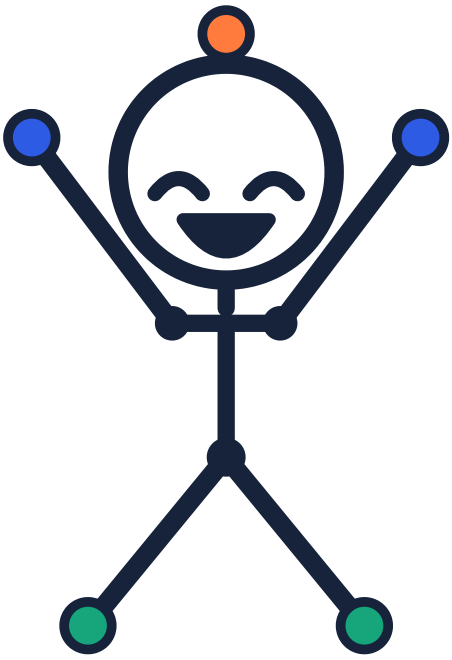
Young Innovators
FOR CHANGE
innovateyouth.org

A FULL-YEAR SCIENCE PROGRAM · GRADE 1

Look and Listen

36 weekly investigations for young scientists:
plants, animals, sound, light and the sky.



This book belongs to

Something I saw

Something I heard

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.
Then listen.

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

The shape of a week

For the grown-up. Each page 1 has one sentence in big letters: the sentence the child reads. Everything else on page 1 is for you: read the boxes aloud and look at any picture together. **Page 2** has a short table and two or three questions to work through together. No computer needed.

Part 1 is plants and animals. Part 2 is sound, with one more week on animal babies. Part 3 is light and shadows. Part 4 is the sun, the moon and the stars.

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.
READ ALOUD	The science for the week, for the grown-up to read to the class. New words are taught here, out loud.
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 see? What do you hear? Every week starts with noticing, before any explaining. A drawing is a good answer, and so is a sentence said out loud.

WEEK	TITLE	TOPIC	STANDARD
PART 1 · WEEKS 1–9 · PLANTS AND ANIMALS: PARTS THAT HELP			
1	**Plant Parts**	Plants	1-LS1-1
2	**Shapes That Help**	Plants	1-LS1-1
3	**Copy a Plant**	Design	K-2-ETS1-2
4	**Like the Parent**	Plants	1-LS3-1
5	**Not the Same**	Plants	1-LS3-1
6	**Animal Parts**	Animals	1-LS1-1
7	**Copy an Animal**	Design	1-LS1-1
8	**Shapes Help**	Review	1-LS1-1
9	**Animal Parents**	Animals	1-LS1-2
PART 2 · WEEKS 10–17 · SOUNDS			
10	**Calls and Cries**	Animals	1-LS1-2
11	**Sound Shakes**	Sound	1-PS4-1
12	**Feel the Buzz**	Sound	1-PS4-1
13	**Loud and Soft**	Sound	1-PS4-1
14	**Send a Sound**	Sound	1-PS4-4
15	**A Cup Phone**	Sound	1-PS4-4
16	**Babies Look Like Parents**	Animals	1-LS3-1
17	**Listen**	Review	1-PS4-1
PART 3 · WEEKS 18–25 · LIGHT AND SHADOWS			
18	**In the Dark**	Light	1-PS4-2

WEEK	TITLE	TOPIC	STANDARD
19	**Light Lets You See**	Light	1-PS4-2
20	**See Through**	Light	1-PS4-3
21	**A Little Through**	Light	1-PS4-3
22	**Shadows**	Light	1-PS4-3
23	**Mirrors**	Light	1-PS4-3
24	**Signal With Light**	Light	1-PS4-4
25	**Look**	Review	1-PS4-2
PART 4 · WEEKS 26–36 · THE SUN, THE MOON AND THE STARS			
26	**The Sun Moves Across**	Sky	1-ESS1-1
27	**Long and Short Shadows**	Sky	1-ESS1-1
28	**The Moon Changes**	Sky	1-ESS1-1
29	**The Moon Pattern**	Sky	1-ESS1-1
30	**Stars at Night**	Sky	1-ESS1-1
31	**Long Days, Short Days**	Sky	1-ESS1-2
32	**Count the Daylight**	Sky	1-ESS1-2
33	**Summer and Winter**	Sky	1-ESS1-2
34	**Solve a Problem**	Design	K-2-ETS1-1
35	**Which Worked Better?**	Design	K-2-ETS1-3
36	**Look and Listen**	Review	1-ESS1-1

WEEK 1 PLANTS

Plant Parts

Every plant has parts. Children find them before anyone names them.

SITS BESIDE
Plant parts and what they do (1-LS1-1)

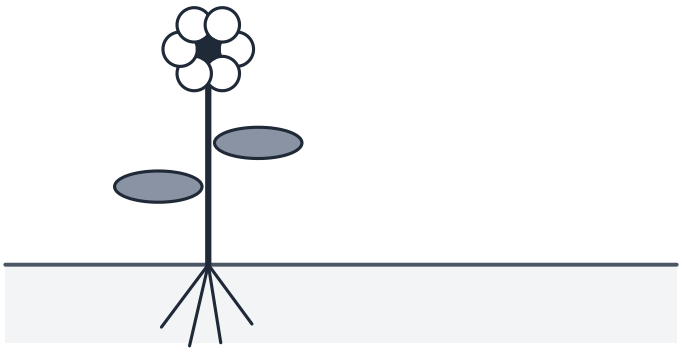
NOTICE FIRST · 2 MINUTES
Find one plant a grown-up points to, outside or in a pot. Touch its leaf gently. What else does it have?

TRY IT · YOU WILL NEED

- a small plant in a pot, or a weed with its roots
- a magnifying glass

Safely: Touch only plants a grown-up says are safe. Never put any part of a plant in your mouth. Wash your hands after touching soil. Never look at the sun through a magnifying glass, and never use one to make a hot spot.

Find the root, the stem, the leaf and the flower.



The parts of a plant READ ALOUD

A plant has roots under the ground. The stem holds the plant up. Leaves grow from the stem. A flower can grow at the top.

Look closely at a real plant. Point to each part.

DRAW IT
Draw your plant. Color the leaves green.

Three plants

PRACTICE DATA · MADE UP FOR THIS PAGE, NOT MEASURED

A class counted the leaves and flowers on three plants.

Plant	Leaves	Flowers
A	4	1
B	6	2
C	3	0

1. Which plant has the most leaves?
2. How many flowers are there in all?
3. Which plant has no flower?

TALK ABOUT IT

Find a plant at home or on the way to school. Name two of its parts.

