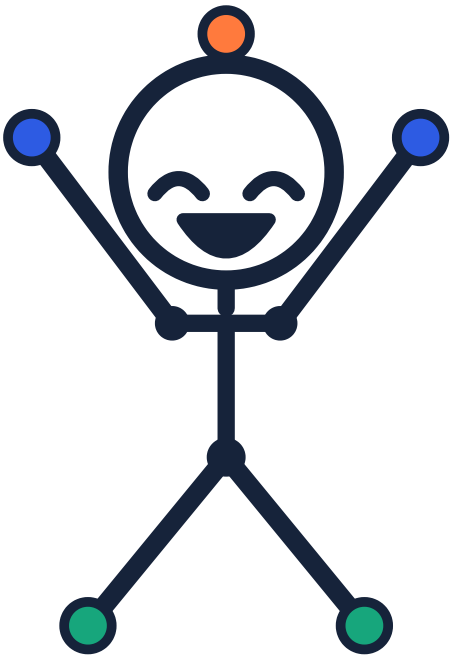
Young Innovators
FOR CHANGE
innovateyouth.org

A FULL-YEAR SCIENCE PROGRAM · GRADE 2

Look Closer

36 weekly investigations into the world up close:
land and water, materials, changes and living things.



This book belongs to

Something I looked at closely

What I noticed

Teacher

School year

Free to print, copy and use. No license, no account, no cost to any student or school.

START HERE HOW THIS BOOK WORKS

Look closer. Then look again.

Two pages a week, front and back. About thirty-five minutes.

The shape of a week

Page 1 teaches one idea and gives you something to try. **Page 2** has a table to think about, two questions for home, and a harder challenge. No computer needed.

Part 1 is land and water. Part 2 is what things are made of. Part 3 is how the land changes, fast and slow. Part 4 is plants, animals and where they live.

The boxes on the page

SITS BESIDE	The California science standard the week teaches. This book sits beside your science lessons, not instead of them.
NOTICE FIRST	Two minutes of looking before any explaining. Every scientist starts by noticing.
TRY IT	What you need for the week's investigation. Most of it is already in a classroom or a kitchen, and the teacher guide lists the few things to gather.
WORDS TO KEEP	One or two words pinned down properly.
PRACTICE DATA	Results made up for the page so everyone can answer the same questions. Your own results will be different, and yours are the real ones.
TALK ABOUT IT	Two questions to talk over with someone at home or at school.
STUCK? TRY THIS	A way in when the page stops making sense.
CHALLENGE ZONE	Harder, and usually open. For whoever finishes early.

The one question of the whole year

What do you notice? Every week starts with looking, before any explaining. Then you test an idea, changing only one thing, so you know what made the difference.

WEEK	TITLE	TOPIC	STANDARD
PART 1 · WEEKS 1–9 · LAND AND WATER			
1	**Land and Water**	Land	2-ESS2-2
2	**A Map of a Place**	Land	2-ESS2-2
3	**Hills and Valleys**	Land	2-ESS2-2
4	**Where the Water Is**	Water	2-ESS2-3
5	**Solid or Liquid**	Water	2-ESS2-3
6	**Frozen Water**	Water	2-ESS2-3
7	**A Model Landscape**	Land	2-ESS2-2
8	**Reading a Model**	Land	2-ESS2-2
9	**What Is Here?**	Review	2-ESS2-2
PART 2 · WEEKS 10–18 · WHAT THINGS ARE MADE OF			
10	**Sort by How It Feels**	Materials	2-PS1-1
11	**Bendy, Hard, Soft**	Materials	2-PS1-1
12	**Best for the Job**	Materials	2-PS1-2
13	**Test It**	Materials	2-PS1-2
14	**Small Pieces**	Materials	2-PS1-3
15	**Take Apart, Build New**	Materials	2-PS1-3
16	**Warm It Up**	Materials	2-PS1-4
17	**Can It Go Back?**	Materials	2-PS1-4
18	**What Is It Made Of?**	Review	2-PS1-1

WEEK	TITLE	TOPIC	STANDARD
PART 3 · WEEKS 19–27 · CHANGES TO THE LAND			
19	**Fast or Slow**	Changes	2-ESS1-1
20	**Wind Moves Land**	Changes	2-ESS2-1
21	**Water Moves Land**	Changes	2-ESS2-1
22	**Stop the Sand**	Design	K-2-ETS1-1
23	**Draw the Idea**	Design	K-2-ETS1-2
24	**Which Fix Worked?**	Design	K-2-ETS1-3
25	**Very Slow**	Changes	2-ESS1-1
26	**Very Fast**	Changes	2-ESS1-1
27	**What Changed It?**	Review	2-ESS2-1
PART 4 · WEEKS 28–36 · LIVING THINGS AND WHERE THEY LIVE			
28	**Plants Need Light**	Living things	2-LS2-1
29	**Plants Need Water**	Living things	2-LS2-1
30	**A Fair Plant Test**	Living things	2-LS2-1
31	**Carrying Seeds**	Living things	2-LS2-2
32	**Pollen on the Move**	Living things	2-LS2-2
33	**Who Lives Here?**	Living things	2-LS4-1
34	**Count the Kinds**	Living things	2-LS4-1
35	**Places Compared**	Living things	2-LS4-1
36	**Look Closer**	Review	2-LS4-1

WEEK 1 LAND

Land and Water

Look at the Earth from high above. You see land, and you see water.

SITS BESIDE
Mapping land and water (2-ESS2-2)

NOTICE FIRST · 2 MINUTES
Look at a globe or a map of the world. Which color is the water? Is there more land or more water?

WORDS TO KEEP

map	A drawing of a place, as if you were looking down on it from above.

Land and water

A **map** shows a place from above, like a bird would see it.

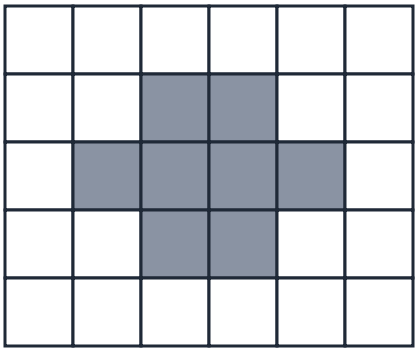
Most maps show land and water in different colors. Water can be an ocean, a lake or a river. Land can be flat or hilly.

On a map of the whole world, there is much more water than land. Most of it is ocean water, which is salty.

DRAW IT
Draw a map of a place you know. Color the land one color and the water another.

An island map

This map is made of squares. Each square is land or water.



land

water

How many squares are land? _____

How many squares are water? _____

How many more water squares than land squares? _____

TALK ABOUT IT

What is the closest water to your school: a river, a lake, the ocean or something else?

Would you like to live on an island? Why?



STUCK? TRY THIS

Count the dark squares first. Then count the white ones.

★ CHALLENGE ZONE

Draw your own island map on squares. Make it 10 land squares. How many water squares did you use?

WEEK 2 LAND

A Map of a Place

A map uses small pictures to show what is in a place.

SITS BESIDE
Mapping land and water (2-ESS2-2)

NOTICE FIRST · 2 MINUTES
Look at a map of your school or a park. What small pictures do you see on it?

WORDS TO KEEP

map key	The box on a map that tells what each picture means.

Pictures on a map

A map uses little pictures for real things. A blue line can be a river. A green circle can be a tree.

The **map key** tells you what each picture means. Read the key first, and then the map makes sense.

Make a map of your classroom. Draw a map key for the desks, the door and the windows.

