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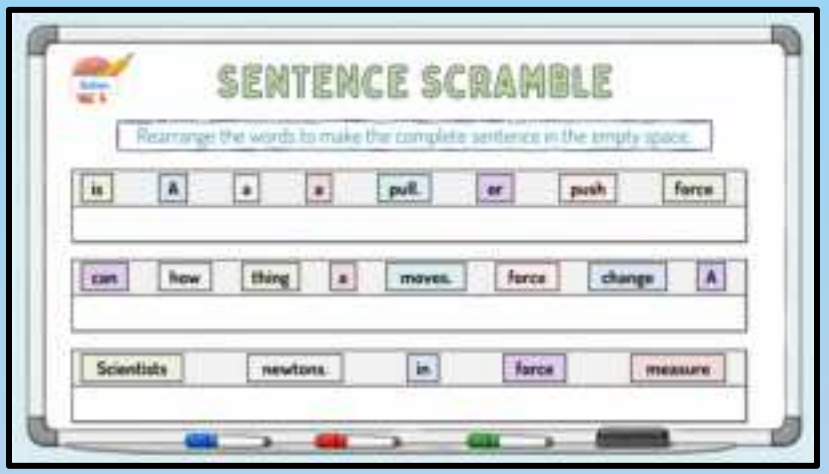
Manitoba Science Curriculum Fields– Grade 3

3-Part Lesson Format

Part 1 – Minds On!

- Learning Goals
- Discussion Questions
- Quotes
- And More!





Part 2 – Action!

- Writing
- Matching
- Drag and Drop
- Drawing
- And More!

Part 3 – Consolidation!

- Exit Cards
- Quizzes
- Reflection
- And More!



Manitoba Science Curriculum Fields– Grade 3



Manitoba Science Curriculum Fields– Grade 3



Workbook Preview

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Grade 3 Science Unit
Fields

Strands A - D		
	Curriculum Outcomes	**Pages**
SCI.3.A (Strand A)	Demonstrate an understanding of different First Nations, Métis, and Inuit ways of knowing, being, and doing in relationship with the land and the natural world by exploring Indigenous methods of observing and interpreting the world, applying scientific principles, and creating technologies within local traditional and contemporary cultural contexts (e.g., wholistic, reciprocal, interconnected, and sustainable ways; land-based learning; outdoor learning; intersections with Western science).	36-39, 63-68, 88-93, 101-103
SCI.3.B (Strand B)	Develop a sense of agency, identity, and belonging in science by • cultivating natural curiosity about the world • acquiring scientific skills and fostering scientific attitudes	6-22, 25-29, 36-96, 4-106, 0-112
SCI.3.C (Strand C)		9-35, 45, 53-73-75, 7, 107-115-118
SCI.3.D (Strand D)	**Purpose:** Science is about finding the cause or causes of phenomena in the natural world. **Method**: Scientific explanations, theories, and models are those that best fit the evidence available at a particular time. **Application**: The knowledge produced by science is used in engineering and technologies to create products and processes. **Implication**: Applications of science often have ethical, environmental, social, economic, and political implications.	25-26, 76-78, 97-100, 113-114, 119-120

Preview of 80 pages from this product that contains 176 pages total.

Strand E – Scientific Knowledge		
	Curriculum Outcomes	**Pages**
SCI.3.E.4	Demonstrate the understanding that there are contact and non-contact forces.	6-19, 30-35, 104-109
SCI.3.E.5	Demonstrate the understanding that objects can exert forces on other objects at a distance. Include the following: gravity, magnetism, static electrical force.	17-120

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FIELDS



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Curriculum Connection
SCI.3.B, SCI.3.E.A

What is a Force?

Every Force Is a Push or a Pull

A **force** is a push or a pull on an object. You use forces all day long. You **push** a door away from you to open it. You **pull** a wagon to [illegible] you to bring it along. Forces [illegible] you, even when you [illegible] ing.



What a Force [illegible]

A force can chang[illegible] w[illegible] moves. A force can also [illegible] the shape of an object. Here are [illegible] jo[illegible]

- **Start** — a shove makes a still ba[illegible]gin to r[illegible]
- **Stop** — your hands catch a flying ball a[illegible] it
- **Turn** — a tug on the handlebars turns your [illegible]
- **Change shape** — squeezing flattens a lump of cla[illegible]



Measuring How Hard

Some forces are strong and som[illegible]e gentle. Scientists measure force in units called **newtons**. One newton is a small force. Holding up an apple takes about one newton. A snow plough pushes with many thousands of newtons. Scientists use a tool called a spring scale to measure a pull in newtons. The needle moves further along the scale when the pull is stronger. Now you can name the forces you use every day.

PREVIEW

Name: _____ 7

Curriculum Connection
SCI.3.B, SCI.3.E.A

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

1) Force is measured in litres.	True	False
2) A force is a push or a pull.	True	False
3) Forces can change an object's shape.	True	False
4) Every force must be a strong one.	True	False
5) A tug o[illegible]ndlebars turns a bike.	True	False

Questio[illegible] [illegible] questions below using evidence from the text.

1) Name four [illegible]

2) Why is a spring scale more useful [illegible] guessi[illegible] a pull is?

PREVIEW

Fill in the Blank Choose the correct word from the box to complet[illegible] sentence.

force	pull	push	shape	newtons

1) A _____ is a push or a pull on an object.

2) You _____ a door away from you to open it.

3) You _____ a wagon towards you to bring it along.

4) Scientists measure how strong a force is in _____.

5) Squeezing a lump of clay changes its _____.

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Curriculum Connection
SCI.3.B, SCI.3.E.A

Exit Cards

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

Name: _____ Mark

Is it true (T) or false (F)?

1) A force is a push or pull.	T / F
2) A pull moves things away.	T / F
3) You can see every force.	T / F
4) Newtons measure force.	T / F
5) Forces can change shape.	T / F

Name: _____ Mark

Is it true (T) or false (F)?

1) A force is a push or pull.	T / F
2) A pull moves things away.	T / F
3) You can see every force.	T / F
4) Newtons measure force.	T / F
5) Forces can change shape.	T / F

Name: _____ Mark

Is it true (T) or false (F)?

1) A force is a push or pull.	T / F
2) A pull moves things away.	T / F
3) You can see every force.	T / F
4) Newtons measure force.	T / F
5) Forces can change shape.	T / F

PREVIEW

Name: _____ 9

Curriculum Connection
SCI.3.B, SCI.3.E.a

Colour Colour the pictures that show a push.





Reeling in a fish



Closing a door



Tugging a sled





Pushing a swing



Pulling a wagon



Pressing a key



Opening a drawer



Kicking a ball



Stamping a boot



Hauling on a rope

PREVIEW

Name: _____ 10

Curriculum Connection
SCI.3.B, SCI.3.E.A

Contact Forces: You Have to Touch

Forces That Need a Touch

A **contact force** is a push or a pull that only works when two things are touching. Your hand must reach the door before it swings open. The ball must meet the ball before the bat. No touch means no push and no pull.



Contact Forces in Use

You use contact forces all day without thinking about them. Every one of them needs one thing to touch another thing.

- **Kicking** — your boot meets the soccer ball
- **Lifting** — your fingers wrap around the handle of
- **Pressing** — your thumb goes down on a button
- **Pedalling** — your foot sits on the pedal of your bike



Friction Slows Things Down

Friction is a contact force that happens when two surfaces rub together. Friction works against the way a thing is moving, so it slows the thing down. A sled slides along way on smooth ice because there is very little friction. The same sled stops fast on dry gravel. Friction is helpful too. It lets your rubber boots grip a wet sidewalk, so you do not slip.

PREVIEW

Name: _____ 11

Curriculum Connection
SCI.3.B, SCI.3.E.A

Multiple Choice Circle the best answer.

1) What has to happen before a contact force can work?			
A gap opens	Things touch	Air moves	A light shines
2) Which one of these is a contact force?			
Gravity	A magnet pull	Static cling	Kicking a ball
3) What makes friction happen?			
Bright s[illegible]t	A kind of magnet	Falling water	Surfaces rubbing
4) On wh[illegible]e [illegible]uld a sled slide the furthest?			
[illegible]	[illegible]Thick grass	Smooth ice	Loose sand
5) Why do rubbe[illegible] yo[illegible]tay up on a wet sidewalk?			
They add weig[illegible]hey a[illegible]tic		They add friction	They are warm

PREVIEW

Scenario Draw yourse[illegible]onta[illegible]t school. Circle the place where two things touch. Lab[illegible]acti[illegible]or a pull.

Scenario You are pulling a heavy box over a rough carpet, and it will not slide. What should you do?

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Curriculum Connection
SCI.3.B, SCI.3.E.4

Exit Cards

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

Name: _____ Mark ☐

Match each word to its meaning.

Contact force ☐	☐ a sled slides a long way
Friction ☐	☐ two surfaces rubbing
Smooth ice ☐	☐ needs two things to touch

Name: _____ Mark ☐

Match each word to its meaning.

Contact force ☐	☐ a sled slides a long way
Friction ☐	☐ two surfaces rubbing
Smooth ice ☐	☐ needs two things to touch

Name: _____ Mark ☐

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Name: _____ Mark ☐

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Friction ☐	☐ two surfaces rubbing
Smooth ice ☐	☐ needs two things to touch

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Curriculum Connection
SCI.3.B, SCI.3.E.A

Drawing Contest - Contact Forces at Work

Objective

What are we learning about?

