Workbook Preview

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Grade 5 Science Unit

PROPERTIES OF AND CHANGES IN MATTER

	Curriculum Expectations	Pages
C1.1	assess the impacts on society and the environment of various processes used in the manufacture of common products	126-127, 136, 143
C1.2	assess how the use of specific materials in the manufacture of common products affects the environment, and identify actions that society and individuals can take to mitigate negative impacts	128-143
C2.1		09
C2.2		6-38, , 108, 125
C2.3	home, in the community, or in the natural environment	2-63, 67-72, 102-103, 120-125
C2.4	describe physical changes in matter as changes of the state, volume, or form of the matter that do not result in the formation of a different substance	73-75, 78-92, 96-99, 101-103
C2.5	describe chemical changes in matter as changes that result in the formation of different substances, and identify signs that a chemical change has occurred	85-99, 101-103
C2.6	explain how changes of state can occur when matter absorbs or releases thermal energy	73-75, 78-84
C2.7	explain why specific physical properties of various solids, liquids, and gases make them useful for particular applications	14-20, 26-34, 36-38, 41-49, 102-113, 120-125

Preview of 100 pages from this product that contains 243 pages total.

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NAME: _____

PROPERTIES OF AND CHANGES IN MATTER



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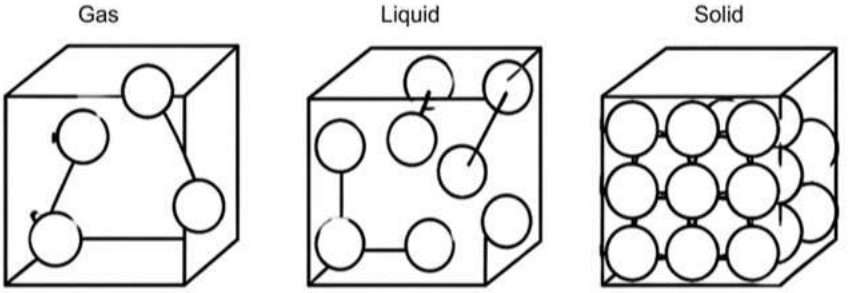
Name: _____ 8

Curriculum Connection
C2.1

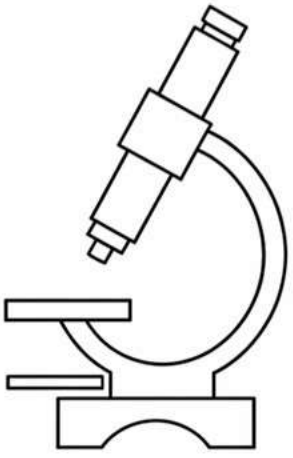
What is Matter?

What is Matter?



Everything is made of matter. Look around. The desks in your classroom are made of matter, th[illegible]ve breathe and the [illegible]k are both [illegible] of mat[illegible] our bodies are made of matter!

Matter is [illegible]ng th[illegible]up space and has mass (weight). Air is matter because air weighs [illegible] is because a balloon that is full of air weighs more than an emp[illegible]n.



Particles - Ato[illegible]s

All matter is made u[illegible]y pa[illegible]ed atoms. When you look at matter, you can[illegible] tiny a[illegible] Even with the best light microscope, singl[illegible]s c[illegible] But atoms are there. You are made of 7 bill[illegible]n, atoms, or 7,000,000,000,000,000,000,000,000

States of Matter

All matter can be grouped into three states – solid, liquid, or gas. An example of matter that goes through the three states of matter is water.

Water can be ice as a solid, regular water as a liquid, and steam as a gas. The atoms in a solid are very close together, while they get further apart in a liquid, and very far apart in a gas.

PREVIEW

Name: _____ 9

Curriculum Connection
C2.1

Questions Answer the questions below using evidence from the text.

1) What does matter mean?
2) What ar three phases of matter? Explain how water can be all three phases of matter.

PREVIEW

Questioning Write 3 qu u hav matter.

1)	
2)	
3)	

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

1) The atoms in a solid are further apart than in a gas.	True	False
2) Matter is everything that takes up space and has mass/weight.	True	False
3) Our bodies are matter.	True	False
4) Our thoughts and dreams are matter.	True	False
5) Matter is made up of tiny particles called atoms.	True	False

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Curriculum Connection
C2.1

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) The smallest unit of matter is ___.	Atom / Cell
2) Air is a type of ___.	Solid / Gas
3) Which is NOT a state?	Liquid / Energy
4) Atoms in a solid move ___.	Freely / Slowly

Name: _____ Mark

Circle the correct answer.

1) The smallest unit of matter is ___.	Atom / Cell
2) Air is a type of ___.	Solid / Gas
3) Which is NOT a state?	Liquid / Energy
4) Atoms in a solid move ___.	Freely / Slowly

Name: _____ Mark

Circle the correct answer.

1) The smallest unit of matter is ___.	Atom / Cell
2) Air is a type of ___.	Solid / Gas
3) Which is NOT a state?	Liquid / Energy
4) Atoms in a solid move ___.	Freely / Slowly

Name: _____ Mark

Circle the correct answer.

1) The smallest unit of matter is ___.	Atom / Cell
2) Air is a type of ___.	Solid / Gas
3) Which is NOT a state?	Liquid / Energy
4) Atoms in a solid move ___.	Freely / Slowly

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Curriculum Connection
C2.1

Matter

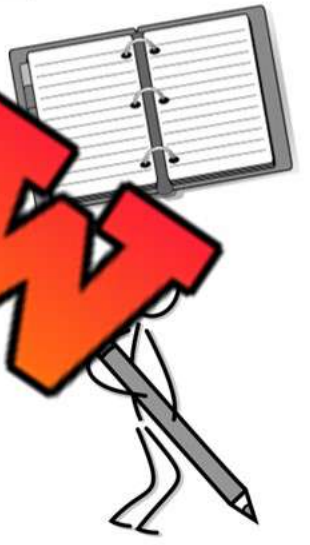
Multiple Choice Circle the correct answer. There may be more than one!

1) Matter is...	2) What are the 3 phases of matter:
❑ Anything that has weight	❑ Solid
❑ Anything we think of	❑ Gas
❑ Anythi t takes up space	❑ Energy
❑ Anyth reates energy	❑ Liquid
3) Wh of matter	4) The particles are furthest apart in a...
❑ Wat e drin	❑ Solid
❑ Noise we	❑ Glass of water
❑ Food	❑ Gas
❑ Rocks	❑ Liquid

PREVIEW

Matching Draw a line connecting the mat the example.

Liquid		❑
Not Matter		❑
Solid		❑ Love t
Gas		❑ Apple Juic
Not Matter		❑ Water
Liquid		❑ Oxygen
Solid		❑ TV
Gas		❑ Dreams



Reflection Do you think air is considered matter? Explain why or why not.

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Curriculum Connection
C2.1

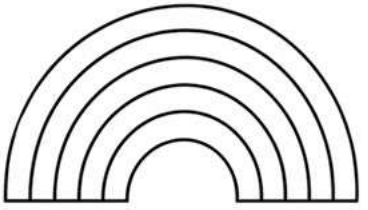
Matter – Yes or No?

Is the example matter – yes or no?

Dream	Cereal	Human
		
Yes / No	Yes / No	Yes / No

Love	Time	Idea
		
Yes / No	Yes / No	Yes / No

Flower	Dog	Table
		
Yes / No	Yes / No	Yes / No

Wind	Rainbow	Sunlight
		
Yes / No	Yes / No	Yes / No

PREVIEW

Name: _____ 13

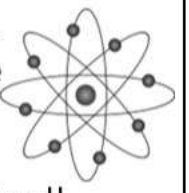
Curriculum Connection
C2.2

Particle Theory

Particle Theory
The **particle theory** states that all matter is made up of tiny particles that are constantly moving. The speed the particles move depends on which state of matter they are in.

Solids
Particles in solids are held tightly together. They are strongly attracted to each other, meaning they move slowly. These particles vibrate instead of move, but they are not still.

Liquids
Particles i ds are fairly close together with some attraction between them. They mov in all directions, but they can't move too far because they are attracte near them.



Gase
Particles gases y ar attraction between them. They move rapidly in all directions. The ead r and the walls of the container they are in.

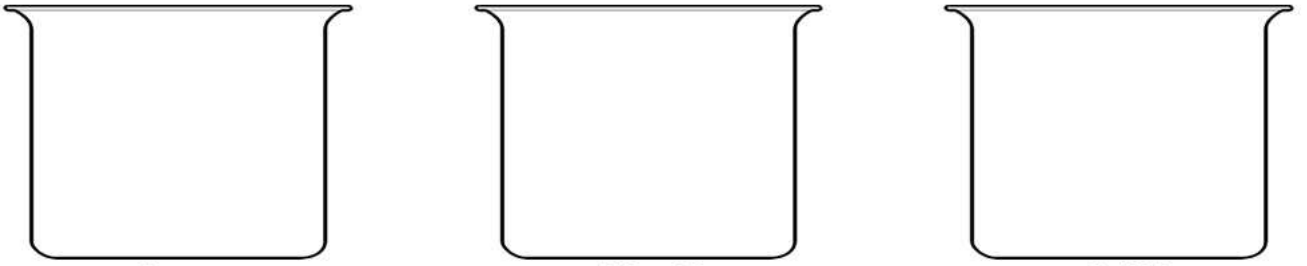
PREVIEW

Fill in the Blanks Fi th rds from the word bank.

Small	Particles	e	Moving	Matter
Gas	Solid	Liquid	S r	Weakest

All things we can touch are made up of _____ rticles _____ compounds that make up _____. The particle th es s ll ticles are _____ constantly. They move faster based on which _____ matter they are in. Particles in _____ have the strongest attracti particles in _____ have the _____. Particles in _____ a fairly close together. The _____ the attraction, the less the particles will move, like in solids.

Draw Add particles (dots) to the beakers to represent which state of matter it is.



Gas **Liquid** **Solid**

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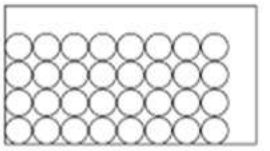
Name: _____ 14

Curriculum Connection
C2.2, C2.7

All About Solids

All About Solids

A **solid** is one of the states of matter. In a solid, the particles are very closely packed together because they are attracted to each other. The forces between the particles are strong so that the particles cannot move freely. Instead of moving, the particles stay in place and vibrate. As a result, a solid:



- has a definite shape (do not take the shape of their container)
- holds that shape unless an outside force acts upon it (example – cuts it)
- is difficult to compress as the particles are already packed tightly
- [illegible] because there are many particles packed closely together

Transform

Solids c[illegible]d into the other states of matter. When a solid is melted, it becomes a liqu[illegible]mple[illegible]g ice cube transforms from solid ice to liquid water. A solid can also [illegible]nsform[illegible]o a gas through a process called sublimination. This process happens rarely[illegible]me[illegible]t it can be observed when dry ice turns directly into a gas (carbon diox[illegible]

PREVIEW

Questions Use informa[illegible]e text[illegible]port your answer.

1) What do you think it means fo[illegible]olid t[illegible]p[illegible]shape? (hint: a gas/liquid does not have a definite shape).

2) How can solids be transformed into other states of matter? C[illegible]an

Visualizing What were you picturing while you were reading? Draw it!

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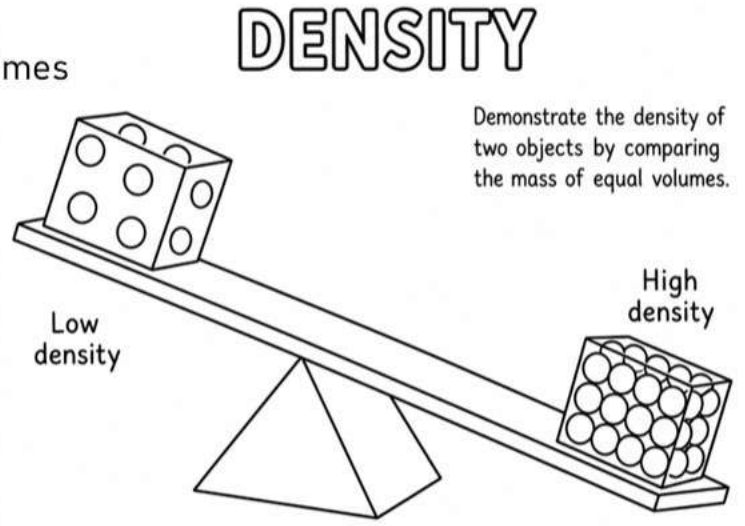
Name: _____ 15

Curriculum Connection
C2.2, C2.7

Buoyancy - Density Of Solids

Sink or Float?

When we mix a solid with a liquid, sometimes the solid dissolves so we can't see it. Other times, the solid sinks or floats. For exam[illegible]nd will sink in water. This is g[illegible]se if sand floated, our [illegible]ss!



Density of Soli[illegible]

Solids will sink or flo[illegible]sity. Remember that solids are made of particles. **Density** is how ti[illegible]ked [illegible]s are. A high dense solid has very tightly packed particles, like a rock or [illegible]avy compared to their size.

A solid with a low density has lo[illegible]y packe[illegible]ticl[illegible]This makes the solid light compared to its size. Examples of solids [illegible]low [illegible]plastic water bottles, paper, leaves, feathers, and sponges.

Density of Water

Water is made of particles as well. So, water has a density too. Water's [illegible]y isn't high or low, it's somewhere in between.



Why Do Solids Sink Or Float?

If a solid has a higher density than water, it will sink. It weighs too much compared to its size, so it cuts right through the water to the bottom.

If a solid has a lower density than water, it will float. When something floats, we say it is **buoyant**. A piece of Lego is buoyant. A brick is not buoyant.

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Curriculum Connection
C2.2, C2.7

True or False

Ice floats in water. Are the statements below true or false?

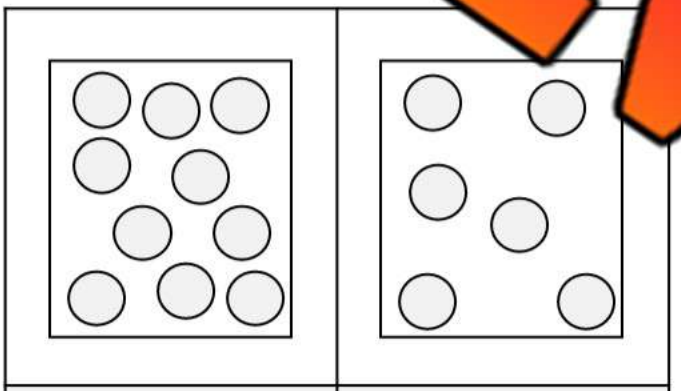
1) Ice is buoyant in water.	True	False
2) Ice has a higher density than water.	True	False
3) Ice is not buoyant in water.	True	False
4) Really l[illegible]e cubes will sink in water.	True	False
5) One c[illegible]w[illegible]hs more than one cup of water.	True	False

PREVIEW

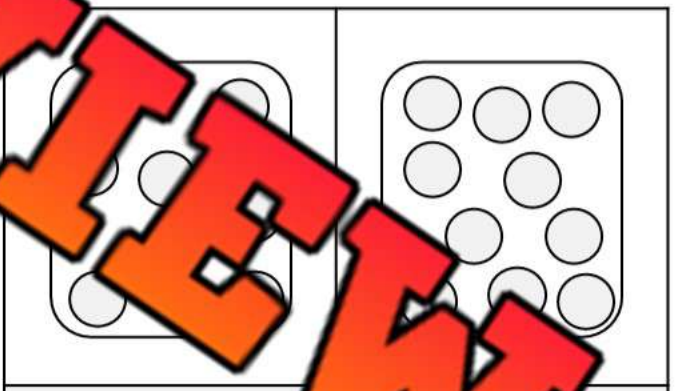
Density

Wh[illegible]as a[illegible]her density?