Which part of a plant do you think we eat when we eat a carrot?



STUCK? TRY THIS

Read down the Leaves column to find the biggest number.

★ CHALLENGE ZONE

Draw a plant with 5 leaves and 2 flowers.

WEEK 2 PLANTS

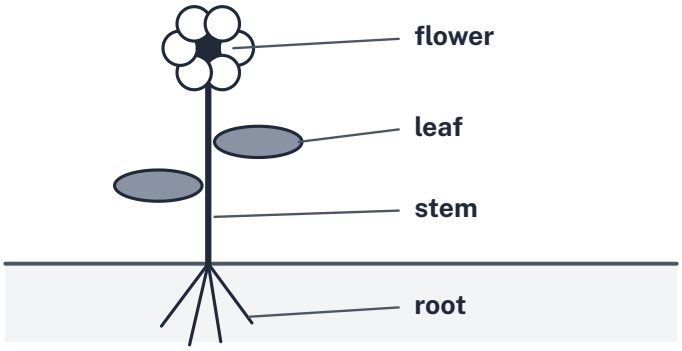
Shapes That Help

Each part of a plant has a shape that helps it live.

SITS BESIDE
Plant parts and what they do (1-LS1-1)

NOTICE FIRST · 2 MINUTES
Look at a rose stem or a cactus in a picture. What would happen if you touched it?

Each part of a plant has a job.



Parts with jobs READ ALOUD

Roots drink water from the ground. The stem holds the plant up. Leaves take in light from the sun, which the plant uses to make its food.

Some plants have thorns. Thorns keep animals from eating them.

DRAW IT
Draw a plant. Draw an arrow to the part that drinks water.

Jobs

Read each part and its job together.

Part	Its job
roots	drink water
stem	hold the plant up
leaves	take in light
thorns	keep animals away

1. Which part drinks water?
2. Which part keeps animals away?
3. Which part holds the plant up?

TALK ABOUT IT

Why do you think a plant leans toward a window?

Name a plant that has thorns or spines.



STUCK? TRY THIS

Find the job first. Then read across to its part.

★ CHALLENGE ZONE

Draw a plant that lives where it is very dry. What shape would its leaves be?

WEEK 3 DESIGN

Copy a Plant

A big leaf makes shade. People copy that idea.

SITS BESIDE
A model whose shape does a job (K-2-ETS1-2)

NOTICE FIRST · 2 MINUTES
Stand under a tree on a sunny day. How does it feel compared with the open sun?

TRY IT · YOU WILL NEED

- paper plates
- paper
- tape
- three ice cubes
- a sunny spot

Safely: Never look straight at the sun.

Make a hat that gives shade like a big leaf.

Shade, like a leaf READ ALOUD

A big leaf shades the ground under it. People copy good ideas from plants and animals.

Make a small shade hat and a big shade hat from paper plates. Put an ice cube under each one in the sun, and one with no hat. Which ice cube lasts longest?

DRAW IT
Draw your shade hat.

Three ice cubes

PRACTICE DATA · MADE UP FOR THIS PAGE, NOT MEASURED

A class timed how long each ice cube took to melt.

Shade	Minutes to melt
no hat	5
a small hat	9
a big hat	15

1. Which ice cube took the longest to melt?
2. How many more minutes did the big hat give than no hat?

TALK ABOUT IT

Where is a shady place at school?

Why do you think people sit under trees on hot days?



STUCK? TRY THIS

The longest time is the biggest number.

★ CHALLENGE ZONE

Draw a hat shaped like a leaf. Show where the shade falls.

WEEK 4 PLANTS

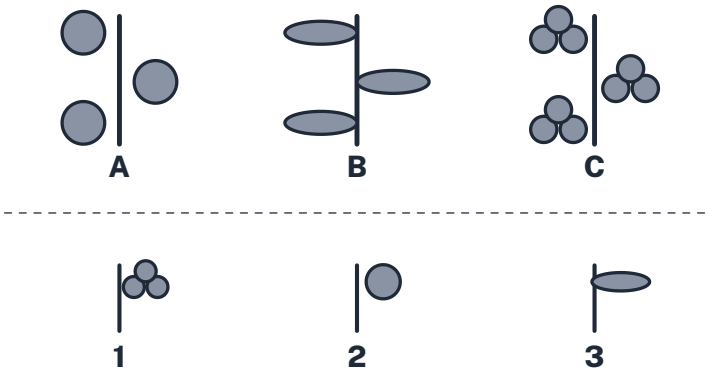
Like the Parent

A young plant looks a lot like the plant it came from.

SITS BESIDE
Young plants and animals look like their parents (1-LS3-1)

NOTICE FIRST · 2 MINUTES
Look at a tree and the small plants growing near it. Do any look alike?

Find the parent for each baby plant.



Like the parent READ ALOUD

A young plant grows from a seed made by a parent plant. It has the same kind of leaves as its parent.

Look at the leaves of each baby plant. Find the parent with the same leaves.

DRAW IT
Draw a baby plant next to its parent.

Match them

Use the picture on page 1.

1. Which parent goes with baby plant 1?
2. Which parent goes with baby plant 2?
3. Which parent goes with baby plant 3?

TALK ABOUT IT

Which animals do you know that look like their parents?

How could you tell a baby oak tree from a baby pine tree?



STUCK? TRY THIS

Look only at the leaf shape: round, long, or three small round parts.

★ CHALLENGE ZONE

Draw a parent plant and its baby. Give them the same leaves.

WEEK 5 PLANTS

Not the Same

Young plants look like their parents, but not exactly. No two are the same.

SITS BESIDE
Young plants and animals look like their parents (1-LS3-1)

NOTICE FIRST · 2 MINUTES
Look at five leaves from one tree. Are they all the same size?

TRY IT · YOU WILL NEED

- paper clips
- five small plants of one kind

Safely: Touch only plants a grown-up says are safe. Never put any part of a plant in your mouth. Wash your hands after touching soil.

The baby plants are alike, but not the same.

Alike, but different READ ALOUD

Plants from the same parent look alike. But look closely: one is a little taller, one has a bigger leaf.

Measure each plant with paper clips laid end to end. Say how many clips tall it is.

DRAW IT
Draw two plants from one parent. Show one way they are different.

Five baby plants

PRACTICE DATA · MADE UP FOR THIS PAGE, NOT MEASURED

A class measured five baby plants from one parent, in paper clips.