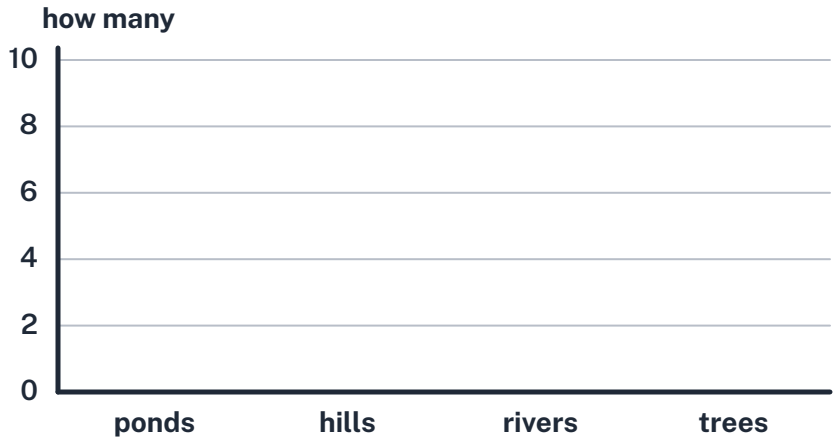
DRAW IT
Draw a map of your classroom. Add a map key.

A park map

PRACTICE DATA · MADE UP FOR THIS PAGE, NOT MEASURED

A class counted the things on a park map.

Thing on the map	How many
ponds	2
hills	3
rivers	1
trees	9



Draw the bars. Which thing is there the most of? _____

How many ponds and hills are there together? _____

How many more trees than hills? _____

TALK ABOUT IT

Where have you seen a map used?

What picture would you use on a map for a playground?



STUCK? TRY THIS

Each line on the graph is 2. A bar for 9 stops halfway between 8 and 10.

★ CHALLENGE ZONE

Make a map key with four pictures for a place you like. Use each picture on a small map.

WEEK 3 LAND

Hills and Valleys

Land has shapes. Some land is flat. Some land is high, and some is low.

SITS BESIDE
Mapping land and water (2-ESS2-2)

NOTICE FIRST · 2 MINUTES
Look out the window or think of a trip you have taken. Was the land flat, or did it go up and down?

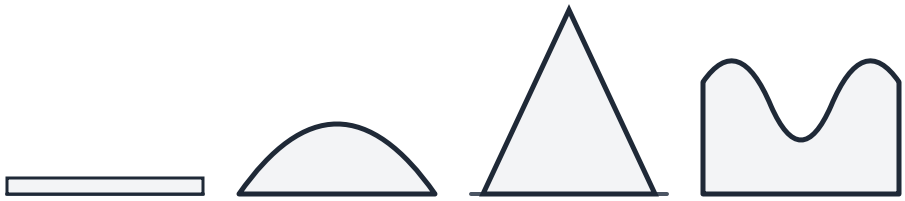
TRY IT · YOU WILL NEED

- a tray of damp sand
- a ruler

Safely: Wash your hands after.

WORDS TO KEEP

valley	A low place between hills or mountains.
plain	Wide, flat land.



Shapes of the land

A hill is high, round land. A mountain is very high, often with a pointed top.

A **valley** is a low place between hills or mountains. A **plain** is wide, flat land.

Make these shapes in damp sand. Measure how tall your hills are with a ruler.

DRAW IT
Draw your sand land. Label a hill, a valley and a plain.

Four sand hills

PRACTICE DATA · MADE UP FOR THIS PAGE, NOT MEASURED

A class made four hills in a tray of sand and measured them.

Hill	How tall
A	12 cm
B	20 cm
C	8 cm
D	15 cm

Which hill is the tallest? _____

How much taller is hill B than hill C? _____

Write the hills in order from shortest to tallest. _____

TALK ABOUT IT

Which landform would be the most fun to visit? Why?

Where would water go if it rained on a hill?



STUCK? TRY THIS

Find the biggest number. Then subtract C from B.

★ CHALLENGE ZONE

Make a valley between two of your sand hills. How deep is it? Measure from the top of a hill.

WEEK 4 WATER

Where the Water Is

Water is in oceans, rivers and lakes. Some water is frozen.

SITS BESIDE
Water as a solid and a liquid (2-ESS2-3)

NOTICE FIRST · 2 MINUTES
Name every place you have seen water outside. Was any of it frozen?

WORDS TO KEEP

solid	Keeps its own shape, like ice.
liquid	Flows and takes the shape of its container, like water.

Solid and liquid

Water can be a **liquid**. Liquid water flows. It is in oceans, rivers, lakes and puddles.

Water can be a **solid**. Solid water is ice and snow. It keeps its shape.

A glacier is a huge sheet of ice that stays frozen all year. There are glaciers on high mountains and near the North and South Poles.

DRAW IT
Draw one place with liquid water and one place with solid water.

Solid or liquid?

Write solid or liquid for each place.

	Place	Solid or liquid?
a	an ocean	
b	a glacier	
c	a river	
d	snow on a mountain	
e	a lake	
f	a puddle	

How many places have solid water? _____

How many more places have liquid water than solid water? _____

Name one more place where water is solid.

_____

TALK ABOUT IT

Where in the world would you find snow?

Where could you find solid water at school?



STUCK? TRY THIS

Ice and snow are solid. Water that flows is liquid.

★ CHALLENGE ZONE

A pond is liquid in summer. What could make it solid? Draw it both ways.

WEEK 5 WATER

Solid or Liquid

Ice is solid water. Warm it, and it melts into liquid water.

SITS BESIDE
Water as a solid and a liquid (2-ESS2-3)

NOTICE FIRST · 2 MINUTES
Hold an ice cube in a paper towel for one minute. What happens?

TRY IT · YOU WILL NEED

- three ice cubes the same size
- three cups the same size
- a sunny spot
- a refrigerator
- a timer

Safely: Never look straight at the sun.

WORDS TO KEEP

melt To change from a solid to a liquid.

Melting

Put one ice cube in each cup. Put one cup in the sun, one in the shade and one in the refrigerator.

Check every few minutes. When the ice is all gone, write down the time. Check the cup in the refrigerator again later in the day.

The ice did not go away. It **melted**: the solid changed into liquid water. The water is still in the cup.

MY INVESTIGATION

I predict: _____

What happened: _____

What I think caused it: _____

Three ice cubes

PRACTICE DATA · MADE UP FOR THIS PAGE, NOT MEASURED

A class timed how long three ice cubes took to melt. Only the place changed.

Where the cup was	Minutes to melt
in the sun	20
in the shade	45
in the refrigerator	180

Where did the ice melt fastest? _____

How many minutes longer did the ice in the shade take than the ice in the sun?

_____

Is the melted ice still water? _____

TALK ABOUT IT

Why does snow melt faster in the sun than in the shade?

What else melts when it gets warm?



STUCK? TRY THIS

Fastest means the fewest minutes. Then subtract 20 from 45.

★ CHALLENGE ZONE

How could you keep an ice cube from melting for a long time? Plan a test.

WEEK 6 WATER

Frozen Water

Make water cold enough, and it freezes into a solid.

SITS BESIDE
Water as a solid and a liquid (2-ESS2-3)

NOTICE FIRST · 2 MINUTES
Open a freezer for a moment. What do you see on the sides or the trays?

TRY IT · YOU WILL NEED

- a small cup of water
- a freezer

WORDS TO KEEP

freeze To change from a liquid to a solid.

Freezing

Put a small cup of water in a freezer. Check it every hour.

First it is liquid. Then it turns slushy. Then it is solid ice. The water **froze**.

Melting and freezing go back and forth. Ice can melt into water, and water can freeze into ice, again and again.

MY INVESTIGATION

I predict:

What happened:

What I think caused it:

A cup in the freezer

PRACTICE DATA · MADE UP FOR THIS PAGE, NOT MEASURED

A class checked a cup of water every hour.

Hours in the freezer	What the water was like
0	liquid
1	liquid
2	slushy
3	slushy
4	solid

After how many hours was it solid? _____

At which hourly check was it first slushy? _____

Where on Earth is water frozen all year?

_____

💬 **TALK ABOUT IT**

Why do you think ponds freeze in some places in winter?

What foods do people freeze?



STUCK? TRY THIS

Slushy means it has started to freeze but is not solid yet.