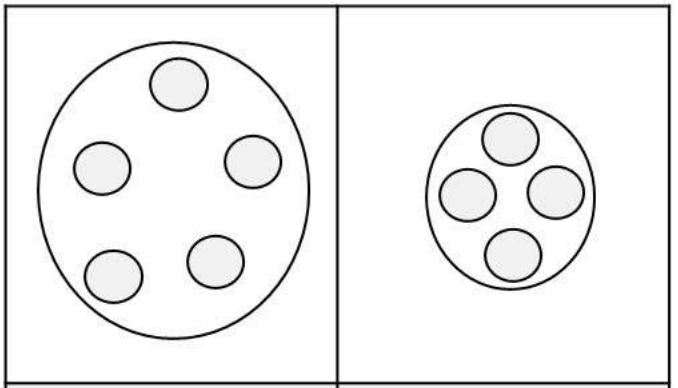
The particles in the s[illegible] Circle which solid has a higher density.



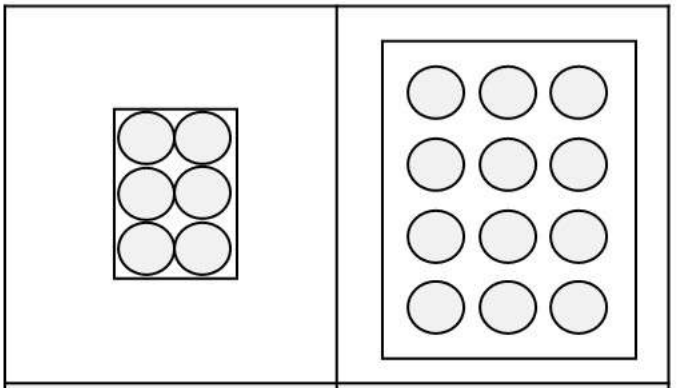
Solid 1 | Solid 2



Solid 1 | [illegible]d 2



Solid 1 | Solid 2



Solid 1 | Solid 2

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Name: _____ 17

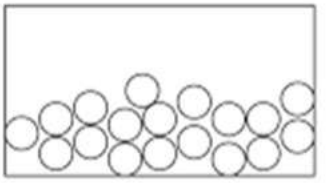
Curriculum Connection
C2.2, C2.7

All About Liquids

All About Liquids

A **liquid** is one of the states of matter. The forces between the particles cause them to be fairly close together, but they do move around slightly in all directions. As a result, liquids:

- do not have a definite shape
- fill the bottom of a container or spread when they are not contained
- maintain the same volume unless the temperature of the liquid changes
- are difficult to compress because the particles can move and will flow when compressed



Transform uids

Liquids ca y transformed to a solid or a gas. This happens if the liquid ab s heat energy. If we release heat from a liquid by pu ee ill transform into a solid. This happens when a liquid reaches its freezin nt, whi nt for different liquids.

A liquid a g where it will become a gas. For example, water begins to boil at 100° , if a l orbs enough heat, it could reach its boiling point and become a gas.

PREVIEW

Questions Use information tex your answer.

1) Why do you think liquids flow and fill t m of a ner? Explain.

2) How can liquids be transformed into other states of matter? e an

Making Connections When have you seen a liquid change states? Explain.

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Curriculum Connection
C2.2, C2.7

Exit Cards

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

Name: _____ Mark

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

1) Liquids do not have a definite shape.	T / F
2) Liquids do not take the shape of their container.	T / F
3) All liquids freeze and boil at the same point.	T / F
4) Liquids keep the same volume in different containers.	T / F

Name: _____ Mark

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

1) Liquids do not have a definite shape.	T / F
2) Liquids do not take the shape of their container.	T / F
3) All liquids freeze and boil at the same point.	T / F
4) Liquids keep the same volume in different containers.	T / F

Name: _____ Mark

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

1) Liquids do not have a definite shape.	T / F
2) Liquids do not take the shape of their container.	T / F
3) All liquids freeze and boil at the same point.	T / F
4) Liquids keep the same volume in different containers.	T / F

Name: _____ Mark

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

1) Liquids do not have a definite shape.	T / F
2) Liquids do not take the shape of their container.	T / F
3) All liquids freeze and boil at the same point.	T / F
4) Liquids keep the same volume in different containers.	T / F

PREVIEW

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Name: _____ 19

Curriculum Connection
C2.2, C2.7

Experiment - Viscosity

Research Question What are we testing?

Which liquids will be the most viscous (thick), and which will be the least viscous (runny)?



Materials What do we need for our experiment?

- Small clear cups
- Small candies
- Various liquids (water, oil, corn syrup, etc.)
- Stopwatch (optional)

Method How do we complete the experiment?

1) Fill each of the cups full of the different liquids.
2) Drop a candy into the first liquid. Use the stopwatch to time how long it takes to drop to the bottom of the cup.
3) Repeat this step for all liquids.
4) Record the length of time for each liquid on this page.

Hypothesis Which liquid is the thickest (most viscous)? Which is the thinnest (least viscous)?

Most Viscous (thickest) _____

Least Viscous (thinnest) _____

PREVIEW

Name: _____ 20

Curriculum Connection
C2.2, C2.7

Observations

Record how long the candy takes to sink to the bottom.

Liquid	Prediction (seconds)	Length of time (seconds)

PREVIEW

Results

Answer the questions be

1) Was your hypothesis correct or wrong? Did a d sur

2) Which liquids flow the fastest?

3) Which liquids flow the slowest?

4) Can you think of a liquid that would flow faster?	
5) Can you think of a liquid that would flow slower?	

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Name: _____ 21

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

Experiment - Weight Of Solid Vs Liquid

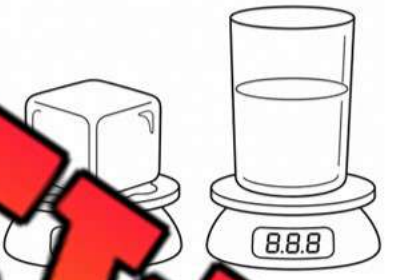
Research Question Liquid or solid? Which weighs more?

If we take an ice cube that was made from 25ml of water, does it weigh the same/more/less than 25ml of water?

Hypothesis What will happen? Will the ice weigh the same/more/less than the liquid form?

Materials What will be needed for the experiment?

- 25ml of water (or other liquid as ... form
- 25ml of other liquid (juice, pop, etc.) – opti...
- Measuring cup
- Jug of water
- Weight scale



Procedure How will you complete the experiment?

1) Make ice by pouring 25ml of water into ice cube trays. Put tray in the freezer. You could also make ice from other liquids to compare different substances.
2) Once the ice is made, weigh it quickly before it melts. Record the weight on this sheet.



3) Weigh the 25ml of water by putting it in a cup. If you are using a digital scale, use the "tear" button to minus the weight of the cup. If not, you will need to weigh the cup separately and subtract it from your total weight. Record your results.
4) Check your hypothesis. Which weighed more. Fill in the questions on the next page.

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Name: _____ 22

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

Observations How much does each solid or liquid weigh?

State of Matter	Weight
Solid – Ice Cube	
Liquid - Water	

Results Answ tions below.

1) Was your hypoth orre p

2) Why do you think the solid and the liquid wei same
Hint: Physical or Chemical Change?

3) How do you know that no chemical change has happened? Think back to the 5 signs of chemical changes – odour, precipitate, temperature, colour, and gas (bubbles).

PREVIEW

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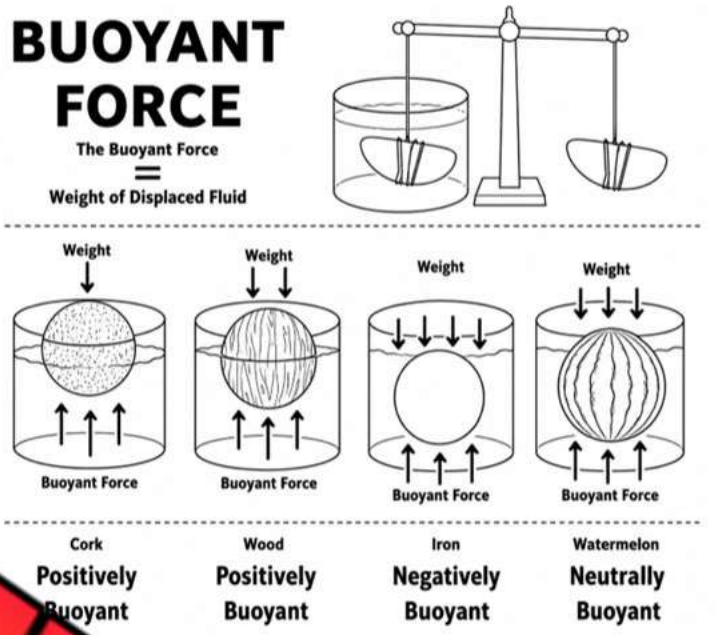
Name: _____ 26

Curriculum Connection
C2.2, C2.7

Buoyancy

What is Buoyancy?

Buoyancy is an upward force created by a fluid that opposes the weight of an object. Buoyancy is why an object sinks or floats when put in a fluid, like water. All objects in water h[illegible]e buoyant force pushing up agai[illegible]t is pulling that objec[illegible]. If the [illegible]rce is not strong enough [illegible]bje[illegible] of the water, it will sink.



Types of Buoyant Forces

Positively Buoyant

An object, like cork, is positively buoya[illegible]ensity [illegible] than the fluid it is in. The result will be that the object floats in the fluid. In th[illegible]agra[illegible] is more positively buoyant than wood, but both float in the water, [illegible]ng th[illegible]st[illegible]e surface because their density is less than the water. They are both said [illegible]ositively [illegible]t.

Negatively Buoyant

An object is negatively buoyant if it sinks in water. This means if the [illegible]er density than the fluid, it will be negatively buoyant. Negatively buoyant o[illegible]vary, meaning some negatively buoyant objects will take time to sink, while other negatively buoyant objects will sink right away, like a large rock. This is because the objects have different densities.

Neutrally Buoyant

A neutrally buoyant object does not sink or float. Instead, it remains balanced at the same level in a fluid. Scuba divers aim to be neutrally buoyant so they cannot feel the force of gravity or buoyancy while they explore underwater. They do this by wearing scuba gear that balances these forces.

PREVIEW

Name: _____ 27

Curriculum Connection
C2.2, C2.7

Questions Use information from the text to support your answer.

1) Define the buoyancy terms below.	
Positively Buoyant	
Negatively Buoyant	
Neutral Buoy	

2) How does density affect the buoyancy of an object?

_____

_____

_____

Examples What objects are positively buoyant, negatively buoyant, neutrally buoyant?

Positively Buoyant	
Negatively Buoyant	
Neutrally Buoyant	

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

1) Steel is positively buoyant.	True	False
2) A good life preserver will be positively buoyant.	True	False
3) Boats are negatively buoyant.	True	False
4) A scuba diver aims to be neutrally buoyant so that can move easier.	True	False
5) A neutrally buoyant object floats for awhile and then sinks.	True	False

PREVIEW

Name: _____ 29

Curriculum Connection
C2.2, C2.7

Experiment - Buoyancy of Water

Materials
What do we need for our experiment?

- ❑ 3 clear cups or glasses that can fit an egg
- ❑ 1-3 eggs – one will work if you take the egg out each time to test the water
- ❑ 8 tablespoons of salt and sugar
- ❑ Water
- ❑ Spoon



Procedure
How to complete the experiment?

1) Fill the 3 cups with water
2) Label the cups on the bottom with the following labels – saltwater, control, and sugar water.
3) Put the 8 tablespoons of salt into the tall cup and saltwater. Stir well to dissolve the salt into the water.
4) Put the 8 tablespoons of sugar into the cup labelled sugar water. Stir well to dissolve the salt into the water.
5) Put the egg in the control glass of water and record what happened. Is the egg buoyant in the water?
6) Put the egg in the sugar water and record what happened. Is the egg buoyant in the sugar water?
7) Put the egg in the saltwater and record what happened. Is the egg buoyant in the saltwater?

PREVIEW

Hypothesis
Will the egg be buoyant in water, saltwater, sugar water? Rank the types of water providing the most buoyancy to least buoyancy.

Fluid	Buoyancy	
Water	Yes	No
Sugar Water	Yes	No
Saltwater	Yes	No

Fluid	Rank 1 = most buoyant, 3 = least buoyant
Water	
Sugar Water	
Saltwater	

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Curriculum Connection
C2.2, C2.7

Observations

Fill in the tables below based on your observations.

Fluid	Buoyant	
Water	Yes	No
Sugar Water	Yes	No
Saltwater	Yes	No

Fluid	Rank 1 = most buoyant, 3 = least buoyant
Water	
Sugar Water	
Saltwater	

Results

wer the questions below.

1) W hypoth ct? Did anything surprise you? Explain.

2) Why was the egg buoyant in alt a ? Explain using the terms density, volume, and mass.

3) Could someone using the same amount of salt and sugar, but dif or water get different results? Explain.

4) If you wanted to increase the buoyancy of the water, what could you do? How could you increase the buoyancy of the water so that the egg barely sinks at all.

PREVIEW

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Name: _____ 35

Curriculum Connection
A2.1, A2.2

Coding - Scuba Diving



PREVIEW

Direction Code the diver to pick up the treasure. Avoid the s weed!
Draw arrows showing the diver's moves ending at the chest...

1	2	3	4	5	6	7	8	9	10

11	12	13	14	15	16	17	18	19

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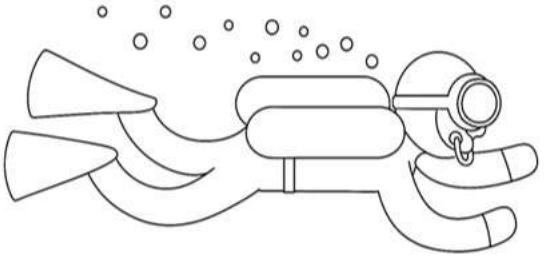
Name: _____ 36

Curriculum Connection
C2.2, C2.7

Scuba Diving Safely

Scuba Diving Safety

Scuba diving is a thrilling activity that allows us to explore the magical world under the sea. However, to enjoy these underwater adventures safely, it's essential to understand the changes in pressure that occur during a dive and how to manage them effectively.



Heading U[illegible]er: Descending Slowly

Diver[illegible]wly when they start their di[illegible]ne rea[illegible]low their bodies to adjust to the i[illegible]essur[illegible]more importantly, it helps[illegible]ect t[illegible]ar[illegible]e our ears are tiny air-filled spaces that need to have the same pressur[illegible]e water d[illegible]feel comfortable.

This is why divers often p[illegible]thei[illegible]g down, which is a way of letting more air in to balance the pressure. By [illegible]ding s[illegible] divers give their ears a chance to adjust gradually.

The Dangers of Rising Quickly: Decompression Sickne[illegible]

When diving, the increased pressure causes the body to abs[illegible] more nitrogen gas from the air in the scuba tanks. Normally, this nitrogen is not a problem as it gets naturally breathed out by our lungs.

However, if a diver comes up too quickly, the pressure around them decreases faster than the body can remove the extra nitrogen gas. This can cause the nitrogen to form bubbles inside the diver's body, leading to a condition called decompression sickness, also known as "the bends". This can result in joint pain, dizziness, and even death.