Plant	Paper clips tall
A	6
B	7
C	5
D	7
E	6

1. How many plants are 7 clips tall?
2. Which plant is the shortest?
3. Are all the plants the same?

💬 **TALK ABOUT IT**

Do all the plants in a garden look exactly the same?

What else could be different about plants that came from one parent?



STUCK? TRY THIS

Count the 7s. Then find the smallest number.

★ **CHALLENGE ZONE**

Line up the five plants from shortest to tallest. Which two could swap places?

WEEK 6 ANIMALS

Animal Parts

Animals have parts with shapes that help them live, just as plants do.

SITS BESIDE
Animal parts and what they do (1-LS1-1)

NOTICE FIRST · 2 MINUTES
Look at a bird, a pet or a picture of an animal. What part of it helps it eat?

Each animal has parts that help it.

Parts that help READ ALOUD

A bird uses its beak to pick up seeds. A turtle hides inside its shell. Thick fur keeps a bear warm. A cat uses its claws to climb.

Every part has a shape that fits its job.

DRAW IT
Draw an animal. Draw an arrow to a part that helps it.

Animals and their parts

Read each row together.

Animal	Part	It helps the animal
a bird	a beak	eat seeds
a turtle	a shell	hide
a bear	thick fur	keep warm
a cat	claws	climb

1. Which animal has a shell?
2. Which part helps the bear keep warm?
3. What do the cat's claws help it do?

TALK ABOUT IT

Which of your own body parts helps you climb?

What part helps a fish swim?



STUCK? TRY THIS

Find the animal in the first column. Read across.

★ CHALLENGE ZONE

Draw a new animal with a part that helps it dig.

WEEK 7 DESIGN

Copy an Animal

Different beaks pick up food in different ways. Try it with tools.

SITS BESIDE
Animal parts and what they do (1-LS1-1)

NOTICE FIRST · 2 MINUTES
Look at pictures of two birds with different beaks. What food might each one eat?

TRY IT · YOU WILL NEED

- tweezers
- a spoon
- a clothespin
- a cup
- small paper balls for seeds
- a timer

Safely: Keep small things out of your mouth.

Use a tool like a beak to pick up seeds.

Beaks are tools READ ALOUD

A bird's beak is a tool for eating. A thin beak picks up small seeds. A wide beak scoops.

Use each tool like a beak. Pick up paper seeds and drop them in a cup for 30 seconds. Count the seeds.

DRAW IT
Draw the tool that worked best.

Three beaks

PRACTICE DATA · MADE UP FOR THIS PAGE, NOT MEASURED

A class counted the seeds each tool picked up in 30 seconds.

Tool	Seeds
tweezers	9
a spoon	6
a clothespin	4

1. Which tool picked up the most seeds?
2. How many more seeds did the best tool pick up than the clothespin?

TALK ABOUT IT

Which tool is most like your own hand?

What tool would help a bird eat soup?



STUCK? TRY THIS

Find the biggest number. Then subtract 4.

★ CHALLENGE ZONE

Draw a beak for a bird that eats fish.

WEEK 8 REVIEW

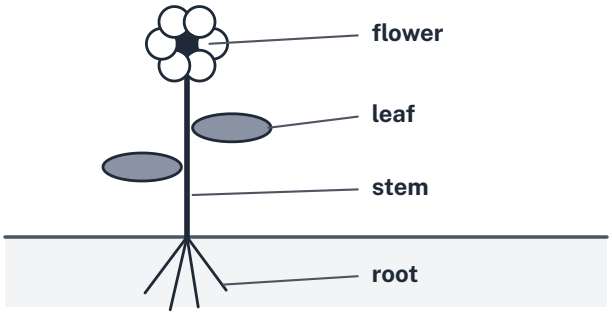
Shapes Help

Seven weeks in one page: plants and animals have parts with shapes that help.

SITS BESIDE
Plant parts and what they do (1-LS1-1)

NOTICE FIRST · 2 MINUTES
Close your eyes and picture a plant and an animal. Name one part of each.

Plants and animals have parts that help them live.



Weeks 1 to 7 together READ ALOUD

Plants have roots, stems, leaves and flowers. Animals have beaks, shells, fur and claws.

Each part has a shape that helps. Young plants look like their parents, but not exactly.

DRAW IT
Draw one plant part and one animal part.

Plant or animal?

Is each part from a plant or an animal?

	Part	Plant or animal?
a	roots	
b	a beak	
c	a leaf	
d	fur	
e	a stem	

1. How many parts are from a plant?
2. How many parts are from an animal?

TALK ABOUT IT

Tell someone at home about one part of a plant and what it does.

Which part of an animal would you like to have for a day?



STUCK? TRY THIS

Roots, leaves and stems belong to plants.

★ CHALLENGE ZONE

Draw a plant and an animal. Label one part of each.

WEEK 9 ANIMALS

Animal Parents

Animal parents help their young stay alive: they feed them, carry them and keep them safe.

SITS BESIDE
How parents help their young (1-LS1-2)

NOTICE FIRST · 2 MINUTES
Look at a picture of a mother animal with her babies. What is she doing?

Animal parents help their babies.

Help from parents READ ALOUD

Many animal babies need help. A bird brings food to its chicks. A cat carries its kitten. A duck leads its ducklings to water.

A deer hides its fawn in tall grass, where it is safe.

DRAW IT
Draw an animal parent and its baby.

How parents help

Read each row together.

Parent	How it helps
a bird	brings food
a cat	carries the kitten
a duck	leads the ducklings
a deer	hides the fawn

1. Which parent brings food?
2. Which parent hides its baby?
3. How many parents are in the table?

TALK ABOUT IT

How do grown-ups help young children stay safe?

Which animal do you think needs the most help when it is young?



STUCK? TRY THIS

Read across each row.

★ CHALLENGE ZONE

Draw an animal parent helping its baby.

WEEK 10 ANIMALS

Calls and Cries

Young animals call, and their parents answer. The sound is a message.

SITS BESIDE
How parents help their young (1-LS1-2)

NOTICE FIRST · 2 MINUTES
Listen outside for one minute. Can you hear a bird? Is it calling to another bird?

Baby animals call, and their parents come.

A call for help READ ALOUD

A baby bird peeps when it is hungry. The parent hears the call and brings food. A lost lamb bleats, and its mother calls back until they find each other.

The baby's call is a message, and the parent answers it.

DRAW IT
Draw a baby animal calling, and its parent coming.

A baby bird's calls

PRACTICE DATA · MADE UP FOR THIS PAGE, NOT MEASURED

A bird watcher counted a baby bird's calls for one hour at three times of day.