Students will draw a busy scene in which people and objects push and pull things by touching them. This helps students spot a contact force and name the exact spot where the two things have to touch.

Materials

What do you need for the activity?

- Drawing paper
- Pencils, erasers and colored pencils
- Reference list of drawing ideas provided
- Rulers for drawing straight arrows



Instructions

How will you complete the activity?

1) Talk about contact forces, such as kicks, lifts, pulls
2) Look at the Reference List for ideas or think of your own scene.
3) Draw your scene and circle every place where two things touch.
4) Show at least two contact forces, such as a push and a pull.
5) Add an arrow at each touching spot to show which way the force goes.
6) Be ready to explain why each force needs touching to work.
7) Display all entries and vote on categories like Best Arrows.

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Curriculum Connection
SCI.3.B, SCI.3.E.4

Reference List of drawing ideas

#	Drawing Idea
1	A player kicking a soccer ball down the field
2	A child pulling a loaded sled up a snowy hill
3	Two hands pushing a shopping cart down an aisle
4	A goalie catching a puck in a big glove
5	A d ing the other end of a rope toy
6	S a heavy door open with a shoulder
7	icy steps with rough treads
8	A hocke a across the ice
9	A hand sq a ball h flat
10	Bike brakes rub et to down
11	Two teams pulling har g-c
12	A person lifting a heavy box off t
13	A curler sweeping the ice in front a rock
14	A rake pulling fallen leaves into a tidy pi
15	Sandpaper rubbing the top of a rough board

PREVIEW

Criteria Use the criteria below to complete the activity.

Criteria	Description
Contact Shown	Every force in the drawing happens where two things are really touching.
Labels	Each touching spot is labelled with the name of the force acting there.
Arrows	An arrow shows which way each push or pull is going.
Colour and Detail	Colour and small details make the people and the objects easy to tell apart.
Explaining	The student can say out loud why each force needs touching to work.

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Curriculum Connection
SCI.3.B, SCI.3.E.A

Reflection Answer the questions below.

1) Which force in your drawing was a push, and which one was a pull?

2) Wh[illegible] your [illegible]oes friction slow something down? Explain.

PREVIEW

Word Scramble Unscramble the words from the wor[illegible]ank.

WORD BANK			
friction	touch	force	rough
pull	newton	push	contact

OERFC		UPHS	
ULPL		CTNOATC	
CIRFNOIT		NNTEWO	

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Curriculum Connection
SCI.3.B, SCI.3.E.4

Rubric How did you do on the activity?

Criteria	1 Point	2 Points	3 Points	4 Points
Contact Shown	No touching spot is shown.	One touching spot is shown.	Most touching spots are shown.	Every force starts at a touch.
Labe	Forces are not labelled.	A few forces are labelled.	Most forces are labelled.	All forces are labelled neatly.
Ar s	s are n.	Arrows point the wrong way.	Most arrows point correctly.	Every arrow shows the right way.
Colour and Detail	Litt de	Sor ur is	Colour shows most of the scene.	Colour and detail make it clear.
Explaining	Cannot explain the forces.	E ins one force	Exp most	Explains every force with a reason.

PREVIEW

Teacher Comments

_____

_____

_____

_____

ark

Student Comments – What Could You Do Better?

_____

_____

_____

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Curriculum Connection
SCI.3.B, SCI.3.E.A, SCI.3.E.5

Contact or Non-Contact?

Two Ways to Move a Ball

Case 1: The Kicked Ball

Ravi sets a soccer ball on the field and runs at it. His boot touches the ball, and the ball slides away across the grass. He can also make it move by staring at it. His friend tries to reach the ball first. A push or a pull only works when the two surfaces meet.



Case 2: The Falling Ball

Mia holds the same ball up high and lets it go. It drops to the grass with nothing touching it on the way down. Then she holds a magnet near a steel paper clip. The clip jumps across a small **gap** to the magnet. A push or a pull that works across a **distance**, with no touching at all, is a **non-contact force**.



PREVIEW

What This Teaches Us

Both cases show real forces, but the forces begin in different ways. A contact force needs the two objects to meet. A non-contact force reaches across empty space. Gravity, magnets and static electricity all work at a distance. To tell the two apart, look for a gap. If there is a gap and the object still moves, the force is a non-contact force.

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Curriculum Connection
SCI.3.B, SCI.3.E.A, SCI.3.E.5

True or False

Is the statement true or false?

1) A magnet must touch a clip to pull it.	True	False
2) A contact force needs two things to touch.	True	False
3) Gravity is a non-contact force.	True	False
4) Non-contact forces cannot cross a gap.	True	False
5) A kicked ball is moved by a contact force.	True	False

Sorting

Sort each into the correct column.

A falling bat		Gravity	Rubbing hands
Magnet pull	Pushing a c	Lifting a box	Kicking a ball

Contact Force	Non-Contact Force

PREVIEW

Making Connections

Think of a time you moved something without touching it. What did you use?

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Name: _____ 20

Curriculum Connection
SCI.3.8, SCI.3.E.5

Gravity Pulls Everything Down

A Pull You Cannot See

Gravity is a pull between **Earth** and every object near it. Gravity works without touching anything at all, so it is a non-contact force. Drop a mitten and it **falls** straight down. Earth is pulling on that mitten the whole way.

Gravity Is Always Working

Gravity never turns off and it never takes a day away. It pulls on you when you stand still and when you jump.

Here are some jobs gravity does every single day:

Makes rain fall from a cloud down to the ground.	Keeps a sled moving down a snowy hill at Mammoth Mountain Ski Area.	Keeps your feet on the floor of your classroom.	Brings a thrown ball back down to your hands.
			

PREVIEW

Weight Is a Force

Your **weight** is the pull of gravity on your body. A full backpack feels heavy because gravity pulls harder on it than on a pencil. Earth is huge, so its gravity is strong. The Moon is much smaller, so the Moon pulls with less force. On the Moon you would weigh far less than you weigh here at home, but your body would still be the same size. Weight can change, but gravity always pulls in the same direction, and that direction is down.

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Curriculum Connection
SCI.3.8, SCI.3.E.5

Two Choices

Circle the best answer.

1) Gravity is a _____ force.	pulling	pushing
2) Rain falls _____ from a cloud.	up	down
3) Gravity works across a _____.	rope	gap
4) Weight is the pull of _____ on you.	gravity	wind
5) The Mo[illegible]ull is _____ than Earth's.	weaker	stronger

Questi[illegible]

[illegible] questions below using evidence from the text.

1) Name two [illegible] p[illegible]own every day.

2) Why would you weigh less on the [illegible] than [illegible] Earth?

PREVIEW

Finish the Sentence

Complete each sentence below.

1) Gravity is called a non-contact force because...

2) I know gravity is still working when...

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Curriculum Connection
SCI.3.B, SCI.3.E.5

Exit Cards

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

Name: _____ | Mark

Underline the correct answer.

1) Gravity pulls objects down / up.

2) Gravity is a non-contact force / contact force.

3) Your weight is the pull of gravity / wind.

4) On the Moon you would weigh less / more.

Name: _____ | Mark

Underline the correct answer.

1) Gravity pulls objects down / up.

2) Gravity is a non-contact force / contact force.

3) Your weight is the pull of gravity / wind.

4) On the Moon you would weigh less / more.

Name: _____ | Mark

Underline the correct answer.

1) Gravity pulls objects down / up.

2) Gravity is a non-contact force / contact force.

3) Your weight is the pull of gravity / wind.

4) On the Moon you would weigh less / more;

Name: _____ | Mark

Underline the correct answer.

1) Gravity pulls objects down / up.

2) Gravity is a non-contact force / contact force.

3) Your weight is the pull of gravity / wind.

4) On the Moon you would weigh less / more.

PREVIEW

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Name: _____ 25

Curriculum Connection
SCI.3.B, SCI.3.D, SCI.3.E.5

Experiment – Egg Drop

Research Question

What are we learning about?

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

Material

What will you need for the experiment?

- ❑ B[illegible] per c[illegible]
- ❑ A variety o[illegible]ch straws, pap[illegible]aper, cardboard, str[illegible]ober bands, glue, etc.
- ❑ A high surface such as a stairway, a ladder, or bleach[illegible] to drop the egg from.



PREVIEW

Instruction

How will you complete the [illegible]imen[illegible]

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

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Curriculum Connection
SCI.3.B, SCI.3.D, SCI.3.E.5

Plan

Answer the questions below to plan your egg contraption.

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

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

PREVIEW

Results

What happened with your egg? Answer the questions b

1) What was pulling the egg down to the ground? Was the force stre
heights?

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

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Name: _____ 30

Curriculum Connection
SCI.3.C, SCI.3.E.4, SCI.3.E.5

Memory Game - Force and Gravity Words

Objective What are we learning about?

Students will match words about pushes, pulls and gravity with their meanings in a memory card gam This gives students the words they need to t tact force from one that reac



Materials W ee he activity?

- Memory Game ca ed)
- Scissors to cut the car
- A clear desk or floor space

Instructions How will you complete the activi

1. Divide the class into groups of 3 or 4 and give et of to each group.
2. Have each group lay all the cards face down in a grid on a sk
3. Students flip two cards at a time to find a word and its meaning.
4. If a student finds a match, they keep those two cards.
5. If the cards do not match, turn them back over and pass the turn.
6. The game carries on until every card has been matched.
7. After the game, review the force words with the class.
8. Talk about which of these forces need touching and which do not.

