Workbook Preview

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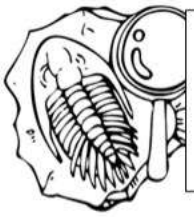
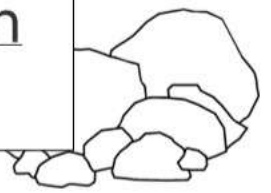


Grade 4 Science – 2022 Curriculum

Rocks, Minerals, and Geological Processes



	Curriculum Expectations	Pages
E1.1	analyse ways in which geological processes impact society and the environment	75-96, 112-114
E1.2	assess social and environmental impacts of extracting and refining rocks and minerals and of manufacturing, recycling, and disposing of products derived from rocks and minerals, while taking various perspectives into account	125-133
E2.1		29, 71-, 112-
E2.2		9-62, 0
E2.3	classify different rocks and minerals according to their composition and physical properties, using various tests and criteria	35-38, 53-58
E2.4	describe everyday uses of rocks and minerals	115-118
E2.5	describe how fossils are formed and what information they can provide about Earth's history	101-103, 106-111
E2.6	demonstrate an understanding of First Nations, Métis, and Inuit geological knowledges that are used in the selection of different rocks and minerals for specific purposes	120-122

Preview of 100 pages from this product that contains 217 pages total.

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Grade 4 Science Unit

Strand A - STEM Investigation and Communication Skills

	Curriculum Expectations	Pages
A1.1	use a scientific research process and associated skills to conduct investigations	137-138, 143-146
A1.2	use a scientific experimentation process and associated skills to conduct investigations	63-64
A1.3	use an engineering design process and associated skills to design, build, and test devices, models, structures, and/or systems	16-17, 99-100, 104-105, 123-124
A1.4	follow established health and safety procedures during science and technology investigations, including wearing appropriate protective equipment and clothing and safely using tools, instruments, and materials	16-17, 63-64, 99-100, 104-105, 123-124
A1.5	communicate their findings, using science and technology vocabulary and formats that are appropriate for specific audiences and purposes	16-17, 63-64, 99-100, 104-105, 123-124
A2.1	write and execute code in investigations and when modelling concepts, with a focus on decomposing problems into smaller steps	30-34, 119, 139-142
A2.2	identify and describe impacts of coding and of emerging technologies on everyday life	119, 143-146
A3.1	describe practical applications of science and technology concepts in their home and community, and how these applications address real-world problems	134-138, 143-146
A3.2	investigate how science and technology can be used with other subject areas to address real-world problems	134-138, 143-146
A3.3	analyse contributions to science and technology from various communities	134-138, 143-146

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ROCKS, MINERALS AND GEOLOGICAL PROCESSES



PREVIEW

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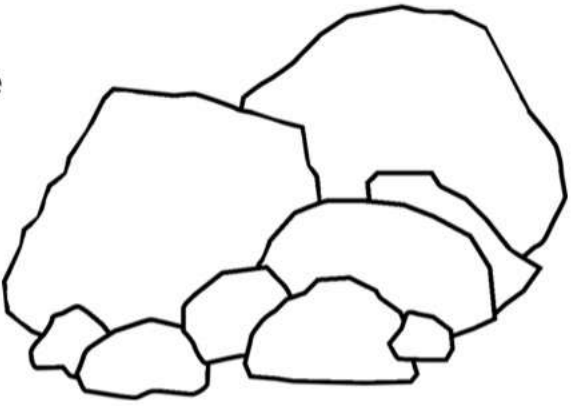
Name: _____ 9

Curriculum Connection
E2.1

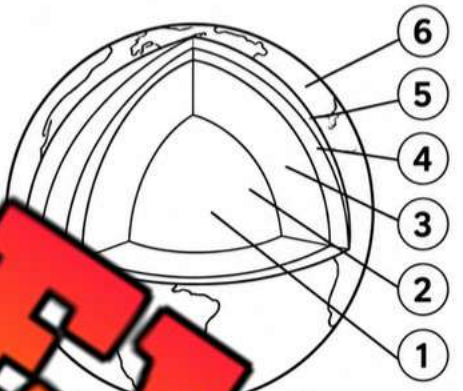
Geology

What is Geology?



Geology is the study of the materials that make up the Earth, the features and structures found on the Earth as well as the processes that act upon them. Geo means Ear[illegible]nd ology means study of, so **geology,** is simply [illegible] of the Earth. Geology and biodi[illegible]ife [illegible]ecause geology is the study o[illegible]n-livin[illegible] Earth, whereas biodiversity studies the living things on Earth.

Non-livi[illegible]n[illegible]e all t[illegible]hat do not breathe, grow, or move. Living things are the things around us [illegible]can[illegible] and grow.



Why is Geology Important?

A scientist who studies the Earth is kno[illegible] **geolo**[illegible]. Geologists can tell us how the Earth was made, w[illegible]s made of, and how it has changed over time. They [illegible]nd map where important minerals like diamonds are, or w[illegible] we can find fuels like oil. They also provide information abou[illegible]nger[illegible] processes like earthquakes and floods.

PREVIEW

Geology Basics

- Minerals are naturally occurring substances that are sometimes made from one element but more often are compounds made from two or more elements
- Diamond is made up of just carbon, which means it is a mineral made from just one element. White fluorite is a compound made from the elements calcium and fluorine.
- Rocks and stones are naturally occurring solids made up of minerals.
- The Earth's crust is made up of rock
- Rocks have been used for millions of years as tools and weapons

Name: _____ 10

Curriculum Connection
E2.1

True or False

Circle whether the statement is true or false.

1) Geologists study the Earth and how it has changed.	True	False
2) Minerals are made of just one element.	True	False
3) A rock is a solid made from minerals.	True	False
4) The Earth's crust is made from rock.	True	False
5) Geo me udy and ology means Earth.	True	False

Quest

ans uestions below using evidence from the text.

1) Why is it imp t we s logy?

2) What is the difference between geology and bi sity?

PREVIEW

Questioning

Write 3 questions you have about geology.

1)	
2)	
3)	

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Curriculum Connection
E2.1

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	✓
Geology is the study of the Earth and the materials that make it up.	
A geologist studies living animals and plants.	
Rocks and stones are naturally made up of minerals.	
The Earth's crust is mostly made of water.	
Geologists can help find important minerals and fuels.	
Diamonds are made from many different minerals.	

Name: _____ Mark ____

Check only the true statements.

Statement	✓
Geology is the study of the Earth and the materials that make it up.	
A geologist studies living animals and plants.	
Rocks and stones are naturally made up of minerals.	
The Earth's crust is mostly made of water.	
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The Earth's crust is mostly made of water.	
Geologists can help find important minerals and fuels.	
Diamonds are made from many different minerals.	

PREVIEW

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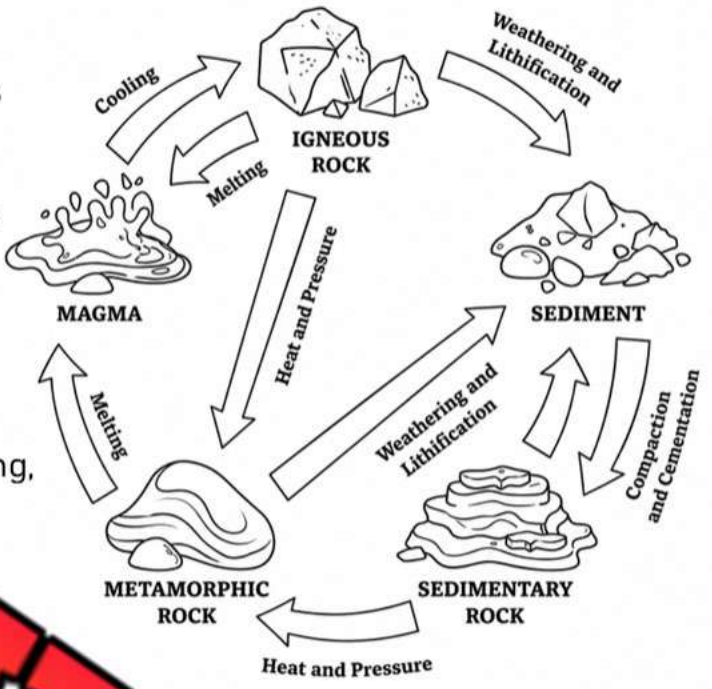
Curriculum Connection
E2.1

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, meta[illegible]phic rock, and sedimentary rock. Each [illegible]rock can change into anoth[illegible]g [illegible]following physical proces[illegible]compa[illegible]nting, weathering, cooling, melti[illegible]a[illegible]and pr[illegible]



Magma and Sedimen[illegible]

Magma and sediment are [illegible]s tha[illegible] become rocks and enter the roc[illegible]ycle. [illegible]ock that is underground.

Sediments are particles from roc[illegible]sion an[illegible]g. These sediments eventually will become sedimentary rock in the [illegible]

Igneous Rock

Igneous rock is hardened magma that can happen below [illegible]the [illegible]d. It can become one of the other types of rocks through the following proce[illegible] magma, eroding into sediment, or be compacted and pressurized to beco[illegible] 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.

PREVIEW

Name: _____ 13

Curriculum Connection
E2.1

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) Igneou[illegible]k can be compacted to become metamorphic.	True	False

Quest[illegible] [illegible]w [illegible]questions below using evidence from the text.

1) What is the [illegible]

2) How can rocks change from one form into anoth[illegible]

PREVIEW

Summarize What is the main idea and supporting details from the reading passage?

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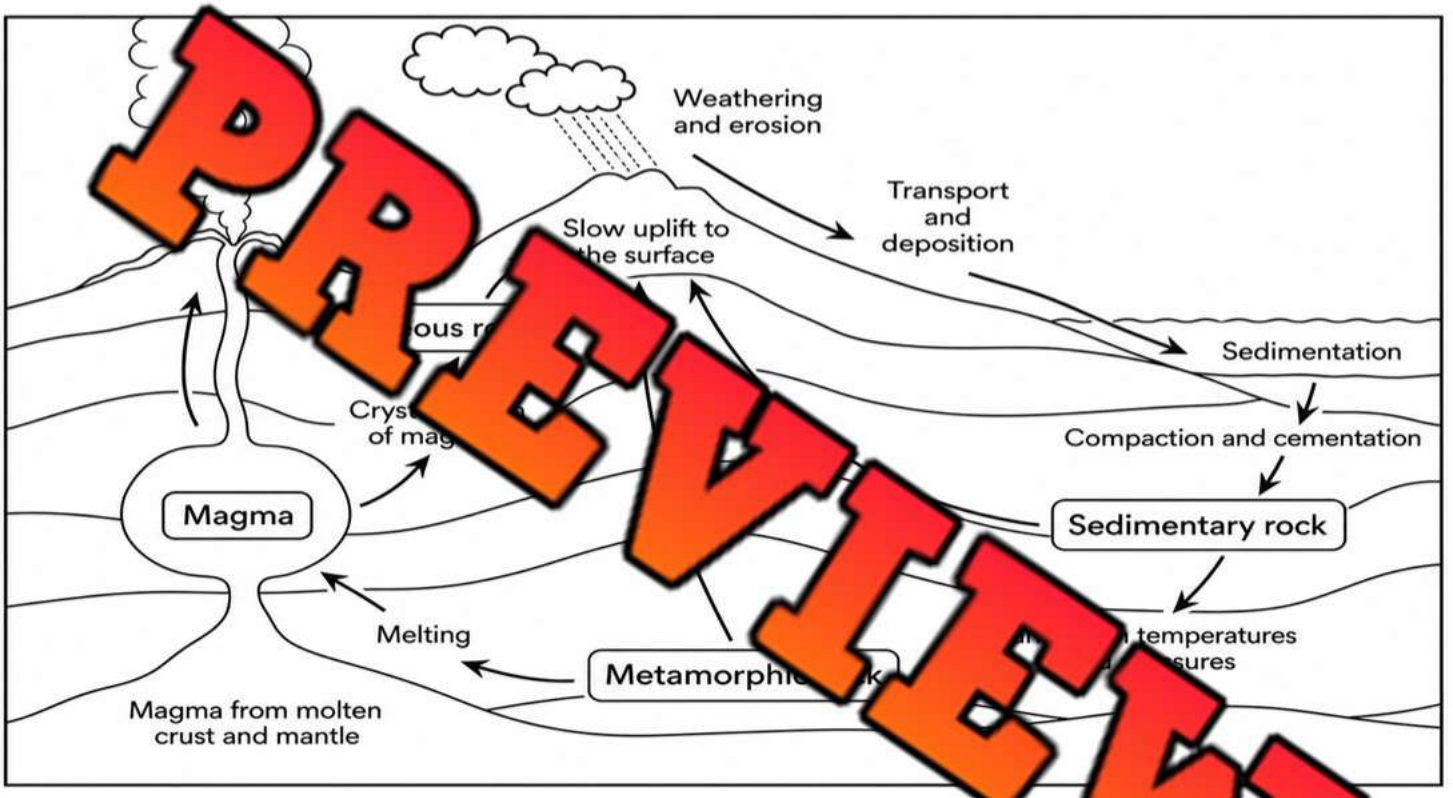
Curriculum Connection
E2.1

The Rock Cycle – Diagram

The Rock Cycle
The rock cycle is a long, slow journey for rocks to travel from the Earth's inner core to the Earth's surface and then back down again. Rocks change during the process that we call the rock cycle. Throughout the rock cycle, rocks form deep in the Earth and often change forms through intense heating, compacting, erosion and settling. The three main kinds of rocks are igneous, sedimentary, and metamorphic.