To avoid decompression sickness, divers come up slowly and perform what's known as "decompression stops". These stops are like short breaks at certain depths where the diver waits for a while. This gives their body time to safely release the extra nitrogen gas.

PREVIEW

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Curriculum Connection
C2.2, C2.7

Questions
Answer the questions below using evidence from the text.

1) Why do scuba divers have to dive down slowly?

2) Why d[illegible] have to come up slowly from a deep dive? What do they do?

PREVIEW

Questioning
Write 2 questions you [illegible] about t[illegible]

1)	
2)	

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

1) Divers descend quickly at the start of their dive.	True	False
2) Ears need the same pressure inside as the water outside.	True	False
3) Increased pressure causes the body to absorb less nitrogen.	True	False
4) Coming up quickly can lead to decompression sickness.	True	False
5) Decompression stops are breaks to release extra nitrogen safely.	True	False

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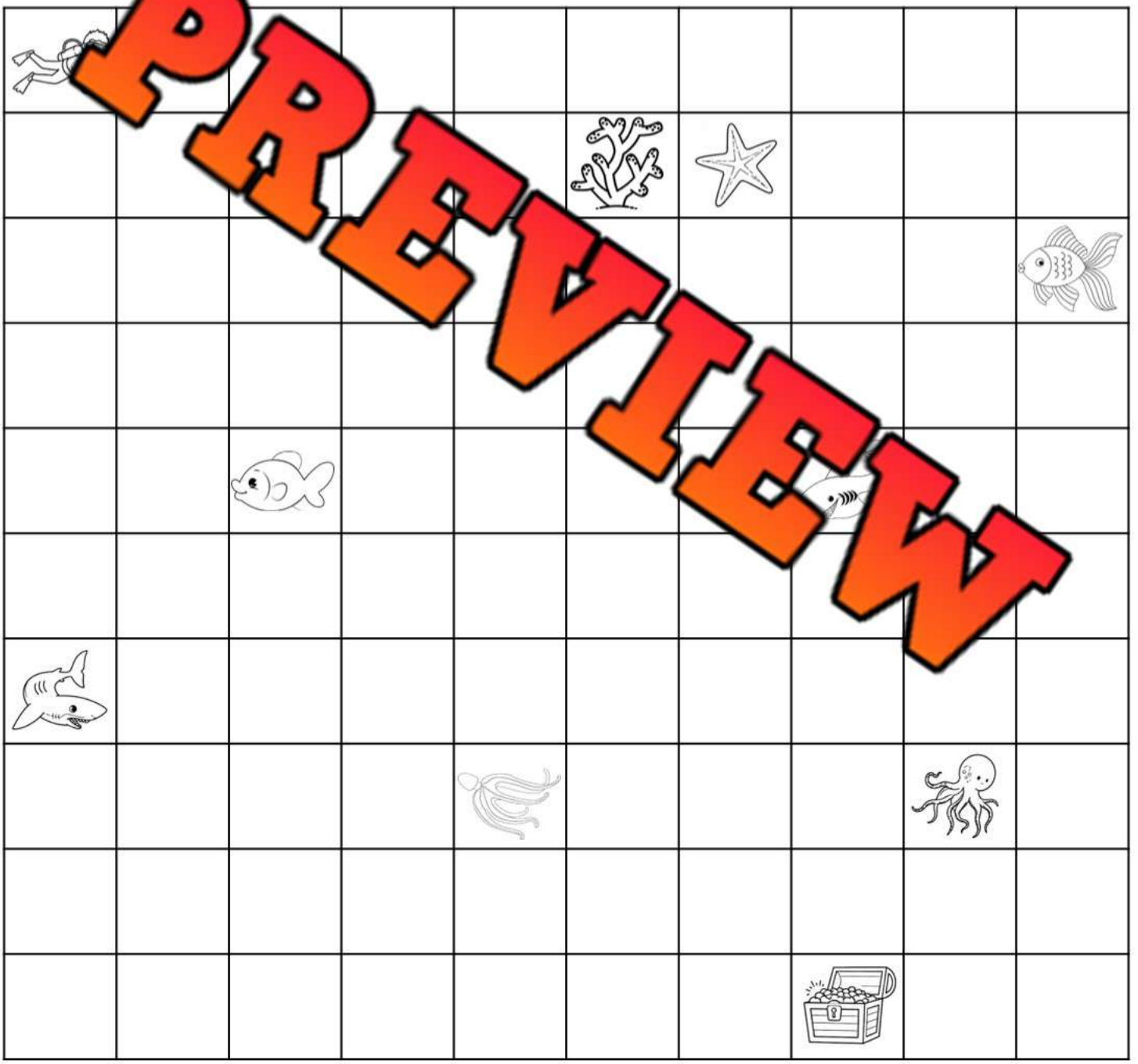
Curriculum Connection
A2.1, A2.2

Coding Activity - Scuba Diving Safely

In a video game, you need to control the scuba diver to get the treasure safely. You'll need to ensure your diver doesn't descend too quickly, which could cause damage to their ears. You'll also need to make sure they don't get decompression sickness on their way up.

Diving Use this map to write the code on the next page.



PREVIEW

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Name: _____ 40

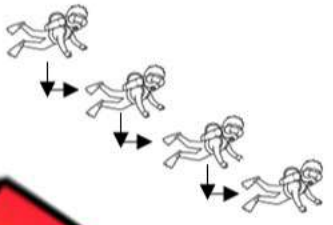
Curriculum Connection
A2.1, A2.2

Coding Activity - Scuba Diving Safely

Coding Code the diver to the treasure and then back to its original spot safely.

A **loop** is a code that helps programmers write efficient programs. When you use a loop, you can say how many times you want the commands below it to be repeated.

For exampl you might use a loop to move a scuba diver in a al through the grid.



Move
Move
Collect

Example Codes

- Move up 1 space
- Move down 1 space
- Swim forward 1 space
- Turn around
- Wait 1 minute
- Loop 5 times

PREVIEW

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Curriculum Connection
C2.2, C2.7

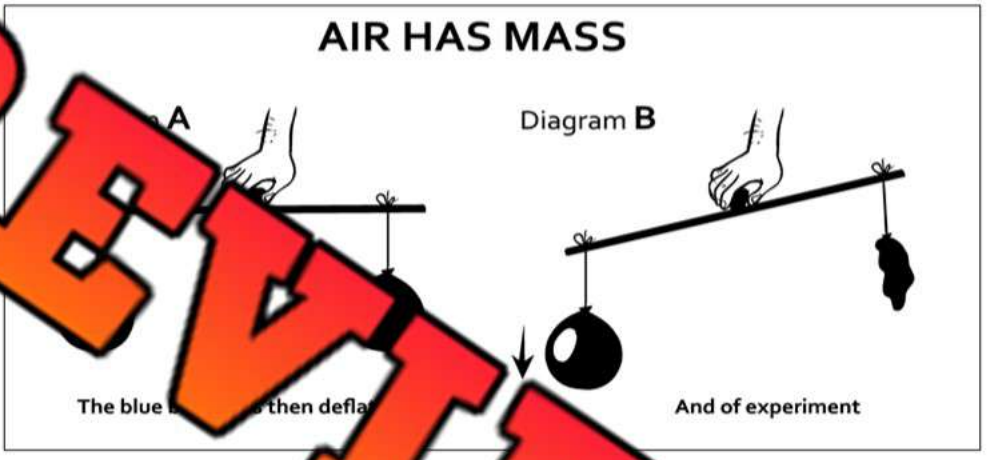
Does Air Have Any Weight?

Research Question — What are we testing?

Does air have any weight?

Materials — t do we need for our experiment?

- 2 b ons
- A metre sti
- String that is about 1 metre long



PREVIEW

Procedure — How do we do the experiment?

1) Blow up the 2 balloons to the same size.
2) Cut two 15-centimeter-long pieces of string.
3) Attach a balloon to opposite ends of the metre stick using the 15 cm string pieces.
4) Tie the left-over string around the centre point of the metre stick.
5) Hold the string up and observe the balloons.
6) Make a hole in one of the balloons letting the air out.
7) Observe what happens.

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Curriculum Connection
C2.2, C2.7



Hypothesis

What do you think will happen?

Results

Answ estions below.

1) Which ballo s mor

The Popped Balloon



Blown-Up Balloon

2) How do you know one balloon is heavier than th

3) Does air have any weight? Explain how you know.

PREVIEW

Name: _____ 47

Curriculum Connection
C2.2, C2.7

Fact or Fiction – States of Matter

Objective

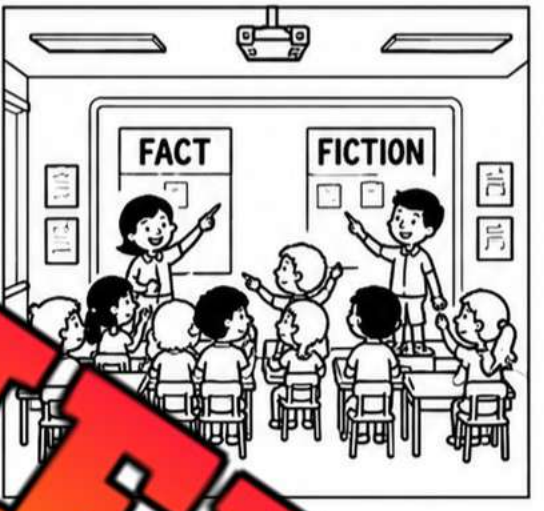
What are we learning about?

Students will explore the properties and behaviors of solids, liquids, and gases. By evaluating fact and fiction statements about matter, students develop critical thinking skills and understand how these states of matter differ and interact in real life.

Materials

What you need for the activity?

- Fact or Fiction statements
- A 'Fact' sign and a 'Fiction' sign to distinguish the two sides of the room
- Designated areas in the classroom for the 'Fact' and 'Fiction' signs, allowing space for students to move to either side.



PREVIEW

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!

Name: _____ 48

Curriculum Connection
C2.2, C2.7

Fact Or Fiction | Read the statements to the class.

#	Statement	
1	Air is mostly made up of oxygen, with nitrogen being the smallest part.	Fiction
2	Liquids can turn into gases when heated to their boiling point.	Fact
3	Solids can be poured into containers just like liquids.	Fiction
4	Gases spread out to fill the space of any container.	Fact
5	Wate most common liquid on Earth.	Fact
6	So particles that move freely and quickly.	Fiction
7	n dioxid sed to make soda fizzy.	Fact
8	Solids ex any available in a container.	Fiction
9	Gases are ea mpre there is space between particles.	Fact
10	Liquids have a fixed ut no pe.	Fact
11	Solids can change shape an cts on them.	Fact
12	Air cannot be felt because it is inv	Fiction
13	Liquids always keep the same shape no ma e con	Fiction
14	Compressed gas can be stored in strong co ers	Fact
15	Solids have no fixed volume and can expand easily.	Fiction
16	Liquids take the shape of the container they are in.	t
17	Gases cannot be compressed because their particles are tightly pac	Fiction
18	Heating a solid can make it melt and become a liquid.	Fact
19	Air has colour, which makes it easy to see.	Fiction
20	Solids have a fixed shape and do not take the shape of their container.	Fact
21	Liquids are used in hydraulic systems to transfer force.	Fact
22	Solids are not rigid and can easily change their shape.	Fiction
23	Air is a form of gas that makes up the atmosphere around Earth.	Fact
24	Liquids cannot be squashed because their particles are close together.	Fact
25	Gases move freely and quickly in all directions.	Fact

PREVIEW

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Name: _____ 51

Curriculum Connection
C2.3

Examples of Evaporation

Evaporation at Home

At home, evaporation happens often. We understand that the water used to clean our clothes will evaporate when we hang them or when we put them in a drying machine.

When we spill a drink on a table, we will notice it w dry hours later. This is due to evaporat drink was sugary, there will be a an on the table.



Evaporation in nunity

In the community, we uring a rainy day, everything is wet and covered in water. Once it s ing, s of evaporation will dry up the puddles. If the sun is out, the eva orat en faster.

Evaporation in the Natural Environment

Animals use the process of evaporation to cool them down. They use **evaporative cooling** to regulate their body temperature. They do this by swimming in water or by wallowing in mud. The water is then evaporated off their bodies just like how humans sweat is evaporated.



Some animals also pant, which means they breathe rapidly with their mouth open to increase evaporation from the hot air they release from their mouths.

In the natural environment, we will notice that water levels in ponds, lakes, and rivers will lower after several hot days without rain. Rainfall will often even out the evaporation. When we see rain, it is because water from rivers, lakes, and ponds is evaporated and formed into a raincloud. Evaporation is key for our water cycle.

PREVIEW

Name: _____ 52

Curriculum Connection
C2.3

Questions Use information from the text to support your answer.

1) What is evaporation?

2) When have you see evaporation today or recently? Describe it.

Examples Write examples of when you see evaporation in the settings below.

At Home	
In the Community	
In the Natural Environment	

PREVIEW

Name: _____ 53

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

Lab Experiment – Evaporation

Research Question
What are we trying to answer?

1) What happens to water after it rains?
2) How does the sun, shade, and wind affect the process of evaporation?

Hypothesis
Answer the research questions below before you do the experiment.

1) What ha[illegible]s to water after it rains?

2) How does th[illegible]vap[illegible]tion? Does shade speed up or slow down evaporation?

3) How does wind affect evap[illegible]

PREVIEW

Materials
What will you need for the experiment?

1) Pail/cup of water for each student
2) Paintbrush for each student
3) Chalk for each student
4) Stopwatch - optional

Procedure
How will you complete the experiment?

1) Go outside and use the water and paintbrush to paint a simple picture on pavement in the sun.
2) Use the chalk to make an outline of your picture.
3) Use the results page to track how your picture looks after 2 minutes, 5 minutes, and 10 minutes.
4) Next, complete the steps above in a new shady location. Compare the results.
5) Lastly, complete the steps above but this time, blow on your picture or use a fan to simulate wind. You could also draw your picture on the side of the school as it will receive more wind than the pavement.

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Name: _____ 54

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

Observations

Fill in the table below as you complete the experiment.

Location	Time	Observations – Examples Below - No evaporation - Half evaporated - Completed evaporated
Sunny Location	After 2 Minutes	
	After 5 Minutes	
	After 10 Minutes	
Shady Location	After 2 Minutes	
	After 5 Minutes	
	After 10 Minutes	
Windy Location	After 2 Minutes	
	After 5 Minutes	
	After 10 Minutes	

PREVIEW

Results

Answer the research questions now that you have completed the experiment.

1) What happens to water after it rains?

2) How does the sun affect evaporation? Does shade speed up or slow down evaporation?

3) How does wind affect evaporation?

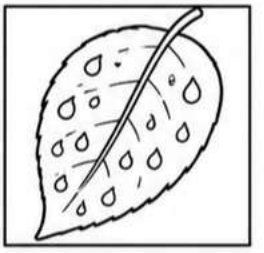
Name: _____ 55

Curriculum Connection
C2.3

Condensation

What is Condensation?
Condensation is when water changes from a gas to a liquid. Condensation is the opposite of evaporation, which is the changing of water from a liquid to a gas.

Why Does Condensation Happen?
Condensation happens when a gas touches a cooler surface. The cooler surface will cause the gas to release heat. When the gas cools, the particles b[illegible] slow down, causing them to be more attracted to each othe[illegible] into water droplets.