Time	Calls
morning	12
noon	8
evening	10

1. When did the baby bird call the most?
2. How many more calls in the morning than at noon?

💬 **TALK ABOUT IT**

How does a baby let grown-ups know it needs something?

What sounds have you heard animals make?



STUCK? TRY THIS

The most calls is the biggest number. Then take away 8 from 12.

★ **CHALLENGE ZONE**

Make up a call for a baby animal. What does it mean?

WEEK 11 SOUND

Sound Shakes

Every sound comes from something shaking.

SITS BESIDE
Sound comes from shaking (1-PS4-1)

NOTICE FIRST · 2 MINUTES
Lay one hand flat on your desk and tap the desk with the other. Can you feel it shake?

TRY IT · YOU WILL NEED

- a bowl
- plastic wrap
- a few grains of dry rice
- a pot and a spoon

Safely: A grown-up does the hard tap while everyone stands back. Rice stays out of mouths, noses and ears.

Things that shake make sound.

Make the rice jump READ ALOUD

Stretch plastic wrap over a bowl. Put a few grains of rice on top. Hold a pot near it and tap the pot with a spoon. A grown-up does the hard tap.

The pot shakes. The shaking travels through the air as sound, and makes the plastic wrap shake. The rice jumps.

DRAW IT
Draw the bowl, the rice and the pot.

Soft, medium, hard

PRACTICE DATA · MADE UP FOR THIS PAGE, NOT MEASURED

A class tapped the pot three ways and counted the grains of rice that jumped.

Tap	Grains that jumped
a soft tap	3
a medium tap	7
a hard tap	12

1. Which tap made the most rice jump?
2. How many more grains for a hard tap than a soft tap?

TALK ABOUT IT

Put a hand on your throat while you hum. What do you feel?

What makes a drum sound?



STUCK? TRY THIS

Find the biggest number. Then take away 3 from 12.

★ CHALLENGE ZONE

Find three things in the room that make a sound when they shake.

WEEK 12 SOUND

Feel the Buzz

You can feel sound shaking things, even when you cannot see it.

SITS BESIDE
Sound comes from shaking (1-PS4-1)

NOTICE FIRST · 2 MINUTES
Put your fingers on your throat and say your name. What do you feel?

TRY IT · YOU WILL NEED

- a rubber band
- a small bell

Safely: Point a stretched rubber band away from faces.

Hum, and feel your throat shake.

Feel it READ ALOUD

Put your fingers gently on your throat and hum. You feel a buzz. That is your voice shaking.

Now stop humming. The buzz stops too. When the shaking stops, the sound stops.

DRAW IT
Draw something that shakes when it makes a sound.

Does it shake?

Feel each one with your fingers.

Thing	Did it shake?
your throat when you hum	yes
a rubber band you pluck	yes
a quiet desk	no
a bell that rings	yes

1. How many things shook?
2. Which thing did not shake?
3. Did the quiet desk make a sound?

TALK ABOUT IT

How can you make a sound with your hands?

Why do you think we cannot see a sound?



STUCK? TRY THIS

Count the yes answers.

★ CHALLENGE ZONE

Hum high, then hum low. Does the buzz feel the same?

WEEK 13 SOUND

Loud and Soft

A big shake makes a loud sound. A small shake makes a soft sound.

SITS BESIDE
Sound comes from shaking (1-PS4-1)

NOTICE FIRST · 2 MINUTES
Tap your desk softly, then a little harder. What changed?

TRY IT · YOU WILL NEED

- a drum or an empty box
- a spoon

Safely: Tap gently. Loud sounds close to your ears can hurt.

A big shake makes a loud sound.

Loud and soft READ ALOUD

Tap a drum gently: it shakes a little and the sound is soft. Tap it harder: it shakes more and the sound is loud.

Very loud sounds can hurt your ears, so we keep sounds gentle.

DRAW IT
Draw something loud and something soft.

Loud or soft?

Is each sound loud or soft?

	Sound	Loud or soft?
a	a whisper	
b	a hard bang on a drum	
c	a big clap	
d	a cat purring	
e	a car horn	

1. How many sounds are loud?
2. How many sounds are soft?

TALK ABOUT IT

Where is a place you should use a soft voice?

Why is a fire alarm loud?



STUCK? TRY THIS

Say each sound out loud, softly or loudly, to decide.

★ CHALLENGE ZONE

Make a loud sound and a soft sound with the same thing.

WEEK 14 SOUND

Send a Sound

People use sound to send messages, even when they cannot see each other.

SITS BESIDE
Sending a message with sound (1-PS4-4)

NOTICE FIRST · 2 MINUTES
Close your eyes. A friend taps the desk. Can you tell where the sound came from?

TRY IT · YOU WILL NEED

- a desk
- a pencil

Tap a message to a friend.

A tap code READ ALOUD

One tap means yes. Two taps mean no. Three taps mean come here.

Sit back to back with a friend. Ask a question and listen for the taps. Sound carries the message, even when you cannot see.

DRAW IT
Draw your tap code.

Read the taps

One tap means yes. Two taps mean no. Three taps mean come here.

	Taps	Message
a	2	
b	1	
c	3	

1. What do two taps mean?
2. What do three taps mean?
3. How many taps mean yes?

TALK ABOUT IT

Why do you think a ship blows a horn in the fog?

What sounds at school tell you something?



STUCK? TRY THIS

Count the taps, then use the code.

★ CHALLENGE ZONE

Make up a tap for a new message, like help or hello.

WEEK 15 SOUND

A Cup Phone

A tight string carries sound from one cup to the other.

SITS BESIDE
Sending a message with sound (1-PS4-4)

NOTICE FIRST · 2 MINUTES
Put your ear on the desk while a friend scratches the far end. Can you hear it?

TRY IT · YOU WILL NEED

- two paper cups
- a long string
- a pencil

Safely: An adult pokes the holes. Never put the string around anyone's neck.

Talk into a cup phone and listen.

A string telephone READ ALOUD

Join two cups with a long string. Pull the string tight and talk into one cup. Your voice makes the string shake, and the shake carries the sound to the other cup.

Now let the string go loose. Can your friend still hear?

DRAW IT
Draw two friends talking on a cup phone.

Tight or loose

PRACTICE DATA · MADE UP FOR THIS PAGE, NOT MEASURED

A class said 10 words into a cup phone and counted the words heard.

String	Words heard
a tight string	9
a loose string	2

1. Which string worked better?
2. How many more words with a tight string than a loose string?

TALK ABOUT IT

Why do you think the string has to be tight?

Who would you call on a cup phone?



STUCK? TRY THIS

Better means more words heard. Then take away 2 from 9.