PREVIEW

Interpret Read the diagram and answer the question below.

Describe the journey of a rock through the rock cycle. Notice that it is not a perfect circle, and that not all rocks go through the same journey.

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Curriculum Connection
E2.1

The Rock Cycle

Instructions Cut and paste the stages of rock cycle in the correct order.

PREVIEW



Igneous rock



Metamorphic rock





Sedimentary rock



Sediment

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Curriculum Connection
A1.3, A1.4, A1.5

Chocolate Rock Cycle Lab

Information | What is this lab about?

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 into another type through the following physical processes: cooling, melting, heating, compacting, cementing, weathering, and extreme pressure.

PREVIEW

Research
How is e formed?



Mate
1. Dark and white baking squares
2. Tinfoil
3. Plastic knife
4. Hot water
5. Empty container



Method
1) To make sedimentary chocolate, sc olat vings off of the baking squares. Put the shavings onto a piece of ti d wrap tinfoil to enclose the chocolate shavings. Press down on the tinfoil your or by standing on it. Open the tinfoil enclosure and observe the entar
2) Create a bowl/boat with your tinfoil. Place yo edi g with some more chocolate shavings and some bigger chunks aking ate in the tinfoil boat. Fill your empty container with hot water e yo il t on the water. Let the heat from the water melt your chocola until uch (test with your knife!). After allowing the chocolate to cool, obs chocolate is similar to metamorphic rock.
3) Use pieces of your sedimentary and metamorphic rock as well as so eces of your original baking chocolate and put them in the tinfoil boat. Place your boat on very hot water and allow the chocolate to melt until it is a liquid. Carefully remove the boat from the water and allow the chocolate to cool. Observe how this is similar to igneous rock.

Hypothesis – What do you think will happen?

How will heat and pressure affect the chocolate?

_____

_____

_____

_____

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Curriculum Connection
A1.3, A1.4, A1.5

Observations | What happened?

Type of Rock	Observations
Sedimentary	
Metamorphic	
Igneo	

Results | An[illegible] questi[illegible]low.

1) Was your hypothesis co[illegible] incorr[illegible]y?

2) How was sedimentary rock formed? How was th[illegible]feren[illegible]ow the other two types of rocks were formed? How was it simila[illegible]

3) How do these processes naturally occur on Earth? Where do they occu[illegible]

4) Do you think rocks stay as the same type of rock for all of time? Why or why not?

PREVIEW

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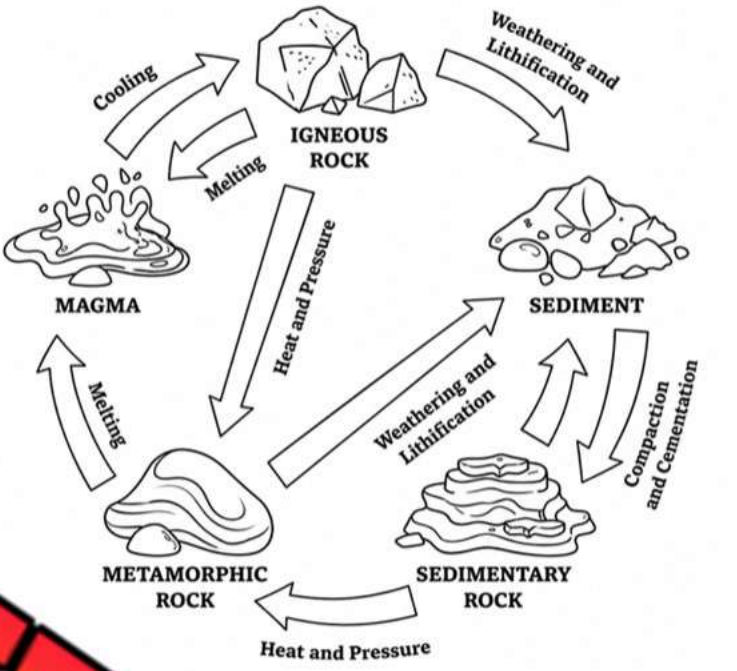
Curriculum Connection
E2.1

Formation of Different Rocks

Explain Explain the questions below.



1) How are sedimentary rocks formed?

2) How ar orphic rocks formed?

3) How are igne form

4) How do igneous rocks turn into meta rock

5) How do metamorphic rocks turn into sedimentary ro

PREVIEW

True or False Circle whether the statement is true or false.

1) When magma is cooled, it turns into metamorphic rock.	True	False
2) Igneous and metamorphic rocks can be weathered into sediments.	True	False
3) Sediments are compacted and cemented into sedimentary rock.	True	False
4) Igneous rock cannot become metamorphic rock.	True	False
5) Through heat and pressure, magma becomes metamorphic rock.	True	False
6) Metamorphic rock can melt into magma.	True	False

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Curriculum Connection
E2.1

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.

Mark

What is underground liquid rock called?	Lava	Magma
Which rock forms when magma hardens?	Igneous	Metamorphic
Which process wears rocks into pieces?	Weathering	Cooling
Which process turns sediment into rock?	Cementing	Melting
Which rock forms from heat and pressure?	Sedimentary	Metamorphic

Name: _____

Circle the answer for each question.

Mark

What is underground liquid rock called?	Lava	Magma
Which rock forms when magma hardens?	Igneous	Metamorphic
Which process wears rocks into pieces?	Weathering	Cooling
Which process turns sediment into rock?	Cementing	Melting
Which rock forms from heat and pressure?	Sedimentary	Metamorphic

Name: _____

Circle the answer for each question.

Mark

What is underground liquid rock called?	Lava	Magma
Which rock forms when magma hardens?	Igneous	Metamorphic
Which process wears rocks into pieces?	Weathering	Cooling
Which process turns sediment into rock?	Cementing	Melting
Which rock forms from heat and pressure?	Sedimentary	Metamorphic

PREVIEW

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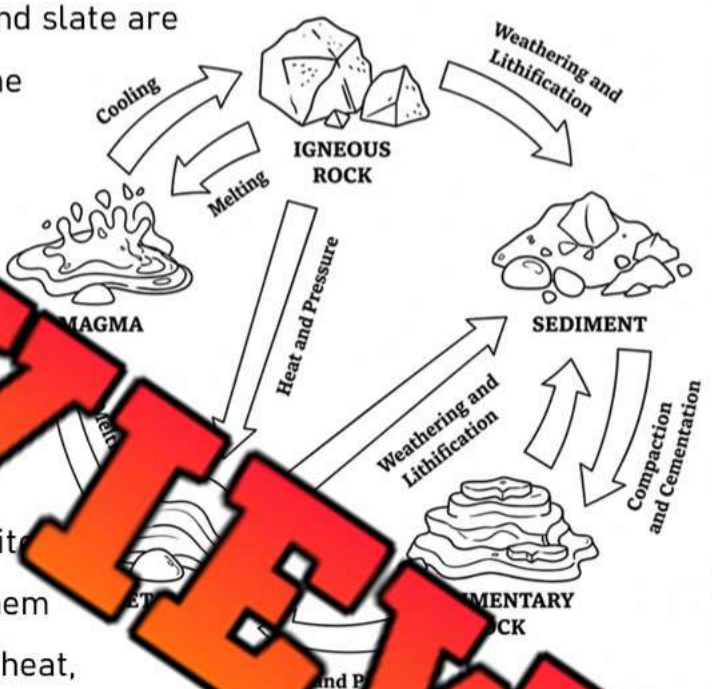
Curriculum Connection
E2.1

Metamorphic Rock



What is Metamorphic Rock?

Metamorphic rock is one stage a rock becomes in the rock cycle. Rocks become metamorphic when they are affected by high temperatures and pressures. They don't melt, but the chemicals they contain may change forms and you may see crystals inside of the rock. Marble and slate are two e hic rocks. The name **metamo ic** com Greek words "change of sha



What do they look like

As you can see in the pictur rph rocks sometimes have alternating bands and dark minerals. They can also be ma mostly one mineral, such as marble or quartzit Metamorphic rocks rarely contain fossils in them because of the extreme conditions (pressure, heat, compression) that they face. The fossils rarely survive these conditi

PREVIEW

How Metamorphic Rocks are Formed

Metamorphic rocks are formed from other rocks that are changed because of heat and pressure. They could start out as a sedimentary or igneous rock and then they metamorphosize into a metamorphic rock.

The conditions required to form a metamorphic rock are very specific. The existing rock must be exposed to high heat, high pressure deep inside the earth, or to a hot, mineral-rich fluid. These conditions are most often met deep in the Earth's crust. It is important for the existing rock to remain a solid and not melt. If there is too much heat or pressure, the rock will melt and become magma.

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Curriculum Connection
E2.1

True or False

Circle whether the statement is true or false.

1) All metamorphic rocks have dark and light bands in them.	True	False
2) Metamorphic rocks can form from a liquid.	True	False
3) Metamorphic rocks are made from extreme pressure and heat.	True	False
4) Metamorphic rocks form deep inside the Earth's crust.	True	False
5) If a metamorphic rock faces too much heat/pressure, it can melt.	True	False

Questions

Answer the questions below using evidence from the text.

1) What is a metamorphic rock? How is it made?

2) What do metamorphic rocks look like?

Visualizing

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

PREVIEW

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Name: _____ 25

Curriculum Connection
E2.1

Sedimentary Rock

What is Sedimentary Rock?



Sedimentary rocks are formed by sediment that is deposited over time, usually as layers at the bottom of lakes and oceans. **Sediment** is tiny pieces of plants, mi[illegible]s, and other organic matter that settle at t[illegible]m of a liquid. Over time, the sedi[illegible]ot[illegible] lakes and oceans become compre[illegible]d and [illegible] into solid layers of rock that we call sedimentary rock.

PREVIEW

What Does Sedi[illegible] Rock L[illegible]

Sedimentary rocks ca[illegible] [illegible]of [illegible]minerals. The layers are usually the same shade. Other sedimentary r[illegible] like [illegible]cks that are compacted or cemented together. The picture in the bottom corn[illegible] thi[illegible] of sedimentary rock.

Sedimentary rocks sometimes co[illegible]n fossils [illegible]s b[illegible]se they are the softest rock that allow impressions to be made into th[illegible]er th[illegible]rphic and igneous rock. Over time, the soft sediment can be imprinted [illegible]eth[illegible]al[illegible] leaves of plants and what is left is a fossil that shows the shape o[illegible]t.

How Sedimentary Rock Forms



As mountains age, rock gets worn down by erosion. **Erosion** is when water or wind removes tiny bits of rock from larger rocks.

A waterfall erodes the rock behind the falling water because the force of the water slowly breaks down the rock. The mountains we see erode much slower but are crumbling one little bit at a time.

The sediments end up on the Earth's surface. If sediment is buried deeply, it becomes compacted and cemented, forming sedimentary rock.

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Name: _____ 26

Curriculum Connection
E2.1

True or False

Circle whether the statement is true or false.

1) Sediments are tiny pieces of rock, plants, or other organic material.	True	False
2) Erosion creates sediments from the movement of wind and water.	True	False
3) Waterfalls don't cause much erosion.	True	False
4) Sediments can be compacted or cemented into rocks.	True	False
5) When sediments are buried, they become metamorphic rocks.	True	False

Questions

Answer the questions below using evidence from the text.

1) What is a sedimentary rock? How is it formed?

2) Why are fossils more likely to form in sedimentary rock?

PREVIEW

Making Connections

What does the reading remind you of?

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Name: _____ 27

Curriculum Connection
E2.1

Igneous Rock

What is Igneous Rock?



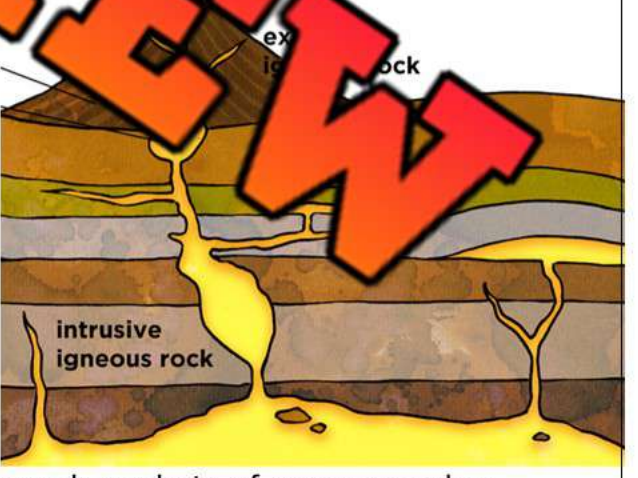
Igneous rock is rock formed when magma or molten lava cools and becomes a solid. Igneous rock can form above or below the Earth's surface. The upper section of the Earth's crust is made up of 95% i ous rock. The rocks that form below the Earth's surface ar **intrusive rocks**, while the rocks that have coole b Earth's surface are called **extrusive rocks.**

PREVIEW

What do igneous

When liquid mag ava c rm crystals. These crystals keep forming as the cooling process conti s A a crystals form, they smash into each other and form a rock that is so h not art. An example of an igneous rock is granite. You can see the crystals i gra many household kitchens.