PREVIEW

Name: _____ 31

Curriculum Connection
SCI.3.C, SCI.3.E.4, SCI.3.E.5

Cards | Memory Game Cards

Force	A push or a pull acting on an object.
	Moving something away from your body, the way you shut a heavy door.
Pull	Br[illegible]g something nearer you[illegible]way a wagon does.
Newton	The unit we m[illegible]e forces in, name[illegible] after a famous scientist.
Contact force	It only works while two objects are pressed together, like a kick.

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Name: _____ 32

Curriculum Connection
SCI.3.C, SCI.3.E.4, SCI.3.E.5

Cards | Memory Game Cards

Non-contact force	It reaches across empty space, so nothing has to be pressed together.
	A rubbing that slows things down when two surfaces slide past.
Gravity	T…tly tug our planet …es e…bject near it.
Weight	How heavy a th…els when you ho… it in your hand.
Fall	What an object does when nothing at all holds it up.

PREVIEW

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Name: _____ 33

Curriculum Connection
SCI.3.C, SCI.3.E.4, SCI.3.E.5

Cards | Memory Game Cards

Earth	The big ball of rock and water we all live on.
	How far apart two things are, measured in centimetres or metres.
Gap	A [illegible]ween two objects [illegible]ever meet.
Drop	Letting go of a t[illegible] so it heads straight for the floor.
Stop	What a rolling ball does after enough rubbing takes its speed away.

PREVIEW

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Curriculum Connection
SCI.3.C, SCI.3.E.4, SCI.3.E.5

Cards | Memory Game Cards

Squeeze	To press soft clay between your hands until its form changes.
	To raise a heavy box off the ground with your arms.
Rough surface	A [illegible] that grips boots [illegible] sliding hard.
Smooth surface	A slippery top, [illegible] fresh ice, that lets a puck glide far.
Object	Any thing you can hold, kick or roll, such as a ball or a book.

PREVIEW

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Name: _____ 36

Curriculum Connection
SCI.3.A, SCI.3.B, SCI.3.E.5

Case Study: Stone Sinkers on Lake Winnipeg



Fishing on a Big Lake

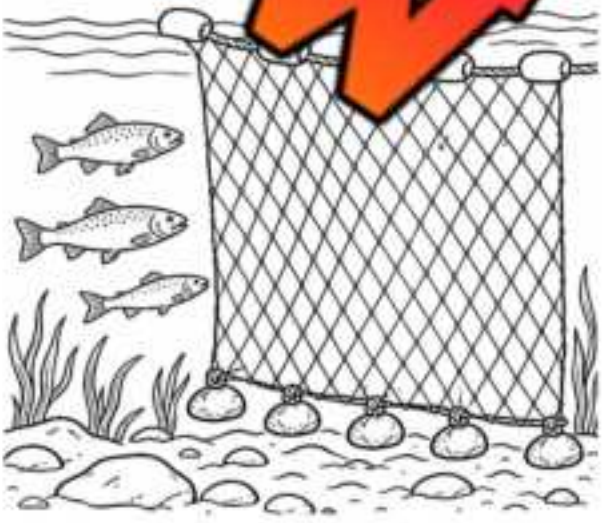
Nêhiyawak (Cree) and Anishinaabe families still set nets on Lake Winnipeg and on the Interlake lakes. A net only catches fish if it hangs open like a wall in the water. Gravity does that job, and no one has to hold the net.

PREVIEW

Weights Below, Floa[illegible]

A **sinker** is a heavy weight [illegible]g [illegible]dge of a net. Sinkers are shaped stones or lumps of lead. **Gravity**, the [illegible]wee[illegible]h and every object, tugs each sinker straight down through the water w[illegible]t to[illegible] it.

- **Sinkers** — stone or lead that gravity [illegible]down
- **Floats** — cedar or foam that the water pus[illegible]
- **Net** — the mesh wall stretched open between th[illegible]



A Wall of Mesh

Floats of cedar wood or foam are tied along the top edge. The water pushes the floats up while gravity pulls the sinkers down. The net stretches tight between them and stands open from the lake bottom toward the surface. Fishers set a net in the evening and lift it in the morning. Gravity holds the net open all night long.

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Name: _____ 37

Curriculum Connection
SCI.3.A, SCI.3.B, SCI.3.E.5

Questions

Answer the questions below.

1) How does gravity make a fishing net hang open in the water?

2) Why do[illegible]rs tie cedar or foam along the top edge of a net?

PREVIEW

True or False

Is th[illegible]t tr[illegible] false (F)?

1) Nêhiyawak families fish on L[illegible]ke W[illegible]	T	F
2) Sinkers are tied along the top edge of a net.	T	F
3) Gravity pulls a sinker down without touchi[illegible]	T	F
4) A net must hang open to catch fish.	T	F
5) Cedar floats sink to the bottom of the lake.	T	F

Sorting

Sort each part: Pulled Down or Pushed Up?

1) A stone sinker tied to the bottom edge of a net.	
2) A piece of cedar tied to the top edge of a net.	
3) A lead weight hanging deep under the water.	
4) A foam float bobbing near the surface.	
5) A rock dropped over the side of the boat.	

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Curriculum Connection
SCI.3.A, SCI.3.B, SCI.3.E.5

Exit Cards

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

Name: _____ Mark

Check (✓) only what is true.

	Gravity cannot reach through the lake water.
	Cedar floats hold the top edge of the net up.
	You must touch a sinker to make gravity pull it.
	Gravity pulls stone sinkers down to the bottom.
	Nêhiyawak families net fish on Lake Winnipeg.
	A net catches more fish when it lies folded flat.

Name: _____ Mark

Check (✓) only what is true.

	Gravity cannot reach through the lake water.
	Cedar floats hold the top edge of the net up.
	You must touch a sinker to make gravity pull it.
	Gravity pulls stone sinkers down to the bottom.
	Nêhiyawak families net fish on Lake Winnipeg.
	A net catches more fish when it lies folded flat.

Name: _____ Mark

Check (✓) only what is true.

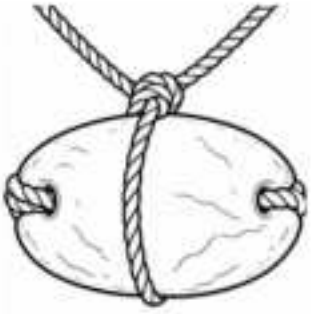
	Gravity cannot reach through the lake water.
	Cedar floats hold the top edge of the net up.
	You must touch a sinker to make gravity pull it.
	Gravity pulls stone sinkers down to the bottom.
	Nêhiyawak families net fish on Lake Winnipeg.
	A net catches more fish when it lies folded flat.

PREVIEW

Name: _____ 39

Curriculum Connection
SCI.3.A, SCI.3.B, SCI.3.E.9

Colour Colour the things that sink to the lake bottom.

	 Dry leaf	 Full glass jar
 Empty bottle	 F weight	 Dry birch bark
 Stone sinker	 Round rock	 Foam block
 Ball of wet clay	 Wooden paddle	 Steel spoon

PREVIEW

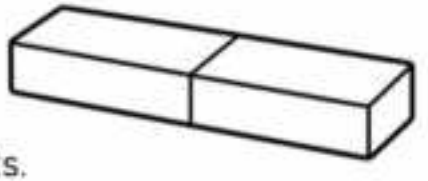
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Name: _____ 40

Curriculum Connection
SCI.3.B, SCI.3.E.5

FAQ: Your Magnet Questions

The Magnet Club — Your Questions About Magnets!



Hi there! We are the Magnet Club at school.

Here are the six questions kids ask us most about magnets.

What does a magnet actually do?

A **magnet** is an object that pulls on iron and steel without touching them. The pull crosses the gap between them. You never have to touch anything at all.

What do attract and repel mean?

Attract means to pull two magnets together. **Repel** means to push away. Two magnets may snap together, or they may shove apart. It depends which ends you hold close.

Can a magnet pull through paper?

Yes. The pull passes through paper, cloth, glass and even wood. That is why a fridge magnet holds your drawing on the door. Nothing blocks the pull.

Does a magnet pull on everything?

No. Magnets pull on **iron**, a hard grey metal, and on steel, which is made from iron. Paper, plastic, wood and water feel no pull from a magnet at all.

Can a magnet lose its strength?

Yes, but slowly. Dropping a magnet hard or heating it can shake its insides out of line. A magnet kept safely in a box stays strong for many years.

How far does a magnet reach?

Not far. A small fridge magnet works from a centimetre or two away. Slide it back and the pull fades fast. Huge magnets in machines reach much further.

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Curriculum Connection
SCI.3.8, SCI.3.E.5

True or False

Circle whether the statement is true or false.

1) Repel means to pull two magnets together.	True	False
2) A magnet can pull through a sheet of paper.	True	False
3) Heating a magnet hard can make it weaker.	True	False
4) A magnet pulls on plastic just like steel.	True	False
5) A magnet's pull fades as the gap grows.	True	False

Question

Answer the questions below using evidence from the text.

1) Name two things a magnet can pull through. Use the text.

2) Why would a magnet be no help for tidying up paper clips?