Cond[illegible]my
Have y[illegible]er noti[illegible]ur cold drink "sweats" on a hot day? Well, your drink doesn't actually sweat [illegible]ens[illegible]n is occurring. On a hot day, there is a lot of water vapour in the a[illegible]e of ev[illegible]n). When this warm air makes contact with your cold glass, the wat[illegible]our i[illegible]a[illegible]nses on the side of your glass. This forms water droplets on the [illegible]e.

Water Cycle – Formation of C[illegible]
Condensation is very important in the w[illegible]. As [illegible]r from lakes, rivers, and oceans evaporate, the water vapour goes up in [illegible]atmosp[illegible] doesn't disappear! Instead, it rises until it comes into contact with a colder surfa[illegible] our [illegible]phere, the water vapour commonly clings to dust particles, salt [illegible], bact[illegible]h released from volcanoes.

We usually think of clouds only being in the sky, [illegible]y can be [illegible] ground level too! When we see a cloud near the ground, we call it fog. [illegible]thro[illegible]g is [illegible]st like walking through a cloud!

PREVIEW

Visualizing What were you picturing while you were reading? Draw



	_____
	_____
	_____
	_____
	_____
	_____

Name: _____ 56

Curriculum Connection
C2.3

Multiple Choice

Circle the correct answer.

1) Condensation is when...	2) Condensation happens when...
a) vapour/gas turns into a liquid	a) water vapour suddenly freezes
b) liquids turn into a gas	b) water droplets form a liquid
c) a solid melts into a liquid	c) water freezes into ice
d) a gas turns into a solid	d) water heats up into a vapour

Fill in the

Fill in the blanks using words from the word bank.

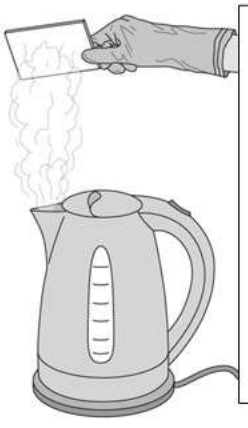
Word Bank				
Condensation	ouds	Condenses	Vapour	Volcanoes
Droplets	ater	faces	Cold	

Condensation occurs whe_____ evaporated and _____ into water droplets _____ from the evaporation collects on a _____ surface. This can be s_____ hen a_____ ft drink has water _____ on the can. The process of the v_____ s fo_____ ter droplets is called _____. A common example _____ d_____ sation _____ formation of _____. Evaporated water from lakes, rivers, and o_____ s c_____ _____ r _____ in the air, like dust, salt, bacteria, or even ash_____.

PREVIEW

Question

What is happening in the picture?



_____

_____

_____

_____

_____

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Name: _____ 58

Curriculum Connection
C2.3

Examples of Condensation

Condensation at Home

- A dehumidifier draws in warm air into its system. The warm air has water in it, that is condensed on a freezing cold coil. The condensed water is dropped into a bucket that can be discarded. Dehumidifiers are used to dry out a room that has been flooded or that has a lot of moisture in the air. They are commonly used in basements.



- Fogging mirrors after a shower happens because of condensation. The hot moist air condenses on the cooler surface of the mirror.
- Foggy eyeglasses happens when your glasses are cooler than the environment around them. This could happen after a workout, when your face is warm and sweaty. It could also happen when you go outside on a hot day after your glasses have been in the air conditioning.

Condensation in the Environment

- Condensation causes morning dew on the grass. Grass is wet if a warm day is followed by a cool night. During the warm day, water evaporates into the air. When nighttime comes, the warm ground will begin to cool and the air will lose all the moisture. At a certain temperature called the dew point, water vapour in the air will begin to condense faster than the water is evaporating. The water condenses on grass, leaves, vehicles, spider webs and anything cool it can cling to.
- Clouds are the most commonly seen example of condensation in our environment.

Condensation in the Community



- Contrails are vapour trails in the sky made by aircrafts. This is not pollution. Instead, it is water vapour released by the aircraft's engine condensing in the colder air temperature.

PREVIEW

Name: _____ 59

Curriculum Connection
C2.3

Questions Answer the questions below using evidence from the text.

1) Why do glasses fog up?

2) Why is there often dew on the grass in the morning?

Examples Write examples of condensation in the settings below.

At Home	
In the Community	
In the Natural Environment	

PREVIEW

Name: _____ 60

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

Lab Experiment – Condensation

Research Question
What are we trying to answer?

Will hot water evaporate and condense on a colder surface? What will happen with the condensed water droplets?

Hypothesis
Answer the research questions below before you do the experiment.

1) Will h[illegible]te and condense on a colder surface? Explain.

2) What will happen with t[illegible]ased [illegible]lets?

PREVIEW

Materials
What will you need for the experiment?

- 1 cup per group/person (glass or see-through)
- 1 plate per group/person
- Approximately 5-10 ice cubes per group
- Hot Water



Procedure
How will you complete the experiment?

1) Pour about 5-10cm of hot water into the cup.
2) Quickly put the plate on top of the cup and let it sit for about 30-40 seconds.
3) Put your ice cubes on top of the plate.
4) Record what happens!

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Name: _____ 61

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

Observations

Fill in the table below as you complete the experiment.

Steps	What Happened
After hot water was poured and the plate was placed on top	
After the ice was added to the	

PREVIEW

Results

Answer the research question that you have completed the experiment.

1) How was this experiment an example of condensation?

2) When the water poured down the side of the glass, what did that represent in our environment?

3) Why did the water pour down the sides of the cup? How does this relate to our real-world water cycle?

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Curriculum Connection
C2.3

Melting and Freezing

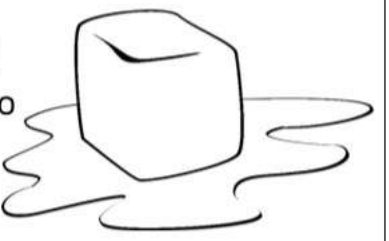
What is Melting?

Melting is the process of a solid changing into a liquid when heat is applied. For example, an ice cube in a freezer will remain a solid because there is no heat added. If you take the ice cube out of the freezer, the room temperature is warmer, which means the ice will absorb the heat.

The heat will cause the particles inside the solid to move. This will cause the particles to spread out and flow into the bottom of the container they are held in.

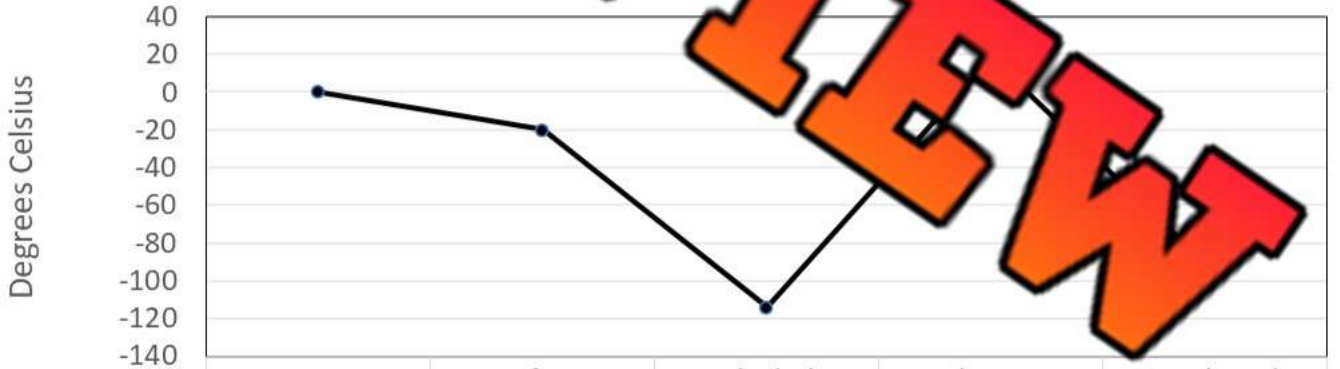
What is a Melting Point?

All solids have a melting point. The melting point for ice is 0°C. If you take an ice cube out of a freezer and then bring it outside into an environment colder than 0°C, it will stay a solid because it hasn't reached its melting point.



Freezing and Freezing Points

Freezing is the opposite of melting. Freezing is when a liquid changes state to a solid. Different liquids have different freezing points. Water has a freezing point of 0 degrees Celsius. Check out the graph below to see other liquids freezing points.



	Water	Antifreeze	Alcohol	Glycerin	Methanol
Freezing Point	0	-20	-114	18	-96

Understanding Science to Help Our Lives



Water will freeze at 0°C, which means it would not make good anti-freeze for your car. Anti-freeze is used to stop water from freezing and damaging a car's engine. Anti-freeze is made of ethylene glycol, which has a freezing point of -20°C.

Windshield wiper fluid is made of methanol. Methanol has a freezing point of -96°C. This makes it a great choice to clean our windshields on extremely cold days!

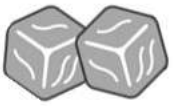
PREVIEW

Name: _____ 63

Curriculum Connection
C2.3

Fill in the Blanks

Fill in the blanks using words from the word bank.



Word Bank				
Solid	Melting	Liquid	Temperature	Same
Gas	Boiling			

Melting occurs when a _____ reaches a temperature warmer than its _____ point, turning it into a _____. For example, an ice cube melts at a _____ warmer than 0 degrees Celsius. The melting point is the _____ as the ___ing point! Liquids don't melt, however they do have a _____ poi___ ey ___nge states into a _____.

PREVIEW

Questions

Fill in the blank___ from the word bank.

1) Explain how melting and f___ cre___ changes in states.

2) Why is it helpful to understand freezing points, espec___ wi___

Making Connections

What does the reading remind you of in your life?

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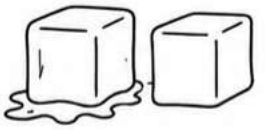
Curriculum Connection
A1.3, A1.4, A1.5

Lab Experiment – Melting



Research Question

What question are we trying to answer?

How does salt, sugar, hot water, and cold water affect the melting process? Will applying these substances to ice slow down or speed up the melting process?

Hypothesis

Answer the research questions below before you do the experiment.

1) Which of the substances above will speed up the melting process?

2) Which of the substances above will slow down the melting process? Explain.

Which will melt first? Rank (1-5) with 1 being the first to melt and 5 being the last to melt	
Control - Just Ice	
Sugar	
Salt	
Hot Water	
Cold Water	

PREVIEW

Materials

What will you need for the experiment?

1) Small plastic cups (mini-solo cups)
2) Water (hot and cold)
3) Salt
4) Sugar
5) Muffin Tin



Procedure

How will you complete the experiment?

1) Fill 5 plastic cups with the same amount of water in each
2) Put them in the freezer overnight
3) Pop the ice out of each cup. You may need to cut the cup around the ice
4) Place one ice cup in each compartment in a muffin tin
5) Pour hot water on one ice cup, cold water on another, salt on another, and sugar on another. Leave one of the ice cups as is. This will be the control. Consider labelling the muffin tins so you can remember how you treated each ice cup.
6) Record the order in which the ice cups melt by checking frequently.

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Name: _____ 65

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

Observations

Fill in the table below as you complete the experiment.

Step	What Happened – Which is melting the fastest? Slowest?
After 10 Minutes	
After 30 Minutes	
After 1	
Afte all ed	

PREVIEW

Results

Answer t earch ow that you have completed the experiment.

1) What surprised you abou lts? u get wrong from your hypothesis?

2) Why do you think the cold water melted the ice cup fas he t w untreated (control)?

3) Why do people use salt on their driveway or steps in the winter to melt the snow or ice? Why don't they use hot water?

Name: _____ 67

Curriculum Connection
C2.3

Sublimation

What is Sublimation?

Sublimation is the process of a solid changing directly into a gas. Sublimation does not happen very often in our day-to-day lives. Only a small number of compounds can change from a solid directly to a gas. For example, carbon dioxide can transform from dry ice (frozen carbon dioxide) to carbon-dioxide gas.

Why Does Sublimation Happen?

Sublimation happens when a solid absorbs heat energy so quickly from its surroundings that it never me as it changes directly into a gas. The solid absorbs so much heat energy that the particl the solid go from being strongly attracted her to loosely attracted. The particles then begin ther and move to fill the shape of the cont ey are i

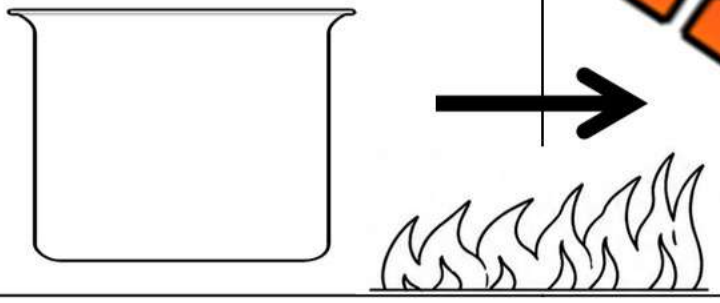


Exampl f Subli

- When snow es d into water vapour
- Freezer burn food i er turns from ice to wat
- Dry ice – frozen carb ges into carbon dioxide gas
- Mothballs – made of n e, whic ges from solid mothballs to a gas during the summer months. Su f a n take one-year.

PREVIEW

Draw Draw the particles in the s d gas t is absorbed by the solid.

Particles in a Solid	a Gas
	

Question Why does sublimation happen? Explain.

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Curriculum Connection
C2.3

Definitions

What do the terms below mean?

Sublimination	
Dry Ice	

Yes or No?

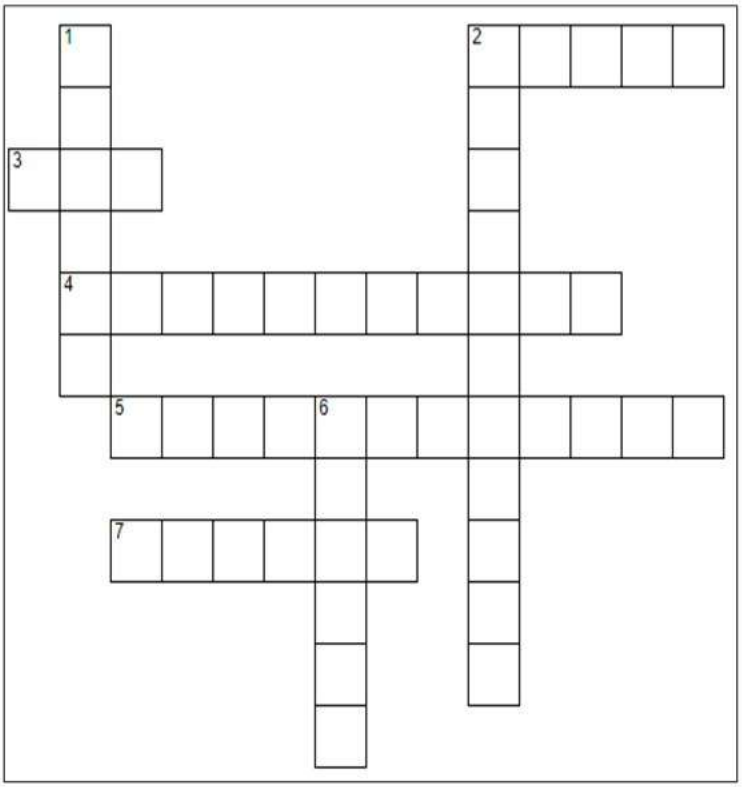
Is the scenario an example of sublimination?

1)	[illegible]	Yes	No
2)	Dry ice bre[illegible]to carbon dioxide.	Yes	No
3)	A milksh[illegible]s solid	Yes	No
4)	Ice crystals e[illegible]ate	Yes	No
5)	Ice gradually disap[illegible]without fi[illegible]ming slushy and wet.	Yes	No
6)	Your sunglasses fog up.	Yes	No

PREVIEW

Crossword

Fill in the crossword using the c[illegible]on t[illegible]t.