When looking at an intrusive igne ock tha be rmed below the surface, you can see the mineral crystals. Extrusive igne cks c ster because it is exposed to the cooler air temperatures outside of the Earth's crust. Extrusive igneous rocks have small grained crystals that are so small, you can't see them. The Earth's moon is made out of igneous rock!



How Igneous Rock is Made?

When sedimentary and metamorphic rocks make their way through the Earth's crust, they eventually reach pockets of magma under volcanoes. These sedimentary and metamorphic rocks melt and become magma when they are exposed to the magma in the Earth's crust. The magma reaches the Earth's surface through volcanoes. As the magma makes its way up towards the Earth's surface, it will cool and form into either intrusive or extrusive igneous rock.

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Name: _____ 28

Curriculum Connection
E2.1

True or False

Circle whether the statement is true or false.

1) Igneous rock forms when lava or magma cools and becomes a solid.	True	False
2) If a rock forms under the Earth's surface, it is an extrusive rock.	True	False
3) Intrusive rocks are formed under the Earth's surface.	True	False
4) Igneous rocks have lots of crystals in them.	True	False
5) Igneous [illegible] are not as strong as sedimentary rocks.	True	False

Questi[illegible]er [illegible]stions below using evidence from the text.

1) How is igne[illegible]ned?

2) What is the difference between intrusive and ext[illegible]e ign[illegible]rock?

PREVIEW

Visualizing

Draw what you were picturing while you were reading. Exp[illegible] the picture.

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Curriculum Connection
E2.1

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 type of rock forms when magma or lava cools?	Sedimentary / Igneous
2) Which type of rock is most likely to contain fossils?	Sedimentary / Metamorphic
3) Which type of rock forms because of heat and pressure?	Igneous / Metamorphic
4) Which rock is an example of a metamorphic rock?	Granite / Marble
5) Which rock is made from layers of compacted sediment?	Sedimentary / Igneous

Name: _____ Mark

Circle the correct answer.

1) Which type of rock forms when magma or lava cools?	Sedimentary / Igneous
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5) Which rock is made from layers of compacted sediment?	Sedimentary / Igneous

PREVIEW

Name: _____ 30

Curriculum Connection
A2.1

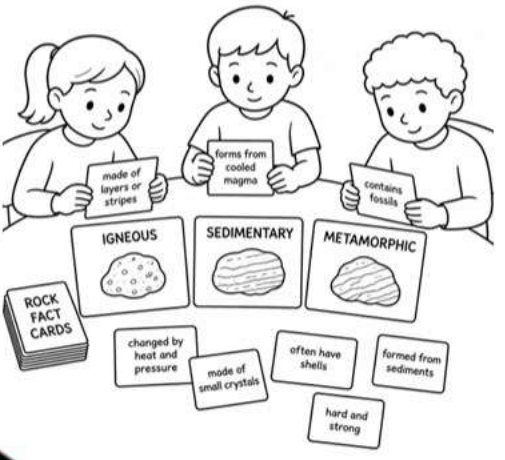
Coding Activity – Rock Classification

Objective — What are we learning about?

To learn more about the three main types of rocks through a fun coding activity. This is a physical activity that uses the principles of coding to help students classify rocks based on how they are formed.

Materials — What do we need?

- ✓ Fl[illegible]ards wi[illegible]es of the three rock types
- ✓ Flashcard[illegible]t ch[illegible]cteristics and facts about eac[illegible].
- ✓ Open space fo[illegible]emen



Method — How do we com[illegible]he

1) Setup: Lay out the flashcards with th[illegible] names [illegible] roc[illegible]rder from the ground up in a line across the room or field.

2) Creating Human Code: Divide the students into [illegible]ee. Ea[illegible]up will represent a "program" and each student in the gro[illegible]arese[illegible]yer of the atmosphere.

3) Rock Fact Cards: Give each group a set of fact cards about eac[illegible]e cards can include facts such as "forms from cooled magma," "contains foss[illegible]," "changed by heat and pressure." The facts should correspond to the type of the [illegible]ck.

4) Programming: The task for each group is to assign the correct facts to each member, representing the correct type of rock. They need to "program" their group by discussing and matching the facts to the rocks.

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 rocks, and each student will say out loud the name of the rock 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.

PREVIEW

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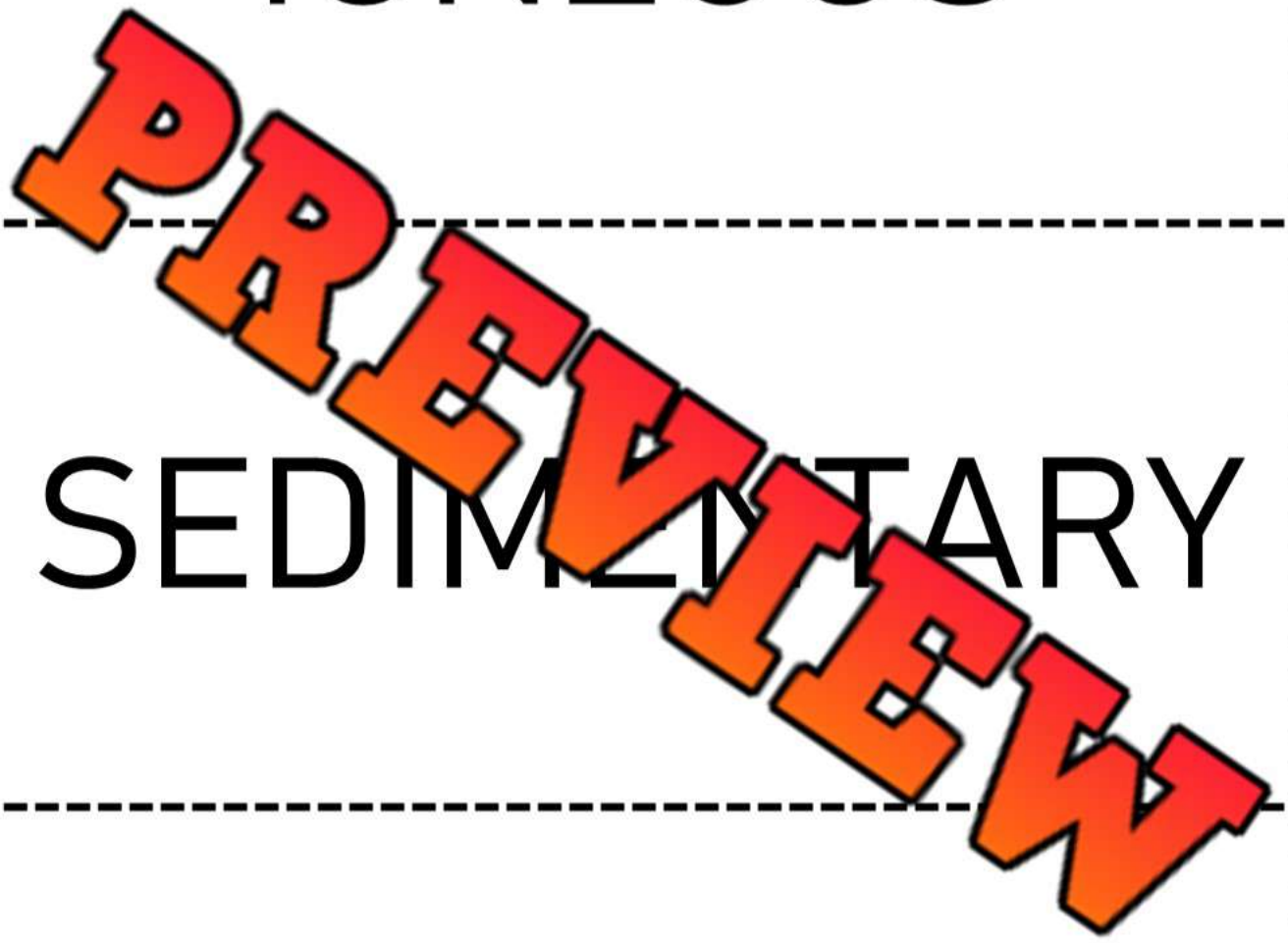
Curriculum Connection
A2.1

IGNEOUS



SEDIMENTARY

METAMORPHIC

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Curriculum Connection
A2.1

Set 1

This rock forms when magma or lava cools.

This rock often has layers of sediment.

Marbl[illegible] example of this rock.

This rock [illegible]ain[illegible]ssils.

This rock is chang[illegible]y heat[illegible]ressure.

Set 2

Granite is an example of this rock.

This rock forms from tiny pieces of rock called s[illegible]

This rock usually does not contain fossils.

Slate is an example of this rock.

This rock can form above or below Earth's surface.

PREVIEW

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Curriculum Connection
A2.1

Set 3

This rock is made when sediments are compacted and cemented together.

This rock may have crystals.

This r[illegible]n begin as an igneous or sedimentary rock before chan[illegible]

Sandston[illegible]am[illegible]e of this rock.

This rock forms f[illegible] cooling [illegible]ma.

Set 4

This rock forms because of high heat [illegible]side [illegible]n.

This rock often has visible layers of sediment.

Basalt is an example of this rock.

This rock can be intrusive or extrusive.

This rock forms when existing rocks change without melting.

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Curriculum Connection
A2.1

Set 5

This rock may be found at the bottom of lakes and oceans.

This rock forms when lava cools on Earth's surface.

This rock often contains the remains or impressions of living things.

This rock changes because of heat and pressure.

Quartzite is an example of this rock.

Set 6

This rock forms when molten rock cools to a solid.

This rock is made from layers of compacted sediment.

Limestone is an example of this rock.

This rock can have alternating bands of light and dark minerals.

This rock forms without melting

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Curriculum Connection
E2.3

Rocks vs Minerals

What is a Mineral?

A **mineral** is a solid substance that has a specific chemical structure that is the same throughout the entire mineral. Minerals can be made of just one element, like gold or copper. Minerals can also be made of more than one element.

We describe minerals based on their lustre, streak, and hardness. Minerals have their own properties that make them different.

of different minerals. Examples of minerals include:



Feldspar



Mica

PREVIEW

What are Rocks?

Rocks are a combination of minerals. W mine bove are combined together, they form the rock named granite. **Granite** is an in e ign k that is formed underground when these minerals undergo extre eat magma. When the magma cools, the minerals solidify roc



Examples of Rocks and Minerals

Obsidian

Minerals
- Silica - Sodium - Potassium

Sandstone

Minerals
- Quartz - Feldspar

ble

Minerals
- Calcium carbonate - Quarts - Graphite - Pyrite

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Curriculum Connection
E2.3

True or False

Circle whether the statement is true or false.

1) Minerals are made of smaller rocks.	True	False
2) Rocks are made of smaller minerals.	True	False
3) Sandstone is made of two minerals – quarts and feldspar.	True	False
4) Mica is a type of mineral.	True	False
5) Marble [illegible] type of mineral.	True	False

Question

[illegible] questions below using evidence from the text.

1) What is the [illegible] between rocks and minerals?

2) Describe a granite rock. What minerals is it made [illegible] of rock is it?

PREVIEW

Draw

Draw a picture of a granite rock. Label the minerals in the [illegible]te.

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E2.3

Research – Rocks and Mineral Composition

Rocks are made up of different minerals. Research the rocks below by searching: "rock name mineral composition". Draw a diagram of the rock by labelling the minerals it is made of.



Research Look up the rock and its mineral composition. Draw a diagram of it.

Rock Name	Gneiss
Mineral Composition	
Diagram	

Rock Name	Limestone
Mineral Composition	
Diagram	

PREVIEW

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Curriculum Connection
E2.3

Research Look up the rock and its mineral composition. Draw a diagram of it.

Rock Name	Conglomerate
Mineral Composition	
Diagram	

Rock Name	Schist
Mineral Composition	
Diagram	

Rock Name	Breccia
Mineral Composition	
Diagram	

PREVIEW

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Curriculum Connection
E2.2

Physical Properties of Igneous Rocks

Properties of Rocks

When we describe a rock's properties, we use the following terms/properties:

- Colour – the colour of the rock
- Lustre – how light reflects off the rock. We use these terms to describe lustre: metal[illegible]-metallic, silky, pearly, greasy, waxy, dull, earthy, shiny, and glassy
- Text[illegible]k smooth or rough?
- T[illegible]arency – [illegible]see through the rock?
- Hardness – [illegible]tro[illegible]r can it be scraped or broken?

PREVIEW

Properties of Igneo[illegible]cks

Not all igneous rocks are [illegible], whi[illegible] it hard to describe the properti[illegible]f ev[illegible] rock. Intrusive and extrusive rocks ge[illegible]y have different properties.



Obsi[illegible]rusive Igneous Rock

Intrusive Igneous Rocks

1) Larger crystals which give it a rougher texture
2) Not as hard as extrusive rock because the crystal size is larger but still a very hard rock, harder than sedimentary rocks
3) Not usually shiny or transparent



Granite – Intrusive Rock

Extrusive Igneous Rocks

1) Smaller crystals not visible because the lava cools quickly on the surface
2) Texture is smooth and glassy
3) Very hard rock because of the very small crystals
4) Glassy lustre that reflects light

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Curriculum Connection
E2.2

Describe What are the general properties for intrusive and extrusive igneous rocks?

Intrusive	Extrusive

PREVIEW

Compare Describe the [illegible] pro[illegible] the rocks below.