PREVIEW

Fill in the Blank

Choose the correct word from the box to complete each sentence.

repel	iron	magnet	weaker	attract

1) A _____ can pull on steel without touching it.

2) To _____ means to pull something toward you.

3) To _____ means to push something away from you.

4) Magnets pull hardest on _____ and on steel.

5) The pull grows _____ as the gap gets bigger.

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Curriculum Connection
SCI.3.B, SCI.3.E.5

Exit Cards

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

Name: _____ Mark

Circle the correct answer.

1) Attract means...	push
	pull
2) Repel means...	pull
	push
3) Magnets pull...	wood
	steel
4) Far away, pull...	weaker
	stronger

Name: _____ Mark

Circle the correct answer.

1) Attract means...	push
	pull
2) Repel means...	pull
	push
3) Magnets pull...	wood
	steel
4) Far away, pull...	weaker
	stronger

Name: _____ Mark

Circle the correct answer.

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	pull
2) Repel means...	pull
	push
3) Magnets pull...	wood
	steel
4) Far away, pull...	weaker
	stronger

Name: _____ Mark

Circle the correct answer.

1) Attract means...	push
	pull
2) Repel means...	pull
	push
3) Magnets pull...	wood
	steel
4) Far away, pull...	weaker
	stronger

PREVIEW

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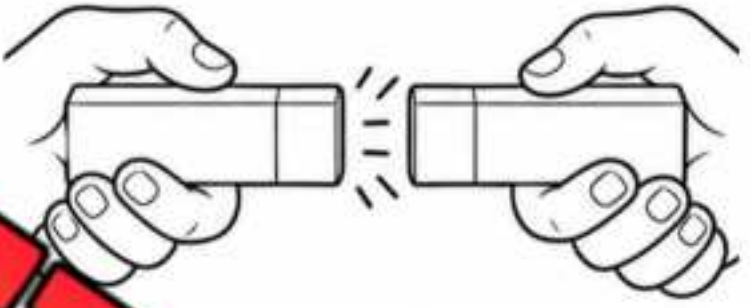
Name: _____ 46

Curriculum Connection
SCI.3.8, SCI.3.E.5

Magnetic Poles

Two Ends, Two Names

Every magnet has two ends called **poles**, the spots where the magnet pulls the hardest. One end is the **north pole,** and the other is the **south pole**. On many bar magnets the north end is painted red or marked with a letter N. The middle of a bar magnet usually pulls at all.

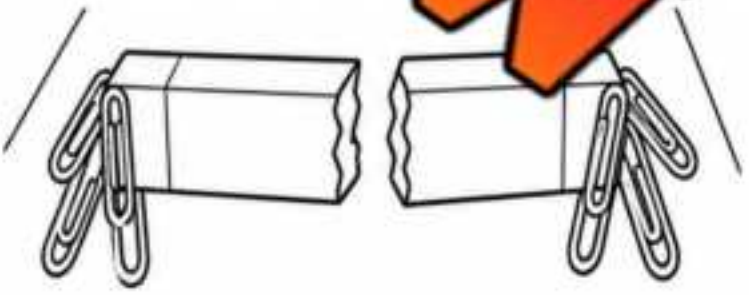


Snap Together or Push

What happens next depends on which [illegible] close.

- Two north poles repel, which means they push each other away.
- Two south poles push each other away a[illegible]
- A north pole and a south pole attract, so [illegible]
- The push and the pull both work across a small [illegible]

Hold two magnets close and your hands feel the force before [illegible] touch.



You Cannot Keep Just One

Imagine snapping a bar magnet in half to keep only the north end. It does not work. Each broken piece grows a new pole right away. You end up with two smaller magnets, and each one has a north pole and a south pole. Even a tiny chip off a magnet has both ends. Every magnet in the world comes as a pair of poles.

PREVIEW

Name: _____ 47

Curriculum Connection
SCI.3.8, SCI.3.E.5

Two Choices

Circle the best answer.

1) Two north poles _____ each other.	pull	push
2) A north and a south pole _____.	repel	attract
3) The N end is the _____ pole.	south	north
4) A magnet pulls hardest at its _____.	middle	poles
5) Half a b[illegible]magnet has _____ poles.	two	no

Question

[illegible] questions below using evidence from the text.

1) What happen[illegible] so[illegible]h poles are brought close together?

2) Why does every magnet always h[illegible] pole

PREVIEW

Word Scramble

Unscramble the words from the word bank.

Word Bank				
south	force	attract	push	magnet
north	repel	gap	poles	iron

TMNGAE		OHRNT	
OHUST		OSLPE	
ATCTART		ELPRE	

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Curriculum Connection
SCI.3.B, SCI.3.E.5

Exit Cards

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

Name: _____ Mark

Circle the pairs that push apart.

N a	two S poles
nort	S and S
	N, one S
two N po	S a

Name: _____ Mark

Circle the pairs that push apart.

N and N	two S poles
north + south	S and S
N and S	one N, one S
two N poles	S and N

Name: _____ Mark

Circle the pairs that push apart.

N and N	two S poles
north + south	S and S
N and S	one N, one S
two N poles	S and N

Name: _____ Mark

Circle the pairs that push apart.

N and N	two S poles
north + south	S and S
N and S	one N, one S
two N poles	S and N

Name: _____ Mark

Circle the pairs that push apart.

N and N	two S poles
north + south	S and S
N and S	one N, one S
two N poles	S and N

Name: _____ Mark

Circle the pairs that push apart.

N and N	two S poles
north + south	S and S
N and S	one N, one S
two N poles	S and N

PREVIEW

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Curriculum Connection
SCI.3.8, SCI.3.E.5

Attract or Repel

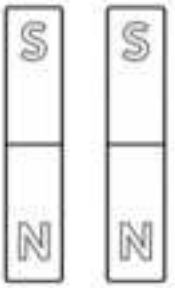
Magnets Will the magnets attract or repel each other?

1)



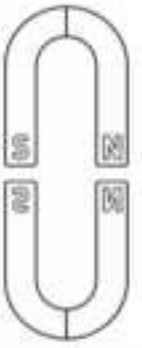
Attract	Repel

2)



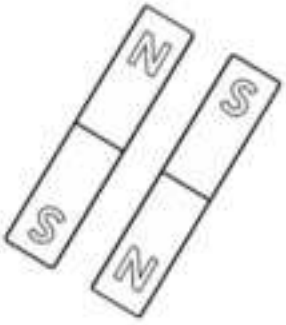
Attract	Repel

3)



Attract	Repel

4)



Attract	Repel



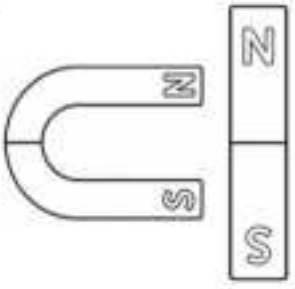
Attract	Repel

6)



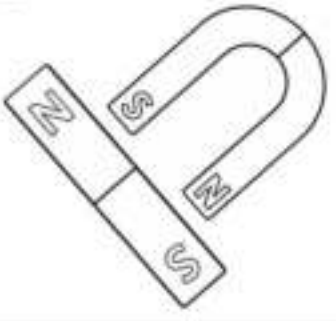
Attract	Repel

7)



Attract	Repel

8)



Attract	Repel

9)



Attract	Repel

PREVIEW

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Curriculum Connection
SCI.3.B, SCI.3.C, SCI.3.E.5

Show and Tell: Is My Object Magnetic?

Objective — What are we learning about?

Students will bring in an object from home and test it with a magnet in front of the class. This builds careful observation and gives students the words for iron, steel, nickel and [illegible] materials a magnet ignores.

Materials — [illegible]ed for our activity?

- An object [illegible] school
- Planning page [illegible]
- A bar magnet for the [illegible]



Instructions — How will we comp[illegible]ur acti[illegible]

1) Explain that iron, steel, nickel and cobalt [illegible]
2) Remind students that copper, wood and plastic a[illegible]
3) Ask students to think of a small safe object at home to bri[illegible]
4) Give students time to look closely at what their object is made o[illegible]
5) Hand out the Planning Page and help students fill it in.
6) Invite students to bring the object in or draw it instead.
7) Have each student guess, then hold the class magnet to the object.
8) Ask classmates to listen quietly, then allow one kind question.
9) Keep a tally on the board of the magnetic and non-magnetic objects.

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Curriculum Connection
SCI.3.B, SCI.3.C, SCI.3.E.5

Criteria Use the criteria below to complete the activity.

Criteria	Description
Clear Object	The object is easy for the class to see, or a large clear drawing stands in for it.
Names the Material	The student names what the object is made from, such as steel, copper or wood.
Makes a	The student says whether a magnet will grab it and gives a reason first.
Spe	udent speaks slowly and loudly enough for the back row to

PREVIEW

Example Presenti Re mple presentation below.

My

This is an old spoon from our kitche er. It i of steel, and steel has iron inside it. I guessed the magnet would grab it I hel gnet close, the spoon jumped up before they even touched. Th ooth and heavy for its size. It taps with a bright ring when I kn the I picked it because it looks the same as our aluminium spoon, but onl o a magnet.



Name: _____ 55

Curriculum Connection
SCI.3.B, SCI.3.C, SCI.3.E.5

Planning Page | Answer the questions below about the object you will show.

1) What is your object, and what is it made from?	

