statement true or false

1) Prescription medicine is made just for you	True	False
2) Over-the-counter medicine can be bought at the store	True	False
3) You need a doctor to give you over-the-counter medicine	True	False
4) It is okay to take over-the-counter medicine by myself	True	False
5) Over-the-counter medicine is not dangerous	True	False

Making a Decision Have you taken medicine before?

Questions Answer the questions below

1) What is the difference between over-the-counter medicine and prescription medicine?

2) Why should we not throw out medicine?

Handling Fluids Safely - WHMIS

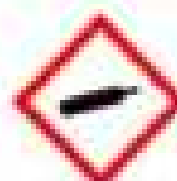
What is WHMIS?

WHMIS stands for the Workplace Hazardous Materials Information System. It is Canada's national hazard communication standard. WHMIS is needed to tell people about the fluids they will be handling. Many fluids we use at home or at work are hazardous. If used incorrectly, handled incorrectly, or stored or disposed of incorrectly, they can be dangerous.

To keep people safe, the government established the WHMIS program to ensure that workers receive consistent information and health and safety information about the products they may be exposed to. When someone gets a new job, they will receive WHMIS training, which teaches them how to read symbols put on the label of dangerous materials.



Explosive



Compressed Gas



Irritant



Flammable



Corrosive



Health Hazard



Oxidizing



Toxic



Environmental Hazard

WHMIS Symbols

Explosive	Explosives are highly unstable substances that could explode.
Compressed Gas	Gas is stored under pressure – be careful handling and disposing.
Irritant	Will immediately irritate skin, eyes, or respiratory tract.
Flammable	Will self-ignite when exposed to water or air.
Corrosive	Will cause corrosion/burns or eye damage on contact.
Health Hazard	A cancer-causing agent or substance that causes damage over time.
Oxidizing	Chemicals that facilitate burning or make fires burn hotter/longer.
Toxic	Substances, such as poisons that have an immediate and severe toxic effect.
Environmental Hazard	Chemicals toxic to aquatic wildlife.

Questions

Use information from the text to support your answer.

1) What is WHMIS? Why was it created?

2) Before WHMIS was created in 1998, what issues could have happened in the workplace?

Instructions

Label each hazard symbol.

Explosive

Compressed Gas

Irritant

Flammable

Corrosive

Health Hazard

Oxidizing

Toxic

Environmental Hazard



Matching

Match the description to the name of the safety symbol.

Answer	Safety Symbol	Description
	Explosive	a) Will cause corrosion/burns or eye damage on contact
	Compressed Gas	b) Gas is stored under pressure – be careful handling, storing, and disposing
	Irritant	c) Substances, such as poisons that have an immediate and severe toxic effect
	Flammable	d) A cancer-causing agent or substance that causes damage over time
	Corrosive	e) Will immediately irritate skin, eyes, or respiratory
	Health Hazard	f) Gases are highly unstable substances that
	Oxidizing	g) Harmful to aquatic wildlife
	Toxic	h) Chemicals that catch fire or make fires burn hotter
	Environmental Hazard	i) Will self-ignite in contact with water or air

Word Search

Find the words from the word bank in the

Explosive	Gas
Compressed	Hazard
Environmental	Oxidizing
Irritant	Toxic
Flammable	Health
Corrosive	Hazard

Q	H	R	T	P	G	L	E	C	K	N	X	V	C	Z	P	U
Y	F	L	A	M	M	A	B	L	E	I	R	M	O	T	T	Q
H	A	Z	A	R	D	H	A	Z	A	R	D	W	M	O	E	F
O	X	I	D	A	T	I	N	G	Y	Z	B	K	P	X	I	X
Q	F	V	H	R	B	B	D	F	M	V	W	E	R	I	A	U
I	R	R	I	T	A	N	T	I	W	G	N	T	E	C	S	I
K	J	W	H	I	L	A	U	E	X	P	L	O	S	I	V	E
Y	F	M	H	E	A	L	T	H	T	T	G	A	S	J	D	V
E	N	V	I	R	O	N	M	E	N	T	A	L	E	G	I	P
C	O	R	R	O	S	I	V	E	X	C	T	R	D	G	F	P

Many products we buy are hazardous chemicals that need to be used properly and disposed of properly.

Your task today is to find different products online that have the safety symbols below. You can go online to a hardware store where chemicals are sold. Search for different cleaners, oils, batteries, fireworks, and acids.



Find

Answer the questions below

1) Find a product that is flammable. Draw the symbol, product name, and picture of the product.

Symbol	Product Name Picture of Product

2) Find a product that uses compressed gas. Draw the symbol, product name, and picture of the product.

Symbol	Product Name	Picture of Product

Find Answer the questions below

3) Find a product that is corrosive. Draw the symbol, product name, and picture of the product.

Symbol	Product Name	Picture of Product

4) Find a product that is flammable. Draw the symbol, product name, and picture of the product.

Symbol	Product Name	Picture of Product

5) Find a product that is explosive. Draw the symbol, product name, and picture of the product.

Symbol	Product Name	Picture of Product

Questions

Answer the questions below using evidence from the text

1) Why is it important to get rid of e-waste properly?

2) How can you get rid of your e-waste?

Draw

Draw picture of _____

True or False

Is the statement true or false?

1) E-waste means unwanted electronic devices.	True	False
2) E-waste can include video games and televisions.	True	False
3) It's safe to throw e-waste in regular trash.	True	False
4) E-waste can contain harmful things like lead.	True	False
5) There are precious metals like gold in electronics.	True	False

Classifying Types of Waste

Classifying Types of Waste

All waste can be classified into one of the following 5 categories: liquid, solid, organic, hazardous, and recyclable. Some waste belongs to more than one category. For example, cardboard is recyclable and is also a form of solid waste. Check out the example below of how waste can be classified.



Your Turn

Come up with some examples of _____ forms of waste below



Did any of the waste you chose belong to two different categories of waste? Explain.

Identify the Types of Waste

Directions Circle the type of waste it is. There may be more than one option to circle.

 Soap	Liquid Solid Organic Hazardous Recyclable	 Motor Oil	Liquid Solid Organic Hazardous Recyclable
 Pizza	Liquid Solid Organic Hazardous Recyclable	 Cardboard Box	Liquid Solid Organic Hazardous Recyclable
 Tin Can	Liquid Solid Organic Hazardous Recyclable	 Apple Core	Liquid Solid Organic Hazardous Recyclable
 Old TV	Liquid Solid Organic Hazardous Recyclable	 Juice	Liquid Solid Organic Hazardous Recyclable
 Glass Jar	Liquid Solid Organic Hazardous Recyclable	 Meat	Liquid Solid Organic Hazardous Recyclable

Memory Game – Match Terms and Definitions

Objective

What are we learning about?

Students will review and understand key terms by playing a memory match game. Each card shows either a vocabulary term or a short definition. Students will match the correct pairs and explain the meaning in their own words.

Materials

What do you need for the activity?

- Set of Memory Game cards (provided)
- A small table or clear floor space



Instructions

How will you complete the activity?

- 1) Divide the class into groups of 3 or 4. Give each group a set of Memory Game cards (provided).
- 2) Have each group lay all the cards face down in a grid on the table.
- 3) The students take turns flipping over two cards at a time, trying to find a matching term and its definition.
- 4) If a student finds a match, they remove those cards from the grid and keep them.
- 5) If the cards do not match, they are turned back over, and the next student takes a turn.
- 6) The game continues until all the cards have been matched.
- 7) After the game, review the terms and definitions with the class.
- 8) Discuss why these terms are important to understand and how they relate to the topic.

Cards

Memory Game Cards

liquid waste

Waste in liquid form, like wastewater, oils, or chemicals, needing treatment to protect nature.

organic waste

Everyday trash we can touch, like wrappers, toys, paper. Some gets reused or recycled.

hazardous waste

Natural leftovers from plants and animals, like food scraps and manure. Great for compost.

recyclable waste

Dangerous items like batteries, paint, or chemicals that can harm people, animals, and water.

Items that can be processed into new products, such as paper, glass, metal, and some plastics.

PREVIEW

Cards

Memory Game Cards

e-waste

Old or broken electronics, like phones, computers, or TVs, needing special recycling to remove metals.

toxic waste

Canada's system of symbols and rules that teach safe handling of hazardous products at work.

landfill

A place where hazardous waste that harms living things; it is often stored and buried.

incinerating waste

A large, enclosed area where garbage is piled and covered to protect soil and water.

Burning waste in special furnaces to reduce volume and sometimes make energy; it can cause pollution.

Cards

Memory Game Cards

consumerism

The habit of buying more and more things, which often creates extra packaging and waste.

decomposers

Turning organic waste into nutrient-rich soil by letting it break down in a compost bin.

biodegradable

Things like worms, fungi, and bacteria that break down dead matter into nutrients.

waste management

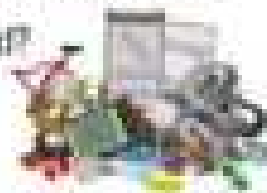
Able to break down naturally in the environment. Biodegradable materials, often with help from decomposers and moisture.

How communities reduce, collect, sort, recycle, treat, and safely dispose of different wastes.

Wasted Materials in the Classroom

When students bring a lunch from home, they often have things to throw out after lunch. If you look in the garbage after lunch, what things will you find?

Are there any materials in there that could have been recycled?



When you put things in the garbage, it is either burned or put in a landfill. If garbage goes to a landfill, it stays there forever, until it decomposes.

Question What do you see in the garbage after lunch?

	Name
1)	
2)	
3)	
4)	
5)	

Draw things you see in the garbage

Question Are there things that could have been recycled?

	Name
1)	
2)	
3)	

Draw things that could have been recycled

Plan – Less Waste in Our Class

Waste is not good for our environment. To make less waste in your class, here are some ideas you could do.

- 1) No waste lunches – bring only food that you will eat and eat all your lunch!
- 2) Use environmentally friendly packaging – get your parents to pack your lunch with no single-use plastics. Instead, use reusable bags.
- 3) Set up a bin for food scraps in the compost, not the garbage.
- 4) Use both pages of paper. Ask your teacher to print on both sides and use scrap paper for notes. Keep a bin for paper that is Good On One Side.
- 5) Use only reusable water bottles. Use a reusable water bottle.
- 6) Don't throw things out. If you have things you don't want anymore, don't throw them away. Instead, give them to other people.



Plan

What can your class do to make less waste?

Ideas

1)

2)

3)

Unit Test – Matter: Waste Unit**Multiple Choice**

/10

1) Compost can be made from: a) Fruits b) Metals c) Plastic d) Glass	2) Worms in compost help to: a) Eat b) Swim c) Sleep d) Decompose
3) E-waste includes: a) Appliances b) Tables c) Computers d) Books	4) Incineration means: a) Using a landfill b) Recycling waste c) Using less d) Burning waste
5) Plastics should be... a) Recycled b) Thrown in the garbage c) Incinerated d) Used a lot for packages	6) Motor oil is what type of waste? a) Liquid waste b) Solid waste c) Gas waste d) Hazardous waste
7) Batteries are what type of waste? a) Liquid waste b) Solid waste c) Gas waste d) Hazardous waste	8) Cheese should be: a) Recycled b) Thrown in the garbage c) Incinerated d) Composted
9) Which is not one of the 7 Rs? a) Reduce b) Reuse c) Require d) Repair	10) Which can't be recycled? a) Chip bags b) Cardboard c) Tin can d) Plastic bottle

Define

What do the terms below mean? Each question is worth 3marks.

Mark

/ 3

Term	Definition - What does it mean?
Waste	
Hazardous Waste	
Flammable Material	

Short Answer

Questions below - Each question is worth 2marks.

Mark

/ 6

1) Why is it helpful to have a waste management plan?

2) What is the role of the Lieutenant-Governor in waste management?

3) Give 2 examples of each of the types of waste:

Solid	
Liquid	
Gas	

1) What can you do to reduce the amount of waste you make? Give at least 5 ways.

2) How is waste managed? Where does it go? Why is it important to manage waste properly?



Workbook Preview



Grade 4 – Science Unit

Organizing Idea: Earth Systems: Understandings of the living world, Earth, and space are deepened by investigating natural systems and their interactions.

Guiding Question: How does Earth sustain life?