		
Type	Intrusive Extrusive	Intrusive [illegible]rusive
Lustre		
Hardness		
Transparency		
Texture		

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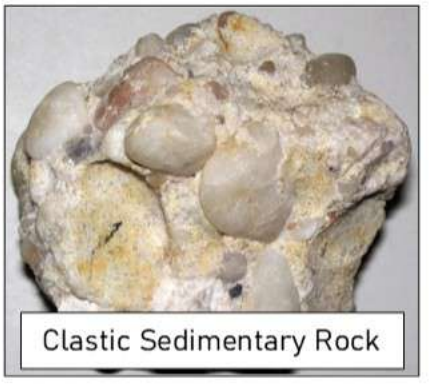
Curriculum Connection
E2.2

Physical Properties of Sedimentary Rocks

Types of Sedimentary Rocks

Sedimentary rocks are formed from smaller rock pieces or pieces of once-living organisms. There are three main types of sedimentary rock.



Clastic Sedimentary Rock

1) Comm dimentary Rocks

These ro s sediments that are carried in river ns and lakes. When they get buried, the sediments lose water and bec e cem m r k. Examples include sandstone, limestone, and shale.

2) Clastic Sedi Rock

Rocks that are weathe small pieces of rock. When they are sent by wind or water to a basin hey ied in the ground. Underground, the sediments are compacted and ce ente tary rock. Examples are shale and sandstone.



Coal ic Rock

3) Biologic Sedimentary Rocks

When living things die, their organic material pile up are compressed and cemented together. This creates biologic sedimentary rocks. Coal is an example of plant material tha cted to form a biologic sedimentary rock that can be burned for energy.

PREVIEW

Properties of Sedimentary Rocks

Sedimentary rocks vary a lot depending on the type of rock.

In general, sedimentary rocks are:

- Not as hard
- Have layered and rough textures
- Often have shells or organic material cemented in the rock
- Can have small, medium, or large grains
- Can have fossils imprinted into the rock

Common Rock
Limestone



Name: _____ 45

Curriculum Connection
E2.2

Compare Describe the physical properties of the rocks below.



Type	Lustre	Hardness	Transparency	Texture
Common				
Clastic				
Biologic				



Type	Lustre	Hardness	Transparency	Texture
Common				
Clastic				
Biologic				



Type	Lustre	Hardness	Transparency	Texture
Common				
Clastic				
Biologic				

PREVIEW

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E2.2

Direction	Start at the Start box and follow the pathway labels by choosing the rock that correctly matches the property in each box. Continue tracing the correct path until you reach the Finish box without crossing into the wrong pathways.



PREVIEW

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Curriculum Connection
E2.2

Memory Game: Rock and Mineral Match

Objective

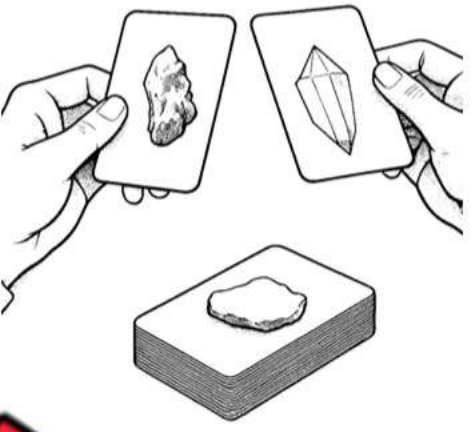
What are we learning about?

To reinforce key vocabulary related to rocks and minerals through a fun memory game, enhancing both memory skills and geological understanding.

Materials

What will you need for the activity?

- Memory game cards (provided) with the terms on one set and definitions on another set.
- A flat surface to lay out the cards.



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 a table or the floor.
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 rocks and minerals.

PREVIEW

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Curriculum Connection
E2.2

Cards | List of terms related to rocks and minerals

Term	Definition
Rock	A solid material made of minerals found on Earth.
[illegible]al	A natural substance with a specific chemical composition.
Characteristic	[illegible]eat[illegible] that helps to [illegible]iden[illegible] describe [illegible]meth[illegible]
Property	A quality or tra[illegible] that something has.
Scratch Test	A method to test the hardness of a mineral by scratching it.

PREVIEW

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Curriculum Connection
E2.2

Cards | List of terms related to rocks and minerals

Term	Definition
Streak Test	A test to see the colour of a mineral's powder.
Igneous	Rocks formed from cooled lava or magma.
Sedimentary	Rocks made from particles of sand and other materials pressed together.
Metamorphic	Rocks changed by heat and pressure inside Earth.
Fossil	Remains or traces of ancient life that have been preserved in rock.

PREVIEW

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Curriculum Connection
E2.2

Cards | List of terms related to rocks and minerals

Term	Definition
Organism	Any living thing, from plants and animals to bacteria.
Extinct	A term used when a species no longer exists anywhere on Earth.
Soil Formation	The process by which weathered rock and organic matter creates soil.
Erosion	The wearing away of the Earth's surface by wind, water, or ice.
Natural Phenomena	Natural events like earthquakes, tornadoes, or volcanic eruptions.

PREVIEW

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Curriculum Connection
E2.2

Cards | List of terms related to rocks and minerals

Term	Definition
Habitat	The natural environment where an organism lives.
Conservation	The protection and preservation of natural resources.
Biodiversity	The variety of life in the world or in a particular habitat or ecosystem.
Recycle	The process of converting waste materials into new materials and objects.
Renewable Resource	Natural resources that can be replenished naturally with the passage of time, like sunlight.

PREVIEW

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Curriculum Connection
E2.3

Identifying Rocks

Identifying Rocks

It can be challenging to identify rocks because some rocks have overlapping properties. Using the checklist below will help you identify the type of rock.


Gas bubbles

Interlocking crystals, glassy, and smooth



PREVIEW

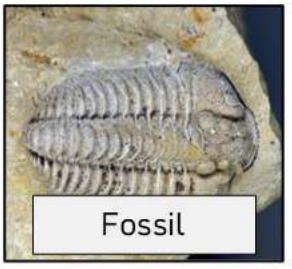
It is igne[illegible]

- ❑ I[illegible] a glassy
- ❑ It has a sm[illegible]
- ❑ It has gas bu[illegible]n it
- ❑ It has interlocking c[illegible]


Bands[illegible]e and black

It is metamorphic if...

- ❑ It has banding – stripes of different colours
- ❑ It has waves of bands in it that are differe[illegible]lou
- ❑ The waves or bands are not perfectly horizonta[illegible]
- ❑ It is very hard – doesn't scratch easily


Fossil


Wavy bands of different colours

It is sedimentary if...

- ❑ It has fossils – imprints or shells in the rock
- ❑ It has particles of rock cemented together
- ❑ It looks like different rocks are compacted together
- ❑ It has horizontal layers of the same shade of colour
- ❑ It isn't as hard – it can be scraped or chipped


Horizontal layers, same shade

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Curriculum Connection
E2.3

Label Which type of rock is it? Explain how you know.



Type of Rock



Type of Rock



Type of Rock



Type of Rock

PREVIEW

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Curriculum Connection
E2.2

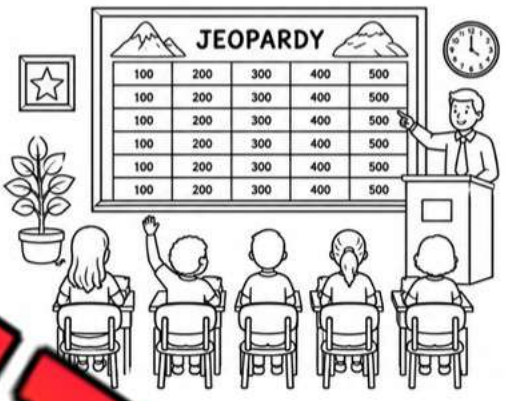
Activity – Rock and Mineral Jeopardy

Objective What are we learning about?

To review and reinforce students' knowledge of rock types, mineral properties, testing methods, and famous geological formations through a competitive Jeopardy game.

Materials What you need for the activity?

- Jeopardy board
- Buzzer or bell



Instructions How will you complete the activity

1) Print the Jeopardy board on the next page.
2) Divide the class into two teams.
3) Ask one team to go first by selecting a point value.
4) Read the question aloud from the point value.
5) The first team to ring the bell or buzzer gets to answer.
6) If they answer correctly, award them the points. If not, the other team can answer.
7) Continue the game until all questions have been answered.
8) Tally the points to determine the winning team.
9) Conclude by discussing what they learned about the topics in the questions.

PREVIEW

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Curriculum Connection
E2.2

Jeopardy Question | Ask students the questions below.

1 Points	2 Points	3 Points	4 Points	5 Points
What is molten rock called? **Magm**	What does erosion do? **Wears rocks down**	What rock forms from cooled lava? **Igneous**	What rock is shiny and often used in jewelry? **Quartz**	What rock is very heavy and used for building? **Basalt**
Is granite ha or soft? **Hard**	**Meta**	Which rock can u find fossils in? **S tary**	What is fossilization? **Turning remains into rock**	What is the hardest mineral? **Diamond**
Are diamonds hard? **Yes**	What test checks how hard a mineral is? **Scratch test**	is a roc made fro creatu shells? **Limestone**	is the r o s? tone	What rock is made from plant remains? **Coal**
What are gems? **Precious stones**	Is limestone hard? **No**	Can quartz be colourful? **Yes**	What is the streak of a mineral? **Colour**	t mineral an draw on paper? **Graphite**
Is coal a rock? **Yes**	What is a mineral? **Natural solid**	What causes rocks to layer? **Pressure**	What does igneous mean in Latin? **Fire**	What type of rock is granite? **Igneous**

PREVIEW

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Curriculum Connection
E2.2

Activity – Properties of Rocks

Find two rocks that look different. Examine them closely and explain their properties below.

Examine Look closely at your rocks and fill in the information below.

Prope	Rock # 1	Rock #2
Lustre (Shiny, dull, glassy, metallic, earthy)		
Texture (rough, smooth, uneven)		
Transparency (see-through or opaque)		
Hardness (Is it strong? Can it be scratched?)		

PREVIEW

Which rock do you like better? Explain why.

_____

_____

_____

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Curriculum Connection
A1.2, A1.4, A1.5

Experiment – Testing Hardness of Rocks

Background — What is the lab about?

The **hardness** of a rock is determined based on whether it can be scratched. Scientists refer to hardness of a rock as how resistant they are to abrasion. Natural glass that happens in nature has a lower hard[illegible]s it can be scratched easily. Some rocks scratch easily, w[illegible] have hard minerals like diamond, are not.

[illegible]erick Mo[illegible] geologist who created the Mohs Hardness Scal[illegible]ferent rocks and minerals by scratching their [illegible]o det[illegible] hardest rocks and minerals. He found tha[illegible]as the [illegible]st mineral (10), and Talc was the weakest (1)

Mineral	Hardness
Talc	1
Gypsum	2
Calcite	3
Fluorite	4
Apatite	5
Feldspar	6
Quartz	7
Topaz	8
Corundum	9
Diamond	10

PREVIEW

Materials — What will you need to co[illegible]ete the [illegible]?

- At least 5 different rocks. Try to find a variety [illegible], sedimentary, and igneous rocks.
- A hard rock to scratch the other rocks with
- A coin
- A steel nail or washer



Procedure — How will you complete the experiment?

1) Use a clean surface to test each rock.
2) Hold the rock firmly and attempt to scratch each rock with your fingernail, another hard rock, and a nail/washer.
3) Try to scratch the coin with your fingernail, a hard rock, and the nail/washer.
4) Look for an etched line. You can also rub the line with your finger to see if any dust (sediments) came loose. If you see dust, you have scratched the surface.
5) Record your observations in the table on the next page.

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Curriculum Connection
A1.2, A1.4, A1.5

Observations

What did you observe while you scratched the rocks?

Rock #	Did your fingernail scratch the surface?	Did the other hard rock scratch the surface?	Did the washer/nail scratch the surface?
1			
2			
3			
4			
6			
Washer/Nail			
Coin			

PREVIEW

Results

What did you learn from t[illegible]xperim[illegible]

1) Which rock or rocks were the strongest? Explai[illegible] were and why they are so strong.

2) Which rock or rocks were the weakest? Explain which type of rocks they were and why they were weak.

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Curriculum Connection
E2.2

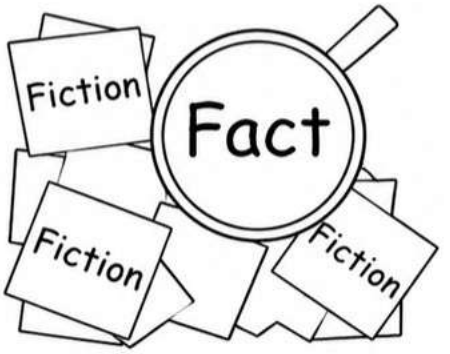
Mineral Myths: Fact or Fiction?

Objective What are we learning about?

To enhance students' understanding of mineral properties and uses while debunking common myths, promoting critical thinking and active learning.

Materials What will you need for the activity?

- A set of statements about minerals
- A 'Fact' sign and 'Fiction' sign to distinguish the two sides of the room
- Designated areas in the classroom for the 'Fact' and 'Fiction' signs, encouraging students to move to either side



Instructions How will you complete the activity?

1) Your teacher will read statements. Pay close attention as each statement is shared.
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!

PREVIEW

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Curriculum Connection
E2.2

Fact or Fiction | Read the statements to the class.