2) How does your object look? Name its colour and its shape.

3) How [illegible]ject smell? Does that smell remind you of anything?

4) How does it feel [illegible]ver it? Warm, cold or smooth?

5) What sound does your object make when [illegible] it o[illegible]?

6) Do you think a magnet will grab it? Say why you think so.

7) Why does it matter to know if an object is magnetic or not?

PREVIEW

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Curriculum Connection
SCI.3.B, SCI.3.C, SCI.3.E.5

Draw and Write Draw your object in the box. Then write what happened when the magnet came close.



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Curriculum Connection
SCI.3.B, SCI.3.C, SCI.3.E.5

Peer Compliment Card

Write a kind note about an object a classmate showed:

Write a kind note to a classmate about the object they shared. Then cut out the card to give to them.

PREVIEW



Peer Compliment Card Example

Dear Classmate,

I liked your belt buckle. I was sure the magnet would grab it, so I was surprised when it did not. Your guess was much better than mine.

From, A Friend

Name: _____ 58

Curriculum Connection
SCI.3.B, SCI.3.C, SCI.3.E.5

Rubric How did you do on the activity?

Criteria	1 Point	2 Points	3 Points	4 Points
Clear Object	No object or drawing shown.	Object is hard to see.	Object is easy to see.	Object is shown and held up clearly.
Names the Materi	es not name material.	Names the material with help.	Names the material clearly.	Names it and explains the choice.
Makes a Guess		Guesses with reason.	Guesses and gives a reason.	Guesses with a clear science reason.
Speaking Voice	Very hard t hear.	om hard	Clear most of the time.	Clear and easy to hear throughout.

PREVIEW

Teacher Comments

Mark

Student Comments – What Could You Do Better?

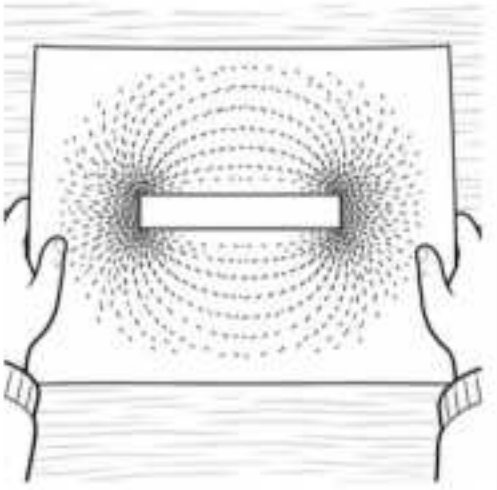
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Name: _____ 59

Curriculum Connection
SCI.3.8, SCI.3.E.5

The Magnetic Field

The Space Around a Magnet



Hold a paper clip close to a magnet and let go. The clip jumps across the gap all by itself. Nothing touched it, yet something pulled it. The magnet's force wo[rked] the space around the magnet. That [is] a **magnetic field**, the area around a magn[et] its force can be felt.

Showing Something Invi[sible]

A magnetic field is **invisi[ble]** eyes cannot see it. Scientists still have a clever way to show its [shape]. They sprinkle **iron filings**, tiny grey bits of iron like dust, onto paper laid over a [magnet]. The filings turn and line up in curved lines.

- The lines are crowded together near the two [poles].
- The lines spread out farther from the magnet.
- The lines curve from one pole around to the other.

PREVIEW

Strong Up Close, Weak Far Away



The field is strongest right beside the magnet. Slide the paper clip farther away and the pull grows weaker. Farther still, the clip does not move at all. A magnetic field has no hard edge. It simply fades away.

Name: _____ 60

Curriculum Connection
SCI.3.B, SCI.3.E.5

Finish the Sentence

Complete each sentence below.

1) We sprinkle iron filings over a magnet so that...

2) A paper clip stops jumping to the magnet when...

PREVIEW

Questions

Answer the questions below.

1) What is a magnetic field? Use the term domain in it.

2) Why do the iron filings crowd together near the poles?

3) A clip sits far from a magnet and does not move. Why not?

Odd One Out

Circle the word that does not belong in each group.

iron	steel	wood	nickel
attract	repel	kicking	field

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Curriculum Connection
SCI.3.8, SCI.3.E.5

Exit Cards

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

Name: _____ Mark

Read each clue. Write the answer.

1) I am the space around a magnet where its force works.	
2) I am grey dust made of iron that shows the field lines.	
3) I am the part of a magnet where the field is strongest.	
4) I mean something is there, but your eyes cannot see it.	

Name: _____ Mark

Read each clue. Write the answer.

1) I am the space around a magnet where its force works.	
2) I am grey dust made of iron that shows the field lines.	
3) I am the part of a magnet where the field is strongest.	
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3) I am the part of a magnet where the field is strongest.	
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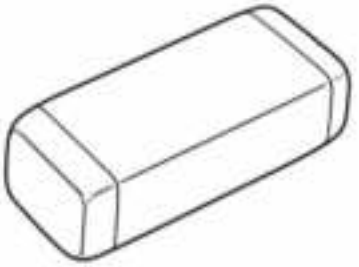
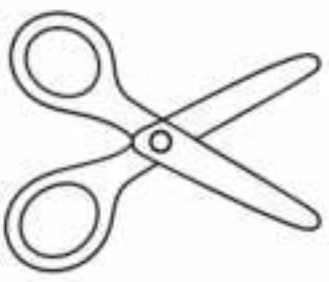
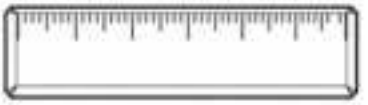
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Name: _____ 62

Curriculum Connection
SCI.3.B, SCI.3.E.5

Colour Colour the things a magnet will pull.

		
	Rubber eraser	Iron filings
		
Wooden pencil	coin	Aluminum foil
		
Iron nail	Steel food can	Glass marble
		
Steel scissors	Plastic ruler	Steel paper clip

PREVIEW

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Curriculum Connection
SCI.3.A, SCI.3.B, SCI.3.E.5

Story: The Star That Does Not Move

The Star That Does Not Move

The night is warm and still at Falcon Lake, in Manitoba's Whiteshell. Jonah and her grandmother sit on the dock. They are **Anishinaabe**, and Grandma Rita has watched [illegible] her whole life.



[illegible]e says. "Any star at all, except [illegible]t one."

Jonah picks [illegible] ab[illegible]e dark line of trees. Her grandm[illegible]er la[illegible]inting at it. They eat bannock and [illegible]he lo[illegible]

An hour passes.

"Look again," she says.

Jonah looks. Her star has slid well a[illegible]m th[illegible]

"Now find the one I told you to leave alo[illegible]."

She finds it, and it has not moved. It is the **nort**[illegible]the [illegible]ys in nearly the same place while the others wheel around it.

"That star gives us our **direction**, the way we are facing," she[illegible]. "Face it, and north is ahead of you."



Then she pulls a **compass** from her jacket, a tool with a small spinning needle that finds north. It settles, pointing the same way as the star.

"Two ways," says Jonah. "Same north."

"Both true," her grandmother says. "That needle is a tiny magnet lining up with Earth's magnetic field. The star just stays put. We use both."

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SCI.3.A, SCI.3.B, SCI.3.E.5

Ordering Number these events 1 to 8 in the order they happened in the story.

	They eat bannock and listen to the loons for about an hour.
	Jonah picks a bright star just above the trees.
	Grandma Rita's compass needle points the same way as the star.
	Jonah and her grandmother sit down on the dock at Falcon Lake.
	J sees that her star has slid away from the stick.
	R tells Jonah to pick any star but one.
	star sitting in the same place as before.
	Her k pointing at Jonah's star.

Think Imagine clou Which tool from the story could help you find north? Expla woul k.

Visualize Draw a large compass and label N, E, S, and W. Colou pointing end of its needle red.

PREVIEW

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Curriculum Connection
SCI.3.A, SCI.3.B, SCI.3.E.5

Exit Cards

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

Name: _____ Mark

Cross out the one that is not true.

	The north star races across the sky each night.
	The north star stays in almost the same place.
	A compass needle and the north star both find north.

Name: _____ Mark

Cross out the one that is not true.

	The north star races across the sky each night.
	The north star stays in almost the same place.
	A compass needle and the north star both find north.

Name: _____ Mark

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	The north star stays in almost the same place.
	A compass needle and the north star both find north.

PREVIEW

Name: _____ 66

Curriculum Connection
SCI.3.A, SCI.3.B, SCI.3.E.5

Pictionary - The Star That Does Not Move

Objective What are we learning about?

Students will draw and guess words from the story of the star that stays still, such as canoe, compass and campfire. This builds the shared words we need for finding our way [illegible].

Mater [illegible] need for the activity?

- Pictionary [illegible]ds (p[illegible] cut apart
- A whiteboard o[illegible]
- Markers and a timer ([illegible])



Instructions How will you complete t[illegible]ctivity?

1) Split the class into two teams.
2) One student from the first team picks a card and k[illegible]se[illegible]
3) That student draws the word on the whiteboard or on larg[illegible]p[illegible]
4) Start a two-minute timer while the team guesses the drawing.
5) If the team guesses before the timer ends, they earn one point.
6) Next, a student from the other team picks a card and draws.
7) Take turns between the teams, with a new student drawing each time.
8) Keep playing until all the cards have been used.
9) Count the points. The team with the most points wins.