★ CHALLENGE ZONE

Try a longer string. Does it still work?

WEEK 16 ANIMALS

Babies Look Like Parents

Young animals look like their parents, but not exactly like them.

SITS BESIDE
Young plants and animals look like their parents (1-LS3-1)

NOTICE FIRST · 2 MINUTES
Look at a picture of a dog and her puppies. What is the same about them?

Puppies look like their parents, but not the same.

Like the parents READ ALOUD

A puppy looks like a dog. A kitten looks like a cat. Young animals look like their parents.

But look closely. One puppy has spots like its mother. One has no spots, like its father. No two are exactly the same.

DRAW IT
Draw a dog and a puppy that looks like it.

Five puppies

PRACTICE DATA · MADE UP FOR THIS PAGE, NOT MEASURED

A mother dog with spots and a father dog with no spots had five puppies.

Puppies	How many
with spots	3
with no spots	2

1. How many puppies have spots?
2. How many puppies are there in all?
3. Do some puppies look like the father?

TALK ABOUT IT

Which animals do you know that look like their parents?

What is one way two puppies from the same dogs can be different?



STUCK? TRY THIS

Add the two numbers for the second question.

★ CHALLENGE ZONE

Draw a mother cat, a father cat and three kittens. Make each kitten a little different.

WEEK 17 REVIEW

Listen

The sound weeks in one page: sound comes from shaking, and it can carry a message.

SITS BESIDE
Sound comes from shaking (1-PS4-1)

NOTICE FIRST · 2 MINUTES
Sit very still for one minute and listen. How many different sounds do you hear?

Every sound comes from something that shakes.

Part 2 together READ ALOUD

Things that shake make sound. A big shake is loud, and a small shake is soft.

Sound can carry a message: a tap code, a cup phone, a baby animal's call.

DRAW IT
Draw something that makes a sound, and show what shakes.

What shakes?

Read each row together.

	Sound from	What shakes
a	a drum	the top of the drum
b	a guitar	the string
c	your voice	your throat
d	a bell	the bell

1. What shakes when you talk?
2. What shakes on a guitar?

TALK ABOUT IT

Tell someone about the cup phone and why the string had to be tight.

What is your favorite sound?



STUCK? TRY THIS

Find the row, then read the last column.

★ CHALLENGE ZONE

Make a new sound with something in the room. What shook?

WEEK 18 LIGHT

In the Dark

You see a thing only when there is light: light shines on it, or it makes its own.

SITS BESIDE
We see when there is light (1-PS4-2)

NOTICE FIRST · 2 MINUTES
Close your eyes tight. What can you see? Open them. What changed?

TRY IT · YOU WILL NEED

- a shoebox with two small holes, one to look through and one for the flashlight
- a small toy
- a flashlight

Safely: Point the flashlight at the box or the wall, never into anyone's eyes.

You can see only when there is light.

A dark box READ ALOUD

Put a toy inside a shoebox and close the lid. Look through one hole. Can you see the toy?

Now open the lid a little, or shine a flashlight through the other hole. Light lets you see. In complete darkness, nobody can see anything.

DRAW IT
Draw the box with the lid open and the lid closed.

Looking in the box

PRACTICE DATA · MADE UP FOR THIS PAGE, NOT MEASURED

A class looked through one hole, three ways.

The box	Could they see the toy?
lid closed	no
lid open a little	yes
flashlight shining in	yes

1. When could they not see the toy?
2. How many times could they see it?

💬 **TALK ABOUT IT**

Why do you think we turn on a light at night?

Can a cat see in a room with no light at all?



STUCK? TRY THIS

Look for the no answer.

★ **CHALLENGE ZONE**

Find the darkest place in the room. Can you still see a little? Where is the light coming from?

WEEK 19 LIGHT

Light Lets You See

The more light there is, the more you can see.

SITS BESIDE
We see when there is light (1-PS4-2)

NOTICE FIRST · 2 MINUTES
Look around the room. Where is the light coming from?

More light lets you see more.

Light and seeing READ ALOUD

Light comes from the sun, from lamps and from fire. When light shines on things, you can see them.

Turn off the lamps and close the curtains. The room gets darker, and you can see fewer things.

DRAW IT
Draw a place with lots of light and a place with only a little.

How many things could they see?

PRACTICE DATA · MADE UP FOR THIS PAGE, NOT MEASURED

A class counted the things they could see on one wall, three ways.

The room	Things they could see
lamp on, curtains open	10
lamp off, curtains open	7
lamp off, curtains shut	1

1. When could they see the most things?
2. With the curtains open, how many fewer things with the lamp off?

TALK ABOUT IT

Why do you think reading is hard in the dark?

What gives light at night outside?



STUCK? TRY THIS

Take away the second number from the first number.

★ CHALLENGE ZONE

Draw a room at night with one lamp on. Shade the parts that are dark.

WEEK 20 LIGHT

See Through

Some things let light through, some let a little through, and some block it.

SITS BESIDE
Light passes through some materials (1-PS4-3)

NOTICE FIRST · 2 MINUTES
Look out a window. Then hold up a book. What is different?

TRY IT · YOU WILL NEED

- clear plastic
- wax paper
- cardboard
- a flashlight

Safely: Point the flashlight at the wall or the paper, never into anyone's eyes.

Some things let light through, and some do not.

Through or blocked READ ALOUD

Shine a flashlight at a wall. Hold clear plastic in front of it: the light goes right through. Wax paper lets some through. Cardboard blocks all of it.

DRAW IT
Draw the flashlight shining through each one.

How much light gets through?

Read each row together.

Material	Light that got through
clear plastic	all
wax paper	some
cardboard	none

1. Which one blocks all the light?
2. Which one lets some light through?

💬 **TALK ABOUT IT**

Why are windows made of clear glass?

What would you use to make a dark room for sleeping?



STUCK? TRY THIS

None means no light got through.

★ **CHALLENGE ZONE**

Find one more thing that lets all the light through and one that blocks it.

WEEK 21 LIGHT

A Little Through

Each layer blocks a little more light, until none gets through.

SITS BESIDE
Light passes through some materials (1-PS4-3)

NOTICE FIRST · 2 MINUTES
Hold one sheet of paper up to a window. Then two. Then three. What happens?

TRY IT · YOU WILL NEED

- tissue paper
- a flashlight

Safely: Point the flashlight at the wall or the paper, never into anyone's eyes.

More paper lets less light through.

Layer by layer READ ALOUD

Shine a flashlight through one sheet of tissue paper onto the wall. You see a bright spot. Add another sheet, and another.

Each sheet blocks a little more light. After enough sheets, no light gets through.