#	Statement	Fact or Fiction
1	Diamonds are the softest mineral.	Fiction
2	Talc is used in making baby powder.	Fact
3	Mica can be found in granite.	Fact
4	All minerals are shiny.	Fiction
5	Quartz is harder than glass.	Fact
6	Gold is the most valuable mineral.	Fiction
7	Limestone dissolves in vinegar.	Fact
8	The streak test is used to determine a mineral's colour.	Fact
9	Rubies can scratch talc.	Fact
10	Marble is formed from sandstone.	Fiction
11	Obsidian is a type of volcanic glass.	Fact
12	Salt can scratch steel.	Fiction
13	Fossils can be found in metamorphic rocks.	Fiction
14	Gypsum is used to make wall plaster.	Fact
15	Coal is considered a renewable resource.	Fiction
16	Fluorite glows under ultraviolet light.	Fact
17	Pumice is so light it can float on water.	Fact
18	All rocks contain minerals.	Fact
19	The Mohs scale measures a mineral's brightness.	Fiction
20	Diamonds can form from compressed coal.	Fact

PREVIEW

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Curriculum Connection
E2.2

Reflection Answer the questions below.

1) What was the most surprising fact you learned today? Why?

2) Writ... wing the truth about minerals can be useful.

3) What is one new thing you learne... abou... roperties and uses of various minerals?

4) How did you decide whether a statement was fact or fiction? What clues did you use?

PREVIEW

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Curriculum Connection
E2.1

Rock Cycle – Earth's Processes

The Processes of the Rock Cycle
Rocks will change type when they are exposed to certain processes on and inside the Earth. The main processes are heating, compacting, erosion, cooling, pressure, carrying, and settling.

Matching Use your prior understanding to match the process with its description.

Answer	[illegible]ss	Description
	Heati[illegible]	[illegible]) The rock particles at the bottom of an ocean or lake get [illegible]ked together and eventually harden to form a sedimentary [illegible]k.
	Compa[illegible]	b) Riv[illegible]eams carry rock pieces away from glaciers and mo[illegible]
	Settling	c) [illegible]emen[illegible]pieces by a river, glacier, or wind.
	Carrying	d) Dee[illegible]side [illegible] this process will change rock from sedimen[illegible]k to m[illegible]phic. When the metamorphic rock goes dee[illegible]nto the [illegible], it [illegible]elt and turn into magma.
	Erosion	e) Rock pieces and pebb[illegible]t o[illegible]ventually get carried into the sea by rivers [illegible]ck pie[illegible] up on the bottom of the sea.
	Cooling	f) Deep inside the Earth's core, rocks are s[illegible]ed which causes them to turn into magma.
	Pressure	g) When magma reaches the Earth's surface, it tu[illegible]s into igneous rock because of this process.

PREVIEW

Questions Use information from the text to answer the questions.

1) Which process changes magma into igneous rock?	
2) Which process changes rock pieces into sedimentary rock?	
3) Which processes change a sedimentary rock into metamorphic?	
4) Which process changes a metamorphic rock into a magma?	

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Curriculum Connection
E1.1

Erosion

Erosion



When soil and rock are moved from one place to another, it is called **erosion**. Erosion happens when heavy rains and water run[illegible]our over soil. The soil often flows in[illegible] other bodies of water. [illegible] natura[illegible], but it is made worse when humans cut down trees, plants, and sh[illegible] pla[illegible] keep the soil strong because their roots hold the soil together. Fa[illegible] make[illegible] orse when they have too many animals. These animals eat mos[illegible] plants w[illegible] eakens the soil.

When soil is lost into w[illegible] the[illegible] es polluted. Also, farmers need soil to plant their crops in. If farmers[illegible] oo mu[illegible], they can't grow the food we need to survive.

Wind is also a force that can cause eros[illegible] Whe[illegible] trees on farmlands, there is nothing to block heavy winds fr[illegible] ag so[illegible]

Slowing Down Erosion

We can reduce erosion by having plants to cover the soil. Shrub[illegible] roots that grow in all directions in the soil. They help keep the soil strong. Shrubs and trees also block the wind from causing erosion.



Using a cover crop also slows down erosion. A **cover crop** is a fast-growing crop that grows between other crops or when the other crops have been harvested. Cover crops are used to make the soil stronger because their roots stop the soil from erosion.

PREVIEW

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Curriculum Connection
E1.1

Questions Answer the questions below using evidence from the text.

1) What is erosion?

2) How ar mans causing erosion?

PREVIEW

Visualizing Draw what yo ictur ile you were reading. Explain the picture.

Reaction If you were a farmer trying to stop erosion, what would you do?

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Name: _____ 78

Curriculum Connection
E1.1

Experiment – Soil Erosion Model

Research Questions — What are we learning about?

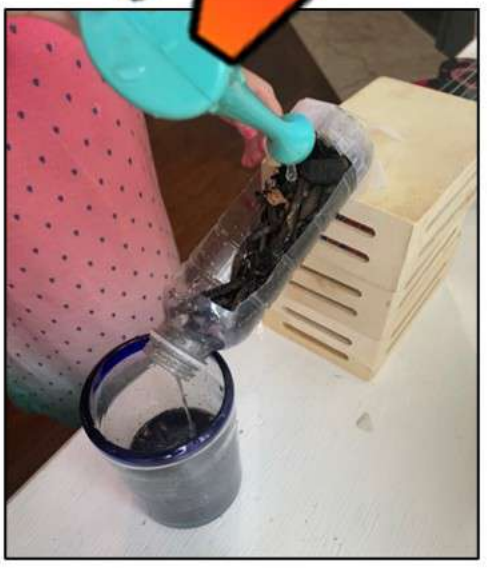
Is soil erosion worse in soil that has plants growing in it or in soil that has no plants?

Materials — What do we need for our experiment?

- ✓ 3 [illegible] same size – 2L bottles work well
- ✓ Soil
- ✓ Mulch or dead leaves/sticks
- ✓ Sod or grass seed
- ✓ 3 clear cups
- ✓ Blocks to support your bottles
- ✓ Scissors or utility knife
- ✓ Watering can
- ✓ Tape to help fasten the materials







Method — How do we complete the experiment?

1) Cut off one side of each bottle – cut it lengthwise so it still has a bottom and spout.
2) Fill one bottle with sod (or soil and plant grass seed and wait for it to sprout).
3) Fill one bottle with just soil.
4) Fill the last bottle with mostly soil but add mulch or dead leaves/sticks on the top.
5) Top the bottles so they are resting on the blocks with the spout angled down.
6) Put the cups under the end of the bottles so they can catch the water from the spout.
7) Pour water on the different types of soil. Observe what is landing in the cups.

PREVIEW

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Curriculum Connection
E1.1

Observations

What did you notice?

Soil Types	What Happened?
Just Soil	
Sod – S Gr	
Soil with Mulch	

PREVIEW

Results

Answer the questions below.

1) What is soil erosion?

2) Which soil had the least amount of soil erosion?

3) Why does soil with grass or plants growing have less erosion?

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Curriculum Connection
E1.1

Erosion Effects: Fact or Fiction?

Objective

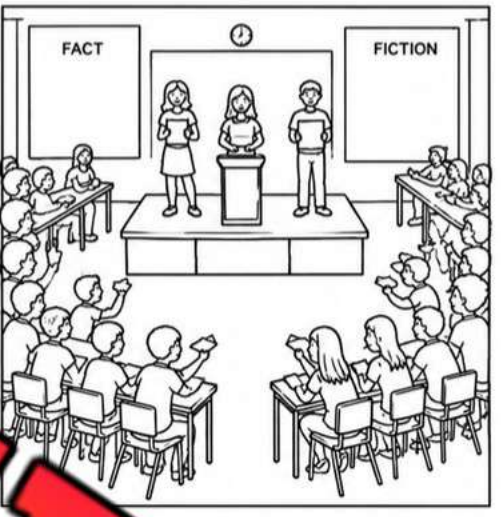
What are we learning about?

To enhance students' understanding of erosion and its impacts on landscapes by differentiating between common myths and facts.

Materials

What will you need for the activity?

- A [illegible] of statements about erosion effects
- A 'Fact' sign and 'Fiction' sign to distinguish the two sides of the room
- Designated areas in the classroom for the 'Fact' and 'Fiction' signs, allowing students to move to either side



Instructions

How will you complete the activity?

1) Your teacher will read statements. Pay close attention as each statement is shared.
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!

PREVIEW

Name: _____ 84

Curriculum Connection
E1.1

Fact or Fiction

Read the statements to the class.

#	Statement	Fact or Fiction
1	Erosion can create new islands.	Fact
2	All types of erosion are harmful.	Fiction
3	Wate[illegible]he only cause of erosion.	Fiction
4	Pla[illegible]top erosion.	Fact
5	[illegible]n during heavy rains.	Fiction
6	Glaciers [illegible]sion.	Fact
7	Wind cannot m[illegible]ock[illegible]	Fiction
8	Erosion makes rivers [illegible]dee[illegible]	Fact
9	Deserts don't experience erosion.	Fiction
10	Coastal erosion can lead to loss of beaches.	Fact
11	Erosion always results in the formation of va[illegible]s.	Fiction
12	Human activities have no impact on erosion rates.	[illegible]iction
13	Mudslides are a type of erosion.	[illegible]act
14	Without erosion, we wouldn't have sand on beaches.	Fact
15	Only rainwater can cause erosion.	Fiction
16	Erosion can uncover fossils in the ground.	Fact
17	Erosion can affect water quality in rivers and lakes.	Fact
18	Ice erosion is called abrasion.	Fiction
19	Building walls along coastlines can stop all coastal erosion.	Fiction
20	Mountains can't be affected by erosion.	Fiction

PREVIEW

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Curriculum Connection
E1.1, E2.1

Weathering Rocks – Soil Formation

Weathering

The term **weathering** means that rocks are broken down into smaller rocks that make up our soil. The weathering process is very slow and is a result of temperature changes, abrasion, chemical reactions, and interactions with living things.

PREVIEW

Temperature Changes – When the temperature changes from warm to freezing cold, rocks break apart because water gets into the cracks in rocks. When the water freezes, it expands a little and changes into ice. As it grows bigger, it cracks open the rock.

Abrasion – Abrasion happens when rocks collide or rub against each other and break down. This happens a lot to rocks at the bottom of a river. The water moves the rocks, so they bump into other rocks. This makes the rocks smoother as the corners of rocks are chipped off.



Chemical Reactions – Rocks will breakdown when they react with water, air, or other chemicals. Acids from rain or chemicals humans add to water can also weather rocks.

Living Things – Plants and animals affect rocks and can break them down. For example, plant roots can grow into the cracks of rocks, making them split. Some animals burrow into rocks, scratching and digging into a rock's weakest point.

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Curriculum Connection
E1.1, E2.1

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

	_____ _____ _____ _____ _____ _____

PREVIEW

True or Fals whether the statement is true or false

1) Soil is made from ocks.	True	False
2) Soil is made from many t ing rocks.	True	False
3) Weathering rocks means rock fall e sky rain.	True	False
4) Weathering rocks means they brea down ar t sm	True	False
5) Plants can grow inside the cracks of rock split	True	False

Questions Use information from the text to supp an

1) What does weathering mean?

_____
_____
_____

2) How does the weathering of rocks lead to soil formation?

_____
_____
_____

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Curriculum Connection
E1.1, E2.1

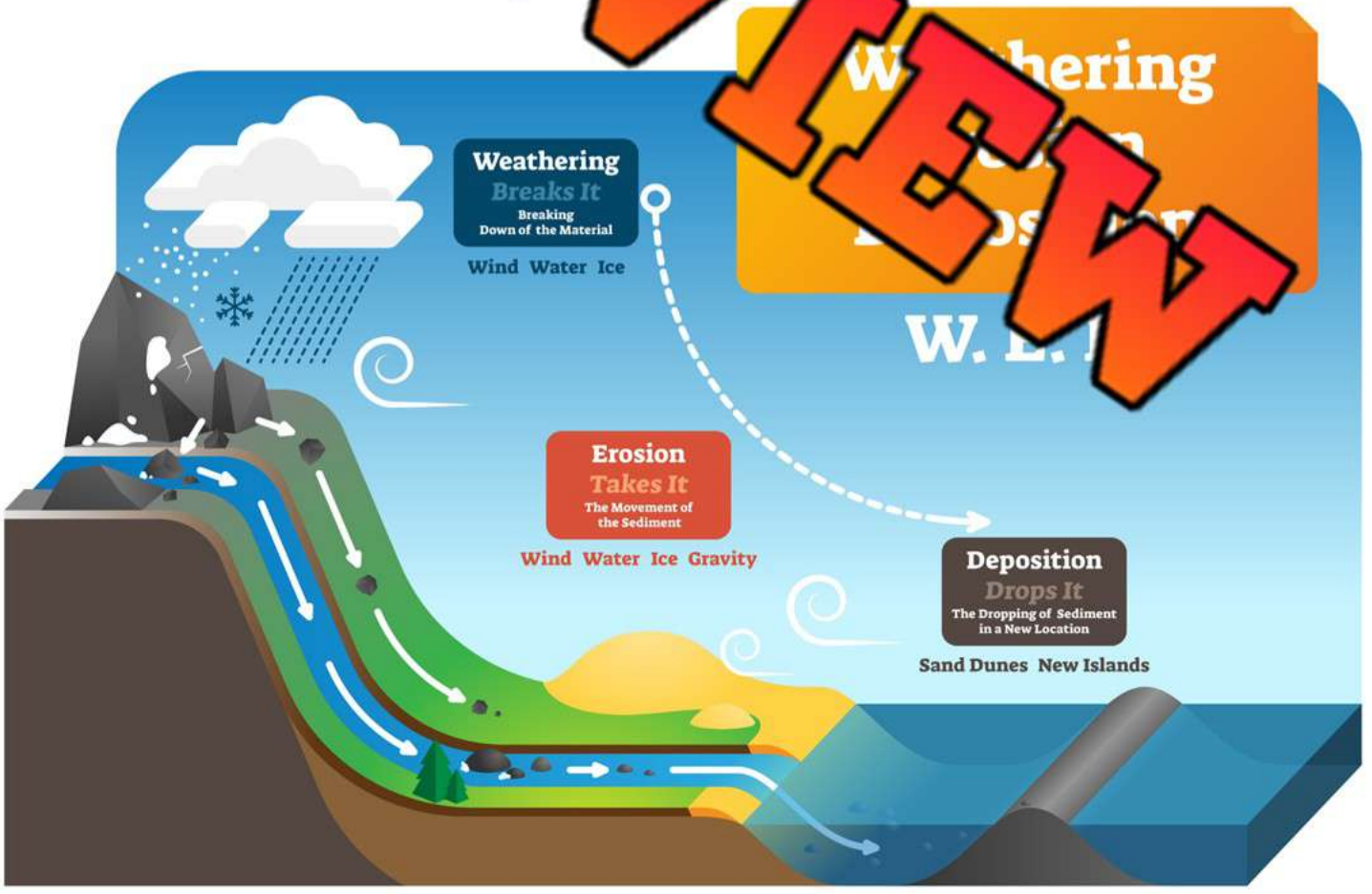
Weathering, Erosion, Deposition

Weathering, Erosion, and Deposition

There is a process that is slowly changing our land. It is known as weathering, erosion, and deposition.