★ **CHALLENGE ZONE**

Would a big bowl of water freeze faster or slower than a small cup? Make a guess, then test it.

WEEK 7 LAND

A Model Landscape

Build hills and a valley in sand. Then make it rain.

SITS BESIDE
Mapping land and water (2-ESS2-2)

NOTICE FIRST · 2 MINUTES
After it rains, where do puddles form at school: on high places or low places?

TRY IT · YOU WILL NEED

- a tray of damp sand
- a cup of water
- a spoon

Safely: Wipe up spills so nobody slips.

Make it rain

Build a hill, a valley and a flat plain in a tray of damp sand. This is a model: a small copy of something real.

Sprinkle water on it with a spoon, like rain. Watch where the water goes.

Water flows downhill. It runs off high places and collects in low places.

DRAW IT

Draw your model from above, like a map. Show where the water went.

MY INVESTIGATION

I predict:

What happened:

What I think caused it:

Where the water went

PRACTICE DATA · MADE UP FOR THIS PAGE, NOT MEASURED

A class sprinkled 8 spoonfuls of water on a model. Some soaked into the sand. They counted the spoonfuls that collected in each place.

Place	Spoonfuls that collected
the top of the hill	0
the side of the hill	0
the valley	4
the flat plain	1

Where did the most water collect? _____

How many spoonfuls collected in all? _____

Why does water collect in low places?

_____

💬 **TALK ABOUT IT**

Where would a lake be most likely to form near you?

Why do you think roads have drains at the low spots?



STUCK? TRY THIS

Add the four numbers. The rest of the 8 spoonfuls soaked into the sand.

★ **CHALLENGE ZONE**

Change your model so the water collects somewhere else. What did you change?

WEEK 8 LAND

Reading a Model

A model can show you something before it happens.

SITS BESIDE
Mapping land and water (2-ESS2-2)

NOTICE FIRST · 2 MINUTES
Think of the model you built last week. Where would you build a house to stay dry?

Use the model

Scientists use models to make predictions.

If you know how high each place is, you can predict where rain will flow and where a lake will form. Water always moves down to the lowest place it can reach.

That is why towns are careful where they build. A house in a low place can flood.

DRAW IT
Draw a map of the four places in the table. Write how high each place is.

Four places on a model

PRACTICE DATA · MADE UP FOR THIS PAGE, NOT MEASURED

A class measured how high four places on their model were.

Place	How high
A	15 cm
B	9 cm
C	3 cm
D	12 cm

Which place is the lowest? _____

How much higher is A than C? _____

Where would a lake form? Why?

_____

💬 **TALK ABOUT IT**

Why might a town build a park, not houses, in its lowest place?

What could you use a model to find out?



STUCK? TRY THIS

Find the smallest number. Water goes there.

★ **CHALLENGE ZONE**

Draw a model of a town with a hill, a valley and a river. Where would you put the school? Why?

WEEK 9 REVIEW

What Is Here?

Eight weeks in one page: the shapes of the land, and where the water is.

SITS BESIDE
Mapping land and water (2-ESS2-2)

NOTICE FIRST · 2 MINUTES
Close your eyes and picture the land near your school. What shapes and what water are there?

Part 1 on one card

A **map** shows a place from above. A **map key** tells what the pictures mean.

Land can be a mountain, a hill, a **valley** or a **plain**.

Water can be a **liquid**, like a river, or a **solid**, like a glacier. Ice **melts** and water **freezes**.

Water flows downhill and collects in low places.

DRAW IT
Draw a place with a mountain, a valley and a river.

Name it

Write the name for each one. Use these words: mountain, plain, valley, ocean, river, lake.

	What it is like	Name
a	a tall, pointed piece of land	
b	wide, flat land	
c	a low place between hills	
d	a huge area of salty water	
e	water flowing downhill in a long line	
f	still water with land all around it	

How many of the six are land? _____

How many are water? _____

Which one would you like to visit? Why?

_____

TALK ABOUT IT

Tell someone at home three landforms and three kinds of water.

Which landform is closest to your school?



STUCK? TRY THIS

Land is solid ground. Water is the ocean, rivers and lakes.

★ CHALLENGE ZONE

Draw one picture that has all six of these in it. Label each one.

WEEK 10 MATERIALS

Sort by How It Feels

Close your eyes and touch something. You can tell a lot without looking.

SITS BESIDE
Describing materials by their properties (2-PS1-1)

NOTICE FIRST · 2 MINUTES
Touch your desk, your sleeve and your pencil. How does each one feel?

TRY IT · YOU WILL NEED

- a rock
- a spoon
- a sponge
- a silk scarf
- a marble
- a pinecone

Safely: Keep small things like marbles out of your mouth.

WORDS TO KEEP

property Something you can notice about a material, like how it feels, how hard it is, or its color.

Feel and sort

Touch each object. Is it hard or soft? Is it smooth or rough?

Each answer is a **property**: something you can notice about a material. Color, shape, how it feels and how hard it is are all properties.

Sort your objects into groups by one property. Then sort them again by a different property. The groups change.

MY INVESTIGATION

I predict:

What happened:

What I think caused it:

Six objects

PRACTICE DATA · MADE UP FOR THIS PAGE, NOT MEASURED

A class sorted six objects by two properties.

Object	Hard or soft?	Smooth or rough?
a rock	hard	rough
a spoon	hard	smooth
a sponge	soft	rough
a silk scarf	soft	smooth
a marble	hard	smooth
a pinecone	hard	rough

How many objects are hard? _____

How many are hard AND smooth? _____

Which ONE is soft and rough? _____

TALK ABOUT IT

Name something soft that you use every day.

Why do you think pillows are soft and not hard?



STUCK? TRY THIS

For the second question, a row must say hard AND smooth.

★ CHALLENGE ZONE

Find one more object that is soft and smooth, and one that is hard and rough.

WEEK 11 MATERIALS

Bendy, Hard, Soft

Some things bend. Some things snap. Some things just stay the way they are.

SITS BESIDE
Describing materials by their properties (2-PS1-1)

NOTICE FIRST · 2 MINUTES
Bend your arm, then try to bend your pencil, gently. Which one bends?

TRY IT · YOU WILL NEED

- a rubber band
- a sheet of paper
- a square of foil
- a pencil
- a craft stick

Safely: Bend things gently. Point a stretched rubber band away from faces.

Does it bend?

Try to bend each object gently, with your hands.

Some materials bend easily: paper, foil, rubber. Some stay stiff: wood, hard plastic. Being bendy or stiff is a property too.

People choose materials for their properties. A bendy straw needs a part that bends. A ladder needs parts that do not.

MY INVESTIGATION

I predict:

What happened:

What I think caused it:

Bend test

PRACTICE DATA · MADE UP FOR THIS PAGE, NOT MEASURED

A class tried to bend five objects gently.

Object	Did it bend?
a rubber band	yes
a sheet of paper	yes
a square of foil	yes
a pencil	no
a craft stick	no

How many objects bent? _____

Which TWO objects did not bend? _____

Name something in the room that should NOT bend, and say why.

_____

TALK ABOUT IT

Name something that needs to bend to work.

Name something that would break if it bent.



STUCK? TRY THIS

Count the yes answers. Then find the no answers.

★ CHALLENGE ZONE

Design a bookmark that can bend but will not tear. Which material would you choose, and why?

WEEK 12 MATERIALS

Best for the Job

To clean up a spill, you need a material that soaks up water.

SITS BESIDE
Testing materials for a purpose (2-PS1-2)

NOTICE FIRST · 2 MINUTES
Spill a few drops of water on a desk. What would you use to wipe it up?

TRY IT · YOU WILL NEED

- squares of paper towel, cloth, wax paper and newspaper, all the same size
- a cup of water
- a dropper

Safely: Wipe up spills so nobody slips.

WORDS TO KEEP

absorb To soak up a liquid.

Which soaks up the most?