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Curriculum Connection
SCI.3.A, SCI.3.B, SCI.3.E.5

Pictionary Cards Cut out the topics below.

Pictionary Cards	
Star	Big Dipper
Night sky	Compass
[illegible]	Campfire
[illegible]	Paddle
Pine tree	Lake
Tent	Blanket
Grandmother	Owl
Snow	T[illegible]
Map	Lantern
Arrow	Cloud
River	Rock pile
Fishing net	Sunrise

PREVIEW

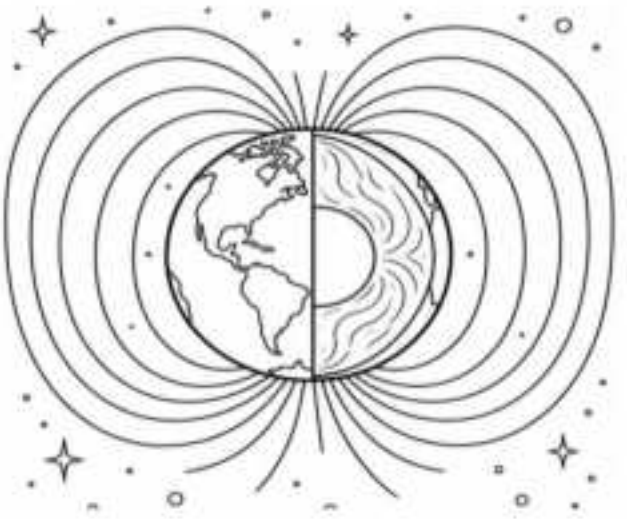
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Name: _____ 69

Curriculum Connection
SCI.3.B, SCI.3.E.5

Earth Is a Giant Magnet

A Magnet the Size of a Planet



Deep inside our planet is a core of hot iron, and that iron is always moving. The moving iron turns the whole Earth into a giant magnet. It has a magnetic field around it, just like a bar magnet on your desk, only enormous.

How a Compass Works

A **compass** is a tool that helps you find direction. Inside it sits a **needle**, a thin magnet balanced on a point so it can turn freely. Earth's magnetic field pulls the needle around until it lines up.

- Set the compass flat on your hand and hold it still.
- Wait until the needle stops swinging.
- Read the letter the coloured end is pointing to.



North, Almost

The needle points to **magnetic north**, the place Earth's magnetic field aims at, which is not quite the top of the globe. Magnetic north sits out in the Arctic Ocean, and it shifts a little every year. Pilots and hikers in northern Manitoba know this. They add a small correction so that the compass and the map agree with each other.

PREVIEW

Name: _____ 70

Curriculum Connection
SCI.3.8, SCI.3.E.5

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

1) Earth has a magnetic field all around it.	True	False
2) Magnetic north is exactly at the top of Earth.	True	False
3) A compass needle is a small magnet.	True	False
4) Earth's core is hot iron that keeps moving.	True	False
5) A comp works best when you shake it.	True	False

Questio questions below using evidence from the text.

1) What makes ke iant magnet?

2) Why do pilots add a correction to compa ?

PREVIEW

Fill in the Blank Choose the correct word from the box to complete sentence.

needle	field	core	compass	iron

1) A _____ is a tool that shows you which way is north.

2) The thin spinning magnet inside is called the _____.

3) Hot moving _____ deep inside our planet makes the magnet.

4) Earth's magnetic _____ reaches out into the space around us.

5) The hot middle part of our planet is called the _____.

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Name: _____ 71

Curriculum Connection
SCI.3.B, SCI.3.E.5

Colouring Sheet Colour the compass below.



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Curriculum Connection
SCI.3.B, SCI.3.E.5

Exit Cards

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

Name: _____ Mark

Check all that are true.

	A compass needs batteries.
	Compasses point south.
	Earth's core is hot iron.
	Magnetic north never moves.
	Earth acts like a magnet.
	The needle points north.
	Earth's core is ice.
	Compasses have a magnet.

Name: _____ Mark

Check all that are true.

	A compass needs batteries.
	Compasses point south.
	Earth's core is hot iron.
	Magnetic north never moves.
	Earth acts like a magnet.
	The needle points north.
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Name: _____ Mark

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	Earth acts like a magnet.
	The needle points north.
	Earth's core is ice.
	Compasses have a magnet.

Name: _____ Mark

Check all that are true.

	A compass needs batteries.
	Compasses point south.
	Earth's core is hot iron.
	Magnetic north never moves.
	Earth acts like a magnet.
	The needle points north.
	Earth's core is ice.
	Compasses have a magnet.

PREVIEW

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Name: _____ 73

Curriculum Connection
SCI.3.B, SCI.3.C, SCI.3.E.5

Interview: Meet a Bush Pilot



Student: What do you do for work?

Dana Flett: I am a bush pilot in Thompson. I fly a small plane north with mail, food and medicine.

Student: W[illegible]ere do you land?

Dana Fle[illegible]rt gravel strips, and in winter right[illegible] plane wears skis then, not whe[illegible].

Student: How [illegible]d you

Dana Flett: I use a **com[illegible]**eedle[illegible]mall magnet, and Earth's magnetic field swings it round without tou[illegible].

Student: So, nothing touches the nee[illegible]

Dana Flett: Nothing at all. That is a **non-cont[illegible]ce**, a[illegible]t reaches across a gap. Earth acts like one giant magnet.

Student: Does it point to the North Pole on my map?

Dana Flett: No. It points to **magnetic north**, a spot in the far no[illegible] same place as the map's North Pole.

Student: How far apart are they?

Dana Flett: Hundreds of kilometres. Near Winnipeg the gap is small. The farther north I fly, the bigger it grows.

Student: So how do you steer the plane?

Dana Flett: I work out my **heading** first. That is the direction the plane points. My chart tells me how much to add.

Student: Thank you, Ms. Flett. I want to fly north one day.

PREVIEW

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Curriculum Connection
SCI.3.B, SCI.3.C, SCI.3.E.5

Fill in the Blanks Circle the missing word.

1)	A compass needle is a tiny _____.	magnet	battery
2)	Dana flies in northern _____.	Ontario	Manitoba
3)	The needle points to magnetic _____.	north	south
4)	A heading is the plane's _____.	direction	speed
5)	Map [illegible]nd magnetic north are _____.	different	the same

Questi[illegible] [illegible]uestions below using what you read.

1) What does [illegible] fin[illegible]irection while she is flying?

2) Why is Dana's compass harder to trust the f[illegible] no[illegible] flies?

PREVIEW

Think The Student asked Dana Flett how a pilot finds north. Write one [illegible]ore question you would ask a bush pilot and say why you want to know the answer.

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Curriculum Connection
SCI.3.B, SCI.3.C, SCI.3.E.5

Exit Cards

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

Name: _____ Mark ☐

Match each word to its meaning.

compass ☐	☐ the way the plane is pointed
magnetic north ☐	☐ where the needle really points
heading ☐	☐ tool with a small magnet inside

Name: _____ Mark ☐

Match each word to its meaning.

compass ☐	☐ the way the plane is pointed
magnetic north ☐	☐ where the needle really points
heading ☐	☐ tool with a small magnet inside

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Name: _____ Mark ☐

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magnetic north ☐	☐ where the needle really points
heading ☐	☐ tool with a small magnet inside

PREVIEW

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Name: _____ 76

Curriculum Connection
SCI.3.B, SCI.3.D, SCI.3.E.5

Activity – Making Your Own Compass

Objective

What are we learning about?

The objective of this activity is to help students understand how Earth's magnetic field influences compass directions by creating a simple compass.

Materials

What will you need for the activity?

- Needles (one per group)
- Small magnets
- Cork slices
- Shallow dishes
- Water
- Teacher-provided how-to guide on making a compass



PREVIEW

Instructions

How will you complete the activity?

1. Organize the class into small groups or pairs to encourage teamwork and collaboration during the activity.
2. Distribute all the materials and the how-to guide and begin the activity by demonstrating how to magnetize the needle.
3. Instruct each group to fill their dish with water and prepare the cork.
4. Guide students to place the magnetized needle on the cork and then put the cork on the water.
5. Observe which direction the needle points and discuss why.
6. Conclude the activity by discussing the importance of Earth's magnetic field in navigation.

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Name: _____ 77

Curriculum Connection
SCI.3.B, SCI.3.D, SCI.3.E.5

How-to Guide | Use this sheet to guide you to make your own compass.

How to Make Your Own Compass

What You Need:

- A needle and a small magnet
- A slice of cork (like from a wine bottle)
- A shallow dish or bowl with some water

Steps to Make Your Compass:

1. Magnetize Your Needle:

- Hold your needle
- Use the magnet to stroke along the needle.
- Do this 30 times in the same direction.
- This makes the needle act like a magnet!

2. Prepare Your Dish:

- Fill your shallow dish or bowl with water.
- Make sure it's still so your compass can work well.

3. Get Your Cork Ready:

- Take your slice of cork.
- If it's too big, cut it so it's just the right size to hold the needle.

4. Put the Needle on the Cork:

- Be careful and ask for help if you need it!

5. Float Your Compass:

- Gently place the cork with the needle on the water in your dish.
- Watch as it floats and the needle starts to turn.

6. Find North:

- Wait a bit and see the needle stop moving.
- It points towards the North because of Earth's invisible magnetic force!