Across

2. First [illegible] su[illegible]a[illegible]n
3. Final stage of [illegible]
4. Matter changing fro[illegible]uid to a gas
5. Matter changing from a gas to a liquid
7. Has weight and takes up space

Down

1. Solid, Liquid, Gas
2. Process of a solid turning into a gas
6. Needed to create conditions for matter to change states

Curriculum Connection
C2.3

Exit Cards

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

Name: _____ Mark

Match each internal force to its correct definition.

Sublimation	❑ The gas form of water.
Dry Ice	❑ A change of state where a solid changes directly into a gas.
Water Vapour	❑ Energy absorbed by a solid that allows its particles to move faster.
Heat Energy	❑ Frozen carbon dioxide that changes directly into a gas.

Name: _____ Mark

Match each internal force to its correct definition.

Sublimation	❑ The gas form of water.
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Heat Energy	❑ Frozen carbon dioxide that changes directly into a gas.

PREVIEW

Name: _____ 71

Curriculum Connection
C2.3

Changes in States of Matter



When matter changes state, it goes through a process. These processes will be explored below.

Matching

Draw a line connecting the process to the definition and to its example.

TERM	DEFINITION	Example
Evaporati	When vapour or gas turns into a liquid.	Dry Ice
Condens on	When a solid turns into a id.	Frost on a leaf
Sublimation	of turning from id int r.	A cold drink has water droplets on the outside
Fusion (melting)	n a directly olid	A wet shirt is drying on a clothesline
Solidification (freezing)	When anything rns into a gas witho becoming liquid.	An ice cube tray is filled with ter and put the freezer
Deposition	When a liquid turns into a solid.	

PREVIEW

Which Process?

Which process has happened when the matter changed states?

Change of State Scenario	Process
1) The grease from the bacon in my frying pan is now thick like butter.	
2) Butter in a hot pan is now a liquid.	
3) Your glasses fog up on a cold day.	
4) Frozen vapour crystals appear on a window.	
5) A wet floor that was just mopped is now dry.	
6) A solid air freshener releases a nice smell and slowly disappears.	

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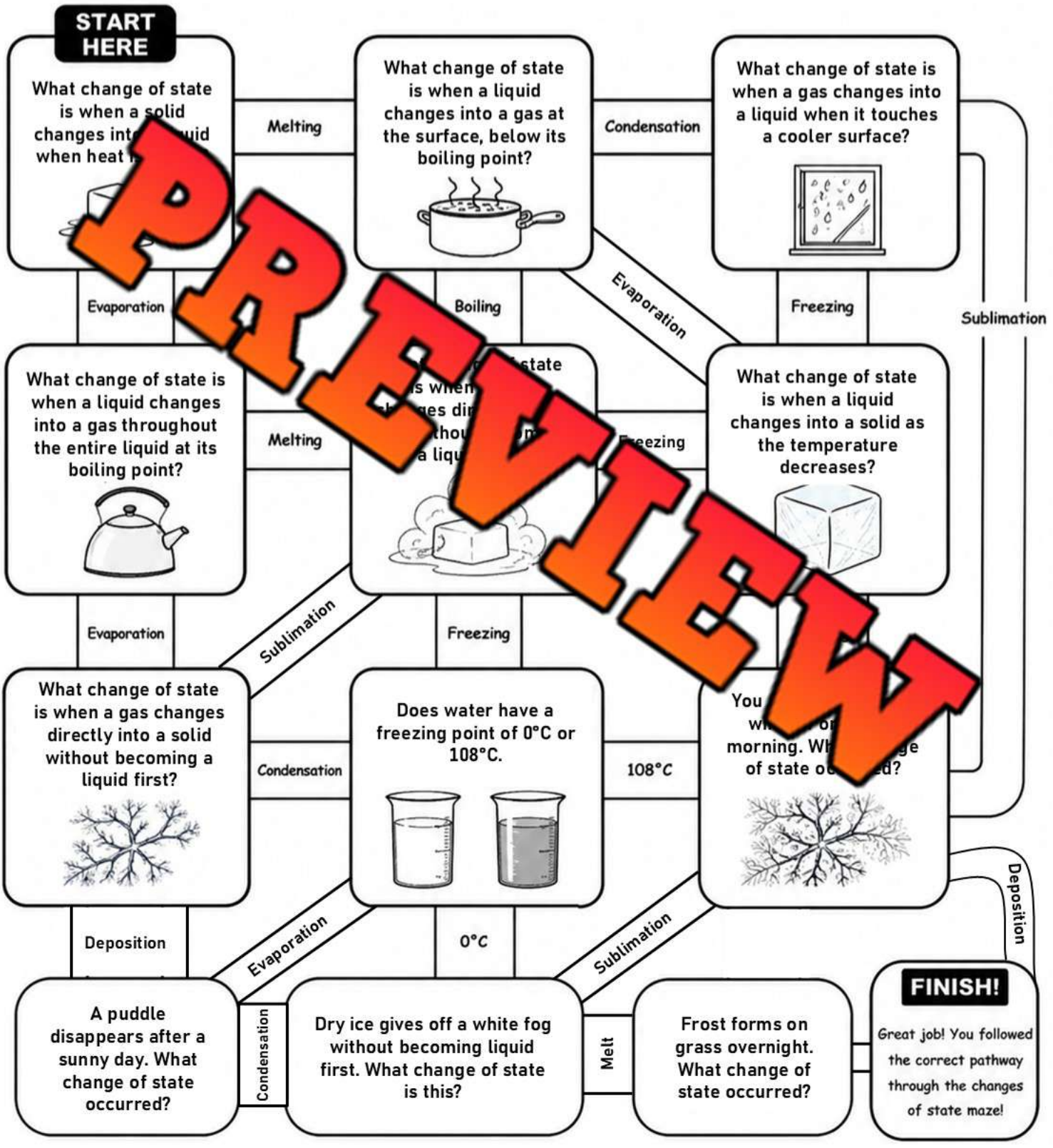
Name: _____ 72

Curriculum Connection
C2.3

Instruction	Start at the START box and follow the pathway by choosing the correct answer to each question about changes of state. Continue through the maze until you reach the FINISH box.



PREVIEW

Name: _____ 73

Curriculum Connection
C2.4, C2.6

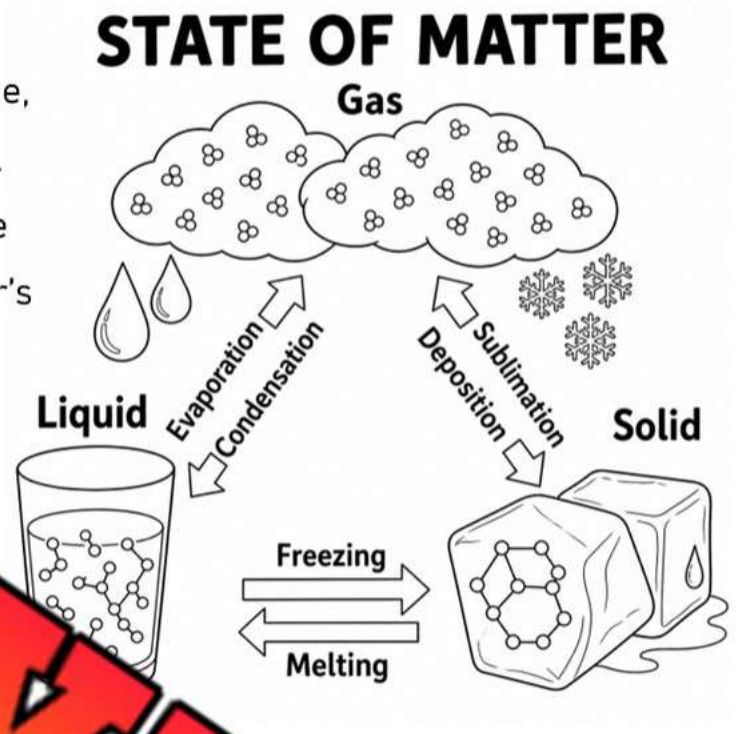
Changes in State - Physical Changes Involving Heat

Changes in State – Physical Changes

When a solid, liquid or gas changes state, they have completed a physical change. Changes in state are reversible because no new s[illegible]nce is formed. The matter's chemic[illegible] i[illegible] the exact same.

exampl[illegible] has the chemical mak[illegible]oge[illegible]d oxygen (H_2O).

It does not matt[illegible]ater is in liquid form, gas form, [illegible] form, it still has the same chemical [illegible] of H[illegible]



PREVIEW

Changes in State Involve Heat

When matter changes state, it can be reverse[illegible]ad[illegible]g heat. When matter absorbs heat, it could undergo t[illegible]ss o[illegible] evaporation, melting (fusion), or sublimation.

When matter releases heat, it could undergo the process[illegible] freezing (solidification), condensation or deposition.

Heat changes the particles in matter by changing the attractions between particles. When heat is absorbed by matter, the particles in the matter lose attraction and begin to move faster. They collide with each other and spread out, changing the state to a liquid or a gas.

When heat is released by matter, the particles in the matter gain attraction and get closer together. If enough heat is released, the particles may slow down and begin to vibrate instead of move, causing a change of state to a solid.

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Name: _____ 74

Curriculum Connection
C2.4, C2.6

Matter and Heat

How is heat affecting the matter below?

Matter	Heat	New State of Matter?	Particles Movement – Circle One		
Water	Absorbed		Vibrate	Slow	Fast
Water	Released		Vibrate	Slow	Fast
Ice	Absorbed		Vibrate	Slow	Fast
Vapour	Released		Vibrate	Slow	Fast

Questions

Answer the questions below using evidence from the text.

1) If matter is left in the same environment (no heat added or released), will it change phases? Explain using an example.

2) What happens when heat is released by matter?

PREVIEW

Visualizing

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

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Name: _____ 76

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

Experiment – Water Cycle

Research Question How does water move through our environment?

How does the heating and cooling of water move water around our environment?

Materials What do we need?

- ✓ Lar
- ✓ r small
- ✓ Plastic w
- ✓ String or lar ber b
- ✓ Hot water – optiona ou can u water as well
- ✓ Ice Cubes - optional



Method How do we complete the experimen

1) Place the cup or mug in the middle of the bowl.
2) Fill the bowl with hot water about 2/3 of the way up. Do n t side the cup.
3) Cover the bowl with the plastic wrap. Wrap the elastic or use the string to secure the plastic to the top of the bowl.
4) Place a few ice cubes on the plastic wrap above the cup.
5) If you used cold water, put the bowl in the sun for a couple of hours.
6) If you used hot water, you should see condensation clinging to the plastic wrap.
7) Label the diagram on the next page.

PREVIEW

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

Diagram Label the diagram using the word bank.

Precipitation	Condensation	Collection	Evaporation



PREVIEW

Results Label the stages of the water cycle below.

The water that is in the cup	
When the water went up to the top of the bowl	
When the water stuck to the plastic wrap	
When the water fell from the plastic wrap	

Name: _____ 85

Curriculum Connection
C2.4, C2.5

Chemical Vs Physical Change

Physical Changes

A **physical change** happens when matter changes its appearance. If you take a piece of paper and rip it in half, the paper has been physically changed. It simply looks different. A physical change is reversible as a new substance is not formed. You could tape or glue the paper back together and reverse the change. A chemical change on the other hand, is irreversible.

Chemical Changes

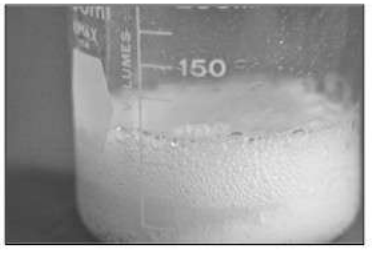
In a **chemical change,** the atoms in the matter connect differently to form a new substance with different characteristics than the original matter. When you mix Kool-Aid with water, it is a chemical change because the atoms in the Kool-Aid connect with the water to change the matter completely. The changed matter is now a new substance.

We know if a chemical change has occurred if any of these five signs have happened:

Colour Change	New Smell	Change in Temperature
Gas has Formed		Solid has Formed

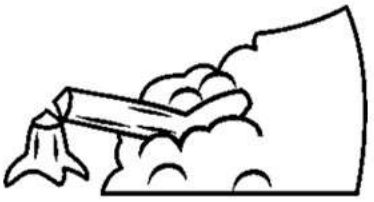
Examples of Chemical Changes

Rust is an example of a chemical change because a new substance occurs and the change is irreversible. **Rusting** is also called **oxidation** as the process where metal reacts with oxygen in the air as well as moisture in the air. The combination of metal, air, and water produces a new substance called **rust.** The equation for rust is: iron + oxygen + water.



Another example of a chemical change is when we mix baking soda with vinegar. The sodium bicarbonate (baking soda) reacts with the acetic acid and water (vinegar) which produces carbon dioxide that we can see in the form of bubbles releasing into the air. You may also smell the new substance, which tells us a chemical reaction has happened.

PREVIEW



Physical Change
The tree has not changed it has just been broken into two pieces. This change can be reversed.



Chemical Change
The wood has been chemically changed because it is turning into ashes. You cannot turn the ashes back into wood.

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Name: _____ 86

Curriculum Connection
C2.4, C2.5

Making Connections

What does the reading remind you of in your life?

True or False

Circle whether the statement is true or false.

1) A chemical change occurs when water changes to form ice.	True	False
2) A physical change is when a new substance is created.	True	False
3) A chemical change is irreversible because a new substance is formed.	True	False
4) Rust occurs when iron, air, and water combine.	True	False
5) Cutting down a tree is a physical change.	True	False

Questions

Use information from the text to support your answer.

1) What is a chemical change? Provide an example.

2) What is the difference between a chemical and physical change?

PREVIEW

Name: _____ 87

Curriculum Connection
C2.4, C2.5

Chemical Vs Physical Changes

Fill in the Blanks

Fill in the blanks using words from the word bank.

Word Bank				
Reversible	Matter	Irreversible	Chemically	Physically

A chemical change is _____, while a physical change is _____. _____ can change both _____ and _____.

PREVIEW

Physical or Chemical

Is the change a physical or chemical change?



A paper is folded in	Physical	Chemical
Batter turns into cake	Physical	Chemical
A glass breaks on the floor	Physical	Chemical
A can is crushed	Physical	Chemical
A fire burning wood	Physical	Chemical
Food digesting in your body	Physical	Chemical
Mixing sand and water	Physical	Chemical
A knife that is rusting	Physical	Chemical





Questions

Use information from the text to support your answer.

1) How do you know if matter has changed chemically or physically?

2) Why is salt mixing with water a physical change?

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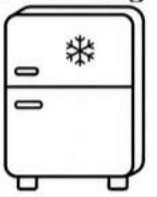
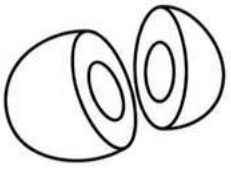
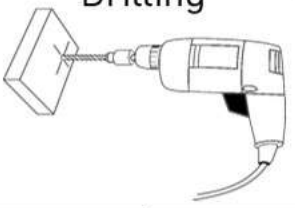
Curriculum Connection
C2.4, C2.5

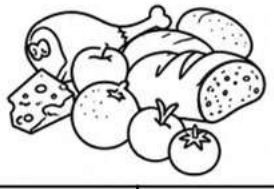
Activity – Physical or Chemical Change

Directions Is the picture showing a chemical or physical change?