	Learning Outcome – Students investigate the systems of Earth and reflect on how their interconnections sustain life	Pages
ES.1	Earth scientists call Earth's systems the spheres, including the lithosphere, atmosphere, hydrosphere, biosphere. The lithosphere is the outer layers of Earth's surface, is made of rocks, contains soils and minerals that support life. The atmosphere is a gas layer that surrounds Earth, warms Earth's surface, reduces extremes of temperature, contains oxygen, which is used for breathing.	7-31 40-46 65 76
ES.2	Sunlight is more direct at the equator than at the poles. The long-term temperature at the equator is warmer than it is at the poles. In Alberta, sunlight is more direct, and the length of daylight is longer, in summer than in winter.	77-90
ES.3	Water is a basic need for plants and animals. Water provides habitat for many organisms. First Nations, Métis, and Inuit laws of nature honour water as being sacred because water sustains life. Laws of nature guide First Nations, Métis, and Inuit in their responsibility to protect water and sources of water. First Nations, Métis, and Inuit laws of nature include: how nature provides gifts of life, living in harmony with the land.	64-73

**Preview of 100 pages from
this product that contains
225 pages total.**

	Learning Outcome – Students investigate the systems of Earth and reflect on how their interconnections sustain life	Pages
ES.4	Changes in one system that can impact another system include changes in number of organisms, food sources, habitat, water distribution and cleanliness, weather patterns Governments, conservation groups, and First Nations, Métis, and Inuit communities collaborate with Parks Canada to conserve, restore, and protect Canada's natural and cultural heritages through initiatives such as: culture camps, science camps, land management and preservation of important sites, cultural centres	104-109
ES.5	Natural resources are materials from nature that are used to meet human needs, and include: air, water, soil, minerals, metals, forests, organisms	91-103
ES.6	Conservation is the preservation and protection of Earth's systems from pollution, depletion, or extinction. Conservation practices can be implemented in natural and human-made areas. Conservation can involve creating local, provincial, and national parks. First Nations, Métis, and Inuit have a long history with the land that has informed conservation practices and beliefs.	110-118, 130-136
ES.7	Conservation can be practised through personal actions, including: use of electricity, e.g., turning off lights when leaving a room, use of water, e.g., taking shorter showers, reducing waste, e.g., using reusable packaging Conservation can be practised through community or global actions, such as: use of energy-efficient alternatives, e.g., solar panels, supplying water to support crops (irrigation), community recycling or composting programs	126-129, 137-149
Computer Science		
CS.1	Students examine and apply design processes to meet needs.	32-39, 47-51, 119-125

NAME: _____

EARTH SYSTEMS

PREVIEW



Earth's Systems: The Four Spheres

Introduction

Our Earth is made up of different parts, or systems, also known as spheres.

These four spheres include the Lithosphere, Atmosphere, Hydrosphere, and Biosphere.

The Lithosphere

The Lithosphere is the rocky part, including the crust and upper mantle. It's the ground, mountains we climb,



The Atmosphere

The Atmosphere is a layer of gases surrounding Earth. It gives us with the air we breathe and protects us from space's harsh conditions. It also traps heat and the warmth of the sun.

The Hydrosphere

The Hydrosphere includes all the water on Earth, in lakes, rivers, glaciers, underground, or in the ocean. It's the water we drink and the rain that waters plants. It's very important as water is necessary for all known forms of life.

The Biosphere

Lastly, the Biosphere is where all life exists. The biosphere includes all living organisms on Earth, including humans, animals, and plants. It overlaps with parts of the other spheres, including forests (lithosphere), coral reefs (hydrosphere), and birds (atmosphere).

Name _____

8

Geography: Continents
(3.1)**True or False**

Circle whether the statement is true or false

1) The Lithosphere is made up of gases.	True	False
2) We breathe in air in the Atmosphere	True	False
3) The Hydrosphere includes all the water on Earth	True	False
4) The Atmosphere is the solid part of the Earth	True	False
5) Birds are part of the Lithosphere.	True	False

Describe

Describe each of the spheres below

Lithosphere	
Atmosphere	
Hydrosphere	
Biosphere	

Questioning

Write 3 questions you have about Earth's systems/spheres

1)	
2)	
3)	

Exit Cards

Cut Out Cut out the exit cards below and have students complete them at the end of class.

Name: _____

Mark

Circle the answer for each question.

1) Where do trees and animals live?	Lithosphere	Biosphere
2) Which sphere includes rivers and oceans?	Hydrosphere	Atmosphere
3) Which sphere contains air and weather?	Atmosphere	Hydrosphere
4) Mountains and rocks belong to which?	Biosphere	Lithosphere
5) Glaciers and groundwater are in which?	Hydrosphere	Lithosphere

Name: _____

Mark

Circle the answer for each question.

1) Where do trees and animals live?	Lithosphere	Biosphere
2) Which sphere includes rivers and oceans?	Hydrosphere	Atmosphere
3) Which sphere contains air and weather?	Atmosphere	Hydrosphere
4) Mountains and rocks belong to which?	Biosphere	Lithosphere
5) Glaciers and groundwater are in which?	Hydrosphere	Lithosphere

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4) Mountains and rocks belong to which?	Biosphere	Lithosphere
5) Glaciers and groundwater are in which?	Hydrosphere	Lithosphere

Name: _____

Mark

Circle the answer for each question.

1) Where do trees and animals live?	Lithosphere	Biosphere
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3) Which sphere contains air and weather?	Atmosphere	Hydrosphere
4) Mountains and rocks belong to which?	Biosphere	Lithosphere
5) Glaciers and groundwater are in which?	Hydrosphere	Lithosphere

The Lithosphere: Earth's Outer Layer

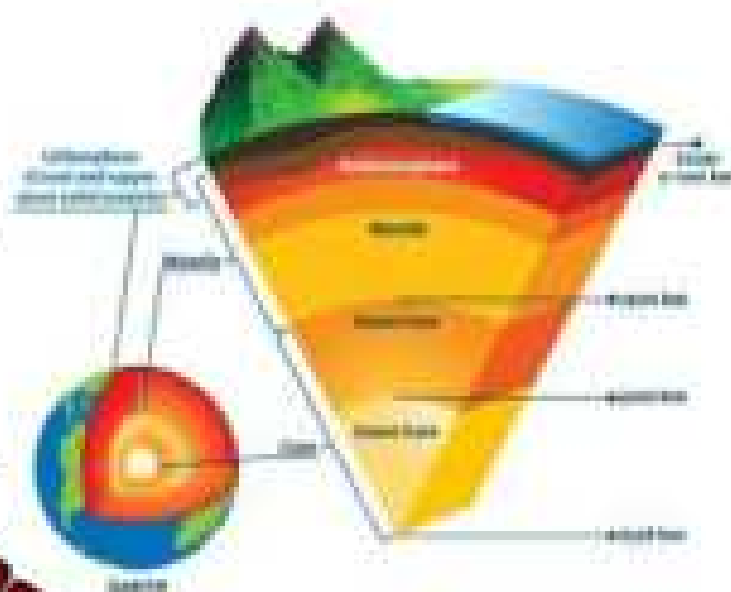
What is the Lithosphere?

The lithosphere is the top layer of the Earth's surface. When you walk on the ground, climb a hill, or touch a rock, you are in contact with the lithosphere.

Layers

The lithosphere is made up of the two layers of the Earth's crust.

- **The Crust:** This is the top layer of the lithosphere that we walk on daily. It includes the continents and the ocean floor.
- **The Upper Mantle:** Beneath the crust is the upper mantle. Even though it's rocky, it's very, very hot, and parts of it can move slowly.



What's in the Lithosphere?

The lithosphere is mostly made of rocks. These rocks can be as small as a grain of sand. There are three types of rocks in the lithosphere: igneous, metamorphic, and sedimentary.

How Does the Lithosphere Help Life?

The lithosphere helps life in many ways:

- **Soils:** The lithosphere has soil, which is made of tiny rock pieces and stuff from dead plants and animals. The soil gives plants a place to grow and holds water.
- **Minerals:** The lithosphere has minerals too. Minerals are found in rocks. They are things like iron, calcium, and potassium. Plants and animals need minerals.

True or False

Circle whether the statement is true or false

1) The crust is part of the lithosphere	True	False
2) The lithosphere is made up of only one layer	True	False
3) The upper mantle is cooler and more solid than the crust	True	False
4) The lithosphere can contain rocks as big as mountains	True	False
5) Minerals are not found in the lithosphere	True	False

Question Answer the questions below using evidence from the text.

1) What is the lithosphere?

2) Why do we need the lithosphere? How does it support life?

Visualizing

Draw what you were picturing while you were reading. Explain the picture.

	_____

The Rock Cycle

The Rock Cycle

The **Rock Cycle** is the process by which rocks change forms from one type to another.

There are three main kinds of rocks:

igneous rock, metamorphic rock, and

sedimentary rock. Each type of rock can

change through the

following processes: compacting,

cementing, weathering, and

heating, and pressure.

Magma and Sediment

Magma and sediment are substances that

become rocks and enter the rock cycle. Magma is liquid and is underground.

Sediments are particles from rock erosion. Weathered rocks and sediments eventually will become sedimentary rock in the future.

Igneous Rock

Igneous rock is hardened magma that can happen below or above the ground. It can become one of the other types of rocks through the following processes: melt into magma, eroding into sediment, or be compacted and pressurized to become metamorphic.

Metamorphic Rock

Metamorphic rock is igneous or sedimentary rock that has been heated and squeezed under heat and pressure. It can erode into sediment or melt into magma.

Sedimentary Rock

Sedimentary rock is compacted sediment. Sediment can be in the form of tiny rock materials or remains of living things. When these tiny materials are compacted together, they form a weak rock known as sedimentary rock.



True or False

Circle whether the statement is true or false.

1. Metamorphic rock is hardened magma	True	False
2. Rocks can change forms under physical processes like heating	True	False
3. Sediments are big chunks of rock	True	False
4. A sedimentary rock is very strong and tough to break	True	False
5. Igneous can be compacted to become metamorphic	True	False

Question 1 Write answers to questions below using evidence from the text.

1) What is the

2) How can rocks change from one form into another?

Summarize

What is the main idea and supporting details from the reading passage?

Exit Cards

Cut Out Cut out the exit cards below and have students complete them at the end of class.

Name: _____

Circle the answer for each question.

What is underground liquid rock called?	Lava	Magma
Which rock forms when magma hardens?	Igneous	Metamorphic
Which process wears rocks into pieces?	Weathering	Erosion
Which process turns sediment into rock?	Cementing	Melting
Which rock forms from heat and pressure?	Sedimentary	Metamorphic

Name: _____

Circle the answer for each question.

What is underground liquid rock called?	Lava	Magma
Which rock forms when magma hardens?	Igneous	Metamorphic
Which process wears rocks into pieces?	Weathering	Erosion
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Circle the answer for each question.

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Which process wears rocks into pieces?	Weathering	Erosion
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Which rock forms from heat and pressure?	Sedimentary	Metamorphic

Fact or Fiction: Rock Cycle Edition

Objective

What are we learning about?

To help students learn about the rock cycle by listening to true and false statements about igneous, sedimentary, and metamorphic rocks, as well as the processes that change them over time.

Materials

What do you need for the activity?

- Fact or Fiction signs
- A 'Fact' sign and a 'Fiction' sign to place on each side of the room
- Designated areas in the classroom for the 'Fact' and 'Fiction' signs, allowing space for students to move to either side

FACT
OR
FICTION



Instructions

How will you complete the activity?

1. Your teacher will read statements. Pay close attention as each statement is read.
2. Consider carefully whether you think the statement is true or false.
3. If you decide the statement is true, walk to the 'Fact' side of the room.
4. If your guess is that it's not true, move to the 'Fiction' side of the room.
5. Stay on your chosen side and listen attentively for the correct answer to be revealed.
6. When the right answer is announced, return to your seat, ready for the next round.
7. Have fun getting up and moving!

Fact or Fiction

Read the statements to the class.