Hold each square over a cup. Add drops of water one at a time, and count until water drips through.

Some materials **absorb** a lot of water. Some absorb none: the water just rolls off.

Use squares that are all the same size, and the same dropper, so the test is fair.

MY INVESTIGATION

I predict:

What happened:

What I think caused it:

Four squares

PRACTICE DATA · MADE UP FOR THIS PAGE, NOT MEASURED

A class counted the drops each square soaked up before water dripped through.

Material	Drops it soaked up
paper towel	30
cloth	25
wax paper	0
newspaper	12

Which material soaked up the most? _____

How many more drops did the paper towel soak up than the newspaper? _____

Which material would you use to wipe a spill? _____

TALK ABOUT IT

Why do you think towels are made of cloth?

Where would you want a material that does NOT soak up water?



STUCK? TRY THIS

Find the biggest number. Then subtract 12 from 30.

★ CHALLENGE ZONE

Wax paper soaked up nothing. Name a job wax paper would be good for.

WEEK 13 MATERIALS

Test It

Which material would make the best umbrella? Do not guess. Test it.

SITS BESIDE
Testing materials for a purpose (2-PS1-2)

NOTICE FIRST · 2 MINUTES
Look at a raincoat or an umbrella. What do you think it is made of?

TRY IT · YOU WILL NEED

- a plastic cup
- a rubber band
- squares of plastic bag, paper, cloth and foil
- a dropper
- water

Safely: Wipe up spills so nobody slips.

WORDS TO KEEP

waterproof Does not let water through.

Keep the cup dry

Stretch a square over a cup and hold it with a rubber band. Put 10 drops of water on top with a dropper.

Look inside the cup. Is it dry? A **waterproof** material does not let water through.

Test every material the same way: the same cup and the same 10 drops of water.

MY INVESTIGATION

I predict:

What happened:

What I think caused it:

Umbrella test

PRACTICE DATA · MADE UP FOR THIS PAGE, NOT MEASURED

A class put 10 drops on each material and counted the drops that got into the cup.

Material on top	Drops (out of 10) that got in
plastic bag	0
paper	8
cloth	5
foil	0

Which TWO materials kept the cup dry? _____

Which material let the most water through? _____

Which would you choose for an umbrella? Why?

_____

TALK ABOUT IT

Name something you wear that is waterproof.

Why would a paper umbrella be a bad idea?



STUCK? TRY THIS

Kept the cup dry means 0 drops got in.

★ CHALLENGE ZONE

Foil and plastic both kept the cup dry. Which would make a better umbrella? Think about another property, like tearing.

WEEK 14 MATERIALS

Small Pieces

Big things can be built from many small pieces.

SITS BESIDE
Building objects from small pieces (2-PS1-3)

NOTICE FIRST · 2 MINUTES
Look at a brick wall. How many pieces do you think it is made of?

TRY IT · YOU WILL NEED

- 20 small blocks that snap together

Build it

Build something with 20 blocks. Then take it apart.

Use the same blocks to build something different. The pieces are the same. The thing you made is new.

Many big things are made of small pieces: a wall from bricks, a sweater from yarn, a house from boards.

DRAW IT
Draw something you built. Then draw something new from the same pieces.

Three things from one box

PRACTICE DATA · MADE UP FOR THIS PAGE, NOT MEASURED

A class had a box of 20 blocks. They built three things, one at a time, and counted the blocks each one used.

What they built	Blocks used
a tower	20
a house	16
a bridge	12

Which thing used the most blocks? _____

How many blocks were left in the box when they built the bridge? _____

How many more blocks did the house use than the bridge? _____

TALK ABOUT IT

Name something at school that is made of many small pieces.

What could you build with 100 blocks?



STUCK? TRY THIS

The box had 20 blocks. Subtract the blocks the bridge used.

★ CHALLENGE ZONE

Build two different things that each use exactly 12 blocks. Draw both.

WEEK 15 MATERIALS

Take Apart, Build New

Take something apart, and every piece is still there to build with.

SITS BESIDE
Building objects from small pieces (2-PS1-3)

NOTICE FIRST · 2 MINUTES
Think of a toy you can take apart and put together a new way.

TRY IT · YOU WILL NEED

- blocks that snap together

Nothing lost

Build a tall tower. Count its blocks. Then take it apart and build two short towers.

Count the blocks in both short towers together. It is the same number as the tall tower had.

Taking something apart does not make pieces disappear. The same pieces can become something else.

DRAW IT
Draw the tall tower, and the two short towers made from it.

One tower into two

PRACTICE DATA · MADE UP FOR THIS PAGE, NOT MEASURED

A class took apart a tower of 24 blocks. They built one new tower with 15 blocks, and a second tower with the rest.

How many blocks are in the second tower? _____

How many blocks are in both new towers together? _____

Did any blocks disappear? _____

TALK ABOUT IT

Name something old that was made into something new.

Why do you think people take things apart?



STUCK? TRY THIS

Subtract 15 from 24 for the second tower.

★ CHALLENGE ZONE

Split a tower of 30 blocks into three towers of different heights. How many in each? Check that they add up to 30.

WEEK 16 MATERIALS

Warm It Up

Warm some things up and they change. Cool them down, and some change back.

SITS BESIDE
Changes from heating and cooling (2-PS1-4)

NOTICE FIRST · 2 MINUTES
Think about a chocolate bar left in a hot car. What happens to it? What happens when it cools?

TRY IT · YOU WILL NEED

- a small piece of butter in a zipper bag
- a bowl of warm tap water
- a bowl of cold water

Safely: Never taste anything in an investigation, even food from the kitchen. Use warm tap water only, never hot.

WORDS TO KEEP

reversible A change that can be undone, like ice melting and freezing again.

Change, and change back

Hold the bag of butter in warm water. Watch it melt. Then hold it in cold water. Watch it get hard again.

That change is **reversible**: it can be undone.

Some changes from heating cannot be undone. A cooked egg cannot become a raw egg again. Toast cannot turn back into bread.

DRAW IT

Draw the butter in the warm water and in the cold water.

MY INVESTIGATION

I predict: _____

What happened: _____

What I think caused it: _____

Can it change back?

Write yes if the change can be undone, or no if it cannot.

	The change	Can it change back?
a	ice melts	
b	butter melts	
c	an egg cooks	
d	bread toasts	
e	chocolate melts	

How many of the changes can be undone? _____

Which TWO cannot be undone? _____

What happened to the butter when you cooled it?

_____

TALK ABOUT IT

Name a food that changes when it is cooked.

Why do you think ice cream melts in the sun?



STUCK? TRY THIS

Ask: could you get the first thing back by cooling it?

★ CHALLENGE ZONE

Melted chocolate can harden again. Is it exactly the same shape as before? Is it still chocolate?

WEEK 17 MATERIALS

Can It Go Back?

Heating changes things. Cooling can undo some of the changes, but not all.

SITS BESIDE
Changes from heating and cooling (2-PS1-4)

NOTICE FIRST · 2 MINUTES
Look at a kernel of popcorn and a piece of popped popcorn. Could one turn back into the other?

TRY IT · YOU WILL NEED

- bread and a toaster
- popcorn kernels and a microwave
- an ice cube
- a crayon
- a warm windowsill
- a freezer

Safely: An adult does all the heating. Never taste anything in an investigation, even food from the kitchen.

Undo it, or not

Watch an adult toast bread and pop popcorn. Let an ice cube melt in a warm room, and leave a crayon on a warm windowsill until it is soft.

Now try to undo each change. Put the melted ice water in a freezer. Let the crayon cool. Let the toast and the popcorn cool.

Predict first: which ones will go back to the way they were? Then check each one.

DRAW IT
Draw a popcorn kernel before and after it popped.

MY INVESTIGATION

I predict: _____

What happened: _____

What I think caused it: _____

Four changes

Write yes if cooling could undo the change.