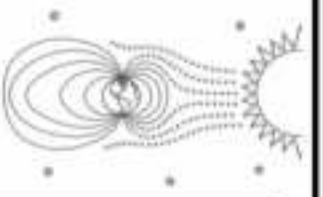
Remember, scientists and explorers have used compasses for hundreds of years to find their way around the big, wide world. Now, you've made one too!

PREVIEW

Name: _____ 88

Curriculum Connection
SCI.3.A, SCI.3.B, SCI.3.E.5

Story: The Northern Lights



Draw Draw pictures to illustrate the story.

The night was cold and clear near Thompson. Ava pulled her hood tight and followed her grandmother out past the woodpile. The snow squeaked under their boots. Th[illegible] Nîhithawak, or Woods Cree, and this is their home. Her grandm[illegible] looked north, and said, "Wait."

PREVIEW

Then the sky changed. A pale green ribbon lifted above the spruce trees. It shivered, folded, and slid sideways, brighter than the moonlight on the snow. The light spilled across half the sky. Ava had seen the **northern lights** before, but never so low and so wide. "What makes them move like that?" she asked.
Her grandmother smiled and said, "Let's make some cocoa and I will explain."

Name: _____ 89

Curriculum Connection
SCI.3.A, SCI.3.B, SCI.3.E.5

Inside, grandmother put on the kettle and began the answer. "It starts at the Sun," her grandmother said. The Sun throws out a steady stream of tiny bits called **charged particles**, pieces far too small to see. They cross millions of kilometres of empty space. By the time they reach Earth they are still racing along, and Earth is waiting for them. That stream never stops, not even on a warm summer day. Ava leaned closer.



Back at the window, Ava watched the green ribbon curl. "Earth is a giant magnet," her grandmother said. "It has a **magnetic field**, an invisible space around it where its force can work." That field is a **non-contact force**, a push or a pull that acts across a gap. It never touches the charged particles, but it can still steer them. It bends most of them toward the far north and the far south. Ava lives in the north where the lights live.

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Name: _____ 90

Curriculum Connection
SCI.3.A, SCI.3.B, SCI.3.E.5

Out on the step again, the cold bit at Ava's cheeks. The green light rippled once, then held still. "So where does the glow come from?" she asked. Her grandmother pointed high above the trees, far higher than any plane could fly, and said the answer was already up there.



Later, wrapped in a blanket, Ava got the rest of it. The steered particles crash into the thin air far above the ground. That air lights up, the way a screen lights up, and the glow is the **aurora**, the science name for the northern lights. Green comes from oxygen low down, and red from oxygen much higher up. "Cree families here have watched these lights for generations," her grandmother said. "Cree and Anishinaabe communities have their own names for them, and we still come outside to watch." Ava stayed out a long time.

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Curriculum Connection
SCI.3.A, SCI.3.B, SCI.3.E.5

Ordering Put these story events in the correct order by numbering them 1 to 8.

	At the window, her grandmother calls Earth a giant magnet.
	Ava follows her grandmother out past the woodpile.
	Her grandmother points to the sky high above the trees.
	A pale green ribbon lifts above the spruce trees.
	Ava learns that the glowing air is called the aurora.
	She explains that the field steers particles far north.
	ut on the kettle, her explanation starts at the Sun.
	t on the a asks where the glow comes from.

What Did You Lea Think whole story, then answer below.

1) Where do the tiny cha icle m before they reach Earth?

2) Why does Ava see the lights so often whe liv ?

Making Connections Ava's grandmother took her outside at night to watch th ky. Write about a time someone in your family showed you something outdoors.

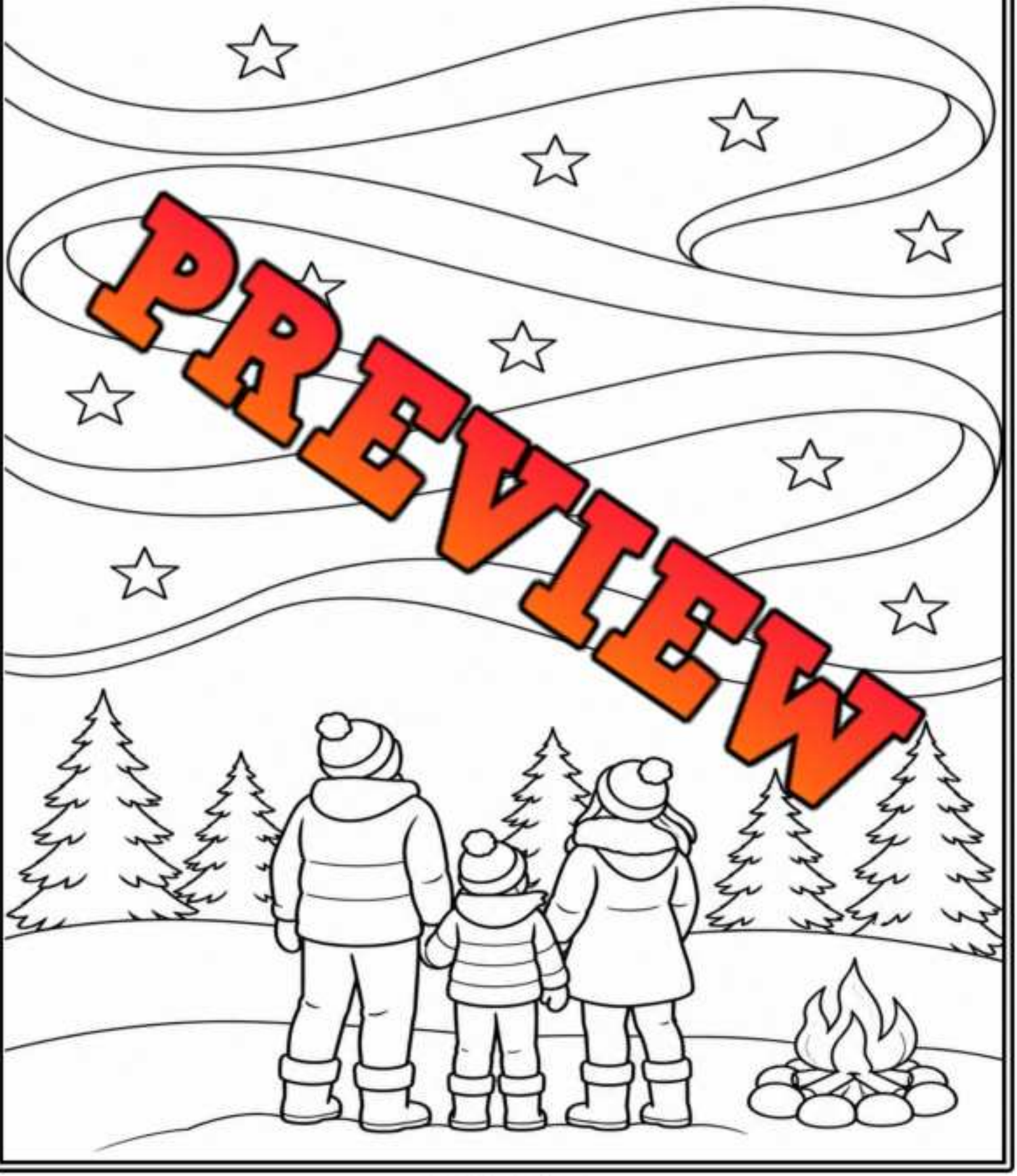
PREVIEW

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Curriculum Connection
SCI.3.A, SCI.3.B, SCI.3.E.5

Colouring Sheet Colour the northern lights below.



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Curriculum Connection
SCI.3.A, SCI.3.B, SCI.3.E.5

Exit Cards

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

Name: _____ Mark

True (T) or false (F)?

1) Magnets pull by touching.	T / F
2) The lights are just ice.	T / F
3) The Sun sends particles.	T / F
4) Earth is a giant magnet.	T / F
5) The glow is high up.	T / F

Name: _____ Mark

True (T) or false (F)?

1) Magnets pull by touching.	T / F
2) The lights are just ice.	T / F
3) The Sun sends particles.	T / F
4) Earth is a giant magnet.	T / F
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Name: _____ Mark

True (T) or false (F)?

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2) The lights are just ice.	T / F
3) The Sun sends particles.	T / F
4) Earth is a giant magnet.	T / F
5) The glow is high up.	T / F

PREVIEW

Name: _____ 94

Curriculum Connection
SCI.3.8, SCI.3.E.5

Static Electricity: Rubbing Up a Charge

Rubbing Moves Tiny Charges

Everything around you is built from bits far too small to see. Some of those bits carry a **charge**, which is a tiny amount of electricity. When you **rub** two things together, some charges move from one thing onto the other. One object ends up with extra charges, and the other is left short.

PREVIEW

Charge That Stays

Charges that build up on an object make **static electricity**. The word static means not moving. A balloon rubbed on hair takes extra charges and holds them.



- **Rub** — sliding two things against each other
- **Charge** — the tiny bit of electricity that moves
- **Cling** — light things pulled in and held with static
- **Spark** — charges jumping across a small gap



A Force Without Touching

A charged object can pull on light things from a little way off. Static electricity is a **non-contact force**, so it works across a gap. Held near your head, a charged balloon lifts your hair before it arrives. In a warm dryer, charges make a sock **cling** to a shirt. This force is strong close up, but it fades away fast across a room.