1) When rocks are weathered, they are broken down into smaller pieces that can be er
2) Wh e ce are small enough, the force of wind and water erode the Small, ed rock pieces are called **sediments**. These sediments become r ll.
3) The sedime mov spot where they are dropped. The new spot might be a sand du the s nts travel to due to wind or water patterns. If enough sed pa n water, an island can even form!

PREVIEW



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Curriculum Connection
E1.1, E2.1

True or False

Is the statement true or false?

1) Weathered rock becomes sediment.	True	False
2) Sediments are large rocks.	True	False
3) Erosion sends sediments to new places.	True	False
4) Erosion and weathering can make sand dunes and islands.	True	False
5) Weath[illegible]erosion, and deposition changes our land.	True	False

Ques[illegible]

[illegible] questions below.

1) How does [illegible], ero[illegible]d deposition change our land?

2) How are sand dunes formed?

PREVIEW

Word Search

Find the words in the wordsearch.

Word Bank	
Soil	Erosion
Rocks	Sediment
Land	Deposition
Dunes	Weathering

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

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Curriculum Connection
E1.1, E2.1

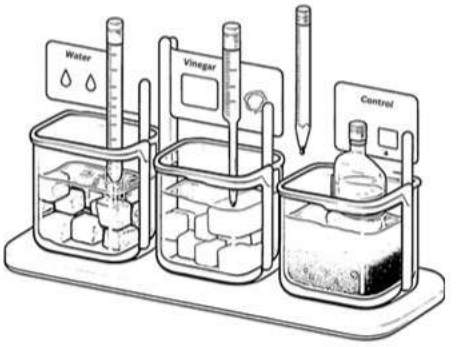
Simulating Soil Formation

Objective What are we learning about?

To demonstrate how rocks weather over time to form soil, using sugar cubes and chalk to simulate rock weathering under different conditions.

Materials What will you need for the activity?

- S[illegible]alk pieces
- S[illegible]plastic [illegible]s or dishes
- Wate[illegible] and v[illegible]
- Droppers [illegible]
- Timer
- Magnifying glass



Instructions How will you [illegible]

1) Give each student or small group of stude[illegible] few [illegible]ubes and pieces of chalk.

2) Place the sugar cubes and chalk pieces into se[illegible]astic [illegible]iners.

3) Add a small amount of water to one container and a small [illegible]ar to another container. Leave one container with no liquid as [illegible]co[illegible]

4) Use the timer to check the sugar cubes and chalk every 5 minutes for 30 minutes.

5) Observe and note any changes in the appearance of the sugar cubes and chalk under different conditions.

6) Use the magnifying glass to examine the materials closely and observe finer details of how they weather.

7) Discuss as a class what happens to each material in water and vinegar and compare these changes to the control group.

PREVIEW

Name: _____ 94

Curriculum Connection
E1.1, E2.1

Record Sheet Record your findings from the soil formation experiment.

Material	Condition	5 minutes	10 Minutes	15 Minutes	20 Minutes	Final Observation
Sugar Cube (**Example**)	Water	Starting to dissolve	Slightly smaller, smoother	More erosion, less defined edges	Almost dissolved	Completely dissolved into a sugary solution
Sugar Cube	Vin					
Sugar Cube	Control (No Liquid)					
Chalk	Water					
Chalk	Vinegar					
Chalk	Control (No Liquid)					

PREVIEW

Name: _____ 95

Curriculum Connection
E1.1, E2.1

Reflection Answer the questions below.

1) What changes did you notice in the sugar cubes and chalk in water compared to vinegar?

2) Wh[illegible] you thi[illegible]gar cube reacted the way it did in water?

3) How does this experiment help us understa[illegible]w so[illegible]s from rocks?

4) Draw a picture of what the sugar cube looked like before and after the experiment.

Before	After

PREVIEW

Name: _____ 99

Curriculum Connection
A1.3, A1.4, A1.5

Mixing Earth Materials Lab

Information | What is this lab about?

Earth's Materials are naturally occurring materials found on the Earth. These materials are raw, meaning they are not human-made. These raw materials provide us with the basic components for life, agriculture and industry. The following are types of Earth materials that we can find here in Canada: minerals, rock, clay, boulders, gravel, sand and soil.



Research

1. How do materials interact with one another?

Materials

1. Sand
2. Gravel – a mixture of small rocks
3. Soil
4. Water
5. Stopwatch
6. Jars
7. Shallow plastic tub

PREVIEW

Method

1. Fill your jar with the sand, gravel and soil in layers.
2. Add water to the jar and shake. Observe what happens to the materials. Write down what you can see in the jar.
3. Allow the materials to settle in the jar. Observe what you can see.
4. Let the jar sit for 5 minutes and then observe once more.
5. Dump the materials out into the plastic tub and observe what you see.

Hypothesis – What will happen to Earth's materials when they are mixed with each other and water?

_____

_____

_____

Curriculum Connection
A1.3, A1.4, A1.5

Observations | What happened?

Stage	Observations
Shaken jar	
Settled jar	
Settled jar 5 minutes later	
Materia dumped	

Result | What d rn from the experiment?

1) Did you see m ials in after shaking it with water? Why do you think this happened?

2) Was the water clear or muddy once the jar w ken? W t after it sat for 5 minutes?

3) Why was the sand tricky to get out of the jar once it was wet?

4) After the jar was shaken, could you still see all of the materials you added? Explain.

PREVIEW

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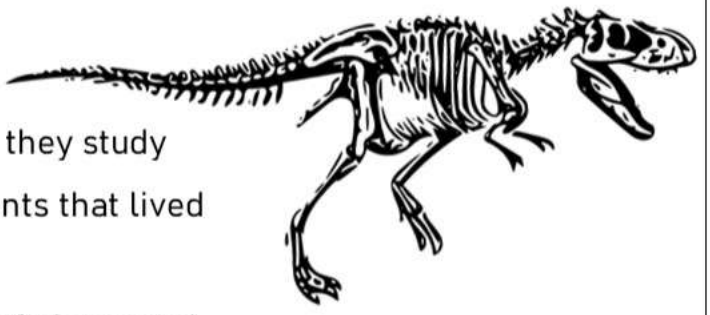
Curriculum Connection
E2.5

Rocks and Fossils

Fossil Facts



Geologists don't just guess about the species who lived on the Earth before we did. Instead, they study fossils which give clues about animals and plants that lived a long, long time ago.

Fossils are the remains or impressions of plants and animals that lived long ago. Fossils can take the form of impressions, which are stone imprints of animals. They can also be remains of plants and animals, such as bones, shells, or exoskeletons. Fossils are nature's records of animals and plants!

Most animals left actual fossils when they decayed, which means we know nothing about them. Only a small percentage of the dinosaurs that ever lived have been or will be found as fossils.

PREVIEW



Fossil Impressions

How can animal remains turn into stone over time? Well, when the body of a dead animal sinks into dirt or mud, some of the parts of the animal's body will decay over time. However, the harder, stronger parts like the teeth and bones will remain. These remains stay in the mud.

Over time, more mud will pile on top, which presses down on top of the animal's remains. Eventually, minerals from the surrounding environment turn the remains into a hard fossil. The fossil ends up being a stone copy of the original plant or animal.

Petrification

Another way that fossils will form is through petrification. **Petrification** is when minerals replace the structure of an organism. This happens as the organism decays and the minerals surrounding the decaying organism fill it in. We are left with a rock that takes the shape of the organism.

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Curriculum Connection
E2.5

True or False

Circle whether the statement is true or false.

1) Fossils are imprints or remains left from plants and animals.	True	False
2) Most animals produced fossils.	True	False
3) Petrification is a process where fossils are formed.	True	False
4) Bones that are found from many years ago are considered fossils.	True	False
5) Fossils are fun to collect but don't tell us much about history.	True	False

Questions

Use information from the text to support your answer.

1) How is a fossil formed?

2) Why do you think it is important to study fossils?

PREVIEW

Making Connections

What does the reading remind you of?

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Curriculum Connection
E2.5

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 a fossil?	
A living animal	Remains of living thing
2) What usually happens to the soft parts of an animal after it dies?	
They decay	They turn into diamonds
3) Which part of an animal is most likely to become a fossil?	
Fur	Bones
4) What is petrification?	
Rocks melt into magma	Minerals replace the structure of an organism

Name: _____ Mark

Circle the correct answer.

1) What is a fossil?	
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Name: _____ Mark

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4) What is petrification?	
Rocks melt into magma	Minerals replace the structure of an organism

PREVIEW

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Name: _____ 104

Curriculum Connection
A1.3, A1.4, A1.5

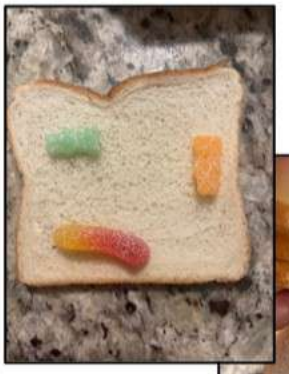
Experiment – Fossils



Research Question — What are we learning about?

How are fossils formed? What needs happen for an animal to become a fossil?

Materials — What will you need for the experiment?





- ❑ T… re… e used 7 but if you're doing thi… h a la… you could use 3 pieces for each grou…
- ❑ Gummy bea… ter if… texture on them that can b… en…
- ❑ Gummy worms – the … he b… texture
- ❑ Plastic wrap

Method — How will you complete th… eri…

1) Put 3 or 4 candies on each slice of bread.
2) Layer the bread and keep adding candies between the layers
3) Wrap the layers of bread in plastic wrap
4) Put something heavy on top and let it compress the bread for at least 8 hours – we used books
5) Unwrap the plastic and carefully pull apart the layers. What do you see?





PREVIEW

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Curriculum Connection
A1.3, A1.4, A1.5

Observations What happened?

Results [illegible]er the questions below.

1) Wha[illegible]d the [illegible] gummy bears represent?

2) What did the weights on to[illegible] pre[illegible]

3) Why was this experiment an example of how fossils are mad[illegible]

4) Since the bread is soft, which type of rock did it represent? Explain.

PREVIEW

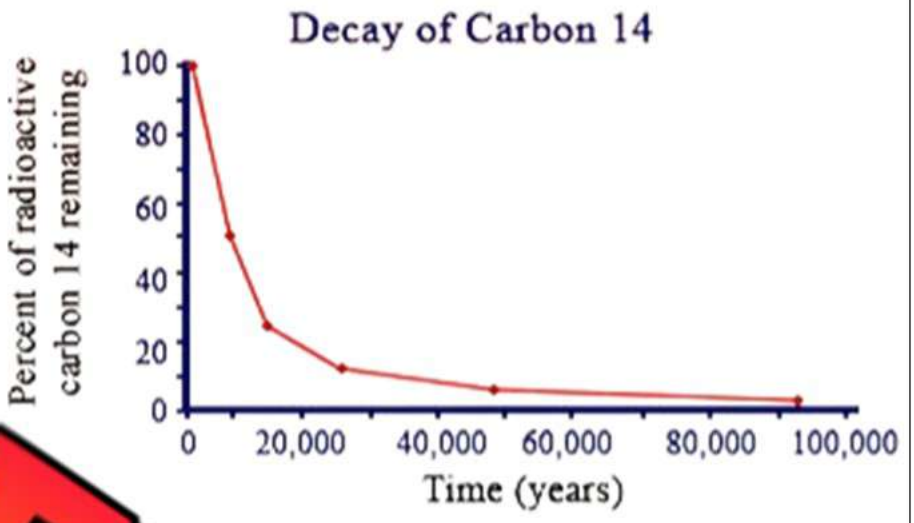
Name: _____ 108

Curriculum Connection
E2.5

Dating Fossils – Absolute Dating

Understanding Absolute Dating

Absolute dating is a way to find out exactly how old something is in years. It works by looking [illegible] much an object h[illegible] [illegible]r time.