Cutting Hair	Burning	Boiling
		
Physical / Chemical	Physical / Chemical	Physical / Chemical

Chopping	Baking	Freezing
		
Physical / Chemical	Physical / Chemical	Physical / Chemical

Boiled Egg	Drilling	Sewing
		
Physical / Chemical	Physical / Chemical	Physical / Chemical

Rotting Food	Fireworks	Mixing
		
Physical / Chemical	Physical / Chemical	Physical / Chemical

PREVIEW

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Name: _____ 90

Curriculum Connection
C2.4, C2.5

Experiment – Whipping Cream Physical Change

Research Question Is making whipped cream a physical change?

If we mix and stir whipping cream, will the cream change? Will it be a chemical or physical change?

Hypothesis What will happen? Made a prediction.

	Hypothesis – Prediction
1) What will happen when the cream is mixed?	
2) Will the change be physical or chemical?	Physical Chemical

Materials What will you need for the experiment?

- A glass jar with a lid
- Whipping cream
- Stopwatch, clock



Procedure How will you complete the experiment?

1) Fill the jar about half full of whipping cream
2) Check the time and begin to shake the jar. Pass it around to students, letting them have a turn to shake the jar.
3) Continue shaking the jar until changes begin to happen to the whipping cream. When whipped cream is made, fill in the observations on the back of the page, noting how long it took for the whipping cream to change into whipped cream.
4) Continue shaking the jar until the cream changes into butter. Note how long it took.

PREVIEW

Name: _____ 91

Curriculum Connection
C2.4, C2.5

Observations | What happened?

Changes	Time – How Long	Chemical or Physical Change?
To Make Whipped Cream		Chemical Physical
To Make Butter		Chemical Physical

What cha happened to the whipping cream?

Results | Answer

1) Do you think these change ph mical? Explain your thoughts.

2) Draw a diagram of the experiment. Draw the jar, whipping cream, and someone shaking it.

PREVIEW

Name: _____ 93 Curriculum Connection C2.5

Evidence of a Chemical Change

Evidence of a Chemical Change
It can sometimes be difficult to tell if a substance has undergone a chemical change. We can use the signs below to help us tell if a chemical change has occurred.

1) Colour Change
If matter h[illegible] changed colour, it may have undergone a chemical change. For example, [illegible] bike that begins to rust will have orange spots on it. This change from gre[illegible]nge tells us a chemical change has happened.
[illegible]ring to water is **not** a chemical change. Although the water has [illegible]ed colo[illegible] actually reverse the change if we boil the water and collect the wate[illegible]ro[illegible]h the process of condensation.



2) Change in [illegible]
When we can smell [illegible]ffe[illegible] matter, we know a chemical change has [illegible]ed. This [illegible]s often with food as it begins to spoil. Rotten milk will have a diff[illegible]hel[illegible] milk. This tells us that the milk has undergone an irreversible [illegible]emi[illegible]ge.

3) Change in Temperature
When matter changes its temperature, we k[illegible] chem[illegible]e has happened. A common example of this is when we burn w[illegible] The[illegible]m temperature before it is on fire, but once on fire, it [illegible]ch ho[illegible]mperature! Another example would be fireworks. When you buy [illegible]orl[illegible] be room temperature, but when you shoot it off, it will be ho[illegible]o to [illegible] lands.



4) Formation of a Precipitate
A solid is known as a precipitate. If matter begins to form a solid inside, we know a chemical change may have occurred. Remember the rotten milk from above? Spoiled milk will form solid chunks in it. These chunks are precipitates, and they tell us a chemical change has happened. This process is irreversible, so it is time to get rid of the milk!



5) Formation of a Gas
Gas bubbles will appear when some chemical changes happen. When we mix vinegar and baking soda, a new mixture will form and begin to foam up with carbon dioxide gas. Another example is that delicious cake that has tiny holes in it when you cut into it.

PREVIEW

Name: _____ 94

Curriculum Connection
C2.5

Making Connections

When have you seen each of the signs of chemical changes?

Sign	Your Experience – Example: a loaf of bread turned green and smelled bad
New Odour	
Temperature Change	
New Colo	
Gas es	
New Precipitate(s)	

True or False

Circle whet tat e or false.

1) Adding food colouring to water is a l chan	True	False
2) Cookies that come out of the oven hot have ch chem	True	False
3) When matter shows one of the 5 signs, it has t ch	True	False
4) When leaves change colour, they have changed chen	True	False
5) Adding chunks of clay to water is a chemical change beca precipitate has formed.	Tr	alse

Questions

Use information from the text to support your answer.

A muffin that was just baked is a chemical change. Explain why using 4 of the 5 signs.

PREVIEW

Curriculum Connection
C2.5

Exit Cards

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

Name: _____

Fill in the blanks using the word bank.

Colour change	Odour	Mark
Gas	Precipitate	

1) A new _____ may be produced when vinegar and baking soda react.
2) Rust forming on iron is an example of a _____ that shows chemical change.
3) Rotten milk has a different _____ than fresh milk.
4) Solid chunks that form during a chemical reaction are called a _____.

Name: _____

Fill in the blanks using the word bank.

Colour change	Odour	Mark
Gas	Precipitate	

1) A new _____ may be produced when vinegar and baking soda react.
2) Rust forming on iron is an example of a _____ that shows chemical change.
3) Rotten milk has a different _____ than fresh milk.
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Name: _____

Fill in the blanks using the word bank.

Colour change	Odour	Mark
Gas	Precipitate	

1) A new _____ may be produced when vinegar and baking soda react.
2) Rust forming on iron is an example of a _____ that shows chemical change.
3) Rotten milk has a different _____ than fresh milk.
4) Solid chunks that form during a chemical reaction are called a _____.

Name: _____

Fill in the blanks using the word bank.

Colour change	Odour	Mark
Gas	Precipitate	

1) A new _____ may be produced when vinegar and baking soda react.
2) Rust forming on iron is an example of a _____ that shows chemical change.
3) Rotten milk has a different _____ than fresh milk.
4) Solid chunks that form during a chemical reaction are called a _____.

PREVIEW

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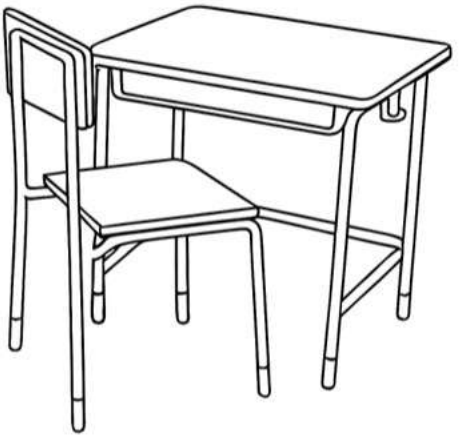
Name: _____ 104

Curriculum Connection
C2.2, C2.7

Using Solids - Real-World Applications

Properties of Solids



Solids have the following general properties:

- Rigid
- Fixed shape
- Fixed volume
- Cannot be compressed (squashed)

Applications of Solids

Solids are used in the structures we have in our lives. We use solids because they are rigid, have a fixed shape and volume, and they cannot be squashed.

Solids are **rigid,** meaning they have a certain structure that will not change shape. Solids are great to build structures need to be strong. A chair is made of rigid solids, like wood, steel, and plastic.

Having a **fixed shape** means the solid will not change shape when you move it or apply pressure to it. A **fixed volume** means it takes up the same amount of space. A desk has a fixed shape that does not change its volume. This is helpful so you can work on the desk and know it won't change its shape. Your teacher appreciates that it has a fixed volume, meaning it won't expand or grow!

Solids cannot be **compressed**, meaning you can't squeeze them. If you're thinking a sponge is a solid that you can squeeze, your misunderstanding that the solid has air inside that you are squeezing.



Solids need to be strong and stable, which is why it is good they can't be compressed. If the road vehicles drive on compressed under heavy loads, the road would eventually be very thin. A thin road would crumble under the changing weather and heavy loads.

PREVIEW

Name: _____ 105

Curriculum Connection
C2.2, C2.7

Making Connections

What does this remind you of in your life?

Questions

Ans[illegible] using evidence from the text.

1) What are the 4 pr[illegible]

2) How would life be different if solids were no[illegible] a fixed shape?

PREVIEW

True Or False

Is the statement true or false?

1) Solids have no fixed volume and can grow to take up more space.	True	False
2) Solids are rigid, meaning they have a certain structure.	True	False
3) Solids do not change shape easily but will under strong forces.	True	False
4) Solids can be compressed because a sponge can be compressed.	True	False
5) A road is made of solids that cannot be compressed.	True	False

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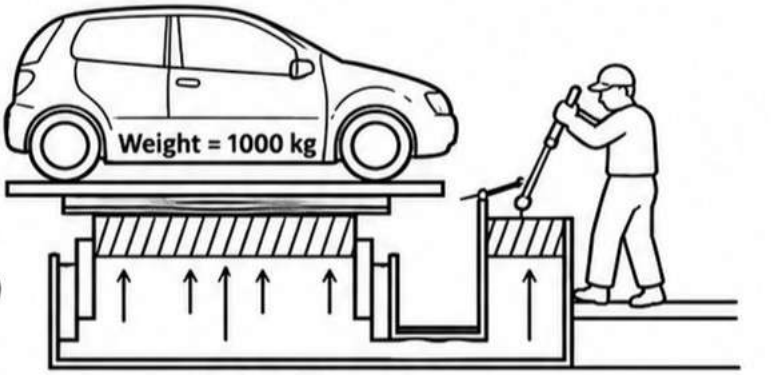
Using Liquids – Real-World Applications

Properties of Liquids

- Not rigid
- No fixed shape
- Fixed volume
- Canno[illegible]mpressed (squashed)



hydraulic crane

Appl[illegible]Liq[illegible]

Liquids a[illegible]e used [illegible]y of ways in our lives because of their properties.

1) We use liq[illegible]brica[illegible]s so that friction doesn't cause the engine to seize. Oil is the [illegible]o engines. The liquid oil can change its shape to fit into all a[illegible]e e[illegible]ring parts do not rub together.

2) Liquids are used in hydraulic sy[illegible] to gen[illegible]ng forces. Liquids cannot be compressed, so when a piston pushe[illegible]liquid[illegible]id pushes a piston on the other side of the hydraulic system w[illegible] transmits our force from one place to another.

When we use a smaller piston to move a larger piston, our force is multiplied, allowing us to generate more force.



Hydraulic brakes use our force on the brake pedal to stop the wheels on our tires.

3) Liquids have a fixed volume, meaning they will take up the same amount of space regardless of how you position the liquid. When you fill your bottle with water, you can move the bottle around and the liquid will not expand or condense. It will continue to take up the exact same amount of space.

PREVIEW

Name: _____ 108

Curriculum Connection
C2.2, C2.7

Questions Answer the questions below using evidence from the text.

1) What are the 4 properties of a liquid?

2) How do hydraulic system use liquids to generate force?

PREVIEW

Visualizing Draw what you ctu w u were reading. Explain the picture.

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

1) A hydraulic system needs liquids to be compressible.	True	False
2) A hydraulic system transmits force from one place to another.	True	False
3) A backhoe uses hydraulic systems.	True	False
4) Liquids have a fixed volume that doesn't grow or shrink.	True	False
5) If you shake a water bottle, the water will expand and pop the bottle.	True	False

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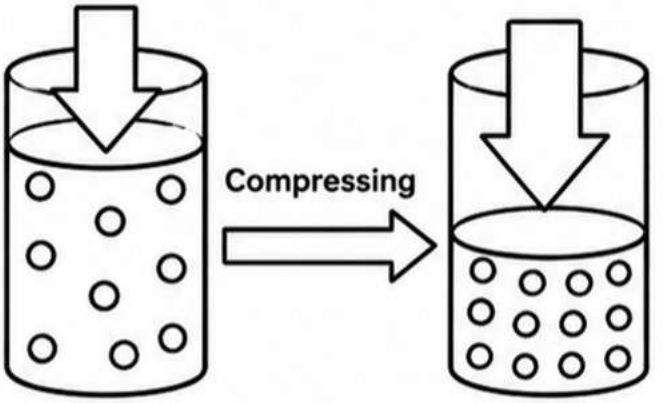
Name: _____ 109

Curriculum Connection
C2.1, C2.7

Using Gases – Real-World Applications

Properties of Liquids

- Not rigid
- No fixed shape
- No fixed volume
- Can be compressed (squashed)



Compressed Gas

Gases can be compressed which allows humans to use them to their advantage.

Compressed gas is a gas that has had its pressure increased by the reduction of its volume. Compressed gas is stored in strong containers that can support the pressure created by the squishing of the volume of the gas.

The diagram shows how gas can be compressed so that the particles of the gas are forced to occupy a smaller volume due to the compressive forces. Gas can be compressed because its particles are spread out. When compressed gas is stored, it will create a force when it is released as the particles will move quickly to expand all over their new container.



Applications of Gases

- <u>Carbon Dioxide in Soda</u> – Carbon dioxide is compressed inside soda cans to give the delicious acidic flavour and fizz. It is stored inside a can and not a juice box because the can is able to hold the compressed gas. When you open the can, the carbon dioxide gas rushes out.
- <u>Hairspray</u> – Gas is compressed in hairspray bottles. It is mixed with the hairspray product. When you push the button, the gas rushes out along with the hairspray. This is why you need to shake the bottle before pressing the button.
- <u>Air Compressor</u> – Gas is stored in a tank so that it can create a force used in nail guns, paint sprayers, and many other tools.

PREVIEW

Name: _____ 110

Curriculum Connection
C2.2, C2.7

Questions Answer the questions below using evidence from the text.

1) What are the 4 properties of a gas?

2) What i[illegible]ssed gas? How does it create a force?

3) How does a hairspray bottle use g[illegible]

PREVIEW

Making Connections What does this remind you of in your life? Writ[illegible]

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Name: _____ 111

Curriculum Connection
C2.2, C2.7

Swim Bladder - Buoyancy

The Swim Bladder - A Fish's Buoyancy Tool
The swim bladder works like a little inflatable balloon within a fish. The bladder can be filled with gas or deflated as needed.

Swim Bladder in Action

- Going Deeper: If a fish wants to go deeper into the water, it lets some gas out of its swim bladder. This increases the fish's density, making it heavier than the surrounding water, which causes it to sink.

- Rising Up: To ascend to the surface, the fish fills its swim bladder with more gas. This increases its volume, making it lighter than the water around it, and it floats up.

- Staying Level: If a fish wants to stay at the same depth, it can adjust the amount of gas in its swim bladder to match the density of the water. This way, the fish can maintain a steady position without sinking or floating.



This is the key concept of buoyancy: objects that are denser than the water will sink, and objects that are less dense will float. By adjusting its density, a fish has the ability to control its position in the water.

Fish Swim Bladders and Submarines - A Similar Technique
Just like fish, submarines also use the principle of buoyancy to move up and down in the water. Submarines have special tanks that can be filled with water or air.

- Diving: When a submarine needs to dive, it fills its tanks with water. This makes the submarine denser than the water around it, so it sinks.

- Surfacing: To rise to the surface, the submarine pumps the water out of the tanks and fills them with air. This makes the submarine less dense, and it floats to the surface.

PREVIEW

Name: _____ 112

Curriculum Connection
C2.2, C2.7

Questions Answer the questions below using evidence from the text.

1) How does a fish use a swim bladder to control its depth in water?

2) How d[illegible]arine go up and down in the water?