#	Statement	
1	The rock cycle shows how rocks can change from one type to another.	Fact
2	Igneous rocks are formed when sand and shells press together.	Fiction
3	Metamorphic rocks are made when heat and pressure change existing rocks.	Fact
4	Sedimentary rocks form from layers of materials like sand, mud, and tiny fossils.	Fact
5	Rocks are forever and never change.	Fiction
6	Lava that cools on Earth's surface makes igneous rock.	Fact
7	Sedimentary rocks form underground when magma hardens.	Fiction
8	Only igneous rocks can become metamorphic rocks.	Fact
9	Metamorphic rocks can turn back into igneous rocks.	Fact
10	Sedimentary rocks can contain fossils of plants and animals.	Fact
11	Weathering and erosion break rocks into small pieces that form sedimentary rocks.	Fact
12	Igneous rocks can become sedimentary rocks through weathering and compaction.	Fact
13	Rocks in the cycle can only move in one direction.	Fiction
14	The rock cycle is part of Earth's natural systems.	Fact
15	All rocks begin as sedimentary rocks.	Fiction
16	Magma is melted rock found beneath Earth's surface.	Fact
17	Metamorphic rocks can become sedimentary if they are broken into pieces.	Fact
18	Metamorphic rocks are formed only from melted lava.	Fact
19	Rocks can change from one type to another many times.	Fact
20	Sedimentary rocks form when lava hardens quickly.	Fiction

**Quiz
Check-In**

This quiz will assess students' understanding of the concepts covered in the Fact or Fiction activity. Cut along the lines and give each section to a student.

Name: _____

Mark

Is the statement true (T) or false (F)?

1. Sedimentary rocks are formed from layers of sand, mud, or shells.	T	F
2. Igneous rocks always form deep underground.	T	F
3. Heat and pressure can change rocks into metamorphic rocks.	T	F
4. The rock cycle only goes in one direction.	T	F
5. Magma is melted rock found under Earth's surface.	T	F
6. Weathering and erosion can break rocks into sediments.	T	F

Name: _____

Mark

Is the statement true (T) or false (F)?

1. Sedimentary rocks are formed from layers of sand, mud, or shells.	T	F
2. Igneous rocks always form deep underground.	T	F
3. Heat and pressure can change rocks into metamorphic rocks.	T	F
4. The rock cycle only goes in one direction.	T	F
5. Magma is melted rock found under Earth's surface.	T	F
6. Weathering and erosion can break rocks into sediments.	T	F

Name: _____

Mark

Is the statement true (T) or false (F)?

1. Sedimentary rocks are formed from layers of sand, mud, or shells.	T	F
2. Igneous rocks always form deep underground.	T	F
3. Heat and pressure can change rocks into metamorphic rocks.	T	F
4. The rock cycle only goes in one direction.	T	F
5. Magma is melted rock found under Earth's surface.	T	F
6. Weathering and erosion can break rocks into sediments.	T	F

Underground Drones

History of Drones

A **drone** is an aircraft with no on-board crew or passengers. Drones are also called "Unmanned aerial vehicles" (UAVs). Drones are controlled by a remote control.

The first drone was made in Britain during the First World War. It was named "Britain's Aerial Target." It was tested and showed promise, but it wasn't used in the war.

Fast forward over 100 years, and drones are now in many different ways, from monitoring crops to carrying out search and rescue operations after natural disasters.

Underground

Mining companies have used drones to help their mining projects. Drones go into mines to search caves, collect samples, and map underground tunnels.



Underground drones are useful in the following ways:

- ✓ They have technology that can record the conditions underground.
- ✓ They can identify geological features like caves, rivers, and lakes.
- ✓ They can send quality videos of what miners can expect to find underground.
- ✓ They can map out any dangerous areas before sending miners down.

The technology has only been around since 2017, but it will be very useful. Being able to send drones underground to learn more about a mine will keep humans safer.

In the past, human surveyors were sent deep into these mines to do the research themselves. Drones will save them from potential collapses, unsafe gas conditions, and from getting trapped underground.



Drone Operators

A new job industry is becoming more popular as drones are being used more and more. To get into the drone industry, you'll need A Transport Canada Advanced RPAS Pilots License and a Class 5 Driver's License.

True or False

Is the statement true or false?



1) An underground drone can map out an underground mine	True	False
2) Underground drones will save people's lives	True	False
3) You can drive a drone as a professional without a license	True	False
4) Drones can be sent into dangerous areas to protect humans	True	False
5) Underground drones have been around a very long time	True	False

Questions

Answer the questions below

1) Is the mining industry growing? What can drones be used for?

2) How is science and technology helping miners? What if the underground drone technology, how are humans affected?

Visualizing

Draw what you were picturing while you were reading. Explain the picture.

IF/THEN Statements - Underground Drones

Directions

Follow the if/then statements to move the drone to the gold

1)	If sedimentary rock is the softest	then	Move down 3 spots
2)	If heat and pressure change rocks	then	Move right 5 spots
3)	If metamorphic rock is the weakest	then	Move left 4 spots
4)	If rocks are cooled lava	then	Move down 2 spots
5)	If combination of minerals	then	Move right 3 spots
6)	If heat	then	Move down 1 spot
7)	If steel with	then	Move left 3 spots
8)	If rocks can be	then	Move left 7 spots
9)	If rocks and minerals	then	Move right 2 spots
10)	If sediments are small particles	then	Move down 1 spot



Writing Code - Underground Drones

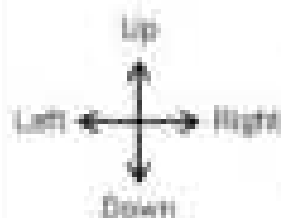
Nova is a robot drone that helps gather information about underground mines. Nova is controlled by a remote control.



Mining

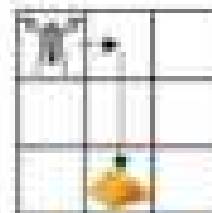
Use the map to write code on the back of the page



**Commands** - Use the example below to learn the code.

Move 1 right

Move 2 down

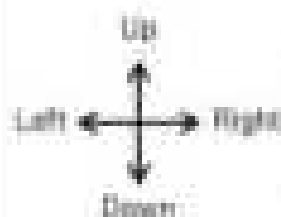
**Mining**

Tell Nova where to dig so that they get to all the materials

1) Find the copper and emerald

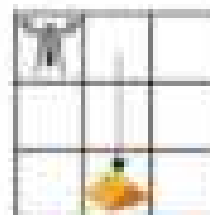
2) Find the platinum and diamond

3) Find the silver, graphite, and granite

**Commands** - Use the example below to learn the code.

Move 1 right

Move 2 down

**Mining**

Collect the minerals/rocks below using as few lines of code as possible.
You can pick up the rocks/minerals in any order.

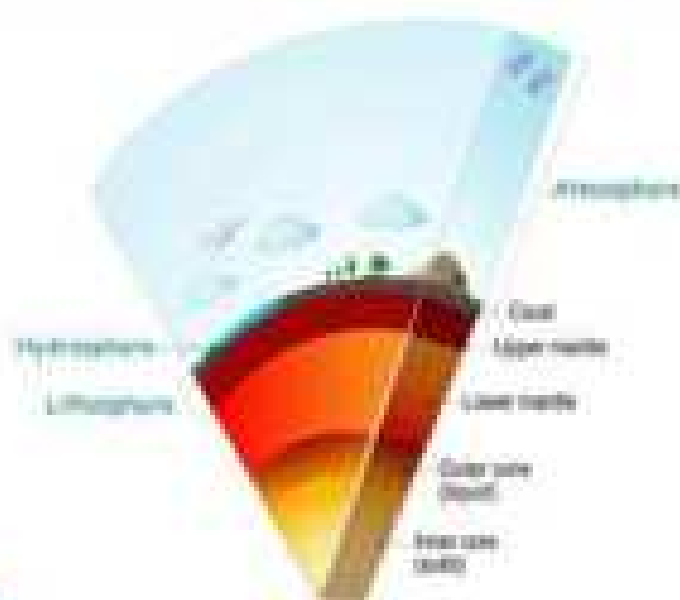
4) Find the iron ore, copper, diamond, gold, and emerald.

5) Find copper, bronze, obsidian, granite, silver, and iron ore. Don't touch the lava!

The Atmosphere: Earth's Invisible Shield

What is the Atmosphere?

Think of Earth wearing a giant, invisible coat. That's what we call the atmosphere! It's a layer of gases that goes all around our planet. Without this protective coat, Earth would be much different, and not very friendly at all.



Keeping Earth Warm

One of the cool jobs of the atmosphere is to keep Earth warm. During the day, the Sun gives its heat to the Earth. But when the Sun sets at night, the heat tries to escape into space. Here's where the atmosphere comes in, acting like a blanket, trapping some of the warmth near Earth's surface. This makes our planet comfortable for us.

Smoothing Out Temperature Extremes

The atmosphere also helps to level out temperature extremes. The Earth doesn't want to get too hot during the daytime and too cold during the nighttime. Without the atmosphere, daytime could feel like an oven, and nighttime could feel like a freezer!

The Atmosphere: Earth's Protective Shield

Besides warming our planet and giving us air to breathe, the atmosphere acts like a superhero shield for Earth! It protects us from small space rocks called meteoroids. Most meteoroids burn up in the atmosphere before they can reach Earth's surface. This is why we see shooting stars! Without the atmosphere, these space rocks could hit Earth and cause damage.

True or False

Circle whether the statement is true or false

1) The atmosphere is not needed for life on Earth	True	False
2) All meteoroids that come towards Earth make it to the surface	True	False
3) The atmosphere traps in heat when the Sun sets	True	False
4) The atmosphere doesn't let too much of the Sun's heat in	True	False
5) Without an atmosphere, it would be a warm paradise on Earth	True	False

Questions 6-8 Use the questions below using evidence from the text

1) What is the

2) Explain the three ways the atmosphere helps and survive

1

2

3

Exit Cards

Cut Out Cut out the exit cards below and have students complete them at the end of class.

Name: _____ Mark:

--

Is the statement true or false?

1) The atmosphere is a layer of gases.	True
	False
2) It acts like Earth's protective coat.	True
	False
3) It is made of liquid water clouds only.	True
	False
4) Shooting stars are comets hitting Earth.	True
	False
5) The atmosphere makes Earth colder overall.	True
	False

Name: _____ Mark:

--

Is the statement true or false?

1) The atmosphere is a layer of gases.	True
	False
2) It acts like Earth's protective coat.	True
	False
3) It is made of liquid water clouds only.	True
	False
4) Shooting stars are comets hitting Earth.	True
	False
5) The atmosphere makes Earth colder overall.	True
	False

Name: _____ Mark:

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Is the statement true or false?

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	False
2) It acts like Earth's protective coat.	True
	False
3) It is made of liquid water clouds only.	True
	False
4) Shooting stars are comets hitting Earth.	True
	False
5) The atmosphere makes Earth colder overall.	True
	False

Name: _____ Mark:

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Is the statement true or false?

1) The atmosphere is a layer of gases.	True
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	False
3) It is made of liquid water clouds only.	True
	False
4) Shooting stars are comets hitting Earth.	True
	False
5) The atmosphere makes Earth colder overall.	True
	False

The Layers of the Atmosphere

The Layers of Earth's Atmosphere

1. Troposphere

- This layer is where all of the weather occurs, so whenever you experience wind, rain, or sunshine, it's thanks to the troposphere!
- Almost all life we breathe, including oxygen and carbon dioxide, exists along with clouds and flying birds.

2. Stratosphere

- The ozone layer resides in the stratosphere, shielding us from the Sun's harmful ultraviolet rays.
- It's the preferred flight path for commercial planes. It's stable and has few weather disturbances.

3. Mesosphere

- The coldest layer of all, the mesosphere, prevents meteors by causing most of them to burn up.
- Whenever you spot a shooting star, you're witnessing a meteor burning in the mesosphere!

4. Thermosphere

- The thermosphere may be super hot, but the air is too thin for us to feel the heat.
- This layer is home to the mesmerizing Northern and Southern Lights (Auroras) and the International Space Station orbits Earth here.

5. Exosphere

- The exosphere is the final layer of Earth's atmosphere, where our atmosphere fades into the vastness of space.
- Although mostly empty, the exosphere is where many satellites orbit the Earth.



True or False

Circle whether the statement is true or false

1) Birds fly in the exosphere.	True	False
2) The ozone layer is in the troposphere.	True	False
3) Airplanes fly in the mesosphere.	True	False
4) Shooting stars burn up in the mesosphere.	True	False
5) Satellites orbit in the exosphere.	True	False

Questions

Describe each of the layers of the atmosphere

Troposphere	
Stratosphere	
Mesosphere	
Thermosphere	
Exosphere	

Draw

Draw a diagram of the layers of the atmosphere

PREVIEW

Exit Cards

Cut Out Cut out the exit cards below and have students complete them at the end of class.

Name: _____

Mark:

--

Circle the correct answer.