[illegible] like a clock, but [illegible] inside very old [illegible] bon[illegible] or rocks. It's called a [illegible] it changes into a different kind of atom over time. By measuring ho[illegible] lef[illegible] can tell when the object was formed.

Different Types of Absolute Dating

Carbon Dating

One common type of absolute dating is carbon d[illegible] It's [illegible] the age of things that were once alive. When a plant or animal di[illegible] takin[illegible] special atom called carbon-14. Therefore, older fossils have less carbon-[illegible] th[illegible] time. Scientists measure how much carbon-14 is left in the fossil t[illegible] it is.

Scientists use a special machine, called a mass spectrometer to me[illegible] the amount of carbon-14 in the fossil.

Potassium-Argon Dating

Another method scientists use is potassium-argon dating. This helps find out how old rocks are by measuring a special atom found in rocks called potassium-40. Over time, potassium-40 changes into another atom called argon-40.

By looking at how much argon-40 is in a rock compared to the original amount of potassium-40, scientists can tell how old the rock is.

PREVIEW

Name: _____ 109

Curriculum Connection
E2.5

True or False Circle whether the statement is true or false.

1) Absolute dating can give a more precise age of a fossil/rock.	True	False
2) When an organism dies, it builds up more C-14.	True	False
3) When something dies, it stops taking in carbon-14.	True	False
4) When a rock forms, it has a certain amount of potassium-40 atoms in it.	True	False
5) Over tim[illegible]ck will gain more potassium-40 atoms.	True	False

Qu[illegible]s [illegible]ver the questions below using evidence from the text.

1) What is absol[illegible]g? In [illegible]w do these methods help us date rocks/fossils?

2) Describe how carbon dating works.

PREVIEW

Opinion Do you think it is important to learn about the history of the Earth? Explain.

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Curriculum Connection
E2.4

Everyday Uses of Rocks

Everyday Uses of Rocks

Did you know that every person in Canada will use over one million pounds of rocks, minerals, and metals in their life? You may not realize that rocks and minerals are used to make many of the things we use every day.

People who mine rocks and minerals by digging them out of the ground allow us to make many of the things we need. In Canada, the mining of rocks is a major industry that employs people in every province and territory. The Canadian Shield is the largest region in Canada, and it contains many valuable minerals, like nickel, gold, silver, and copper.

PREVIEW

Examples Of How Rocks Are Used

- Buildings – are often made of stone, steel (iron) and cement
- Jewelry – made of diamonds and other precious stones
- Pencils – use lead, which is a mineral
- Mirrors – made of shiny steel, which is the metal iron that comes from sedimentary rocks
- Chalk – made from a very soft, white, sedimentary rock
- Electronics – made from metals that come from iron (sedimentary)
- Soda Can – made from aluminum, which is a mineral from the earth



How We Use Each Type of Rock

Igneous	Statues, granite for countertops, pumice is used for scrubbing
Metamorphic	Quartz and marble are used in statues, vases, and countertops/tile
Sedimentary	Coal is used to burn for energy, iron makes steel, salt is used to eat

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Curriculum Connection
E2.4

True or False

Circle whether the statement is true or false.

1) Salt is a metamorphic rock.	True	False
2) Sedimentary rocks are used for countertops and tile floors.	True	False
3) Metamorphic and igneous rocks are used for countertops.	True	False
4) Chalk is a sedimentary rock.	True	False
5) The lead in a pencil is a mineral.	True	False

Questions

Use evidence from the text to support your answer.

1) How do rocks and minerals differ?

2) What types of rocks are used in tiles and countertops? What are they used?

PREVIEW

Making Connections

What does the reading remind you of?

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Curriculum Connection
A2.1, A2.2

Coding – Sort the Materials

Computers can sort objects by following simple rules. Today you will become the computer and use the code to sort everyday objects into the correct rock or mineral.

Directions Use the Coding Rules table to find the correct code for each rock or mineral. Then write the code in the blank beside the everyday object that's made from that rock or mineral.

PREVIEW

Code	Rock or Mineral
G	Granite
C	Coal
D	Diamond
L	Limestone
GO	Gold
M	Marble
CU	Copper
S	Salt
IR	Iron
GY	Gypsum
CL	Clay
SL	Slate

Common Everyday Use	Write the Code Letter
Wires, electricity generation	
Knives, cutting tools	
Steel beams, cars, buildings	
Kitchen countertops, building	
Electrical wires, [illegible]	
Bricks, pottery	
Cooking, preserving food	
Roof tiles, chalkboards	
Statues, floor tiles, countertops	
Jewellery, electronics	
Drywall, plaster	
Cement, concrete, buildings	

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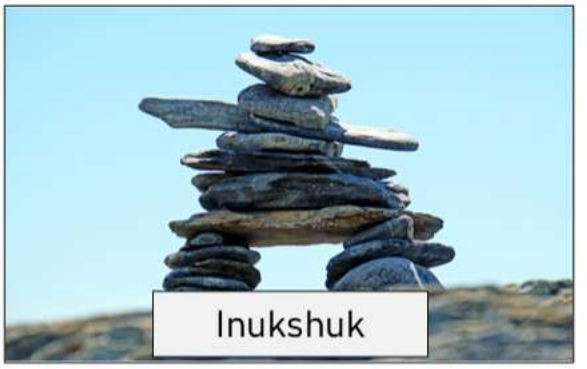
Curriculum Connection
E2.6

Indigenous Groups Use of Rocks

Rocks Telling Stories


Inukshuk

Indigenous groups studied rocks and learned valuable lessons from them. In many areas, unique or special rocks are chosen by Indigenous peoples for impor[illegible]eremonies. Rocks are sometimes used to [illegible]rtant areas or sacred places.

[illegible]t use Inukshuks as directional markers that allow them to know where the[illegible] wh[illegible] they are out hunting. They use the inukshuks to mark areas of quality [illegible] Inuks[illegible]made of rocks found nearby. They are sturdy and able to withstand[illegible] in the winter, as well as warmer temperatures in the summ[illegible]

PREVIEW

Red Rock and Flint



In Ontario, many indigenous groups mined red[illegible] from in the ground. The red rock was the red min[illegible]al called 'hematite'. The hematite was crushed into a fine powder and mixed with water and other materials to make a red paint. The red paint was used to make sacred symbols call[illegible]ographs. The pictographs were drawn on rocky cliff faces and they are still visible today!


Flint

Flint was also mined. Flint is a rock made of the minerals silicon and quarts. Flint is very hard and sharp, which made it a great rock for making tools. Cutting tools used flint for the blade that could be used to cut wood, prepare food, and make clothing.

Flint was also used to make fire. The flint rock was used to strike iron and create sparks that would ignite a flame.

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Curriculum Connection
E2.6

True or False

Is the statement true or false?

1) Flint is used to make fire and cutting tools.	True	False
2) An Inukshuk is used by Inuit groups as directional markers.	True	False
3) Mining rocks is a new activity.	True	False
4) Rocks were used to make paint to draw pictographs.	True	False
5) Inukshuk last one year before they fall down.	True	False

Question

Answer questions below using evidence from the text.

1) How do the Inuit use rocks?

2) How was flint used by Indigenous groups?

PREVIEW

Questioning

Write 3 questions you have about how Indigenous groups used rocks.

1)	
2)	
3)	

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Curriculum Connection
E2.6

Inukshuks

Colour Colour the Inukshuk below. Each rock could be different so vary your colours.



Draw Draw your own Inukshuk below and c it. Tu e for more room.

PREVIEW

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Curriculum Connection
A1.3, A1.4, A1.5

Activity – Clay Inukshuk

Background

What is the lab about?

Today, we will be making our own Inukshuks using clay. You will need to decide on the shape and arrangement of your clay rocks.

Material

What do we need?

- [illegible] student to make at least 5 rocks

Procedure

[illegible] Inukshuk [illegible] as ideas for your Inukshuk.

1) Draw a sketch of your Inukshuk [illegible] have a plan.
2) Think about how many clay rocks [illegible] your Inukshuk.
3) Also consider the number of vertical and horizontal rocks you will use. In order for your Inukshuk to stand at the end, use a horizontal rock as the bottom as a base.
4) Once you are happy with your sketch, begin shaping clay rocks.
5) Assemble your Inukshuk by putting your rocks together.

PREVIEW

Ideas

Use the Inukshuks below as ideas for your Inukshuk.







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Curriculum Connection
A1.3, A1.4, A1.5

Sketch Draw your Inukshuk below.



Results Answer the questions below.

1) Why do the Inuit use Inukshuks? How do they help the Inuit?

_____

_____

_____

2) How many rocks did you use to make your Inukshuk? How did you make it sturdy?

_____

_____

_____

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Curriculum Connection
E1.2

Impacts of Mining

What is Mining?

Mining is the digging of rocks and minerals from the ground. We need these minerals to make the products we use everyday.



Open-Pit Surface Mine

Mini an be done in two ways – surface mining an round mining. **Surface mining** is oft where a large area is dug out to find minerals.

rgroun used when minerals are found below the Earth's surface. There is often to th and an elevator that takes miners down to the underground mine. mi derground tunnels.



Underground Mine

Environmental Impacts o

The plants, animals, and people live be harmed by the mining. Mining often pol e air, and water nearby. Below are some ways mining h e en nt.

- When mining iron for steel, some of the iron mixe r. When water and iron mix, sulfuric acid is made. This acid gets i ter – s and rivers
- Mining has polluted drinking water wells as pollutants g o th
- When it rains in an open mining pit, acid water is made. When a s drink the water, they get poisoned
- Mining is messy, causing a lot of dust and toxic waste particles polluting the air we breathe
- When mining begins in an area, the habitats in that area are destroyed.

Social Impacts of Mining

For people, mining has its benefits and drawbacks. It has allowed us to make things we need and enjoy and has created a lot of jobs for Canadians. On the other hand, people have been forced to move from their homes and have been affected by the pollution it causes.

PREVIEW

Name: _____ 126

Curriculum Connection
E1.2

True or False

Circle whether the statement is true or false.

1) Open-pit mining is done underground.	True	False
2) Mining for iron creates sulfuric acid that pollutes water.	True	False
3) Mining creates air, land, and water pollution.	True	False
4) The drinking water near a mine could be contaminated.	True	False
5) Mining [illegible] bad and has no benefits.	True	False

Comp[illegible]

Wha[illegible] benefits and drawbacks of mining?

[illegible]s	Drawbacks

PREVIEW

Reaction

How do you feel about mining? Should we continue mining?

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Curriculum Connection
E1.2

Mining Town - Mirny

Mining Town - Mirny



Mirny is a city in Russia that is built around a diamond mining pit. Mirny has a population of 40,000 people. Most of the reside[illegible]f Mirny work for Alrosa, which is t[illegible]t diamond mining comp[illegible]or[illegible]

[illegible]aluabl[illegible]in the ground caused [illegible]ol[illegible]move[illegible] the mining pit. Man[illegible]ple m[illegible]t[illegible]rea to find a job. Some workers live hours away from the mine. Thes[illegible]s take[illegible]o the mine and work a 2-week shift.

The pit is human-made, m[illegible]ng h[illegible]g it out using machines. The pit is 525 me[illegible]ep!



Effects of the Mirny Mine

The community of Mirny deals with the following:

- Noise pollution from the loud machinery that dig fo[illegible] diamonds.
- They are also exposed to poor air quality as dust particles get i[illegible]
- The emissions from machines as well as the dust particles cause poo[illegible]hat can cause lung problems, throat pain, and asthma in nearby residents.
- The machinery used to dig leak chemicals that get into the groundwater
- The water in the bottom of the mine is toxic
- The change in the land has created air pressure problems. Helicopters that have flow over it have reported being sucked into the hole! The temperature near the mine is also cooler, which changes habitats for local wildlife
- When no more diamonds are found, the mine will still be there. It may become a landfill for garbage

PREVIEW

Name: _____ 129

Curriculum Connection
E1.2

True or False

Circle whether the statement is true or false.

1) Most people living in Mirny work at the mine.	True	False
2) The pit is 425 metres deep.	True	False
3) The mine has sucked in helicopters.	True	False
4) A positive of the mine is that it gives jobs to people.	True	False
5) The mi ed to take iron out of the ground.	True	False

Comp

are the benefits and drawbacks of the Mirny mine?

Benef e Mi	Drawbacks of the Mine

PREVIEW

Questioning

Write 3 questions you have about the mine.

1)	
2)	
3)	

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Name: _____ 132

Curriculum Connection
E1.2

Mining Town – Dawson City

Dawson City – Gold Rush

Dawson City was the centre of the Klondike Gold Rush in the Yukon. In 1885, a few hundred members of the Tr'ondëk Hwëch'in (Han) First Nation lived in the Dawson City area (it wasn't named Dawson City yet). In 1886, George Carmack, an American prospecto[illegible]nd gold in the Klondike region.