	The change	Can cooling undo it?
a	bread toasted in a toaster	
b	popcorn popped in a microwave	
c	ice melted in a warm room	
d	a crayon softened on a warm windowsill	

How many changes could cooling undo? _____

Which change made something much bigger? _____

Name one more change from heating that cannot be undone.

_____

TALK ABOUT IT

Name something that melts and then hardens again.

Why do you think cooked food cannot turn back into raw food?



STUCK? TRY THIS

Ask what happens to each one after it cools.

★ CHALLENGE ZONE

Sort five changes you know into two groups: can be undone, and cannot be undone.

WEEK 18 REVIEW

What Is It Made Of?

Eight weeks in one page: everything is made of materials, and materials have properties.

SITS BESIDE
Describing materials by their properties (2-PS1-1)

NOTICE FIRST · 2 MINUTES
Look around the room. Find one thing made of wood, one of metal and one of cloth.

Part 2 on one card

A **property** is something you can notice about a material: how it feels, if it bends, if it **absorbs** water, if it is **waterproof**.

People choose a material because its properties fit the job.

Big things can be built from small pieces, and the pieces can build something new.

Heating and cooling change materials. Some changes are **reversible**, and some are not.

DRAW IT
Draw three objects from your classroom and write the material of each.

Name the material

Write the material each object is made of. Use these words: metal, glass, wood, cloth.

	Object	Material
a	a spoon	
b	a window	
c	a wooden chair	
d	a sock	
e	a nail	
f	a pencil	

How many objects are made of metal? _____

Which TWO objects are made of wood? _____

Pick one object. Why is it made of that material?

_____

TALK ABOUT IT

Tell someone at home why a window is made of glass and not wood.

What material would you use to make a raincoat?



STUCK? TRY THIS

Think about how each object feels and looks.

★ CHALLENGE ZONE

Choose one object. Draw it made of a different material. Would it still work?

WEEK 19 CHANGES

Fast or Slow

Some changes to the land happen in a minute. Some take longer than a whole human life.

SITS BESIDE
Fast and slow changes to the land (2-ESS1-1)

NOTICE FIRST · 2 MINUTES
Look at a sidewalk or a step that is very old. What has changed about it?

WORDS TO KEEP

erosion	Rock and soil being worn away and carried off, a little at a time.

Fast and slow

Some changes to the land are fast. A landslide or an earthquake can change the land in minutes.

Some changes are very slow. Wind and water wear rock away, a tiny bit at a time. That is **erosion**. A river can take a very, very long time to carve a canyon.

Ice changes the land too. Water gets into a crack in a rock, freezes, and pushes the crack wider. Slow changes are hard to see, because nobody watches long enough.

DRAW IT
Draw a fast change to the land and a slow one.

Sort the changes

Write fast or slow for each change.

	Change	Fast or slow?
a	a volcano erupts	
b	a river carves a canyon	
c	an earthquake shakes the ground	
d	wind wears down a rock	
e	a landslide falls	
f	a mountain wears down	

How many changes are fast? _____

Which slow change makes a canyon? _____

Why are slow changes hard to notice?

_____

TALK ABOUT IT

What is the oldest thing you have seen outdoors?

Which fast change would you most like to see from far away?



STUCK? TRY THIS

A fast change happens in minutes or hours. A slow one takes many, many years.

★ CHALLENGE ZONE

Draw one place before and after a fast change, and one place before and after a slow change.

WEEK 20 CHANGES

Wind Moves Land

Wind can pick up sand and carry it away.

SITS BESIDE
Wind and water change the land (2-ESS2-1)

NOTICE FIRST · 2 MINUTES
Have you ever felt sand or dust blow against your legs on a windy day?

TRY IT · YOU WILL NEED

- a tray with a thin layer of dry sand
- a straw for each student
- a ruler

Safely: Only blow out. Never suck in through the straw. Blow gently, keep your face back, and wear safety glasses if you have them. Never share straws.

Make some wind

Blow gently through a straw at the sand in a tray. Watch the sand move.

Wind moves sand the same way, but over a whole beach or desert. It can pile sand into hills called dunes.

Measure how far the sand moves after each blow.

MY INVESTIGATION

I predict:

What happened:

What I think caused it:

Blowing on sand

PRACTICE DATA · MADE UP FOR THIS PAGE, NOT MEASURED

A class blew through a straw, the same way each time, and measured how far the sand had moved.

Blows	How far the sand moved
1	3 cm
2	6 cm
3	9 cm
4	12 cm

How far had the sand moved after 4 blows? _____

How much farther did it move with each blow? _____

Predict how far after 5 blows. _____

TALK ABOUT IT

Where have you seen sand or dust blown by the wind?

Why do you think beaches sometimes have fences in the sand?



STUCK? TRY THIS

Subtract each row from the next one. Is it the same every time?

★ CHALLENGE ZONE

How could you stop the sand from moving when you blow? Try one idea and say what happened.

WEEK 21 CHANGES

Water Moves Land

Rain running downhill can carry sand and soil with it.

SITS BESIDE
Wind and water change the land (2-ESS2-1)

NOTICE FIRST · 2 MINUTES
After a big rain, look at a slope at school. Did any dirt wash down?

TRY IT · YOU WILL NEED

- three trays of damp sand, each piled into a hill
- pebbles
- leaves
- a cup of water

Safely: Wipe up spills so nobody slips.

Rain on a hill

Pour the same cup of water slowly onto the top of each sand hill. Watch what washes down.

Running water carries sand and soil downhill. Over a long time, this changes the shape of the land.

Cover one hill with pebbles and one with leaves. Do they wash away as much?

MY INVESTIGATION

I predict:

What happened:

What I think caused it:

Three hills in the rain

PRACTICE DATA · MADE UP FOR THIS PAGE, NOT MEASURED

A class poured the same water on three hills and counted the spoonfuls of sand that washed to the bottom.

Hill	Spoonfuls of sand washed down
bare sand	8
sand with pebbles on top	3
sand with leaves on top	4

Which hill lost the most sand? _____

How many fewer spoonfuls washed down with pebbles than with bare sand? _____

What helps hold sand in place?

_____

TALK ABOUT IT

Why do you think people plant grass on hillsides?

Where does the water go after it runs down the hill?



STUCK? TRY THIS

Fewer means subtract: bare sand minus pebbles.

★ CHALLENGE ZONE

Plan a fourth hill that you think would lose the least sand of all. What would you cover it with?

WEEK 22 DESIGN

Stop the Sand

Engineers start a design by understanding the problem.

SITS BESIDE
Defining a problem to solve (K-2-ETS1-1)

NOTICE FIRST · 2 MINUTES
Look at the sandbox or a sandy spot at school. Is there sand where it should not be?

WORDS TO KEEP

engineer	A person who designs things to solve problems.

What is the problem?

Imagine a school where sand keeps blowing out of the sandbox onto the path. People slip on it.

An **engineer** does not start by building. First, ask questions. When does the sand blow out? How much? From which side?

Then watch and measure. A problem you understand is much easier to solve.

DRAW IT
Draw the sandbox and the path. Draw arrows to show where the sand goes.

Sand on the path

PRACTICE DATA · MADE UP FOR THIS PAGE, NOT MEASURED

A class swept the sand off the path every afternoon for one week and counted the cups. Wednesday and Friday were windy days.

Day	Cups of sand
Monday	3
Tuesday	1
Wednesday	6
Thursday	2
Friday	5

On which day was there the most sand? _____

How many cups were swept in all? _____

What do the windy days tell you about the problem?

_____

TALK ABOUT IT

What is a problem at school that an engineer could help solve?

What question would you ask before fixing it?



STUCK? TRY THIS

Add all five days.

★ CHALLENGE ZONE

Write three questions you would ask about the sandbox before designing a fix.

WEEK 23 DESIGN

Draw the Idea

Before engineers build, they draw. A drawing shows how an idea will work.