1) Which layer has weather?	Troposphere
	Stratosphere
2) Where do planes usually fly?	Mesosphere
	Stratosphere
3) Which layer has ozone?	Troposphere
	Stratosphere
4) Coldest layer is which?	Mesosphere
	Thermosphere
5) ISS orbits in which layer?	Thermosphere
	Exosphere

Name: _____

Mark:

--

Circle the correct answer.

1) Which layer has weather?	Troposphere
	Stratosphere
2) Where do planes usually fly?	Mesosphere
	Stratosphere
3) Which layer has ozone?	Troposphere
	Stratosphere
4) Coldest layer is which?	Mesosphere
	Thermosphere
5) ISS orbits in which layer?	Thermosphere
	Exosphere

Name: _____

Mark:

--

Circle the correct answer.

1) Which layer has weather?	Troposphere
	Stratosphere
2) Where do planes usually fly?	Mesosphere
	Stratosphere
3) Which layer has ozone?	Troposphere
	Stratosphere
4) Coldest layer is which?	Mesosphere
	Thermosphere
5) ISS orbits in which layer?	Thermosphere
	Exosphere

Name: _____

Mark:

--

Circle the correct answer.

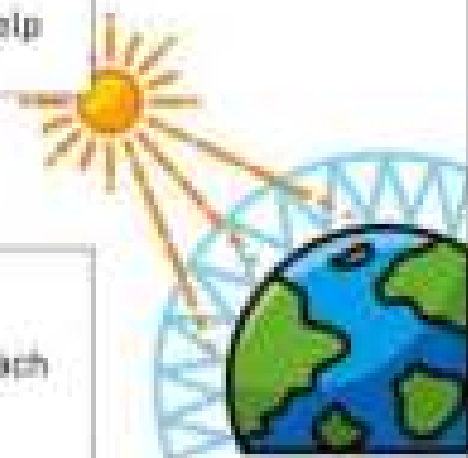
1) Which layer has weather?	Troposphere
	Stratosphere
2) Where do planes usually fly?	Mesosphere
	Stratosphere
3) Which layer has ozone?	Troposphere
	Stratosphere
4) Coldest layer is which?	Mesosphere
	Thermosphere
5) ISS orbits in which layer?	Thermosphere
	Exosphere

Coding Activity – Layers of Atmosphere

Objective

What are we learning about?

To learn more about the atmosphere in a fun and engaging way. This is a physical activity that uses the principles of coding to help students understand the different layers of the atmosphere.



Materials

What do we need?

- ✓ Flashcards with names of the different layers of the atmosphere
- ✓ Flashcards with characteristics and facts about each layer
- ✓ Open space for students to move around

Method

How do we do it?

- 1) **Setup:** Lay out the flashcards with names of the layers of the atmosphere in order from the ground up in a line across the room or field.
- 2) **Creating Human Code:** Divide the students into groups. Each group will represent a "program" and each student in the group will represent a layer of the atmosphere.
- 3) **Atmosphere Fact Cards:** Give each group a set of fact cards about the atmosphere. The facts can include things like "this layer is where weather occurs" or "this is where satellites orbit". The facts should correspond to the layers of the atmosphere.
- 4) **Programming:** The task for each group is to assign the correct facts to each member, representing the correct layer of the atmosphere. They need to "program" their group by discussing and matching the facts to the layers.
- 5) **Execution:** Once the groups have assigned the facts, each group will present their "program". When someone says, "run" or "start", they will line up in the order of the layers, and each student will say out loud the name of the layer they represent and the facts they were assigned.
- 6) **Debugging:** If a fact is wrong or misplaced, the other students can help "debug" the program by suggesting corrections.

TROPOSPHERE

STRATOSPHERE

MESOSPHERE

THERMOSPHERE

EXOSPHERE

PREVIEW

Set 1

This is the layer where we live and where weather happens, like rain and snow.

This layer is where the northern and southern lights (aurora borealis and aurora australis) occur.

This layer holds the ozone layer, which protects us from the sun's rays.

This is the outer layer of the atmosphere, where space begins and objects orbit Earth.

This is the layer where meteors burn up when they enter Earth's atmosphere.

Set 2

This layer is above the troposphere and extends up to about 50 kilometers.

It's the layer closest to Earth's surface and extends up to about 10 kilometers.

This layer is above the mesosphere and extends up to about 600 kilometers.

This layer has the lowest density of molecules as there are less air molecules, making the air thinner.

This is the least explored layer of the atmosphere because it's too high for aircraft and too low for satellites.

Set 3

It's the coldest layer of the atmosphere, with temperatures dropping as low as -90°C .

The ozone layer, which absorbs and scatters the sun's harmful ultraviolet rays, is in this layer.

It's the layer where many satellites orbit Earth.

It's where most rain, snow, and thunderstorms occur.

The air in this layer gets thinner as you go higher due to the absorption of the sun's radiation.

Set 4

Is known as the middle sphere.

The air in this layer gets colder as you go higher.

It's the layer where the Northern and Southern Lights (Aurora Borealis and Aurora Australis) occur.

The air in this layer gets warmer as you go higher because of the ozone layer.

The air is extremely thin in this layer.

Set 5

Most of Earth's air mass (around 75-80%) is in this sphere.

The International Space Station orbits in this sphere.

It's very dry and has very little water vapor.

It gradually merges into space and has very few particles, mostly hydrogen and helium.

Most meteors burn up in this sphere as they fall towards Earth, causing shooting stars.

Set 6

This layer is above the stratosphere and extends up to about 85 kilometers.

This sphere is the outermost layer of the atmosphere, extending from the thermosphere up to 10,000 kilometers.

Birds and airplanes fly in the lower part of this sphere.

Despite its high temperatures, this layer would feel cold to us because of the thin atmosphere.

Most commercial airlines cruise in the lower part of this layer where the air is stable.

All About Air

All About Air

Everything around you is matter. The air you breathe is matter. The juice you drink is matter. The chair and desk in the classroom are both matter. They are all different kinds of matter. Matter can be liquid, solid or gas.

Air is a gas in the form of a gas. We cannot see air, but it is all around us. Air covers a layer that is several kilometers deep. This layer is called the atmosphere. When you go to outer space, you leave the atmosphere and won't have air.

Air is made of several kinds.

Air is made of:

- Nitrogen → 78 percent
- Oxygen → 21 percent
- Carbon Dioxide
- Water Vapour
- Argon
- Rare gases

Properties of Air

- We cannot feel air unless it is moving, like on a windy day
- We cannot see clean air
- Air has no colour, unless it is dirty
- We cannot smell air unless it is polluted. Clean air has no smell
- Air is a gas and a fluid. We know this because planes can fly through the air!



Name: _____

93

Learning Objectives
93

True or False

Is the statement true or false



1) Air is matter	True	False
2) Our air is made mostly of oxygen	True	False
3) Our bodies are matter	True	False
4) Air is a liquid	True	False
5) We can see or smell clean air	True	False

Sea, Sand and Fire

Find the answers to the questions below

1. What are the three states of matter? _____

2. Name the two main gases in air. _____

3. Can we see clean air? _____

4. What kind of air can we see? _____

5. What layer on earth has air in it? _____



Making Connections

Have you ever seen dirty air? Explain.

Exit Cards

Cut Out Cut out the exit cards below and have students complete them at the end of class.

Name: _____

Mark: _____

Is the statement true or false?

1) Air is matter in gas form.	True
	False
2) Clean air has no colour.	True
	False
3) Oxygen is 50 percent of air.	True
	False
4) We can always see air.	True
	False
5) We only feel air when it moves.	True
	False

Name: _____

Mark: _____

Is the statement true or false?

1) Air is matter in gas form.	True
	False
2) Clean air has no colour.	True
	False
3) Oxygen is 50 percent of air.	True
	False
4) We can always see air.	True
	False
5) We only feel air when it moves.	True
	False

Name: _____

Mark: _____

Is the statement true or false?

1) Air is matter in gas form.	True
	False
2) Clean air has no colour.	True
	False
3) Oxygen is 50 percent of air.	True
	False
4) We can always see air.	True
	False
5) We only feel air when it moves.	True
	False

Name: _____

Mark: _____

Is the statement true or false?

1) Air is matter in gas form.	True
	False
2) Clean air has no colour.	True
	False
3) Oxygen is 50 percent of air.	True
	False
4) We can always see air.	True
	False
5) We only feel air when it moves.	True
	False

Types of Clouds

Understanding Clouds: Types and What They Mean

Clouds are a fascinating part of our sky. They come in different shapes, sizes, and can tell us a lot about the weather. Here are some common types of clouds:

Cumulus Clouds

Cumulus clouds are fluffy and look like cotton balls floating in the sky. They usually form in the morning when the weather is clear. However, when they grow bigger and taller, they can turn into cumulonimbus clouds, which bring thunderstorms.



Stratus Clouds

Stratus clouds are like big gray blankets covering the sky. They are usually found low in the sky and can cover the whole sky. These clouds bring overcast or foggy weather. If you've ever been in fog, you've been in a stratus cloud!

Cirrus Clouds

Cirrus clouds are thin and wispy, found high up in the sky. They mean good weather because it's very cold up high. Cirrus clouds usually mean good weather. If they start to cover the whole sky, it might mean a change in the weather is coming.

Cumulonimbus Clouds

Cumulonimbus clouds are towering, dark clouds that bring thunderstorms, heavy rain, snow, or even tornadoes. They can reach high up into the atmosphere and sometimes have an anvil shape at the top.

Nimbostratus Clouds

Nimbostratus clouds are thick, dark clouds that cover the sky and bring steady rain or snow. Unlike cumulonimbus clouds, they don't bring thunder or lightning.

By looking at clouds, we can tell a lot about what the weather is going to do. So, next time you're outside, take a look up at the sky and see if you can spot these different types of clouds!

True or False

Circle whether the statement is true or false

1) Cumulus clouds often indicate good, clear weather.	True	False
2) Stratus clouds are high in the sky and made of ice crystals.	True	False
3) Fog is a type of stratus cloud that's touching the ground.	True	False
4) Nimbostratus clouds are known for bringing thunder and lightning.	True	False
5) Cirrus clouds are fluffy and white, resembling cotton.	True	False

Match the letter from the description beside the correct type of cloud

Answers	Description
	A) Thick clouds that bring thunderstorms, heavy rain, and sometimes tornadoes.
Stratus	B) A layer of clouds covering the sky, often bringing drizzle.
Cirrus	C) Thin, wispy clouds high up in the sky and usually indicate good weather.
Cumulonimbus	D) Fluffy, white clouds that look like cotton floating in the sky.
Nimbostratus	E) Thick, dark clouds that bring long periods of steady rain or snow.

Draw

Draw the types of clouds below

Cumulus	Stratus	Cirrus	Cumulonimbus	Nimbostratus

Exit Cards

Cut Out Cut out the exit cards below and have students complete them at the end of class.

Name: _____

Mark ☐

Check only the true statements.

Statement	✓
Cumulus clouds look like cotton in sky.	☐
Stratus clouds often bring light drizzle.	☐
Cirrus clouds form low near the ground.	☐
Fog is a stratus cloud touching ground.	☐
Cirrus clouds are made of ice crystals.	☐
Cumulus clouds always mean dangerous weather.	☐
Cumulonimbus clouds may have an anvil top.	☐
Stratus clouds are thin wispy high clouds.	☐

Name: _____

Mark ☐

Check only the true statements.

Statement	✓
Cumulus clouds look like cotton in sky.	☐
Stratus clouds often bring light drizzle.	☐
Cirrus clouds form low near the ground.	☐
Fog is a stratus cloud touching ground.	☐
Cirrus clouds are made of ice crystals.	☐
Cumulus clouds always mean dangerous weather.	☐
Cumulonimbus clouds may have an anvil top.	☐
Stratus clouds are thin wispy high clouds.	☐

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Fog is a stratus cloud touching ground.	☐
Cirrus clouds are made of ice crystals.	☐
Cumulus clouds always mean dangerous weather.	☐
Cumulonimbus clouds may have an anvil top.	☐
Stratus clouds are thin wispy high clouds.	☐

Name: _____

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Cirrus clouds are made of ice crystals.	☐
Cumulus clouds always mean dangerous weather.	☐
Cumulonimbus clouds may have an anvil top.	☐
Stratus clouds are thin wispy high clouds.	☐

What is the Hydrosphere?

What is the Hydrosphere?

Have you ever looked at a globe? Notice how much of it is blue? That's water, and all of it together is called the hydrosphere. The hydrosphere includes all the places on Earth where water is found, whether it's a drop of dew on a leaf, a puddle, or deep ocean.