DRAW IT
Draw the light with one sheet and with many sheets.

Sheets of tissue paper

PRACTICE DATA · MADE UP FOR THIS PAGE, NOT MEASURED

A class added sheets one at a time and looked for light on the wall.

Sheets	Could they see light?
1	yes
2	yes
3	yes
4	no
5	no

1. With 2 sheets, could they see light?
2. How many sheets did it take to block the light?

TALK ABOUT IT

Why do you think curtains are thick in some rooms?

What could you use to make a lamp less bright?



STUCK? TRY THIS

Find the first no.

★ CHALLENGE ZONE

Try it with a different paper. Does it take more sheets or fewer?

WEEK 22 LIGHT

Shadows

A shadow is where something blocks the light.

SITS BESIDE
A material that blocks light makes a shadow (1-PS4-3)

NOTICE FIRST · 2 MINUTES
Find your shadow in the room or outside. What is making it?

TRY IT · YOU WILL NEED

- a flashlight
- a small toy
- blocks to measure with

Safely: Point the flashlight at the wall or the paper, never into anyone's eyes.

A shadow is where light is blocked.

Make a shadow READ ALOUD

Shine a flashlight at a wall. Put a toy between the light and the wall. The toy blocks the light, and a shadow appears.

Move the toy close to the light. The shadow grows. Move it far from the light. The shadow gets small.

DRAW IT
Draw the light, the toy and its shadow.

A toy's shadow

PRACTICE DATA · MADE UP FOR THIS PAGE, NOT MEASURED

A class measured the shadow with blocks, three ways.

Where the toy was	Shadow, in blocks
near the light	8
in the middle	5
far from the light	3

1. Where was the shadow the biggest?
2. How many blocks bigger was it near the light than far away?

💬 TALK ABOUT IT

What shapes can you make with hand shadows?

Why is it cool in the shade of a tree?



STUCK? TRY THIS

The biggest shadow is the biggest number. Then take away 3 from 8.

★ CHALLENGE ZONE

Make a shadow that looks like an animal. Draw it.

WEEK 23 LIGHT

Mirrors

Shiny things bounce light. A mirror can send light to a new place.

SITS BESIDE
What light does when it meets a material (1-PS4-3)

NOTICE FIRST · 2 MINUTES
Look into a spoon. What do you see?

TRY IT · YOU WILL NEED

- a small plastic mirror
- a spoon
- foil
- paper
- cloth
- a flashlight

Safely: Point the flashlight at the wall or the paper, never into anyone's eyes. Aim the mirror at the wall, never at faces. Use a plastic mirror.

A mirror can make light bounce.

Bounce the light READ ALOUD

Shine a flashlight at a mirror. The light bounces off and makes a spot somewhere new.

A spoon and foil are shiny too, and they bounce light. Paper and cloth do not make a bright spot.

DRAW IT
Draw the light bouncing off the mirror.

What bounced the light?

PRACTICE DATA · MADE UP FOR THIS PAGE, NOT MEASURED

A class shined a flashlight at five things.

Thing	Did it bounce a bright spot?
a mirror	yes
a spoon	yes
foil	yes
paper	no
cloth	no

1. How many things bounced the light?
2. Which two did not?

TALK ABOUT IT

Where do you see mirrors at school or in a store?

Why do you think cars have mirrors?



STUCK? TRY THIS

Count the yes answers.

★ CHALLENGE ZONE

Use a mirror to make a light spot land on a picture on the wall.

WEEK 24 LIGHT

Signal With Light

Light can carry a message across a room, or across the sea.

SITS BESIDE
Sending a message with light (1-PS4-4)

NOTICE FIRST · 2 MINUTES
Have you seen a light flash to tell people something, like a car's turn signal?

TRY IT · YOU WILL NEED

- a flashlight
- a friend

Safely: Point the flashlight at the wall or the paper, never into anyone's eyes.

Send a message with flashes of light.

A light code READ ALOUD

One flash means stop. Two flashes mean go. Three flashes mean come here.

Flash a message onto the wall. Your friend reads it. Light carries the message, even across a big room.

DRAW IT
Draw your flash code.

Read the flashes

One flash means stop. Two flashes mean go. Three flashes mean come here.

	Flashes	Message
a	3	
b	1	
c	2	

1. What do three flashes mean?
2. How many flashes mean stop?

TALK ABOUT IT

What lights tell drivers when to stop and go?

Why might a ship flash a light at night?



STUCK? TRY THIS

Count the flashes, then use the code.

★ CHALLENGE ZONE

Make up a flash code for a new message.

WEEK 25 REVIEW

Look

Seven weeks in one page: light lets you see, passes through some things, and bounces off others.

SITS BESIDE
We see when there is light (1-PS4-2)

NOTICE FIRST · 2 MINUTES
Look around the room for something clear, something shiny and something that makes a shadow.

Light lets you see, and it can go through, bounce or stop.

Part 3 together READ ALOUD

You can see only when there is light. Some things let light through. Some block it and make a shadow. Shiny things bounce it.

Flashes of light can carry a message.

DRAW IT
Draw a light, a mirror and a shadow.

What does the light do?

Read each row together.

	Thing	What the light does
a	a window	lets light through
b	a book	blocks the light
c	a mirror	bounces the light
d	wax paper	lets some light through

1. Which thing bounces the light?
2. Which thing blocks the light?

TALK ABOUT IT

Tell someone how a shadow is made.

What is your favorite thing to do with a flashlight?



STUCK? TRY THIS

Read across each row.

★ CHALLENGE ZONE

Draw something clear, something shiny and something with a shadow.

WEEK 26 SKY

The Sun Moves Across

The sun rises on one side of the sky, climbs high, and sets on the other side.

SITS BESIDE
Patterns of the sun in the sky (1-ESS1-1)

NOTICE FIRST · 2 MINUTES
Without looking at the sun, notice where the bright part of the sky is this morning.

TRY IT · YOU WILL NEED

- a window
- chalk or tape to mark the floor

Safely: Never look straight at the sun. Keep chalk dust away from your face.

The sun is low in the morning and high at noon.

The sun's path READ ALOUD

In the morning the sun is low in the sky. At noon it is high. In the late afternoon it is low again, on the other side.

Mark where the sunlight lands on the floor in the morning and again at noon. It moves. If no sunlight comes in, trace a shadow outside instead. Never look straight at the sun.

DRAW IT
Draw where the sunlight or the shadow was in the morning and at noon.

Where was the sun?

PRACTICE DATA · MADE UP FOR THIS PAGE, NOT MEASURED

A class noticed the sun three times one day.