SITS BESIDE
Drawing a design (K-2-ETS1-2)

NOTICE FIRST · 2 MINUTES
Think of something you made from a plan or a picture. Did the plan help?

Draw it first

Draw your idea for keeping sand in the sandbox. Label each part.

A drawing helps you explain your idea to other people. It also helps you find problems before you build.

Engineers often draw more than one idea, then choose.

DRAW IT
Draw your best idea for keeping sand in the sandbox. Label each part.

Three ideas

PRACTICE DATA · MADE UP FOR THIS PAGE, NOT MEASURED

A class drew three ideas and guessed how many days each would take to start working.

Idea	Days until it works (a guess)
a fence of sticks and cloth	1
a hedge of bushes	60
a lid for the sandbox	2

Which idea takes the longest to start working? _____

How many more days for the hedge than for the lid? _____

Which idea would you choose? Why?

_____

TALK ABOUT IT

Why do you think bushes take so long to work as a fence?

Who could you show your drawing to for ideas?



STUCK? TRY THIS

Find the biggest number of days.

★ CHALLENGE ZONE

Draw one more idea of your own. Label its parts and say how it would stop the sand.

WEEK 24 DESIGN

Which Fix Worked?

Build small models of each idea, and test them the same way.

SITS BESIDE
Testing designs to compare them (K-2-ETS1-3)

NOTICE FIRST · 2 MINUTES
How could you test a fix for the sandbox without waiting for a windy day?

TRY IT · YOU WILL NEED

- a tray of dry sand for each idea
- a straw for each student
- materials for small fences and walls
- a spoon

Safely: Only blow out. Never suck in through the straw. Blow gently, keep your face back, and wear safety glasses if you have them. Never share straws.

Test the models

Build a small model of each fix around a tray of sand. Then blow through a straw at each tray in the same way.

Count the spoonfuls of sand that blew out of each tray. The best fix lets the least sand out.

Test every model the same way, so the test is fair.

MY INVESTIGATION

I predict:

What happened:

What I think caused it:

Four trays

PRACTICE DATA · MADE UP FOR THIS PAGE, NOT MEASURED

A class blew on four trays the same way and counted the spoonfuls of sand that blew out.

Fix	Spoonfuls blown out
no fix	10
a fence	3
a wall of blocks	1
a row of leaves	6

Which fix kept the most sand in? _____

How many fewer spoonfuls with the wall than with no fix? _____

The wall worked best. Why might the class still choose the fence?

_____

TALK ABOUT IT

Why is it useful to test a small model before building the real thing?

What else would you want to know before building a fix?



STUCK? TRY THIS

Kept the most sand in means the fewest spoonfuls blew out.

★ CHALLENGE ZONE

Change one thing about the fence to make it work better. Test it and say what happened.

WEEK 25 CHANGES

Very Slow

Rubbing wears things away, a little at a time.

SITS BESIDE
Fast and slow changes to the land (2-ESS1-1)

NOTICE FIRST · 2 MINUTES
Look at the bottom of an old shoe. Why is it worn down?

TRY IT · YOU WILL NEED

- a piece of sidewalk chalk
- a ruler
- a rough sidewalk or a brick

Safely: Rub gently and keep your fingers off the sidewalk. Keep chalk dust away from your face. Wash your hands after.

Wear it down

Measure a piece of chalk. Rub it on a rough sidewalk 20 times, then measure it again.

Each rub takes away a tiny bit. After many rubs, the chalk is much shorter.

Rivers and wind wear away rock the same way, but rock is much harder than chalk. That is why a canyon takes a very long time.

DRAW IT
Draw the chalk before and after. Write both lengths.

MY INVESTIGATION

I predict:

What happened:

What I think caused it:

Rubbing chalk

PRACTICE DATA · MADE UP FOR THIS PAGE, NOT MEASURED

A class rubbed a piece of chalk on a sidewalk and measured it every 20 rubs.

Rubs	How long the chalk was
0	10 cm
20	9 cm
40	8 cm
60	7 cm

How long was the chalk after 60 rubs? _____

How much shorter did it get every 20 rubs? _____

Why does a river take so long to wear away rock?

_____

TALK ABOUT IT

Name something at school that is slowly wearing down.

Why do you think stairs in old buildings dip in the middle?



STUCK? TRY THIS

Subtract each row from the one before.

★ CHALLENGE ZONE

Predict how many rubs it would take to wear the chalk down to 5 cm. Show how you know.

WEEK 26 CHANGES

Very Fast

Tip the land too steeply, and it can slide all at once.

SITS BESIDE
Fast and slow changes to the land (2-ESS1-1)

NOTICE FIRST · 2 MINUTES
Pile sand into a mound. What happens if you keep adding more to the top?

TRY IT · YOU WILL NEED

- a tray of damp sand
- books to tilt the tray
- a cup

Safely: Wipe up spills so nobody slips.

A landslide in a tray

Put a tray of sand on a table. Lift one end with a book, then two, then more.

At first nothing moves. Then, all at once, sand slides down. That is a model of a landslide: a fast change to the land.

Landslides happen most on steep slopes, often after a lot of rain.

DRAW IT
Draw the tray before and after the sand slid.

MY INVESTIGATION

I predict:

What happened:

What I think caused it:

Tilting the tray

PRACTICE DATA · MADE UP FOR THIS PAGE, NOT MEASURED

A class tilted a tray of sand with more and more books and counted the cups of sand that slid.

Books under the tray	Cups of sand that slid
1	0
2	0
3	2
4	7

With how many books did sand first slide? _____

How many more cups slid with 4 books than with 3? _____

Is a landslide a fast change or a slow change? _____

TALK ABOUT IT

Why is it risky to build at the bottom of a steep slope?

What could help stop a hill from sliding?



STUCK? TRY THIS

Look for the first row that is not 0.

★ CHALLENGE ZONE

Pour water slowly onto the top of your sand until it is very wet. Does it slide sooner or later? Say what you found.

WEEK 27 REVIEW

What Changed It?

Eight weeks in one page: wind, water and ice change the land, fast and slow.

SITS BESIDE
Wind and water change the land (2-ESS2-1)

NOTICE FIRST · 2 MINUTES
Think of a change to the land you have seen. What do you think caused it?

Part 3 on one card

The land changes. Some changes are fast, like a landslide. Some are slow, like a canyon.

Wind moves sand. Water carries sand and soil downhill. Ice can crack rock. Wearing away is called **erosion**.

An **engineer** understands a problem, draws ideas, and tests them to find the best fix.

DRAW IT
Draw one change made by wind and one made by water.

Wind, water or ice?

Write wind, water or ice for each change.

	Change	What caused it?
a	sand blew out of the sandbox	
b	a ditch formed on a hill after rain	
c	a rock cracked when water inside it froze	
d	a sand dune moved across a beach	
e	a river washed away its bank	

How many changes were caused by wind? _____

Which change was caused by ice? _____

Pick one change and say if it was fast or slow.

_____

TALK ABOUT IT

Tell someone at home about one way wind or water changes the land.

Which change from this part surprised you?



STUCK? TRY THIS

Ask what was moving: air, water, or water that froze.

★ CHALLENGE ZONE

Draw a hill before and after a big rain. Show where the sand and soil went.

WEEK 28 LIVING THINGS

Plants Need Light

A plant kept in the dark grows strangely. Light is something plants need.

SITS BESIDE
What plants need to grow (2-LS2-1)

NOTICE FIRST · 2 MINUTES
Look at a houseplant. Which way are its leaves facing?

TRY IT · YOU WILL NEED

- two bean plants the same size
- two cups of soil
- water
- a sunny window and a dark closet
- a ruler

Safely: Never look straight at the sun.

Light or dark

Put one plant by a sunny window and one in a dark closet. Give them the same water. Wait ten days.

The plant in the dark may grow tall and thin, but its leaves turn pale yellow. It is stretching to find light.

The plant by the window stays green and strong. Plants need light to make their food.