By [illegible]r 5,000 people successfully made the trip to Dawson City to make a fortu[illegible]ld[illegible]99, the population of Dawson City was 30,000 people! At the time, Da[illegible]on City [illegible]er population than Vancouver and almost as large as Ottawa.

Booming City



In 1899, over 300 busi[illegible]s flourishing in Dawson City. [illegible] were grocery stores, dress shops, blacksmiths, churches and more.

Wealthy residents dined on champagne, [illegible] and [illegible]reakfast while others ate stale bread, lard and tea. Those who fou[illegible] a lavi[illegible]style, and those that didn't got scurvy from eating nothing but cann[illegible]3 t[illegible]day.

Ghost Town

In 1900, the mineral everyone rushed to find was becoming harder to find and was being found in nearby communities, like Nome, Alaska. Many people left Dawson City and headed for Alaska. The population went from 30,000 to just 8,000 in 1900.

In 1902, more and more people left Dawson City because corporate mining was becoming more popular. Big corporations were buying land and digging much easier than the individuals who moved to Dawson City could.

By 1918, the population had declined to less than 1,000 people. Dawson City was now a ghost town as the city that hosted 30,000 people now had only 1,000 remaining. Today, Dawson City is home to just 1,375 people.

PREVIEW

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Name: _____ 133

Curriculum Connection
E1.2

Summarize

Summarize Dawson City from mining town to ghost town.

Questions

Answer the questions below using evidence from the text.

1) Why did Dawson become a ghost town?

2) Why do you think more people didn't stay or move to Dawson after the gold rush?

PREVIEW

Word Search

Find the words from the word bank.

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

Word Bank

Gold
Rush
Natural
Resource
Town
Ghost
Dawson
City
Rich

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Name: _____ 134

Curriculum Connection
A3.1, A3.2, A3.3

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 done was made in Britain during the First World War. It was named, "Britain's A[illegible] Target." It was tested and showed promise, but it wasn't used in the war.

Fas[illegible] over 100 years, and drones are now in many different ways, from moni[illegible]e [illegible] to carrying out search and res[illegible] opera[illegible] natural disasters.



Underground D[illegible]s

Mining companies ar[illegible] w u[illegible] d drones to help their mining proje[illegible] ones [illegible]nto mines to search caves, collect d[illegible] and [illegible] derground tunnels.

Underground drones are useful in the f[illegible]ing wa[illegible]

- ✓ They have technology that can record the g[illegible]els un[illegible]
- ✓ Can identify geological features like caves, volc[illegible]o[illegible] der gr[illegible]akes
- ✓ Sending quality video of what miners can expect whe[illegible] un[illegible]ound
- ✓ Can map out any dangerous areas before sending miners down

The technology has only been around since 2017, but it will be very useful[illegible]g 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.



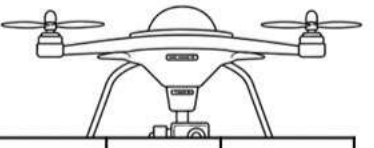
Drone Operators

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.

PREVIEW

Name: _____ 135

Curriculum Connection
A3.1, A3.2, A3.3



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) Underg[illegible]d drones have been around a very long time.	True	False

Ques[illegible]

[illegible]r the questions below.

1) Is the minin[illegible] gr[illegible]? What can drones be used for?

_____

_____

_____

2) How is science and technology helpin[illegible]iners? W[illegible]ut th[illegible]derground drone technology, how are humans affected?

_____

_____

_____

PREVIEW

Visualizing

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

_____

_____

_____

_____

_____

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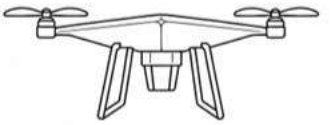
Name: _____ 137

Curriculum Connection
A1.1, A3.1, A3.2, A3.3

Research – Underground Drones



Research Learn more about underground drones.

1) What is an underground drone?

2) How [illegible] do d[illegible]?

3) What are underground dron[illegible]ed f[illegible]

4) Why is driving a drone underground hard?

5) How fast do drones fly? Do you think you can drive that fast underground?

PREVIEW

Name: _____ 139

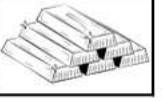
Curriculum Connection
A2.1

IF/THEN Statements – Underground Drones

Directions Follow the if/then statements to migrate the butterfly to warmer weather.

1)	If sedimentary rock is the softest	then	Move down 2 spots
2)	If heat and pressure change rocks	then	Move right 3 spots
3)	If i ive igneous rocks form above ground	then	Move left 4 spots
4)	If ks are cooled lava	then	Move down 2 spots
5)	ocks ar nation of minerals	then	Move right 2 spots
6)	If we e	then	Move down 2 spots
7)	If steel is with	then	Move left 3 spots
8)	If rocks can tell t istor	then	Move right 3 spots
9)	If rocks and minerals ha e no	then	Move right 2 spots
10)	If intrusive rocks have larger tals		Move down 1 spot





PREVIEW

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Name: _____ 140

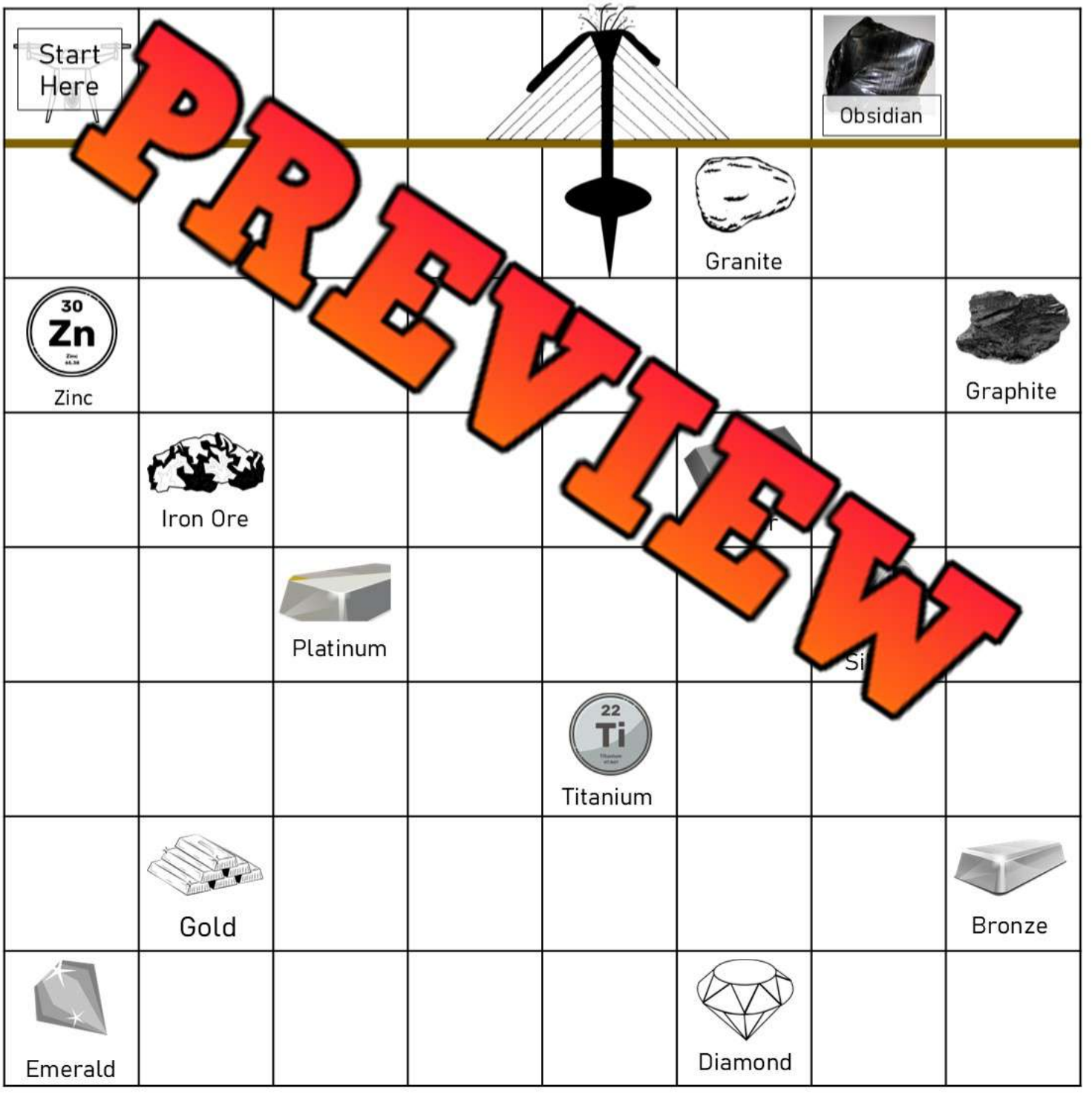
Curriculum Connection
A2.1

Writing Code – Underground Drones

Nova is a robot drone that helps gathers information about underground mines. Nova is controlled by a remote control.



Mining Use the map to write code on the next page.



PREVIEW

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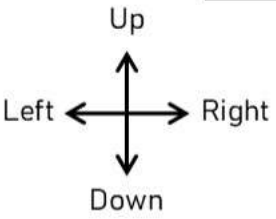
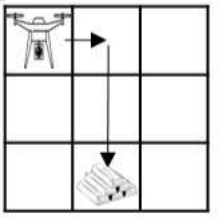
Curriculum Connection
A2.1

Writing Code – Underground Drones



Commands – Use the example below to learn the code

Move 1 right
Move 2 down



Mining Tell Nova where to dig so that they gets to all the materials.

1) Find t r and emerald.

2) Find the platinum and diamond.

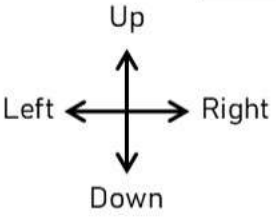
3) Find the silver, graphite, and granite.

PREVIEW

Name: _____ 142

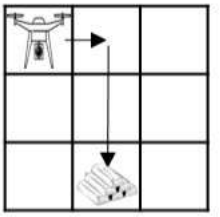
Curriculum Connection
A2.1

Writing Code – Underground Drones



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 [illegible]e, copper, diamond, gold, and emerald.

5) Find copper, bronze, obsidian, granite, silver, [illegible]. Don't touch the lava!

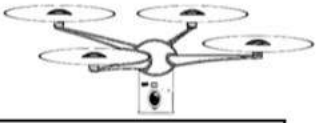
PREVIEW

Name: _____ 143

Curriculum Connection
A1.1, A2.2, A3.1, A3.2, A3.3

STEM Assignment – Underground Drone

Create your own underground drone. You'll need to write code for each of the buttons your done has. For each function, a new code needs to be written.



Questions Answer the questions about your machine below.

1) What buttons does your machine have? What functions does it perform?

2) How does your machine work? Write one example line of code for the machine to process. Example: IF button is pressed, THEN turn on light

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

Name: _____ 144

Curriculum Connection
A1.1, A2.2, A3.1, A3.2, A3.3

STEM Assignment – Underground Drone

Examples

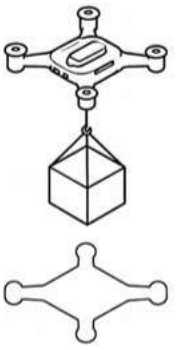
If the up button is pressed

THEN move the drone up

If the gas button is pressed

THEN test the gas, display the type of gas on screen 1





IF/THEN Write code for your invention

If

THEN

If

THEN

If

THEN

If

THEN

If

THEN

If

THEN

If

THEN

PREVIEW

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Name: _____ Date: _____

Unit Test – Rocks and Minerals

Multiple Choice /10

1) The study of rocks and the materials that makeup the Earth is called... a) Biodiversity b) Geology c) Biology d) Geograp	2) Which of the following is **not** a rock type? a) Sedimentary b) Magma c) Metamorphic d) Igneous
3) Whi[illegible] liquified rock? a) Sedi[illegible]tary b) Magma c) Metamorphic d) Igneous	4) Which type of rock is made up of tiny particles that are a result of erosion? a) Sedimentary b) Magma c) Metamorphic [illegible]gneous
5) Which type of rock has wavy l[illegible]s of different colours? a) Sedimentary b) Magma c) Metamorphic d) Igneous	[illegible]rocess slowly removes rock pieces [illegible] they [illegible] made into sedimentary rock? a) S[illegible]g b) [illegible]ng c) Erosi[illegible] d) Compacti[illegible]
7) Which type of rock is hardened magma? a) Sedimentary b) Magma c) Metamorphic d) Igneous	8) Which type of rock[illegible]t it in? a) Sedimentary b) Magma c) Metamorphic d) Igneous
9) Granite is an example of a... a) Rock b) Mineral c) Both d) None of the above	10) Which rock is used to make fire? a) Granite b) Obsidian c) Basalt d) Flint

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Definitions (1 marks each) **/3**

Term	Definition (what does it mean)
Rock	
Mineral	
Lustre	

PREVIEW

Short Answer Questions (2 mark[illegible]n)

1) How can you describe a rock? Pictur[illegible]ock in y[illegible] describe it below.
_____ _____ _____
2) How do we use rocks in our everyday lives?
_____ _____ _____
3) How does erosion lead to sedimentary rock?
_____ _____ _____

Long Answer Questions **/10**

1) What is the rock cycle? How do rocks change type? What processes change rocks from one type to another?

2) What is a fossil? How are they formed? What do they tell us about the Earth's history?

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