Time	The sun was
morning	low
noon	high
late afternoon	low

1. When was the sun highest?
2. When was the sun low?

💬 **TALK ABOUT IT**

Does the sun come up on the same side of your school every day?

Is it warmer outside in the morning or at noon?



STUCK? TRY THIS

Look for the word high.

★ **CHALLENGE ZONE**

Draw the sun at three times of day on one picture.

WEEK 27 SKY

Long and Short Shadows

When the sun is low, shadows are long. When it is high, shadows are short.

SITS BESIDE
Patterns of the sun in the sky (1-ESS1-1)

NOTICE FIRST · 2 MINUTES
Look at your shadow at recess. Is it longer than you or shorter?

TRY IT · YOU WILL NEED

- chalk
- a sunny spot
- paper strips

Safely: Never look straight at the sun. Keep chalk dust away from your face.

My shadow is long in the morning and short at noon.

Long and short shadows READ ALOUD

Stand on a chalk mark and have a friend trace your shadow. Count how many steps long it is, or lay paper strips along it and count them.

When the sun is low, your shadow is long. When the sun is high, at noon, your shadow is short.

DRAW IT
Draw your shadow in the morning and at noon.

One shadow, three times

PRACTICE DATA · MADE UP FOR THIS PAGE, NOT MEASURED

A class measured a shadow in steps, three times in one day.

Time	Shadow, in steps
morning	8
noon	2
afternoon	6

1. When was the shadow the shortest?
2. How many steps longer was it in the morning than at noon?

💬 **TALK ABOUT IT**

When is the best time of day to see a long shadow?

Why do you think the shadow changed?



STUCK? TRY THIS

The shortest is the smallest number. Then take away 2 from 8.

★ **CHALLENGE ZONE**

Guess how long your shadow will be at the end of the school day. Check.

WEEK 28 SKY

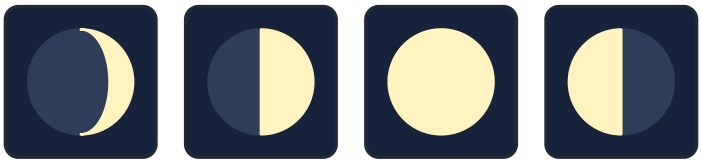
The Moon Changes

The moon looks a little different every night: thin, then half, then full.

SITS BESIDE
Patterns of the moon and stars (1-ESS1-1)

NOTICE FIRST · 2 MINUTES
Look at the four moon pictures. What shape is each one? If you see the moon this week, look at its shape too.

The moon looks different from night to night.



Week 1 Week 2 Week 3 Week 4

A changing moon READ ALOUD

The moon does not make its own light. Sunlight shines on it. As the weeks go by, we see more or less of its sunny side.

So the moon looks thin, then half, then full, then half again. Some nights we cannot see the moon at all.

DRAW IT
Draw one moon from this page. If you saw the moon this week, draw it too.

Four weeks of the moon

Use the moon pictures on page 1.

1. In which week was the moon full?
2. In which week was the moon thin?
3. How many weeks show half a moon?

TALK ABOUT IT

Have you ever seen the moon in the daytime?

Why do you think the moon is easier to see some nights?



STUCK? TRY THIS

Full means the whole moon is bright.

★ CHALLENGE ZONE

Draw what you think the moon will look like in week 5.

WEEK 29 SKY

The Moon Pattern

The moon's shapes come back in the same order, again and again.

SITS BESIDE
Patterns of the moon and stars (1-ESS1-1)

NOTICE FIRST · 2 MINUTES
Look at a calendar. Does it show the full moon? How far apart are they?

The moon pattern starts again about once a month.

A pattern that repeats READ ALOUD

From one full moon to the next is about a month. Then the pattern starts again: thin, half, full, half, thin, and a few nights with no moon at all.

People have used the moon to keep track of time for a very long time.

DRAW IT
Draw the moon pattern, in order.

From full moon to full moon

PRACTICE DATA · MADE UP FOR THIS PAGE, NOT MEASURED

A class counted the days from one full moon to the next, four times.

Count	Days
first	29
second	30
third	29
fourth	30

1. How many times did they count 30 days?

2. About how many days are there from one full moon to the next?

TALK ABOUT IT

What else happens again and again, in a pattern?

Why might people long ago have watched the moon?



STUCK? TRY THIS

The numbers are all close to 30.

★ CHALLENGE ZONE

Mark the next full moon on a calendar. Check it with a grown-up.

WEEK 30 SKY

Stars at Night

Stars are in the sky all the time. We see them at night, when the sun has set and the sky is dark.

SITS BESIDE
Patterns of the moon and stars (1-ESS1-1)

NOTICE FIRST · 2 MINUTES
Think of the night sky. Where have you seen the most stars?

We see stars at night, when the sky is dark.

Stars all the time READ ALOUD

Stars are in the sky in the daytime too. The sun is so bright that we cannot see them.

At night the sky is dark, and the stars show. Far from city lights, you can see many more.

DRAW IT
Draw the night sky.

Counting stars

PRACTICE DATA · MADE UP FOR THIS PAGE, NOT MEASURED

A scientist counted the stars in one small part of the sky, in three places.

Place	Stars
a big city	10
a small town	40
the country, far from lights	100

1. Where did they see the most stars?
2. Where did they see the fewest stars?
3. Why can we not see stars in the day?

TALK ABOUT IT

Why do you think city lights make stars hard to see?

What is your favorite thing to see in the night sky?



STUCK? TRY THIS

Most is the biggest number. Fewest is the smallest.

★ CHALLENGE ZONE

Draw the night sky in a city and in the country.

WEEK 31 SKY

Long Days, Short Days

In summer the sun is up for longer. In winter the days are short.

SITS BESIDE
Daylight changes with the seasons (1-ESS1-2)

NOTICE FIRST · 2 MINUTES
Is it dark when you get up on a winter morning? What about in summer?

Summer days are long, and winter days are short.

Hours of daylight READ ALOUD

In summer the sun comes up early and goes down late. There are many hours of daylight.

In winter the sun comes up late and goes down early. There are fewer hours of daylight.

DRAW IT
Draw a summer day and a winter day.

Daylight in four seasons

PRACTICE DATA · MADE UP FOR THIS PAGE, NOT MEASURED

A class found the hours of daylight on one day in each season.

Season	Hours of daylight
winter	10
spring	12
summer	14
fall	12

1. Which season has the most daylight?
2. How many more hours in summer than in winter?
3. Which two seasons have the same?

TALK ABOUT IT

What do you like to do on long summer evenings?