DRAW IT
Draw both plants after ten days. Color the leaves.

MY INVESTIGATION

I predict:

What happened:

What I think caused it:

Ten days later

PRACTICE DATA · MADE UP FOR THIS PAGE, NOT MEASURED

A class measured two bean plants after ten days. Only the light was different.

Where the plant was	How tall	Green leaves
by a sunny window	10 cm	6
in a dark closet	14 cm	0

Which plant was taller? _____

Which plant had more green leaves? _____

Which plant was healthier? How do you know?

_____

TALK ABOUT IT

Why do you think gardens are planted in sunny places?

Is the tallest plant always the healthiest? Why not?



STUCK? TRY THIS

Taller is not the same as healthier. Look at the leaves.

★ CHALLENGE ZONE

Move the closet plant back into the light. Predict what will happen to its leaves in a week.

WEEK 29 LIVING THINGS

Plants Need Water

Without water, a plant droops, dries out and stops growing.

SITS BESIDE
What plants need to grow (2-LS2-1)

NOTICE FIRST · 2 MINUTES
Have you seen a plant that was not watered? What did it look like?

TRY IT · YOU WILL NEED

- two bean plants the same size
- two cups of soil
- water
- a ruler

Water or no water

Give one plant water every few days. Give the other none. Keep them side by side in the same light.

The watered plant keeps growing. The dry plant droops, and its leaves dry out.

Plants take in water through their roots. Water helps them stand up and make their food.

DRAW IT
Draw both plants on day 9.

MY INVESTIGATION

I predict:

What happened:

What I think caused it:

Nine days

PRACTICE DATA · MADE UP FOR THIS PAGE, NOT MEASURED

A class measured two bean plants every three days. Only the water was different.

Day	0	3	6	9
Watered (cm)	4	6	8	10
Not watered (cm)	4	5	4	3

How much did the watered plant grow from day 0 to day 9? _____

On which day was the dry plant tallest? _____

Why was the dry plant lower on day 9? Look at its stem.

_____

TALK ABOUT IT

Why do you think people water gardens more in summer?

Name an animal that also needs water every day.



STUCK? TRY THIS

Subtract day 0 from day 9 for the watered plant.

★ CHALLENGE ZONE

Too much water can hurt a plant too. Plan a test to find out how much water is best.

WEEK 30 LIVING THINGS

A Fair Plant Test

A fair test changes one thing. Then you know what made the difference.

SITS BESIDE
What plants need to grow (2-LS2-1)

NOTICE FIRST · 2 MINUTES
If you change two things at once and the plant grows, how can you tell which one helped?

Change one thing

To find out if plants need light, the only difference between the two plants should be the light.

Same water. Same soil. Same kind of plant, the same size. If you also change the water, you cannot tell which change made the difference.

A test that changes only one thing is a **fair test**.

DRAW IT
Draw a fair test of light: two plants, with only the light different.

Fair or not?

Each row tells how two plants were different. Write how many things were changed.

	How the two plants were different	Things changed
a	same water, one in the light and one in the dark	
b	one in the light with water, one in the dark with no water	
c	same light, one watered and one not	
d	one big plant in the light, one small plant in the dark	

How many of the tests are fair? _____

Which TWO tests change two things? _____

Fix test b so it is fair.

_____

💬 **TALK ABOUT IT**

Why does a fair test need to change only one thing?

Name something you could test fairly at home with two cups of water.



STUCK? TRY THIS

A fair test changes exactly 1 thing.

★ **CHALLENGE ZONE**

Plan a fair test to find out if plants grow better in sand or in soil. What will you keep the same?

WEEK 31 LIVING THINGS

Carrying Seeds

A plant cannot walk. Some seeds catch a ride on animals instead.

SITS BESIDE
Animals help plants spread seeds (2-LS2-2)

NOTICE FIRST · 2 MINUTES
Have you ever found prickly bits stuck to your socks or a dog's fur after a walk?

TRY IT · YOU WILL NEED

- an old fuzzy sock to pull over a shoe
- a stick
- a magnifying glass

Safely: Stay on the path an adult says is safe. Never touch plants with three leaves. Keep seeds away from your nose, ears and eyes. Check for ticks and wash your hands after. Never look at the sun through a magnifying glass, and never use one to make a hot spot.

WORDS TO KEEP

seed The part of a plant that can grow into a new plant.

Hitch a ride

Pull an old fuzzy sock over your shoe and walk along the edge of a grassy or weedy path, or drag the sock on a stick. Then look at the sock.

Some **seeds** have tiny hooks. They stick to fur, and to socks, and get carried to new places. Some seeds are inside fruit that animals eat.

When a seed lands somewhere new, a new plant can grow there. Animals help plants spread.

DRAW IT

Draw a seed you found. Use the magnifying glass to draw its hooks.

MY INVESTIGATION

I predict:

What happened:

What I think caused it:

Three socks on one walk

PRACTICE DATA · MADE UP FOR THIS PAGE, NOT MEASURED

Three students walked the same path with different socks over their shoes. They counted the seeds that stuck.

Sock	Seeds stuck
a wool sock	14
a cotton sock	6
a smooth nylon sock	1

Which sock picked up the most seeds? _____

How many more seeds stuck to the wool sock than the cotton sock? _____

How do hooks help a seed?

_____

TALK ABOUT IT

Which animals do you think carry the most seeds? Why?

Why is it good for a plant when its seeds travel far away?



STUCK? TRY THIS

Find the biggest number. Then subtract 6 from 14.

★ CHALLENGE ZONE

Design a seed that would catch a ride on a dog. Draw it and label how it sticks.

WEEK 32 LIVING THINGS

Pollen on the Move

Bees carry pollen from flower to flower. You can build a model bee.

SITS BESIDE
Animals help plants spread pollen (2-LS2-2)

NOTICE FIRST · 2 MINUTES
Watch a bee on a flower, from far away. Where does it go next?

TRY IT · YOU WILL NEED

- ten paper flowers
- colored chalk dust
- a cotton swab
- a fuzzy pipe cleaner
- a pencil with an eraser

Safely: Keep the chalk dust away from your face. If you are allergic to stings, or not sure, watch bees from indoors.

WORDS TO KEEP

pollen — A fine dust, often yellow, made by flowers. Moving it from flower to flower helps the plant make seeds.

A model bee

Put a little chalk dust in the middle of one paper flower. That is the **pollen**.

Touch it with your model bee, then visit the other flowers one at a time. Count how many flowers end up with some pollen.

Real bees have fuzzy bodies. Pollen sticks to them, and they carry it to the next flower. That helps the plant make seeds.

MY INVESTIGATION

I predict:

What happened:

What I think caused it:

Three model bees

PRACTICE DATA · MADE UP FOR THIS PAGE, NOT MEASURED

A class tested three model bees. Each one visited the same 9 clean flowers after touching the pollen.

Model bee	Flowers that got pollen
a cotton swab	7
a fuzzy pipe cleaner	9
a pencil eraser	2

Which model bee carried pollen to the most flowers? _____

How many more flowers did the pipe cleaner reach than the pencil eraser? _____

Why does a fuzzy bee work better?

_____

TALK ABOUT IT

Why do you think gardeners like bees?

Name another animal that visits flowers.



STUCK? TRY THIS

Find the biggest number. Then subtract the eraser's number.

★ CHALLENGE ZONE

Design a better model bee. What would you change, and how would you test it?

WEEK 33 LIVING THINGS

Who Lives Here?

Look closely at one small patch of ground, and you find many kinds of living things.

SITS BESIDE
Kinds of living things in different places (2-LS4-1)

NOTICE FIRST · 2 MINUTES
Look at one square of grass for one minute. How many different living things can you find?

TRY IT · YOU WILL NEED

- a loop of string about 1 meter around
- a magnifying glass
- a clipboard

Safely: Look, but never lift a rock or log, and never touch an animal. Stay back from bees and ant hills. If you are allergic to stings, tell your teacher. Never look at the sun through a magnifying glass, and never use one to make a hot spot. Wash your hands after.