Places You Find Water

You can find the hydrosphere in many places! Here are a few:

- **Oceans:** This is the biggest part of the hydrosphere. Oceans cover more than 70% of Earth's surface.
- **Rivers and Lakes:** Flowing rivers and peaceful lakes are part of the hydrosphere too.
- **Glaciers and Ice Caps:** Even frozen water counts! Glaciers in the Arctic, Antarctica, and high mountains are part of the hydrosphere.
- **Groundwater:** Water underground that you can't see is also part of the hydrosphere. This water can be found in soil and rocks.
- **Water Vapor:** This is water in gas form. It's in the air all around us!

Water: The Essence of Life

Water is super important for life on Earth. Animals, plants, and humans all need water to live. Animals drink water and live in it. Plants need water to grow. Humans use water for drinking, cooking, cleaning, and lots of other things. Even our bodies are mostly water!

True or False

Circle whether the statement is true or false.

1) The hydrosphere includes all the water on Earth.	True	False
2) Oceans cover less than half of Earth's surface.	True	False
3) Glaciers and ice caps are part of the hydrosphere.	True	False
4) There is no water underground.	True	False
5) Water vapor in the air is part of the hydrosphere.	True	False

Questions Write 3 questions you have about the reading

1)	
2)	
3)	

Questions

Use information from the text to supply the answers.

1) What is the hydrosphere? Where is most of the water found?

2) Why is the hydrosphere important to plant and animal life?

Exit Cards

Cut Out Cut out the exit cards below and have students complete them at the end of class.

Name: _____

Mark

What is the Hydrosphere and why is it so important for life?

Name: _____

Mark

What is the Hydrosphere and why is it so important for life?

Name: _____

Mark

What is the Hydrosphere and why is it so important for life?

Name: _____

Mark

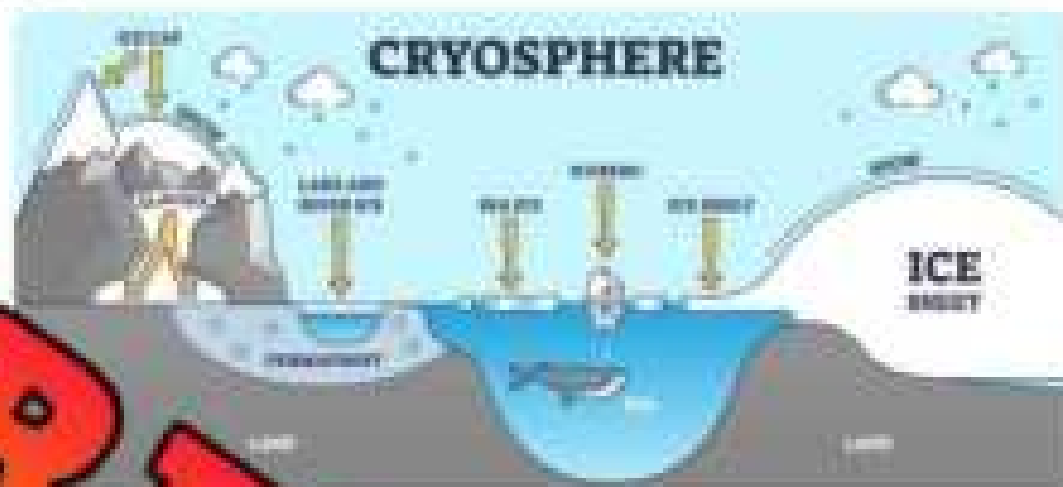
What is the Hydrosphere and why is it so important for life?

PREVIEW

Cryosphere - Glaciers

What is the Cryosphere?

The cryosphere is the part of the earth's surface that has solid water – ice.



What is a glacier?

A glacier is a moving, large piece of ice that flows over a long period of time. Most glaciers are made of freshwater that has melted.

- ❖ **Ice Sheet** – Ice sheets are the largest ice formations on Earth. Ice sheets are the size of continents as they must be bigger than 50,000 square kilometres. The only ice sheets on Earth are in Antarctica and Greenland.
- ❖ **Ice Cap** – Ice caps are smaller than ice sheets, covering less than 50,000 square kilometres. Most ice caps are found near the North and South Poles of the earth. Canada has the Devon Ice Cap on Devon Island in Nunavut.
- ❖ **Icebergs** – Icebergs are floating pieces of ice that are more than 15 metres long. They are found in oceans or lakes. Icebergs are made when they break off a larger glacier. Icebergs are made of freshwater, as they begin their life on land.
- ❖ **Sea Ice** – Sea ice is frozen ocean water; therefore, it is made of saltwater. Sea ice floats on the ocean's surface.
- ❖ **Ice Shelf** – Ice shelves are permanent floating sheets of ice that are connected to a landmass. When ice breaks off an ice shelf, it can become an iceberg.

Questions

Use information from the text to support your answer.

1) What is a glacier?

2) What is an ice sheet? Where are they found?

Order

Put the glaciers in order of smallest (1) to largest (6)

Iceberg	Ice Cap	Ice Sheet	Sea Ice	Lake/River Ice

Multiple Choice

Circle the best answer

1) The largest glacier is an	Ice cap	Ice sheet
2) An ice sheet must be larger than	100,000 km ²	50,000 km ²
3) A glacier that is smaller and is made of freshwater	Sea ice	Iceberg
4) Sea ice is made of	Freshwater	Saltwater
5) Most glaciers are made of	Freshwater	Saltwater
6) Glaciers are	Moving	Still

Exit Cards

Cut Out Cut out the exit cards below and have students complete them at the end of class.

Name: _____

Mark: ☐

Circle the correct answer.

1) Which term means Earth's frozen water areas?	Cryosphere
	Sea Ice
2) Largest glacier type, continental sized.	Ice Sheet
	Ice Cap
3) Floating ice connected to landmass.	Ice Shelf
	Iceberg
4) Floating ice that broke from glacier?	Sea Ice
	Iceberg
5) Only in Antarctica and Greenland?	Ice Caps
	Ice Sheets

Name: _____

Mark: ☐

Circle the correct answer.

1) Which term means Earth's frozen water areas?	Cryosphere
	Sea Ice
2) Largest glacier type, continental sized.	Ice Sheet
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Name: _____

Mark: ☐

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	Iceberg
5) Only in Antarctica and Greenland?	Ice Caps
	Ice Sheets

All Living Things Need Water

Water

All living things need water to live. Our bodies are made of 75% water. It is very important to drink enough water every day. Most people drink at least 8 glasses of water a day. Our bodies lose water when we go to the bathroom, when we sweat and when we breathe.

WATER IN CERTAIN ORGAN AND BODY PART



Water makes our bodies work and stay healthy. Our blood is made of 94% water. Even our brain does not work when we don't drink enough water. When we don't drink enough water, we say we are dehydrated.

Plants Need Water

Plants use water to make food for themselves. They take in water from their roots. The water moves up through the plant's stem and into the leaves. The chloroplasts in the leaves use the water to make sugar for the plant to eat.

Without water, a plant will die. This is because they can't make their own food without water. Even a cactus needs a bit of water! A cactus will need to take in water once every month.

Most plants that grow in Canada need to have 2 cm of water each week. Plants will grow best when it rains a lot.



Questions

Answer the questions below about the machine you chose

1) Why do we need water?

2) Why do we need water?

Visualizing

Draw what you picture in your mind when you were reading. Explain the picture

Word Search

Find the word bank words in the puzzle

A	B	F	U	D	B	O	D	I	E	S	G	L	H	W	B	C
E	I	F	D	3	D	X	Q	H	L	T	Z	L	T	A	O	A
L	X	E	Y	U	B	L	Q	F	E	A	R	T	H	T	T	C
S	E	K	R	N	E	O	H	E	A	L	T	H	T	E	T	T
N	F	F	R	E	S	H	F	D	C	Q	U	K	O	R	L	U
P	S	N	D	R	I	N	K	P	L	A	N	T	S	T	E	S

Word Bank☐ Water☐ Fresh☐ Drink☐ Bodies☐ Health☐ Need☐ Earth☐ Bottle

True or False

Circle whether the statement is true or false

1) Ponds and lakes are saltwater bodies.	True	False
2) Ducks live in ponds and lakes.	True	False
3) Trout and salmon live in rivers and streams.	True	False
4) Oceans are freshwater bodies.	True	False
5) Coral reefs are found in lakes.	True	False

Describe the characteristics of aquatic habitats and the plants and animals that live there

Ponds and Lakes	
Rivers and Streams	
Oceans	
Coral Reefs	

What is the Biosphere?

What is the Biosphere?

The biosphere is like a giant, global house where every living thing on Earth resides! From the tiniest microbe to the tallest giraffe, from deep-sea creatures to birds in the sky, everything that lives is part of the biosphere.

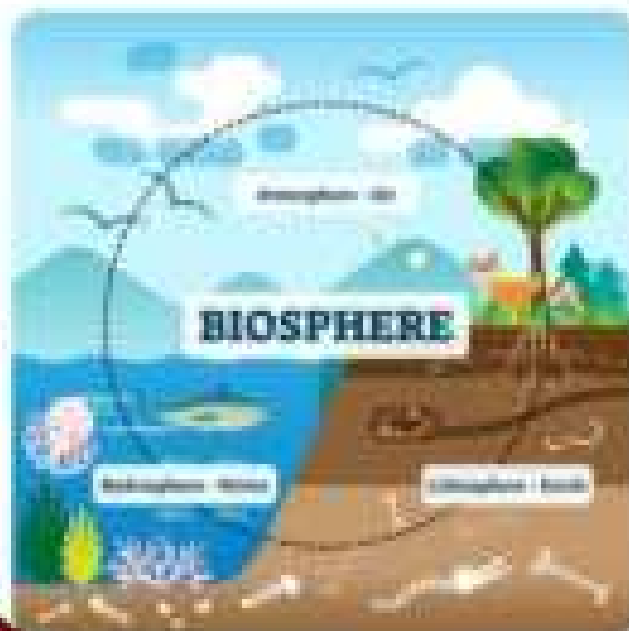
Where is the Biosphere?

The biosphere is everywhere! It covers many regions on Earth, from the deepest oceans to the highest mountains. Here's where you can find life:

- **Land:** On land, life can be found in many places. This includes lush forests, hot deserts, high mountains, and even your own back garden!
- **Water:** Life loves water! From the deepest ocean trenches to the smallest ponds, you'll find members of the biosphere. This includes whales, fish, and tiny plankton.
- **Air:** Yes, even in the sky! Birds, insects, and bats are all airborne members of the biosphere.
- **Underground:** Even below the surface, there is life. This includes earthworms in soil, moles in burrows, and bacteria in rocks deep within Earth!

Why is the Biosphere Important?

The biosphere is essential because it includes all life on Earth, and life supports life! Every creature plays a part. Bees help flowers by pollinating them. Plants give us oxygen to breathe. Even small creatures like worms help make the soil good for plants.



Draw

Draw living things in water, on land (underground too), and in the air

PREVIEW

Questions

Use information from the text to answer the questions.

1) What is the biosphere?

2) How does life support life? How do living things help other living things?

Longitudinal Biodiversity Gradient

Biodiversity on Earth

The latitudinal biodiversity gradient

shows which areas around the

world have the most

Biodiversity

As you can see, the

gradient, the more diversity

be found along the equator

because the climate along the equator

most mild. This means the temperature, wind, and rain

all year.

The temperature is warm and the days are long. This is why the places near the equator are great for plants and animals to live in.