Diagram Draw diagrams of a fish [illegible]swim[illegible]er and a submarine with its ballast tanks. Explain the [illegible]grams.

PREVIEW

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Curriculum Connection
C2.2, C2.7

Exit Cards

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

Name: _____

Fill in the blanks using the word bank.

Gas	Buoyancy	Mark
Submarine	Density	

1) The ability of an object to float or sink in water is called _____.
2) Letting out air to sink deeper increases a fish's _____.
3) A machine that rises and sinks in water like a fish is a _____.
4) The substance inside a bladder or tank that controls floating is _____.

Name: _____

Fill in the blanks using the word bank.

Gas	Buoyancy	Mark
Submarine	Density	

1) The ability of an object to float or sink in water is called _____.
2) Letting out air to sink deeper increases a fish's _____.
3) A machine that rises and sinks in water like a fish is a _____.
4) The substance inside a bladder or tank that controls floating is _____.

Name: _____

Fill in the blanks using the word bank.

Gas	Buoyancy	Mark
Submarine	Density	

1) The ability of an object to float or sink in water is called _____.
2) Letting out air to sink deeper increases a fish's _____.
3) A machine that rises and sinks in water like a fish is a _____.
4) The substance inside a bladder or tank that controls floating is _____.

Name: _____

Fill in the blanks using the word bank.

Gas	Buoyancy	Mark
Submarine	Density	

1) The ability of an object to float or sink in water is called _____.
2) Letting out air to sink deeper increases a fish's _____.
3) A machine that rises and sinks in water like a fish is a _____.
4) The substance inside a bladder or tank that controls floating is _____.

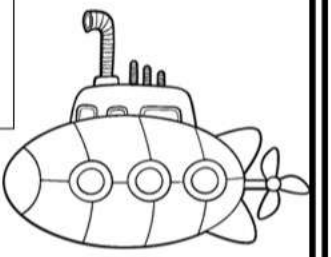
PREVIEW

Name: _____ 114

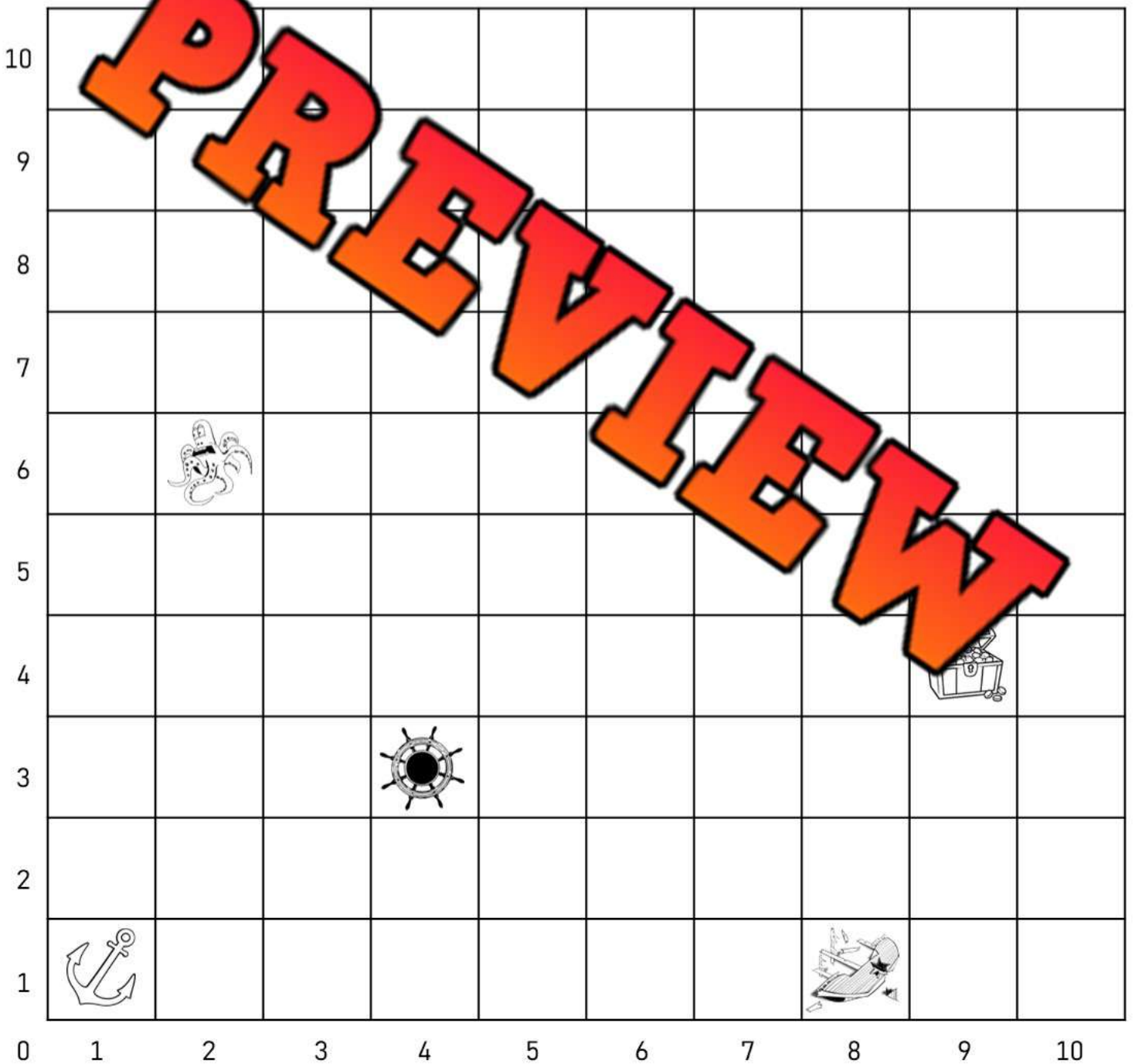
Curriculum Connection
A2.1, A2.2

Coding Activity - Submarine Adventure

Code the submarine to take pictures of the underwater objects. You will use the grid on this page to write your code on the next page. Your submarine will add water to its ballast tanks to move down and release water and add air to its tanks to move up.



Mapping Use this map to write the code on the next page.



PREVIEW

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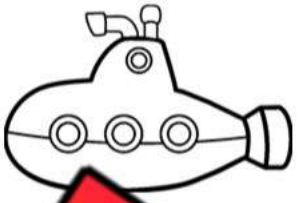
Name: _____ 115

Curriculum Connection
A2.1, A2.2

Coding Activity - Submarine Adventure

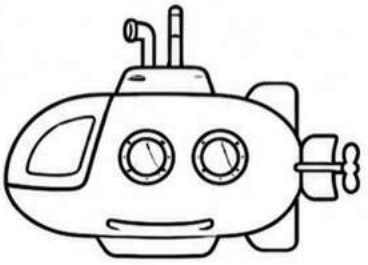
Coding Write code that gets the submarine to the different objects underwater.



Whe[illegible] to [illegible]n, you wi[illegible]ed to [illegible]e to have the s[illegible] water to its ta[illegible] nee[illegible] to release water t[illegible].

Example codes:

- Add water to tank
- Move down to (1, 1)
- Take picture of anchor



Code

PREVIEW

Question What are submarines useful for?

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Name: _____ 116

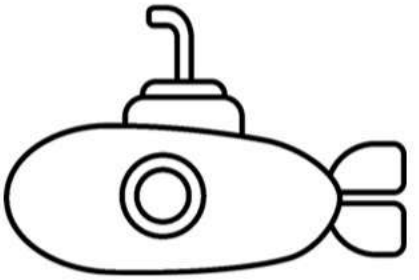
Curriculum Connection
A2.1, A2.2

STEM Assignment - Designing A Submarine

Create your own submarine that can dive deep into the ocean.

What tools does your submarine need?
- Periscope, sonar system, ballast tanks, propeller, GPS, oxygen tanks, lights, carbon dioxide scrubbers (to get rid of CO_2 we breathe out).

What is your submarine capable of doing?
- Can it [illegible] anywhere in the ocean?
- Can it [illegible] quickly?
- Can it [illegible] dark?
- Can it [illegible] on the bottom of the ocean?



What is your submarine designed to do?
- Will it search [illegible] underground?
- Will it be used [illegible] people to shipwrecks?
- Will it be used to [illegible] naval ships?

PREVIEW

Questions Answer the questions about your submarine below.

1) What is the name of your submarine?

2) What tools will your submarine have?

3) What is your submarine capable of doing?

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

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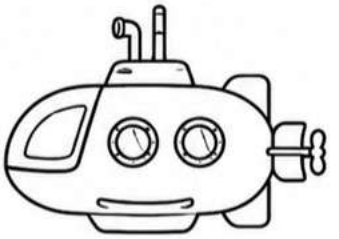
Name: _____ 117

Curriculum Connection
A2.1, A2.2

Write simple If/Then statements so that the operator of the submarine can move the sub and perform the tasks it needs to do.

IF the up arrow button is pressed

THEN release ballast water and add air



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

If

THEN

If

THEN

If

THEN

If

THEN

If

THEN

If

THEN

If

THEN

PREVIEW

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Name: _____ 120

Curriculum Connection
C2.2, C2.3, C2.7

Memory Game: Matter, States, And Properties

Objective

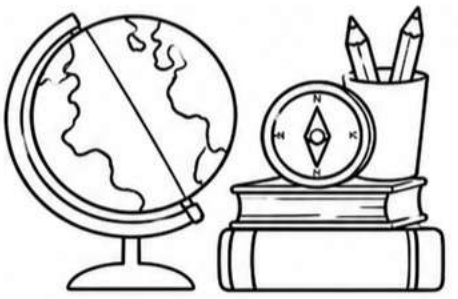
What are we learning about?

The goal of this activity is to help students understand matter, its states, and properties such as density, buoyancy, compressibility, and volume. Students will match key terms with their correct definitions or examples.

Material

What will you need for the activity?

- Memory game with terms on one set & matching definitions on the
- A flat surface like a table or the floor 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 Memory Game cards. (Provided)
2) Have each group lay all the cards face down in a grid on a table.
3) Each group takes turns flipping over two cards at a time, aiming to find matching term and 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 each term and its meaning with the class.
8) Discuss how matter and its properties like buoyancy, density, and compressibility are used in everyday life.

PREVIEW

Name: _____ 121

Curriculum Connection
C2.2, C2.3, C2.7

Cards | Memory Game Cards

Term	Definition
Buoyancy	The upward force that helps objects float.
	Has a fixed shape and volume.
Air Compressor	...ach... ...t stores and ...ea... ...ssed air.
Density	How tightly ma...er is packed into a space.
Oxygen	The gas we breathe in to live.

PREVIEW

Name: _____ 122

Curriculum Connection
C2.2, C2.3, C2.7

Cards | Memory Game Cards

Term	Definition
Condensation	When a gas cools and changes into a liquid.
Hy[illegible]lics	The use of liquid pressure to move or lift objects.
Matter	[illegible] has mass [illegible] space.
Carbon Dioxide	A gas people br[illegible]e out that plants use to make food.
Compressibility	How much a substance can be squeezed or squished.

PREVIEW

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Name: _____ 123

Curriculum Connection
C2.2, C2.3, C2.7

Cards | Memory Game Cards

Term	Definition
Swim Bladder	A gas-filled organ that helps fish float or sink.
[illegible]ne	The amount of space an object takes up.
Liquid	Has [illegible]ed volume but [illegible] shape [illegible] con[illegible]r.
Nitrogen	The main gas [illegible] air, about 78 percent.
Evaporation	When a liquid turns into a gas.

PREVIEW

Name: _____ 124

Curriculum Connection
C2.2, C2.3, C2.7

Cards | Memory Game Cards

Term	Definition
Gas	Has no fixed shape or volume and spreads out easily.
	A mixture of gases surrounding the Earth.
Mass	ne a t of matter p st.
Water Pressure	The force water pu nes with when moved or squeezed.
Atom	The smallest particle that makes up all matter.

PREVIEW

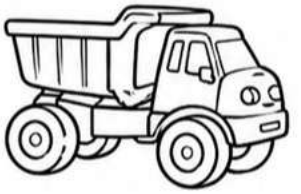
Name: _____ 129

Curriculum Connection
C1.2

Chemical Change – Making Plastic

How is Plastic Made?

Plastic is a very important material that is used to make many objects in our lives. To make plastic, chemical changes are made to different materials.



How Plastic Is Made

1) Oil is [illegible]ed from the ground.
2) The o[illegible]ed, making a new chemical called naphtha (NAP-THA).
3) O[illegible] mixed with naphtha to make plastic.
4) Th[illegible]stic is [illegible] a liquid.
5) Dyes are [illegible] liqu[illegible]tic to change the colour.
6) The liquid is po[illegible]into [illegible]akes shapes with the plastic.



PREVIEW

Questions Answer the que[illegible]bel[illegible]

1) Summarize how plastic is made in[illegible]own w[illegible]

2) Look around, what plastic things do you see?

Yes/No Is the answer yes or no?

1) Is making plastic a chemical change?	Yes	No
2) When oil is pulled out of the ground, is the oil changed chemically?	Yes	No
3) When the oil is heated, is it a physical change?	Yes	No
4) When the liquid plastic is poured into a form, is it changed chemically?	Yes	No
5) When the plastic is melted, is it changed physically?	Yes	No

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Curriculum Connection
C1.2

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 facts.

- ☐ Heating oil is one step of making plastic.
- ☐ Plastic is made directly from water.
- ☐ Making plastic is a chemical change.
- ☐ Melting plastic into a liquid is a physical change.
- ☐ Plastic is poured into a mould to give it a shape.
- ☐ Melted plastic creates a new substance.
- ☐ Oil is taken from underground before it is used to make plastic.
- ☐ Adding dye changes the colour of the plastic.
- ☐ Plastic can be made without any chemicals.

Name: _____ Mark

Check only the facts.

- ☐ Heating oil is one step of making plastic.
- ☐ Plastic is made directly from water.
- ☐ Making plastic is a chemical change.
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Name: _____ Mark

Check only the facts.

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Name: _____ Mark

Check only the facts.

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- ☐ Plastic can be made without any chemicals.

PREVIEW

Name: _____ 134

Curriculum Connection
C1.2

Types of Packaging

Different Types of Packaging Materials
Almost everything we buy comes in a package. Food, toys, electronics and more are usually wrapped in some form of package that protects the product inside. The problem is that all packaging is waste. This is because we don't buy the product for the packaging. The packaging is extra and unwanted. Some types of packaging are better for the environment than others. Check out the list below.



Plastic	
Advant	stic has a low cost, is durable, lasts a long time, is light-weight, and can in many different ways (shrink wrap, hard plastic covering, bottles, etc
Disadvantages	iod radable, which means it won't break down naturally. We too plastic pollution. Some plastics can leak chemicals food.

C	
Advantages	Cardboard also lo weight for people to carry. Businesses can print th on c rd. Cardboard can be easily recycled. Cardboard is odegra
Disadvantages	Cardboard isn't as durable as pla wood damaged by water (rain). Cardboard does not prote prod s well because it can be damaged (deformed) easily.

Aluminum	
Advantages	Aluminum is 100 percent recyclable. It can be repurp back in a store in as little as two months. Aluminum as the highe cle rate at 68 percent. It is also inexpensive.
Disadvantages	Aluminum is a non-renewable resource, which means when we run out of aluminum, it is gone forever. To make aluminum, a lot of energy is burned. Some research suggests that aluminum could be bad for our health.