WORDS TO KEEP

habitat The place where a living thing lives and finds what it needs.

A tiny habitat

Lay a loop of string on the ground. Look closely inside it, with a magnifying glass.

Count how many different kinds of living things you find: plants, insects, worms. Count kinds, not each one.

A **habitat** is a place where living things find what they need: food, water and shelter.

DRAW IT
Draw what you found inside your string loop. Label each kind.

Inside one string loop

PRACTICE DATA · MADE UP FOR THIS PAGE, NOT MEASURED

A class found these kinds of living things inside one string loop on the school lawn.

Living thing	Plant or animal?
grass	plant
clover	plant
a dandelion	plant
ants	animal
a beetle	animal
a worm	animal

How many different kinds of living things did they find? _____

How many kinds were plants? _____

What might the ants find to eat here?

_____

TALK ABOUT IT

Where at school do you think the most kinds of living things live?

Why should we look at insects without touching them?



STUCK? TRY THIS

Count the rows. Each row is one kind.

★ CHALLENGE ZONE

Put your string loop in a different place. Do you think you will find more kinds or fewer? Try it.

WEEK 34 LIVING THINGS

Count the Kinds

Two places side by side can have very different numbers of kinds of living things.

SITS BESIDE
Kinds of living things in different places (2-LS4-1)

NOTICE FIRST · 2 MINUTES
Are there more kinds of living things in a mowed lawn or in a garden bed? What do you think, and why?

TRY IT · YOU WILL NEED

- a loop of string
- a magnifying glass

Safely: Look, but never lift a rock or log, and never touch an animal. Stay back from bees and ant hills. If you are allergic to stings, tell your teacher. Never look at the sun through a magnifying glass, and never use one to make a hot spot. Wash your hands after.

More places, more kinds

Put your string loop on a mowed lawn. Count the kinds. Then put it in a garden bed, a planter or a weedy corner, and count again.

A place with many kinds of plants usually has many kinds of animals too, because there is more food and more places to hide.

Scientists compare places by counting kinds.

DRAW IT
Draw your two places side by side. Show the kinds you found in each.

A lawn and a garden

PRACTICE DATA · MADE UP FOR THIS PAGE, NOT MEASURED

A class counted the kinds of living things inside one string loop in each place.

Place	Kinds they found
mowed lawn	grass, clover, ants
garden bed	grass, clover, roses, tomato plants, ants, bees, a worm

Which place had more kinds? _____

How many more kinds? _____

Why might the garden have more kinds?

_____

TALK ABOUT IT

What could your school plant to bring more kinds of living things?

Why do you think bees were in the garden but not on the lawn?



STUCK? TRY THIS

Count the kinds in each place, then subtract.

★ CHALLENGE ZONE

Which kinds were found in both places? Which were only in the garden?

Places Compared

A graph shows at a glance which place has the most kinds of life.

SITS BESIDE
Kinds of living things in different places (2-LS4-1)

NOTICE FIRST · 2 MINUTES
Think of a pond or a stream. What living things might be in it and around it?

Graph the kinds

A bar graph shows numbers as bars. A taller bar means a bigger number.

Draw a bar for each place on page 2. Then you can see at once which place has the most kinds of living things. Places with water, plants and shelter usually have the most kinds of life.

Four places

PRACTICE DATA · MADE UP FOR THIS PAGE, NOT MEASURED

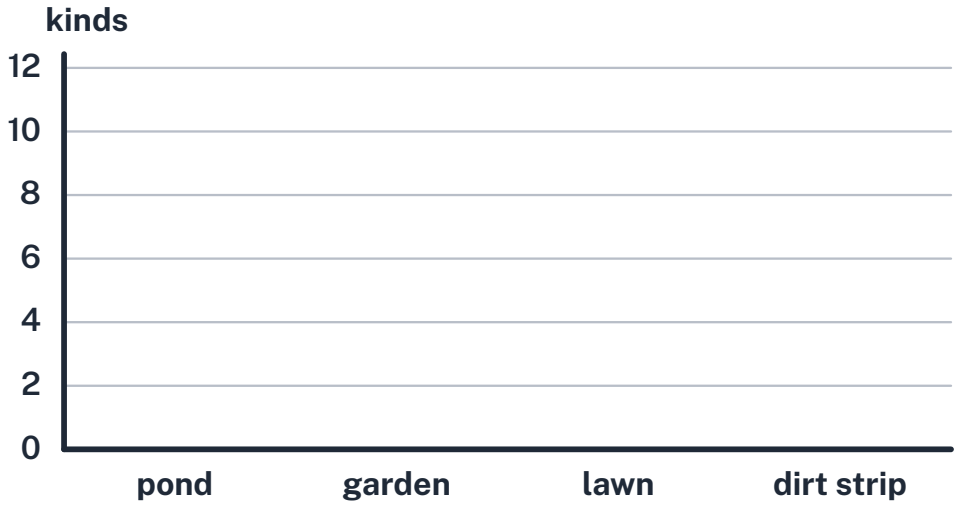
A class counted the kinds of living things in four places. The dirt strip is a strip of dirt with a few weeds, by the parking lot.

Place	Kinds of living things
pond	12
garden	7
lawn	3
dirt strip	2

NOTES AND DRAWINGS

Draw the graph

Draw a bar for each place, using the table on page 1: pond 12, garden 7, lawn 3, dirt strip 2.



Which place had the most kinds? _____

How many more kinds at the pond than on the lawn? _____

Why might the dirt strip have the fewest?

_____

TALK ABOUT IT

Which place near you has the most kinds of living things?

What would happen to the living things if the pond dried up?



STUCK? TRY THIS

Each line on the graph is 2. A bar for 7 stops halfway between 6 and 8.

★ CHALLENGE ZONE

How could people help more kinds of living things live in the dirt strip?

WEEK 36 REVIEW

Look Closer

A whole year of looking closely: at the land, at materials, at changes and at life.

SITS BESIDE
Kinds of living things in different places (2-LS4-1)

NOTICE FIRST · 2 MINUTES
Look out the window one more time. What do you notice now that you did not notice at the start of the year?

The year on one card

Part 1: land and water. Maps, landforms, and water as a solid and a liquid.

Part 2: materials. Properties, the best material for a job, and changes from heating and cooling.

Part 3: changes to the land, fast and slow, and an engineer's way to solve a problem.

Part 4: what plants need, how animals help them, and how many kinds of life live in a place.

DRAW IT
Draw something you looked closely at this year.

Which part of the year?

Write 1, 2, 3 or 4 for the part of the year each one belongs to.

	Thing	Part
a	a lake	
b	a waterproof boot	
c	a canyon	
d	a seed with hooks stuck to a sock	
e	a map key	
f	a fence against the wind	

How many things belong to Part 1? _____

Which TWO things belong to Part 3? _____

What was your favorite thing to look closely at this year?

_____

💬 **TALK ABOUT IT**

Tell someone at home your favorite investigation from this year.

What do you want to find out about next year?



STUCK? TRY THIS

Look at the year on one card. Which part talks about each thing?

★ **CHALLENGE ZONE**

Draw one picture that shows something from all four parts of the year.

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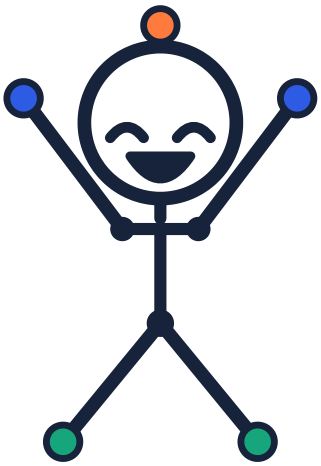
Grade 2 · Look Closer

Certificate of Completion

This is to certify that

_____

practiced looking closely for thirty-six weeks.



_____ _____

Teacher Date

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