As you get further from the equator, the climate changes

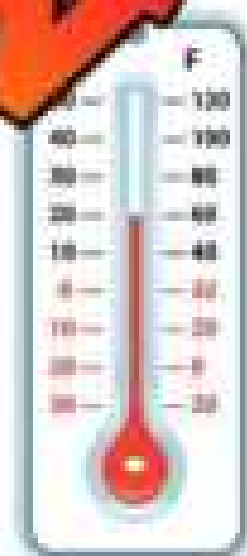
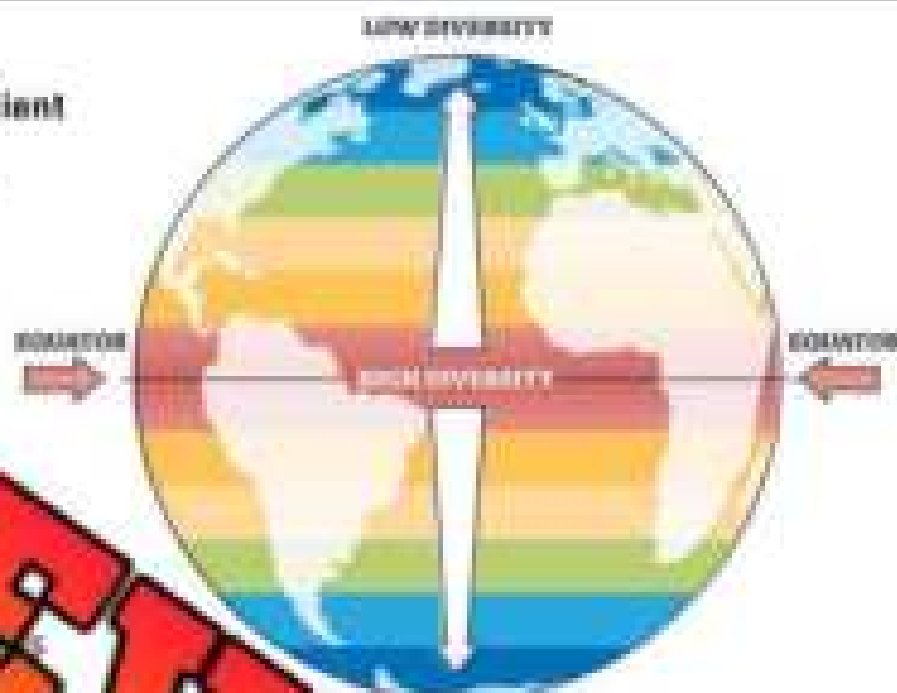
from mild to extreme. The climate on the poles is very difficult

to survive in as the temperatures go from -29°C to 23°C .

Organisms that live in these climates must be adapted so they

can survive in very cold temperatures and warmer temperatures

as well.



Questions

Answer the questions below using evidence from the text

1) Why is it easier to live near the equator?

2) Why is it harder to live near the north or south pole?

Questioning

What questions do you have about the information?

1)

2)

True or False

Circle whether the statement is true or false

1) The temperature changes a lot if you live near the equator.

True

False

2) Florida is near the equator, so it is warm all year.

True

False

3) Animals living away from the equator need to adapt to changing weather.

True

False

4) More plants and animals live near the poles.

True

False

5) More plants and animals live near the equator.

True

False

Experiment: Effects of Solar Energy

Objective

What are we learning more about?

In this experiment, students will explore how solar energy, or sunlight, affects different materials like water, soil, grass, asphalt, concrete, wood, and metal.

Materials

What do we need?

- ✓ Containers (one for each material)
- ✓ Something to hold them (e.g., paper clips, etc.)
- ✓ Soil
- ✓ Grass
- ✓ Area where they can sit in the sun
- ✓ A small piece of wood
- ✓ A sunny outdoor space
- ✓ An infrared thermometer or regular thermometer



Method

How do we complete the experiment?

- 1) Setting up the materials: choose the materials you want to test. The grass and soil should be in separate containers.
- 2) Initial Temperature Measurement: Put the materials in a shady area where no direct solar energy will affect them. Wait 30 minutes and then use the infrared thermometer to measure the temperature of each material. If using a regular thermometer, place it on the material for a minute before reading the temperature. For the asphalt/cement, you will need to measure it when it is in the shade.
- 3) Start the Experiment: Let the materials sit in the sun for 15 minutes. Make sure all materials receive equal sunlight.
- 4) Take Measurements: After 15 minutes, use the thermometer to measure the temperature of each material again. Then continue measuring every 15 minutes for 1 hour.

Observations

Fill in the table below. Write the materials you are using and then record the initial measurement and measurements after 15-minute increments.

Materials	Initial Measurement	After 15 Minutes	After 30 Minutes	After 45 Minutes	After 60 Minutes

PREVIEW

Experiment: Effects of Solar Energy**Graph**

Choose one material to graph. Choose the material that had the biggest change.

Title: _____

PREVIEW

0 15 30 45 60

Natural Resources in Canada

Natural Resources

We call materials and substances that we find in our environment **natural resources**. Think about that. This means that anything you find in your yard is a natural resource.

Some natural resources are worth more than others. The dirt you find in your yard isn't worth much as soil can be found almost anywhere. Gold on the other hand, is a **valuable natural resource** because it is hard to find! Examples of other natural resources include water, trees, air, oil, coal, natural gas, iron, and copper.

Valuable Natural Resources

A **valuable natural resource** is based on how easy it is to find and how important the resource is to us. Read the list below to learn more about 5 natural resources that are very valuable.

1. **Water** – Even though we see water everywhere, only 2.5% of that water is drinkable or useable for cooking.
2. **Air** – We **NEED** clean air. It is a very important natural resource. Clean air is needed, and some places have bad air from power plant exhaust as well as exhaust from vehicles.
3. **Coal** – It is estimated that we will run out of coal in 100 years. Coal provides us with electricity that we use to power our electrical appliances.
4. **Oil** – Some experts believe we will run out of oil in 50 years. Oil is used as fuel for our vehicles. It takes millions of years for new oil to be made.
5. **Natural Gas** – We use natural gas to power many of the machines we use in our homes such as our furnace, air conditioners, stoves, and BBQs.

How Regions Benefit from Natural Resources

When one region has access to valuable natural resources, they benefit because they can sell this resource to other provinces or territories. They can also sell to other countries around the world.

For example, Alberta and the Interior Plains produce the most oil in the world! This means they can sell the valuable oil to other places in order to make money for their province. It also means that many people move to Alberta to get jobs on the oil sands. These jobs usually pay a lot because of all the money the companies are making by selling the oil. These companies pay heavy taxes to the government of Alberta, meaning Alberta benefits as well for having these natural resources on its land.



True or False

Circle whether the statement is true or false.

1. Air is considered a natural resource because it exists in our environment.	True	False
2. Some natural resources are more valuable than others.	True	False
3. Soil is a valuable natural resource because it is hard to find.	True	False
4. Oil is a natural resource that has benefitted Alberta.	True	False
5. Water is a valuable resource because water is found easily.	True	False

Questions

Answer the questions below using evidence from the text.

1. What are natural resources? Give 3 examples. Try to think of 1 that is not from the reading.

2. How do natural resources help provinces and countries? Which is most valuable?

Summarize

What is the main idea and the supporting details of the reading?

Exit Cards

Cut Out Cut out the exit cards below and have students complete them at the end of class.

Name: _____

Mark

Circle the correct answer.

1) Which is a natural resource?	Microchips
	Air
2) What do companies pay to the government?	Salaries
	Taxes
3) Which resource powers many home appliances?	Natural Gas
	Soil
4) Which resource fuels most vehicles?	Coal
	Oil
5) Which resource often generates electricity?	Wood
	Coal

Name: _____

Mark

Circle the correct answer.

1) Which is a natural resource?	Microchips
	Air
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Name: _____

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Name: _____

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	Oil
5) Which resource often generates electricity?	Wood
	Coal

Natural Resources in Alberta

Natural Resources in Alberta

Alberta is a province in Canada that has an abundance of natural resources. Natural resources are things that come from the earth that we can use in many ways. Let's learn about some important natural resources.



- Forests** - Alberta has a lot of forests that cover a large part of the province. Forests are important because they supply wood for building things like houses and paper. They also help clean the air we breathe and offer homes to animals.
- Fish** - Alberta has a lot of fish in its rivers and lakes. Fish are important because they provide food for people and animals. Some of the most common fish in Alberta are trout, northern pike, and walleye.
- Oil and Gas** - Alberta is well-known for its oil and gas deposits. Oil and gas are important because they are used for heating homes, running cars, and making many things like plastic. Alberta is one of the largest producers of oil and gas in the world.
- Water** - Alberta has a lot of water in its rivers and lakes. Water is important because it provides drinking water for people and animals. It also helps plants grow and offers habitats for fish and other animals.

Forests, fish, oil and gas, and water are some of the most important natural resources in Alberta. It's essential to take care of these resources so that they can continue to serve us in the future.

True or False

Circle whether the statement is true or false

1) Forests are one of Alberta's most important natural resources	True	False
2) Wood isn't very important in our day-to-day lives	True	False
3) Oil is used to make plastics	True	False
4) Alberta has lots of water in its oceans	True	False
5) We can use any resources as we want because we have lots	True	False

Word Search

Circle the words in the word search

Natural	Resources
Geography	Forests
Fish	Mining
Energy	Economy
Conserve	Extract
Future	Salmon
Trout	Cod

T R A C T Q F B Q O B Z L T B
 M O N T K U K A Q N A P Z
 N K R W O B T U M D I F G
 I V I E C U B Q X O N
 T E N O Y E O R I I R I
 U X G B W B S E C E N
 O N S O F A L S I
 R E S O U R C E I K H T M
 T G E O G R A P H I G
 W X M V D I Y D V C E

Reflect

Which natural resources are most important in your community?

Pictionary: Natural Resources

Objective

What are we learning about?

Students will learn about natural resources by drawing and guessing them in a fun game. They will explore how natural resources are part of Earth's systems and why they are important for people, animals, and the environment.

Material

What will you need for the activity?

- Markers
- Natural resource cards (examples: trees, rivers, rocks, fish, mountains, etc.)

**Instructions**

How will you complete this?

1. Split the class into two teams, maybe by rows or groups.
2. Have one student from Team A come up and pick a card. Keep the card a secret from everyone else.
3. The student then draws what's on the card on a whiteboard for their team.
4. Start a timer for 2 minutes. During this time, Team A tries to guess what's being drawn.
5. If Team A guesses the drawing correctly before the timer goes off, they earn a point.
6. Next, it's Team B's turn. A student from Team B picks a card and draws, while their team guesses.
7. Alternate turns between the two teams, letting different students draw each time.
8. Continue the game until all the cards have been used. Keep track of points for each team.
9. At the end, count the points. The team with the most points is the winner of Natural Resources Pictionary!

Name: _____

100

Dictionary Connection
ELA

Dictionary Topics

Cut out the topics below.

Tree

River

Fish

Mountain

Sun

Wind

Cloud

Soil

Flower

Rock

Grass

Sand

Lake

Shell

Leaf

Bird

Rail

Star

Map

Volcano

Iceberg

Waterfall

Cave

Bee

Mushroom

Fruit

Snowflake

Coal

Oil

PREVIEW

Resource Town in Alberta

What is a Resource Town?

A resource town is a community that grows because of the resources available in the area. Quite often, one natural resource is found in an area. When this happens, people move to that area so they can work for companies that extract the resource.

As more and more people move to the area, shops, businesses, and residential areas (housing) begin to develop as well. This is an example of how a natural resource can lead to a community developing around it. We call these communities resource towns.

Resource Town in Alberta: Fort McMurray

In 1964, the first oil sands project in Fort McMurray began. The Great Canadian Oil Sands (now Suncor Energy) was given permission to build a processing plant and a refinery. The plant is a factory that separates bitumen from oil sands. Many people throughout North America moved to the oil sands to find jobs. The town grew from 2,614 people to 10,000 people by the mid-1970s.



Ten years later, a second project led by Syncrude Canada started. The town grew to nearly 37,000 with more jobs available. By the late 1990s, Fort McMurray's population



grew to 47,705 people. In 2020, Fort McMurray had a population of 137,000. With so many people living in Fort McMurray, other services were needed to keep the people safe and happy. City workers were needed to offer water, sewage removal, roads, snow removal, and many other services. Many businesses like banks, grocery stores, and restaurants were needed as well. This meant that the small town that was built around the oil sands became a large urban city with everything people needed.

Questions

Use information from the text to support your answer.

1) Why do communities often develop near natural resources?

2) Why is Fort McMurray considered a resource town?

Making Connections

Are there any resources in your town that draw people to it?

True or False

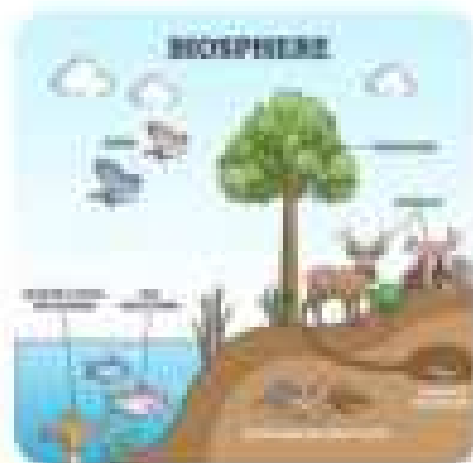
Circle whether the statement is true or false.