Why do you think it is colder in winter?



STUCK? TRY THIS

Most is the biggest number. Then take away 10 from 14.

★ CHALLENGE ZONE

Draw the same street at 6 o'clock in summer and in winter.

WEEK 32 SKY

Count the Daylight

A bar graph of six months shows how daylight grows and shrinks through the year.

SITS BESIDE
Daylight changes with the seasons (1-ESS1-2)

NOTICE FIRST · 2 MINUTES
Which month of the year has your birthday? Do you think it has long days or short days?

Days get longer, then shorter, every year.

A year of daylight READ ALOUD

The table on page 2 shows the hours of daylight in six months. Draw a bar for each one.

The bars go up toward summer and down toward winter. Then the pattern starts again.

NOTES AND DRAWINGS

Six months

PRACTICE DATA · MADE UP FOR THIS PAGE, NOT MEASURED

A class found the hours of daylight on one day in six months. Draw a bar for each month.

Month	Jan	Mar	May	Jul	Sep	Nov
Hours	10	12	14	14	12	10



1. Which two months have the most daylight?
2. Which months have 12 hours?

TALK ABOUT IT

Which month do you think has the shortest day?

Does the pattern start again next year?



STUCK? TRY THIS

Each line on the graph is 2 hours.

★ CHALLENGE ZONE

Guess the hours of daylight in December. Use the pattern.

WEEK 33 SKY

Summer and Winter

The sun sets later in summer than in winter.

SITS BESIDE
Daylight changes with the seasons (1-ESS1-2)

NOTICE FIRST · 2 MINUTES
Is it still light outside at 6 o'clock in summer? In winter?

The sun sets later in summer.

Sunset READ ALOUD

In winter, the sun sets early in the evening, and it gets dark early.

In summer, the sun sets much later, and it stays light into the evening.

DRAW IT
Draw a summer evening and a winter evening.

Sunset times

PRACTICE DATA · MADE UP FOR THIS PAGE, NOT MEASURED

A class wrote down when the sun set on one winter day and one summer day.

Season	Sunset, o'clock
winter	5
summer	8

1. In which season did the sun set later?
2. How many hours later?

TALK ABOUT IT

What can you do outside on a summer evening that is hard in winter?

Why do you think streetlights come on earlier in winter?



STUCK? TRY THIS

Take away 5 from 8.

★ CHALLENGE ZONE

Draw a clock that shows a summer sunset and one that shows a winter sunset.

WEEK 34 DESIGN

Solve a Problem

An engineer starts with a problem people really have, and asks about it.

SITS BESIDE
Asking questions to define a problem (K-2-ETS1-1)

NOTICE FIRST · 2 MINUTES
At lunch, is the sun in anyone's eyes? Ask around.

Find a problem, and ask people about it.

What is the problem? READ ALOUD

An engineer solves problems. First, find a problem and ask people about it.

Ask: where at school is it too sunny? Count the children who say each place.

DRAW IT
Draw the place that is too sunny.

Too sunny!

PRACTICE DATA · MADE UP FOR THIS PAGE, NOT MEASURED

A class asked children where it was too sunny at school.

Place	Children who said too sunny
the lunch tables	12
the swings	3
the library	0

1. Where did the most children say it was too sunny?
2. How many children said a place in all?

💬 **TALK ABOUT IT**

What is a problem at school you would like to fix?

Who could you ask about it?



STUCK? TRY THIS

Add the three numbers.

★ **CHALLENGE ZONE**

Draw an idea to make the lunch tables less sunny.

WEEK 35 DESIGN

Which Worked Better?

Test two ideas the same way, and compare.

SITS BESIDE
Comparing two solutions (K-2-ETS1-3)

NOTICE FIRST · 2 MINUTES
Look at two shady places at school. Which one is bigger?

TRY IT · YOU WILL NEED

- paper
- string
- tape
- craft sticks for poles
- a cardboard box
- small toy people or blocks
- a flashlight

Safely: Shine the flashlight down at the box, never into anyone's eyes.

Try two ideas, and see which one is better.

Two ideas READ ALOUD

Here are two ideas to shade the lunch tables: a big umbrella and a sheet tied between two poles.

Build a small model of each one over a box. Shine a flashlight down from above, like the sun. Count how many toy people fit in the shade.

DRAW IT
Draw your model of the shade.

Two kinds of shade

PRACTICE DATA · MADE UP FOR THIS PAGE, NOT MEASURED

A class counted the toy people that fit in the shade of each model.

Shade	Toy people in the shade
a big umbrella	4
a sheet tied between two poles	9

1. Which shade fit more toy people?
2. How many more toy people fit under the sheet than the umbrella?

TALK ABOUT IT

Why is it good to test two ideas before choosing?

What else could make shade at school?



STUCK? TRY THIS

More is the bigger number. Then take away 4 from 9.

★ CHALLENGE ZONE

Draw a third idea for shade. Would it fit more toy people?

WEEK 36 REVIEW

Look and Listen

A whole year of looking and listening: plants and animals, sound, light and the sky.

SITS BESIDE
Patterns of the moon and stars (1-ESS1-1)

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

I look, I listen, and I find out.

The year together READ ALOUD

Plants and animals have parts that help them. Things that shake make sound. Light lets us see and makes shadows. The sun, the moon and the stars move in patterns.

DRAW IT
Draw your favorite thing from this year.

Sound, light or sky?

Read each one together. Is it about sound, light or the sky?

	Thing	Sound, light or sky?
a	a cup phone	
b	a shadow	
c	the full moon	
d	a drum	
e	a mirror	
f	the stars at night	

1. How many are about sound?
2. How many are about the sky?

TALK ABOUT IT

Tell someone your favorite thing you learned this year.

What do you want to find out about next year?



STUCK? TRY THIS

Ask: do you hear it, see it, or see it in the sky?

★ CHALLENGE ZONE

Draw one picture with something from sound, light and the sky.

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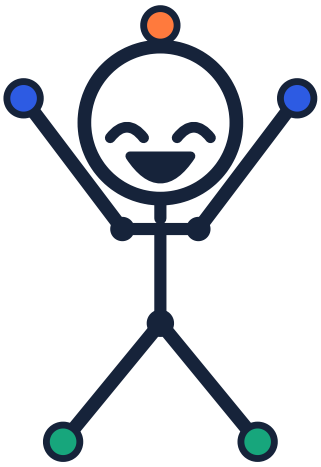
Grade 1 · Look and Listen

Certificate of Completion

This is to certify that

_____

practiced looking and listening for thirty-six weeks.



_____ _____

Teacher Date

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