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Name: _____ 95

Curriculum Connection
SCI.3.8, SCI.3.E.5

Multiple Choice

Circle the best answer.

1) What moves when you rub two objects together?			
Tiny magnets	Warm water	Small holes	Tiny charges
2) What does the word static mean?			
Very fast	Not moving	Made of iron	Very hot
3) Why can a charged balloon lift your hair before it touches?			
It works[illegible]ap	It is very heavy	It is full of air	It is warm
4) Which[illegible]s is an example of static electricity?			
A[illegible]	door opening	A sock clinging	A boat floating
5) What[illegible]a spar[illegible]			
Charges jump[illegible]	Air g[illegible]t	A magnet turning	Water freezing

PREVIEW

Matching

Draw[illegible] to matc[illegible]tem to what happened in the text.

charge ○	○ [illegible]g two things
static electricity ○	[illegible]bs [illegible] your hair
rub ○	○ tiny [illegible]
cling ○	○ thi[illegible]d a[illegible]d
spark ○	○ acts without
balloon ○	○ charges that stay
non-contact force ○	○ a tiny snap of light
dryer ○	○ warm place socks stick

Scenario

Your hair keeps standing up after you pull off your winter hat. Your friend says the hat must be broken. What should you do?

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Curriculum Connection
SCI.3.8, SCI.3.E.5

Exit Cards

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

Name: _____ Mark

Circle the best answer.

1) What is a charge? a) A kind of magnet b) A tiny bit of electricity c) A drop of water d) A small motor	**2)** What does rubbing move? a) Magnets b) Water c) Air d) Charges
3) Static electricity is a... a) contact force b) kind of glue c) type of metal d) non-contact force	**4)** Why does a sock cling? a) It picked up a charge b) It is wet c) It is heavy d) It has glue

Name: _____ Mark

Circle the best answer.

1) What is a charge? a) A kind of magnet b) A tiny bit of electricity c) A drop of water d) A small motor	**2)** What does rubbing move? a) Magnets b) Water c) Air d) Charges
3) Static electricity is a... a) contact force b) kind of glue c) type of metal d) non-contact force	**4)** Why does a sock cling? a) It picked up a charge b) It is wet c) It is heavy d) It has glue

PREVIEW

Name: _____ 97

Curriculum Connection
SCI.3.D, SCI.3.E.5

Experiment – Magic Spoon

Research Question

What are we learning about?

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

Materials

What do I need to do the experiment?

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



PREVIEW

Method

How do we complete the experiment?

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



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Curriculum Connection
SCI.3.D, SCI.3.E.5

Observations What did you notice?

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

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

3) How could you use this to s ixtures?

PREVIEW

Draw Draw a diagram of what happened. Label the spoo

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Curriculum Connection
SCI.3.D, SCI.3.E.5

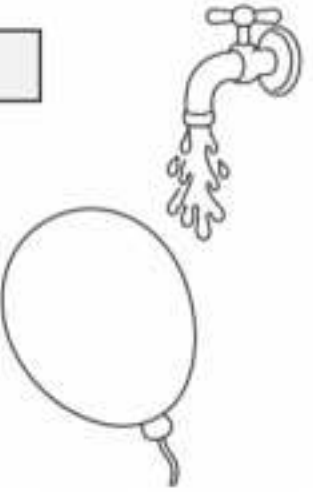
Experiment – Bending Water

Research Question — What are we learning about?

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

Materials — What do I need to do the experiment?

- ✓ 1 balloon
- ✓ Sink with faucet



Method — How do we complete the experiment?

1) Rub your hair with the balloon

2) Run a small stream of water. The smaller the better, but it needs to be a full stream, not just drips.

3) Hold the balloon near the stream but not touching it.

4) Watch the stream of water bend.



PREVIEW

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Curriculum Connection
SCI.3.D, SCI.3.E.5

Observations | What did you notice?

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

2) Why di[illegible]er bend?

3) Did the water move clos[illegible] ba[illegible]ther away? Explain.

PREVIEW

Draw | Draw a diagram of what happened. Label the [illegible]ater.

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Name: _____ 101

Curriculum Connection
SCI 3.A, SCI 3.E.5

Snowshoes and the Pull of Gravity

Two Walks in the Same Deep Snow

Case 1: Winter Boots

It is January in Manitoba and the snow is deep and soft. Nina steps in with winter boots on. Gravity is the pull between Earth and every object, and it works without touching. Gravity pulls Nina's whole weight straight down. All of that pull presses on two small patches of snow, one under each boot. The soft snow cannot hold so much pull on so little space. Nina sinks past her knees with every step.

Case 2: Anishinaabe Snowshoes

Now Nina straps on **snowshoes**, wide frames of bent birch wood laced with **babiche**, which is thin rawhide strips. Gravity still pulls on her exactly as hard as before. Nothing has switched it off. But the same pull is now spread over a much larger patch of snow. Each bit of snow holds only a little of it. Nina walks along on top.



What This Teaches Us

A non-contact force can be spread out even though it cannot be switched off. Anishinaabe and Nêhiyawak makers in Manitoba still build snowshoes in different shapes for different snow. Long, narrow shoes suit open country and deep, soft snow. Wide, round shoes suit thick bush. The shape decides how far the pull of gravity is spread.

PREVIEW

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Curriculum Connection
SCI.3.A, SCI.3.E.5

True or False

Is the statement true or false?

1) Snowshoes switch off the pull of gravity.	True	False
2) Gravity still pulls on you when you wear snowshoes.	True	False
3) Snowshoes spread your weight over more snow.	True	False
4) Gravity must touch an object to pull on it.	True	False
5) Babiche lacing is made from thin rawhide strips.	True	False
6) Every s[illegible]oe is built in the same shape.	True	False

Sor[illegible]

[illegible]tile: boots or snowshoes?

Ash and h[illegible]	Weig[illegible]d	Two deep holes	Snow gives way
Stay on top	[illegible]	Wide frame	You sink down

Walking in winter boo[illegible]	[illegible]Walking in snowshoes

PREVIEW

Making Connections

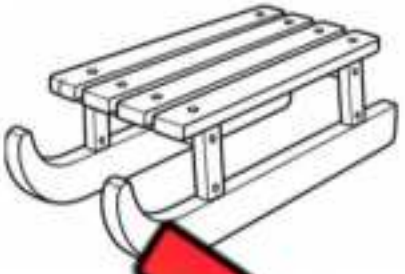
Name another way people spread out a load. Draw it and explain how spreading helps.

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Curriculum Connection
SCI.3.A, SCI.3.E.5

Colour Colour the things that spread a weight out wide.

 Wide [illegible]nners	 Thin skate blade	 Cross-country skis
 Narrow boot heel	 T[illegible]e tire	 Duck's webbed foot
 Sharp stick end	 Toboggan	High-heeled shoe
 Snowshoes	 Wide tractor tire	 Bare foot

PREVIEW

Name: _____ 122

Mark /

Unit Test

Fields

Part 1 | Choose the correct answer.

1) A force is a push or a: A) Colour B) Sound C) Pull D) Smel	**2) Which force needs no touching?** A) Gravity B) Kicking C) Lifting D) Squeezing
3) T A) Pull togeth B) Push apart C) Stick fast D) Heat up	**4) Which metal is magnetic?** A) Aluminium B) Copper C) Gold
5) A compass needle points: A) South B) East C) North D) West	**Gra ulls objects:** A) S ays ard F C) Stra D) Away
7) Static builds up when you: A) Cool things down B) Wet your hands C) Rub things together D) Sit very still	**8) The Moon orbits** A) Magnets B) Static C) Wind D) Gravity
9) Stone sinkers make a net: A) Hang down open B) Float on top C) Roll up tight D) Dry out fast	**10) Snowshoes work by:** A) Removing gravity B) Spreading your weight C) Adding more mass D) Melting the snow

PREVIEW

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Part 2 Draw a line to match each term to what it means.

Mark /

Gravity ○	○ a charge built up by rubbing, that can spark
Magnet ○	○ an object with two ends that attract iron
Sta… ○	○ the pull between Earth and everything on it
C…	○ the two ends of a magnet where it pulls hardest
Orbit	○ the curved path one object takes around another
Poles ○	○ a tool whose needle lines up with the north

PREVIEW

Part 3 Fill in the blanks using the … from … bank.

repel	field	
magnet	orbit	
charge	compass	attr…

Mark /

1) _____ pulls everything on Earth toward the ground.

2) Two poles that are the same will _____ each other.

3) A north pole and a south pole _____ each other.

4) Rubbing a balloon on your hair gives it a _____.

5) A _____ has a needle that lines up with Earth.

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Part 4 Is this a non-contact force? Write Yes or No.

Mark /

1) The Moon is held in its orbit around Earth.	
2) Jonah kicks a soccer ball across the field.	
3) A rubbed balloon lifts your hair up.	
4) Ali lift[illegible] up onto the top shelf.	
5) A [illegible]er clip across a table.	
6) Sam pushe[illegible]or [illegible] with his hand.	
7) An apple falls f[illegible] br[illegible]und.	
8) Priya pulls a wagon alo[illegible]de[illegible]	

PREVIEW

Part 5 Answer each question in a full senten[illegible]

Mark /

1) What are the similarities and differences betwe[illegible] and [illegible]tism?

2) How are contact forces and non-contact forces alike and different?

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