1) The first oil sands project in Fort McMurray was in 1672.	True	False
2) Many people moved to Fort McMurray to work at the oil sands.	True	False
3) The population grew from just 2,000 to 137,000 in only 56 years.	True	False
4) Oil in Alberta is very valuable.	True	False
5) Communities grow when surrounded by valuable natural resources.	True	False

Interconnections Between Earth's Spheres

Interconnections of Earth's Spheres

Earth is made up of different family members, or "spheres": the Lithosphere, Atmosphere, Hydrosphere, and Biosphere. Each of these spheres is closely interconnected as they help each other.



		Atmosphere	Hydrosphere	Biosphere
Lithosphere	-	When volcanoes erupt, they release ash and smoke into the air.	When it rains, the rainwater comes down and makes the land wet.	The soil in the land helps plants grow big and strong.
Atmosphere	Ash from erupting volcanoes goes up into the air.	-	Water in the air can fall as rain or snow, creating up to 100 inches of snow in some areas.	Plants breathe in the air and use it to make food. Animals eat plants for food.
Hydrosphere	Rainwater can wash soil from the land into rivers and lakes.	When the sun shines, it heats up the water, causing it to turn into water vapor and go up into the air.	-	Plants and animals, including plants and animals, need water to grow and stay healthy.
Biosphere	When plants and animals die, they can turn into soil, making the land richer.	Plants take in a gas called carbon dioxide from the air and give off oxygen which we need to breathe.	Animals like fish live in water and birds drink it.	-

Questions

Answer the questions below using evidence from the text

1) Are Earth's systems connected? Explain.

2) Why is it important to keep all of our spheres healthy?

Biosphere

How is the biosphere connected with the other spheres?

Lithosphere
and BiosphereHydrosphere
and BiosphereAtmosphere
and Biosphere

Change in One Sphere Affect Others

Change in Biosphere: A forest full of trees is removed to make space for a new city

Lithosphere	The land where the trees once grew becomes bare. The tree roots are not there to hold the soil together anymore. This can lead to soil erosion, where the soil gets washed away more easily when it rains.
Hydrosphere	The soil that gets washed away can end up in our rivers, lakes, or oceans, making the water muddy and not so clean. Also, trees usually help to drink up water from the ground. Without the trees, there might be too much water left, which can lead to flooding.
Atmosphere	Trees are important because they breathe in a gas called carbon dioxide and breathe out oxygen, which we need to live. Without trees, there could be more carbon dioxide left in the air. Too much carbon dioxide can make the Earth warmer, a process known as global warming.

Questions

Answer the questions using information from the text.

1) What is the change that is affecting other spheres?

2) How is the change affecting the other spheres below? Paraphrase information from the text. Add any other effects you can think of.

Lithosphere	
Hydrosphere	
Atmosphere	



Change in One Sphere Affect Others

Change in Biosphere: The number of bees is decreasing rapidly

Lithosphere

With fewer bees to pollinate flowers, there may be fewer plants. This could change the way our landscapes and gardens look.

Hydrosphere

Fewer plants due to less pollination could lead to more water runoff when it rains, as plants help to absorb water. This would cause

Atmosphere

Fewer plants due to less pollination by bees, there could be less oxygen in our atmosphere. Plants create oxygen when they grow.

Questions

Answer the questions below using evidence from the text.



1) What is the change that is affecting the biosphere?

2) How is the change affecting the other spheres below? Create a diagram using information from the text. Add any other effects you can think of.

Lithosphere

Hydrosphere

Atmosphere

Change in One Sphere Affect Others

Change in Lithosphere: A big piece of land is changed when we drill deep holes to get oil from underground

Hydrosphere	Sometimes accidents happen during drilling and oil can spill out. This can make rivers, lakes, and oceans dirty and harm the fish and other animals living in the water
Atmosphere	When we use the oil in our cars and factories, it releases a gas called carbon dioxide into the air. This gas can make the Earth warmer, a process known as global warming
Biosphere	Animals that live on the land where we drilled lose their homes. Animals that drink the water can get sick from the oil spills

Questions

Answer the questions below using evidence from the text

1) What is the change that is affecting other spheres?

2) How is the change affecting the other spheres below? Provide information from the text. Add any other effects you can think of.

Hydrosphere	
Atmosphere	
Biosphere	



Ways to Conserve Earth's Systems

What is Conservation?

Conservation means taking care of our planet and its many different parts, like the air, the water, the land, and all the animals and plants.

Lithosphere: The Land We Live On

- **Recycling:** When we recycle, we use old things to make new ones, reducing trash and keeping our planet clean.
- **Composting:** We compost our food waste. This returns nutrients to the soil, helping plants grow and stay healthy.

Hydrosphere: Our Water World

- **Saving Water:** By turning off the faucet when we brush our teeth, or taking shorter showers, we save water.
- **Cleaning Up:** Picking up trash and not littering helps keep our lakes, and oceans clean, which is better for fish and other water animals.



Biosphere: Home to All Life

- **Protecting Animals:** Keeping animals safe helps keep our world healthy. We can protect animals by not destroying their homes or hunting them.
- **Growing Gardens:** Planting flowers, vegetables, and other plants provides food and shelter for insects, birds, and other creatures.

Atmosphere: The Air Above Us

- **Using Public Transit, Biking, or Walking:** Cars can make the air dirty. By driving less and using other ways to get around, we help keep the air clean.
- **Using Less Energy:** When we use less electricity, like turning off lights when we leave a room, we create less pollution that can dirty the air.



Plan Fill in the table below to plan how you can conserve to help Earth's systems.

List 5 things you can do to conserve so that Earth's systems can be healthy.

1

2

3

4

5

2) How will you doing these things help the Earth's system?

3) Why is it important for all humans to conserve? Why do we need to work together?

How Humans Affect Water

How Humans Affect Water

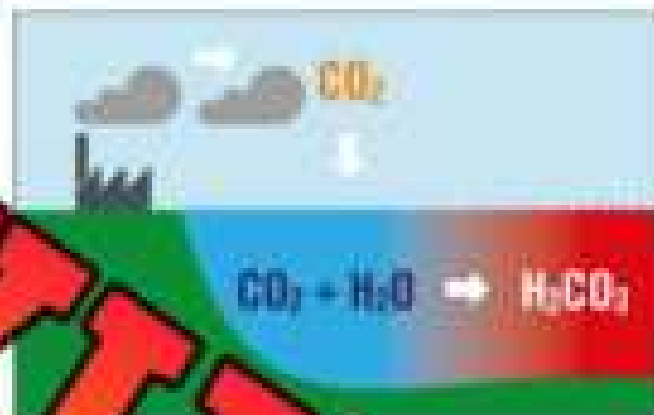
Humans need clean water to live. The problem is that many things humans do make our water dirty. Below are 5 ways humans are making water pollution.

1) Farming

To grow plants, farmers use pesticides, fertilizers, and manure to make the soil better. But, if too much of these chemicals get into the groundwater, it becomes polluted with too many chemicals that seep into the water.

2) Burning Gasoline

When we burn gas in cars, boats, and airplanes, we make carbon dioxide. Carbon dioxide is air pollution. But, carbon dioxide also gets into our water. When it does, it combines with saltwater in the oceans and makes carbonic acid. Fish and animals living in the oceans don't like carbonic acid, they like clean water.



3) Medicine

In Canada, doctors give medicines like antibiotics and narcotics to help their patients. Some of these medicines don't get thrown out the right way. Instead, they end up in garbage dumps. When rain falls on the medicine, it leaches into the groundwater that we drink.

4) Cities

When cities grow, they take over land that was used to clean water. For example, wetlands filter dirty water and make it clean. When we destroy wetlands, we make water pollution worse.



Questions

Answer the questions below



1) How do humans pollute our water?

2) What is acid rain and how does it happen?

True or False

Circle whether the statement is True or False



1) Farms can make water pollution

False

2) Burning gas makes acid water in oceans

True

False

3) Most water animals like living in acid water

True

False

4) Wetlands are bad because they pollute water

True

False

5) Medicines can pollute our water

True

False

6) Wetlands filter water to make it clean

True

False

7) Leaching is when water washes through soil

True

False

STEM – Water Testing Technologies

Changing Technologies

For farmers, the most important thing is the quality of their soil and water. In the past, farmers had to send their soil and water samples to science laboratories to test the quality. The process was time-consuming and cost a lot of money.

Today, farmers can use something called an AgroPad to test their water and soil quality. To run the test, you take an AgroPad (a card about the size of a bank card), and put a drop of water or soil on it. Within less than 10 seconds, the card will change colours.

Then you use the AgroPad app on your smartphone to scan the card. The app will then give you the results. Farmers need to understand the quality of your water and/or soil. The app will test the levels of calcium, magnesium, aluminium, and nitrogen found in the soil and water. If farmers find that their soil and water are low in something, they can add the nutrients it needs to be healthy. Healthy soil and water means better crops and more food for everyone!

The AgroPad is being used by many family farms around the world. IBM understands that 80% of the food we eat comes from family farms. These family farms need to be supported by the latest technology.



Multiple Choice

Circle the correct answer.

1) The AgroPad is made by _____	Microsoft
2) The AgroPad can test the quality of water and _____	Air
3) You can find out if your water or soil has too much _____	Carbon
4) You can add _____ if your soil is low in something	Nutrients
5) Family farms grow what percentage of food worldwide?	50% 80%

Question

How is technology helping farmers around the world?

STEM – Water Testing Invention

Create your own invention that tests the quality of water and adds nutrients to make the water quality better. Use the legend below to know what to add.



Test Results	What to Add When High Levels	What to Add When Low Levels
Levels of pH	Sodium bisulfate	Sodium Bicarbonate
Levels of Chlorine	Hydrogen peroxide	Chlorine
Levels of Magnesium	Sodium	Magnesium
Levels of Nitrogen	Malic acid	Aluminum
Levels of Nitrogen	Chlorine	Nitrogen

IF/THEN

What does your invention



If the pH is high and magnesium is low

THEN

If chlorine is high and nitrogen is low

THEN

If nitrogen is high and aluminum is low

THEN

If the levels of pH, magnesium and nitrogen are high

THEN

If the pH, nitrogen, magnesium, and aluminum are low

THEN

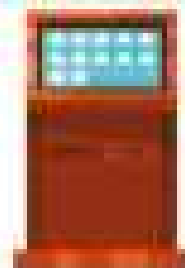
If the pH and chlorine are high, but the aluminum and magnesium are low

THEN

STEM – Water Testing Invention

Draw your invention. Make sure the invention has:

- ✓ A place to put the water
- ✓ A screen to tell you the results
- ✓ A start button
- ✓ Any other buttons it will need to work



PREVIEW

Questions

Answer the questions about your machine below.

1) How does your water testing machine work?

2) What buttons does your machine have?

3) For at least 2 buttons on your machine what to do when the button is pressed. For example, if on the left button light

4) How will your machine help people? Explain its impact on the world.

STEM

Math connection – answer the questions below



1) How much does it cost for you to make your machine? Think of the parts you will need and estimate a price.

2) How many units will you make at first?

3) How much revenue will you have in total?

4) How much will you sell for?

5) How much net profit will you earn if you sell the units you will make? For net profit, you'll find the gross and subtract the cost.

6) If you wanted to make \$100,000 in profit, how many units would you need to sell?

PREVIEW

Writing Code – Calgary's Water Service

Automation is so much more efficient than manually performing work. Furthermore, automation makes less mistakes, as there are no user-errors. That is why the City of Calgary has hired you to automate their billing service.

They would like you to write a code that charges people based on how much water they use. Below is what they want to charge residents for how much water they use.



Tier	Amount of Water	Cost
1	Up to 6 cubic metres	\$1.00/m ³
2	7 to 25 cubic metres	\$1.50/m ³
3	26 to 180 cubic metres	\$2.00/m ³
4	More than 180 cubic metres	\$3.00/m ³



Coding

Write a program that will send a bill to residents in Calgary based on their water usage.

Writing Code – Calgary's Water Service**STEM**

Fill in the code below by calculating the cost of the water for the resident

1) Fill in the blank below to determine how much the resident owes.

email = input ("please enter your email so we can send you your bill")

if resident uses of waterthen set to send to

2) Describe how you would solve this problem.