Glass	
Advantages	Glass keeps the contents fresh. No chemicals will leech into the food or drinks. Glass can store contents for a long time. Glass is 100 percent recyclable. They can be washed and reused as well.
Disadvantages	Glass costs a lot, which means the product costs more. It can be broken easily when being moved around. If glass is not recycled, it can take up to 1 million years to fully decompose.

PREVIEW

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Name: _____ 135

Curriculum Connection
C1.2

Questions

Answer the questions below using evidence from the text.

1) What is packaging? What are the four main types of packaging?

2) Why is choosing packaging materials an important choice? Explain some of the advantages and disadvantages in your answer.

PREVIEW

Reflection

Which packaging material is the best?

True or False

Is the statement true or false?

1) Plastic is biodegradable and will break down naturally.	T	F
2) Some plastics can be harmful to eat and drink out of.	T	F
3) Cardboard is biodegradable and will break down naturally.	T	F
4) Glass is biodegradable and better for the environment.	T	F
5) All packaging needs to be recycled, especially glass, plastic, and aluminum.	T	F

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Name: _____ 137

Curriculum Connection
C1.2

Decreasing Waste – The Three R's

Decreasing Waste

We all know that waste is not good for our environment. When waste ends up in our environment, it is pollution that affects our air quality as well as our ecosystems. Plants and animals suffer when we produce too much waste. That is why we all need to work together to decrease the amount of waste we produce.

The Three

To keep th[illegible]mple, Canadians and people around the world have been learning about th[illegible]reduce, reuse, recycle. By following the three R's, we can decr[illegible]aste we produce.

PREVIEW

Reduce

We can reduc[illegible]te by [illegible]ing less. The less we buy, the less waste we will have. When w[illegible]buy t[illegible]ed to make sure we use them and try to choose packages that [illegible]recyclable. For example, buying plastic water bottles and then th[illegible]hem[illegible]kage is terrible for the environment.

We should reduce the amount [illegible] bott[illegible] purchase by buying a reusable water bottle. We can also t[illegible] consid[illegible] how many things we are buying. Sometimes we buy things we don[illegible]y ne[illegible]hen we don't use them. Most of the time, these things end up a[illegible]te.

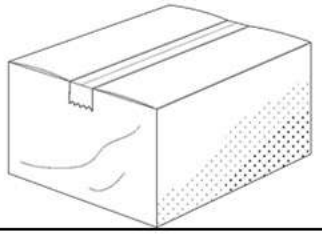


Reuse

Reusing items instead of throwing them away is another way to reduce waste. When we buy new items, we throw out our older stuff, which adds to the landfills and causes pollution. You should consider reusing or [illegible]urposing items before buying new. For example, you can reuse paper by writing on the back of a page or using scrap paper for less important things.

Recycle

Recycling is making new products out of already used materials that would have been otherwise thrown away. When we recycle materials, they are sent to factories to be sorted and eventually reused for new products. The recycled materials like plastic, cardboard, and metal are made into new products. This means those plastics, carboards, and metals never end up as waste, since they are always being used.



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Name: _____ 138

Curriculum Connection
C1.2

Questions Answer the questions below using evidence from the text.

1) What can we do to decrease the amount of waste we make?

2) Which R you think you need to work on the most?

PREVIEW

Summarize What is the ll ab marize using the important details.

True or False Is the statement true or false?

1) We need to decrease our waste to keep our environment healthy.	True	False
2) Doing the three R's will decrease the amount of waste we make.	True	False
3) We should recycle everything we are throwing away.	True	False
4) We can reduce the number of things we buy.	True	False
5) We don't need to worry about which type of package a product comes in.	True	False

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Name: _____ 139

Curriculum Connection
C1.2

Beyond The Three R's

Beyond the Three R's

Waste is a big problem and the three R's are a great start to solving it. But there is more we can do to stop how much we are wasting. We should consider the new 7 R's! Calgary is the world's cleanest city, and they do it by having their residents follow the 7 R's. Beyond the three r's, we can add 4 more – Refuse, Repair, Regift, and Recover.

PREVIEW

Refuse

The ter[illegible] all things left over after use. It is similar to waste, but wast[illegible] th[illegible]ftover that cannot be recycled. When we buy things, we should [illegible]sider [illegible]ing refuse that will be leftover after we use the item. We should as[illegible]like

- Is this produ[illegible]able [illegible]e else with less packaging?
- Do I need this pr[illegible]
- Is this product recyc[illegible]



Repair

We quite often buy new things becau[illegible] old t[illegible] have stopped working. To cut down on waste, w[illegible] should consider repairing what we already [illegible]or example, our old shoes can have new soles put [illegible] them to allow them to last longer. We could also ge[illegible] TV [illegible]ning machines fixed before buying new ones.

Regift

If we have items that we don't like anymore, we shouldn't just throw [illegible] in the trash. Instead, we can regift them to someone who will appreciate them. If you post these items for free, you will quite often find someone who will love them. This means the item did not end up in the trash and it is helping someone else.

Recover or Rot (Compost)

We need to remember that organic waste is helpful for our environment. We should never throw away food scraps, glass clippings and other organic waste because we can compost it. Composting organic waste means the waste becomes nutrient rich soil. Allowing organic waste to rot in composters is good for our environment.



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Name: _____ 140

Curriculum Connection
C1.2

Questions

Answer the questions below using evidence from the text.

1) What can we do beyond the 3 R's?

2) Does the city or town you live in have thrift shops? Can you easily regift or sell some of your old th

PREVIEW

Making Connections

What is ind you of in your life?

True or False

Is the statement true or false?

1) Letting organic material rot is good for our environment.	True	False
2) Throwing out old food is okay because it is old.	True	False
3) We can reduce waste by regifting or reselling our old stuff.	True	False
4) Refuse is only the leftover waste that can't be recycled.	True	False
5) You can repair your old things, so you don't have to throw them away.	True	False

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Name: _____ 143

Curriculum Connection
C1.1, C1.2

Rate the Impact

Many product we use every day are made by people (manufactured). Some products have a bigger impact on the environment that others.



- ★ Look at each product in the table.
- ★ Rate its environmental impact from 1 to 5 stars.
- ★ 1 star = low impact (better for the environment)
- ★ 5 stars = high impact (worse for the environment)
- ★ Shade stars to show your rating.
- ★ Write a sentence to explain why you gave that rating.

PREVIEW

Product	Rate the Impact	Explain your Rating
Glass Jar	☆☆☆☆☆	
Plastic Bag	☆☆☆☆☆	
Aluminum Can	☆☆☆☆☆	
Paper Notebook	☆☆☆☆☆	
Rubber tire	☆☆☆☆☆	
Cotton T-shirt	☆☆☆☆☆	
Plastic water Bottle	☆☆☆☆☆	

Think More! Which product has the highest impact? Which has the lowest? Why?

_____

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Name: _____ 144

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

Coding – Supercomputers Predicting Weather

A **meteorologist** is someone who studies the air to predict the weather. Meteorologists use the temperatures of the air as well as the air movement to predict if it will rain, snow, or storm.



Meteorologists need data to make their predictions. They get their data from satellites in the sky. These satellites move around the Earth, taking pictures and tracking the movement of air.

On l upercomputers used by meteorologists can process quadrillions of calculatio cond. The data from the satellites is automatically sent to these compute cial sets of code. The supercomputers make models of what the weat t meteorologists can study them. All of this is possible becaus compu hat tell the technology what to do.

PREVIEW

Fill in the Blanks e wo ds to fill in the blanks.

W				
models	coding		data	weather

1) A meteorologist is someone who studi _____.
2) Meteorologists can predict the _____
3) Satellites collect _____ fro e in
4) Supercomputers make _____ of what the w the ook like.
5) We wouldn't be able to predict the weather without _____.

Directions Read the if statement and come up with your own then statement.

1)	If it is cold outside	then	
2)	If it is going to rain today	then	
3)	If it is going to snow today	then	
4)	If there is lightning today	then	

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Name: _____ 145

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

Investigate – Local Weather

Weather Reports
A weather report is a prediction of what the skies will bring to an area. The weather report uses tools and data to measure the air pressure, wind speed, and movement of weather fronts.

The data from these tools give meteorologists the ability to make strong predictions of the upcoming weather. The weather report predicts the short-term forecast (u[illegible]ally 36 hours) with a higher accuracy than the 14-day forecast.

Weather [illegible]formation about your local weather.

Weather [illegible]ts	Information
Tem[illegible]e	
Relative Hu[illegible]dity	
Wind Speed and Dire[illegible]	
Probability of Precipitation (P[illegible]P)	
Type of Precipitation	
Sunny/Cloudy?	



PREVIEW

Questions Answer the questions below.

1) How does the weather look for the next couple of days?

_____

_____

_____

2) Is there any extreme weather coming in the next 14 days – snowstorms or lightning?

_____

_____

_____

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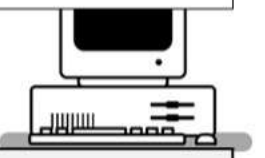
Name: _____ 147

Curriculum Connection
A2.1

Writing Code – Weather Reports

When data is collected from supercomputers, codes are used to display predictions about the weather. Check out the example below.

Input	Output
dark clouds full of rain are coming	It will rain today
winds are strong, over 100 kph	It will be windy and a tornado is possible
the temp is 2° C	The temperature is cool, almost freezing



Coding Write the output code that goes with the inputted data.

Input	Outputs
There are no clouds in the	
The wind is 0kph	
The temperature is 25° C	

Input	Outputs
Lightning clouds are on the way	
The wind is weak at 5kph	
The temperature is 20° C	

Input	Outputs
Clouds full of water are coming	
The wind is 15kph	
The temperature is -30° C	

PREVIEW

Name: _____ 148

Curriculum Connection
A2.1

Coding: Storing Data – Weather Forecast

When we write code, we sometimes need to store data to be used later. We can store the data and name it a variable. A **variable** is a quantity that changes. We can use letters or words to represent the changing quantity.

Example – A program that collects data from a supercomputer.

```
Fetch [rainfall percentage] as the variable [rain]
Display [rain] on the screen
If [rain] is greater than 50%
Then display "It will probably rain today"
```



Fetch means to find data

Coding Write your own program that collects wind, rain, and temperature data and displays it as weather forecast on the screen.

1)

2)

3)

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Name: _____ 149

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

If/Else Statements – Predicting Weather

When precipitation is expected, the precipitation can take the form of rain, snow, sleet or freezing rain. An if statement could be used to display which type of precipitation will fall.

Reminder:

- **Rain** – starts as snow and melts in warm air and stays melted (liquid)
- **Freezing rain** - starts as snow and then melts in warm air and refreezes on the ground because it is frozen
- **Sleet** – starts as snow and melts in warm air and then refreezes before reaches the groun
- **Snow** as snow and stays frozen



Direction plays which type of weather is coming. Write he The s that would follow the If statements.

1) IF the snow s on t

THEN display, "

2) IF the snow melts and stays melted

3) IF the snow stays frozen

4) IF the snow melts and then refreezes before reaching the grou

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Directions Draw one screen of the app displaying one of the then statements above



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Name: _____ 150

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

Coding – Excavator Hydraulic System

An excavator operator uses a control pad to move the boom and the bucket around. The boom is the long arm that the bucket attaches to. The boom moves left, right, up and down. The bucket moves up and down only.

Together, the boom and bucket allow the excavator to lift up to 5,000 kg (over 10,000 lbs). Hydraulic systems use liquids to generate more force to lift these massive loads.



To co[illegible]ol the control pad, coding is used. If the operator moves the [illegible]k left, then the boom moves to the left. If the operator [illegible]e bucket down, then the bucket moves down and d[illegible]d.

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Directions W[illegible] get [illegible]h done.

1) The operator sees a [illegible] to the[illegible] They need to lower the bucket and then scoop it up and then dump [illegible]here [illegible]d.

Turn boom _____

Move bucket _____

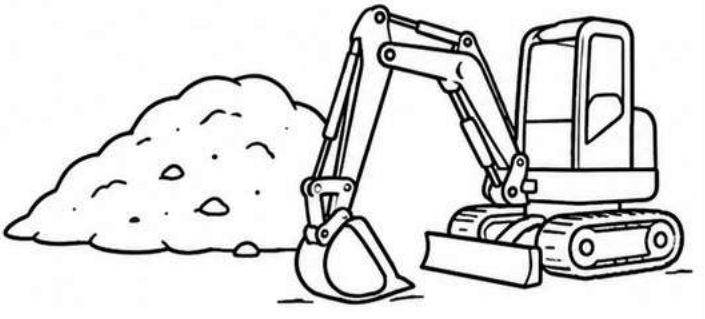
Move bucket _____

Turn boom _____

Move bucket _____



2) The operator needs to pick up dirt from their right this time. The bucket is lowered already, so they just need to scoop up the dirt and then dump it back where they started.



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Name: _____ 151

Curriculum Connection
A2.1

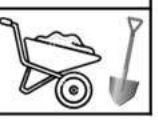
If Then Conditional Statements – Activity

Directions Follow the if/then statements to move the backhoe to the job site.

1)	If matter can only be a liquid or solid	then	Move down 3 spots
2)	If the particles in solids are tightly packed	then	Move right 4 spots
3)	If a takes the shape of its container	then	Move down 3 spots
4)	If kes the shape of its container	then	Move right 4 spots
5)	zin of water is 10 degrees C	then	Move down 3 spots
6)	If chemi s r rsible	then	Move left 5 spots
7)	If cutting tree is change	then	Move right 4 spots
8)	If a new odour i a phys nge	then	Move down 1 spots
9)	If hydraulic systems us	then	Move up 3 spots
10)	If plastics are made from fossil	nen	Move down 4 spots

PREVIEW





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Name: _____ 155

Understanding Matter and Energy

Multiple Choice | Circle the best answer. Only choose 1 answer!

1) When glass breaks, which change occurred? a) Chemical Change b) Physical Change c) Particle d) All of	2) When water mixes with salt, which change occurred? a) Chemical Change b) Physical Change c) Particle Change d) All of the above
3) Eve g that and takes up space is... a) Particles b) Sublimation c) Matter d) Energy	4) When a solid turns to a liquid... a) Freezing b) Sublimation lting (Fusion) tion
5) When a liquid turns into a solid... a) Freezing b) Sublimation c) Melting (Fusion) d) Evaporation	6) Wh ui turns to a gas... a) nsati b) ma c) Melti d) Evaporati
7) When a gas turns into a liquid... a) Condensation b) Sublimation c) Melting (Fusion) d) Evaporation	8) Condensation hap a) water vapour suddenly s b) water droplets form a liquid c) water freezes into ice d) water heats up into a vapour
9) When a solid turns directly into a gas... a) Condensation b) Sublimation c) Melting (Fusion) d) Evaporation	10) Adding food colouring to water is a... a) Chemical Change b) Physical Change c) Particle Change d) All of the above

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Definitions

What does each term mean? (1 mark each)

Term	Definition (what does it mean)
Freezing Point	
Matter	
Chemi… Cha…	
Phys… Change	

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Short Answer

Ans… …uestio… …w – Each question is worth 2 marks

1) Do particles in a solid move faster… …er th… …particles in a liquid or a gas?

2) What happens to the particles in a solid when they a… …ted…

3) What is the difference between sublimation and deposition?

4) Explain how water goes through the 3 states of matter?

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Long Answer | Answer the questions below – Each question is worth 5 marks

1) How does heat affect matter? How does heat change matter from one state to another?
Use some of following terms in your answer:
release, absorb, matter, freeze, melt, evaporate, condense, particles, heat

2) How does the production of food affect our environment?
Use some of following terms in your answer:
processing, waste, fossil fuels, transportation, emissions, chemical/physical changes

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