3) Fill in the blank below to determine how much the resident owes.

email = input ("please enter your email so we can send you your bill")

if resident uses of waterthen set to send to

4) Fill in the blank below to determine how much the resident owes.

email = input ("please enter your email so we can send you your bill")

if resident uses of waterthen set to send to

Personal Water Consumption - Survey

Water in the World

There is a lot of water in the world, but not a lot of freshwater. Only about 1% of all water can be used for drinking.



Also, to turn dirty water from our homes into drinking water, it takes a lot of water. For these reasons, we need to save water when we can.

Survey the questions below

	Answer
1) Do you take a shower?	
2) While brushing your teeth, do you let the water run?	
3) Do you let the water run while you wash your face?	
4) Do you take long, medium, or short showers?	
5) Does your toilet have a full and half flush?	
6) Do you have a pool that you need to fill with water?	
7) Is your shower a high flow or low flow? Is it strong?	
8) Do you wash dishes with running water?	
9) Do you run a dishwasher without it being completely full?	
10) Do you use your washing machine without a full load?	
11) If you have a pool, do you use a solar cover to stop water from evaporating?	
12) Do you water your gardens or lawn a lot?	

Water Wasting

Answer the questions below

1) Do you waste a lot of water? Explain how you waste water below.

2) Use some of the ideas from this page to come up with ways you could conserve water in your home.

PREVIEW

How the Indigenous Use Water

Honouring Water - First Nations, Métis, and Inuit

Water is honoured by indigenous groups. Water is the most important gift on Mother Earth. It provides an interconnection between living things as all living things need water. Water flows between us, within us, and it replenishes us. Water is the blood of Mother Earth.

The Indigenous understand that water is the giver of all life. Without clean water, life is impossible. Indigenous do not waste water or pollute water.

How the Indigenous Use Water

For most Indigenous groups, water is needed for all aspects of life. They use water for food. They use rivers and lakes to travel from one place to another. Many use canoes to move from one place to another.

The Inuit use water in the form of ice to travel. They use sea ice to move around as the sea ice is connected to the land. They use ice to move from community to community. It also connects them with the ocean where they find food like seals, walrus, and fish.

Water Pollution

The Indigenous understand that pollution is not good. When Mother Earth is sick, they feel sick too. They do not pollute the same way other groups do. Before Europeans came to present-day Canada, there was no gas burning vehicles. There were no factories. Instead, the Indigenous enjoyed a healthy environment with clean air and water.

First Nations Versus Fossil Fuels is an organization of First Nation members that oppose the water and air polluting burning of fossil fuels.



Questions

Answer the questions below.

1) How do the Indigenous use water?

2) Why is water important to Indigenous groups?

Multiple Choice

Circle the best answer.

1) The Indigenous pollute more or less than other groups?	More	Less
2) To the Indigenous, water is...	Valuable	Useless
3) When the environment is unhealthy, the Indigenous...	Healthy	Unhealthy
4) The Inuit move around on...	Ships	Plains
5) Many Indigenous groups use _____ to move on water	Ships	Canoes

Visualizing

Draw what you were picturing while you were reading. Explain the picture.

Parks Canada and Heritage Sites in Alberta

What is Parks Canada?

Parks Canada is a special agency that takes care of Canada's national parks, national historic sites, and marine conservation areas. Their job is to protect these special places for all of us to enjoy and learn from. They also make sure that these places are safe for the plants, animals, and people who visit or live there.

Protect

Heritage sites are places that have special meaning because of the important things that happened there. Parks Canada helps to protect these sites in many ways. They repair old buildings, take care of artifacts, and even recreate events from the past for visitors to experience.

Heritage Sites in Alberta

Alberta has some very special heritage sites that are taken care of by Parks Canada. Let's learn about a few of them.

- **Banff National Park:** This is Canada's first National Park. It has stunning mountains, clear blue lakes, and lots of wildlife. Parks Canada helps to keep the park clean and safe for all the animals that live there and the people who visit.
- **Rocky Mountain House National Historic Site:** This is a special place where you can learn about the fur trade, which was a very important part of Alberta's history. Parks Canada takes care of the old buildings and artifacts and even puts on special events where visitors can experience what life was like during the fur trade.
- **Head-Smashed-In Buffalo Jump World Heritage Site:** This site was used by the Blackfoot for thousands of years to hunt buffalo. Today, Parks Canada helps to preserve the site and teaches visitors about its history.



Questions

Use information from the text to support your answer.

1) What is Parks Canada? What do they do?

2) Why is Parks Canada important? What would happen if we didn't have Parks Canada?

Making Connections

How are these heritage sites?

True or False

Circle whether the statement is true or false.

1) Parks Canada takes care of Canada's zoos.	True	False
2) Heritage sites are places with special meaning.	True	False
3) Banff National Park is Canada's first National Park.	True	False
4) Parks Canada teaches visitors about Alberta's history.	True	False
5) Parks Canada helps to keep the parks clean and safe.	True	False

Parks Canada Work With Indigenous Groups

Parks Canada Working With Indigenous Groups

Parks Canada works with Indigenous groups, like First Nations, Métis, and Inuit people, to take care of our special places in nature. They do this in many different ways.

Learning From Each Other

One way that Parks Canada and Indigenous groups work together is by learning from each other. In Alberta's Banff National Park, Parks Canada works with local First Nations, the Stoney Nakoda and Blackfoot. The Stoney Nakoda teach Parks Canada about the animals and plants in the park, and how to take care of them. Parks Canada shares their knowledge about how to keep the park safe and healthy for everyone.

Sharing Stories and Traditions

Parks Canada also works with Indigenous groups to protect their stories and traditions. In Batoche National Historic Site in Saskatchewan, the local Métis people teach visitors about their history. They show how to weave sashes and dance a special dance called the Red River Jig. This way, their traditions are kept alive and shared with others.



Taking Care of the Land Together

Sometimes, Parks Canada gives back land to Indigenous groups. In the Mealy Mountains of Labrador, a new national park reserve is being created. The local Innu people will help take care of this park together with Parks Canada. This means they both make decisions about how to protect the park and its animals and plants.

Questions

Use information from the text to support your answer

1) How does Parks Canada work with the Métis in Saskatchewan?

2) How does Parks Canada work with the Inuit community?

3) Why do you think it is important for Parks Canada to work with Indigenous groups? Consider who has lived on the land for a long time.

True or False

Circle whether the statement is true or false

1) Parks Canada works alone to take care of natural places	True	False
2) At Batoche National Historic Site, Métis people share their traditions	True	False
3) Parks Canada never gives back land to Indigenous groups	True	False
4) Métis people show visitors sash weaving and the Red River Jig	True	False
5) Innu people help manage the new Mealy Mountains park	True	False

Role Play – Humans Destroying Habitats

Objective

What are we learning about?

To help students understand and demonstrate how human activities can damage habitats.

Materials

What do we need?

- ✓ Scissors and glue
- ✓ A space for a performance
- ✓ Camera or phone for filming (optional)



Method

How do we do the experiment?

- 1) Cut out the human activities on each page and put each one up. Place them in a hat.
- 2) Divide the class into small groups of 3-5 people.
- 3) Each group will pick a piece of paper from the hat. The human activity written on the paper will be the theme for their skit.
- 4) Give the groups time to research their chosen human activity and understand how the activity damages habitats and what effect it has on animals, plants, and the environment.
- 5) Each group will then brainstorm and write a short skit that shows how this human activity damages a habitat. Make sure the skit includes a solution or a call to action to solve this problem.
- 6) Groups will need to rehearse their skit, deciding who will play each role and how they will perform their skit.
- 7) Finally, each group will perform their skit for the class. After each skit, have a class discussion about the human activity and what we can do to lessen our impact on habitats.

Deforestation: Cutting down trees removes the habitat of many animals and plants, leading to loss of biodiversity.

Urbanization: Building cities and expanding human settlements often destroys natural habitats.

Pollution: Dumping waste into rivers, oceans, or on land can poison habitats and make them uninhabitable.

Overfishing: Removing too many fish from the sea disrupts the balance of aquatic ecosystems.

Mining: Taking resources from the earth leads to habitat destruction and pollution.

Agriculture: Large-scale farming often involves clearing land and using pesticides which can destroy habitats.

Climate Change: Human activities leading to global warming can cause habitats to change faster than wildlife can adapt.

Poaching and Hunting: Illegal or excessive hunting can deplete wildlife populations and disrupt habitats.

Planning

Plan your skit below

1) What is the human activity for your skit?

2) How will you act out this skit?

a) What costumes will you have? Who will play who?

b) What will happen in your skit?

c) What will the solution to the human activity be?

PREVIEW

Memory Game – Earth Systems Review Game

Objective

What are we learning about?

Students will review key Earth Systems terms by playing a memory match game. Each card shows either a term or its short definition. Students match the correct pairs and explain how the terms connect to Earth's systems, rocks, and clouds.

Materials

What do you need for the activity?

- Set of Memory Game cards (provided)
- A small table or clear floor space

**Instructions**

How will you complete the activity?

- 1) Divide the class into groups of 3 or 4. Give each group a set of Memory Game cards (provided).
- 2) Have each group lay all the cards face down in a grid on the table.
- 3) The students take turns flipping over two cards at a time, trying to find a matching term and its definition.
- 4) If a student finds a match, they remove those cards from the grid and keep them.
- 5) If the cards do not match, they are turned back over, and the next student takes a turn.
- 6) The game continues until all the cards have been matched.
- 7) After the game, review the terms and definitions with the class.
- 8) Discuss why these terms are important to understand and how they relate to the topic.

Cards

Memory Game Cards

Lithosphere

The solid outer layer of Earth made of rocks, mountains, and land surfaces.

Hydrosphere

All living things on Earth, including plants, animals, and people.

Atmosphere

All water on Earth, like oceans, rivers, lakes, and glaciers.

Rock Cycle

The layers of gas around Earth that give us air to breathe.

The process where rocks change type through melting, cooling, and breaking.

Cards

Memory Game Cards

Igneous Rock

Rock formed when hot melted lava or magma cools and hardens.

Metamorphic Rock

Rock changed by heat and pressure into a new kind of rock.

Sedimentary Rock

Rock formed when small pieces of sand and shells press together.

Troposphere

The lowest layer of the atmosphere where weather and clouds form.

Exosphere

The outermost layer of Earth's atmosphere, where space begins.

Cards

Memory Game Cards

Biodiversity

The variety of different living things in a place or on Earth.

Natural Resources

Things from nature like water, trees, and minerals people use.

Resource Town

A town that exists mainly because of nearby natural resources.

Cumulus Clouds

Fluffy white clouds that look like cotton and bring nice weather.

Nimbostratus Clouds

Thick, dark clouds that usually bring long periods of rain.

Name: _____

Date: _____

Unit Test – Earth Systems

Multiple Choice

/10

1) Which sphere includes all the water on Earth? a) Hydrosphere b) Lithosphere c) Atmosphere d) Biosphere	2) Which sphere includes all living things? a) Hydrosphere b) Lithosphere c) Atmosphere d) Biosphere
3) Which spheres belong to? a) Hydrosphere b) Lithosphere c) Atmosphere d) Biosphere	4) Which sphere does air belong to? a) Hydrosphere b) Lithosphere c) Atmosphere d) Biosphere
5) Which body of water holds most of Earth's water? a) Glaciers b) Rivers c) Oceans d) Groundwater	6) Which layer of atmosphere is furthest from Earth's surface? a) Thermosphere b) Stratosphere c) Mesosphere d) Troposphere
7) Which doesn't belong to the lithosphere? a) Earth's crust b) Soil c) Upper Mantle d) Inner Core	8) Where is it warmest? a) At the equator b) At the north pole c) At the south pole d) In Canada
9) Which natural resource is most important in Alberta? a) Saltwater b) Oil and gas c) Fruit plants d) Gold and silver	10) Oceans have which type of water? a) Freshwater b) Glacial water c) Saltwater d) Brackish water

Term	Definition (what does it mean)
Biosphere	
Atmosphere	
Conservation	

Short Answer Questions (2 marks each)

1. What three types of rocks are part of the lithosphere?

2. Where on Earth is there the most biodiversity? Why is there more biodiversity there?

3. Name 4 natural resources Alberta has a lot of.

1) If the bee population gets smaller, how does it affect the lithosphere, hydrosphere, and atmosphere?

2) How can we protect our Earth's system? What do we need to do to participate in conservation? How will you be helping the Earth become more sustainable?
