

Name: \_\_\_\_\_

# Third Grade

Student Booklet

What are you curious about?



# Fossils & Changing Environments

3rd Grade • NGSS • Unit Worksheets

**Lesson 1**



Where can you find whales in a desert?

**Lesson 2**



How do we know what dinosaurs looked like?

**Lesson 3**



Can you outrun a dinosaur?

I am also curious about...

# Fossil Dig Worksheet



Name: \_\_\_\_\_

1) In Layer A, examine each fossil and then fill in the answers below.

	One trait this fossil has is...
Fossil 1	
Fossil 2	
Fossil 3	

2) I think the fossils found in Layer A lived **ON LAND** / **IN THE WATER** when they were alive. I think

this because... \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

3) For each fossil in Layer B, fill in the blanks below.

	One trait this fossil has is...
Fossil 4	
Fossil 5	
Fossil 6	

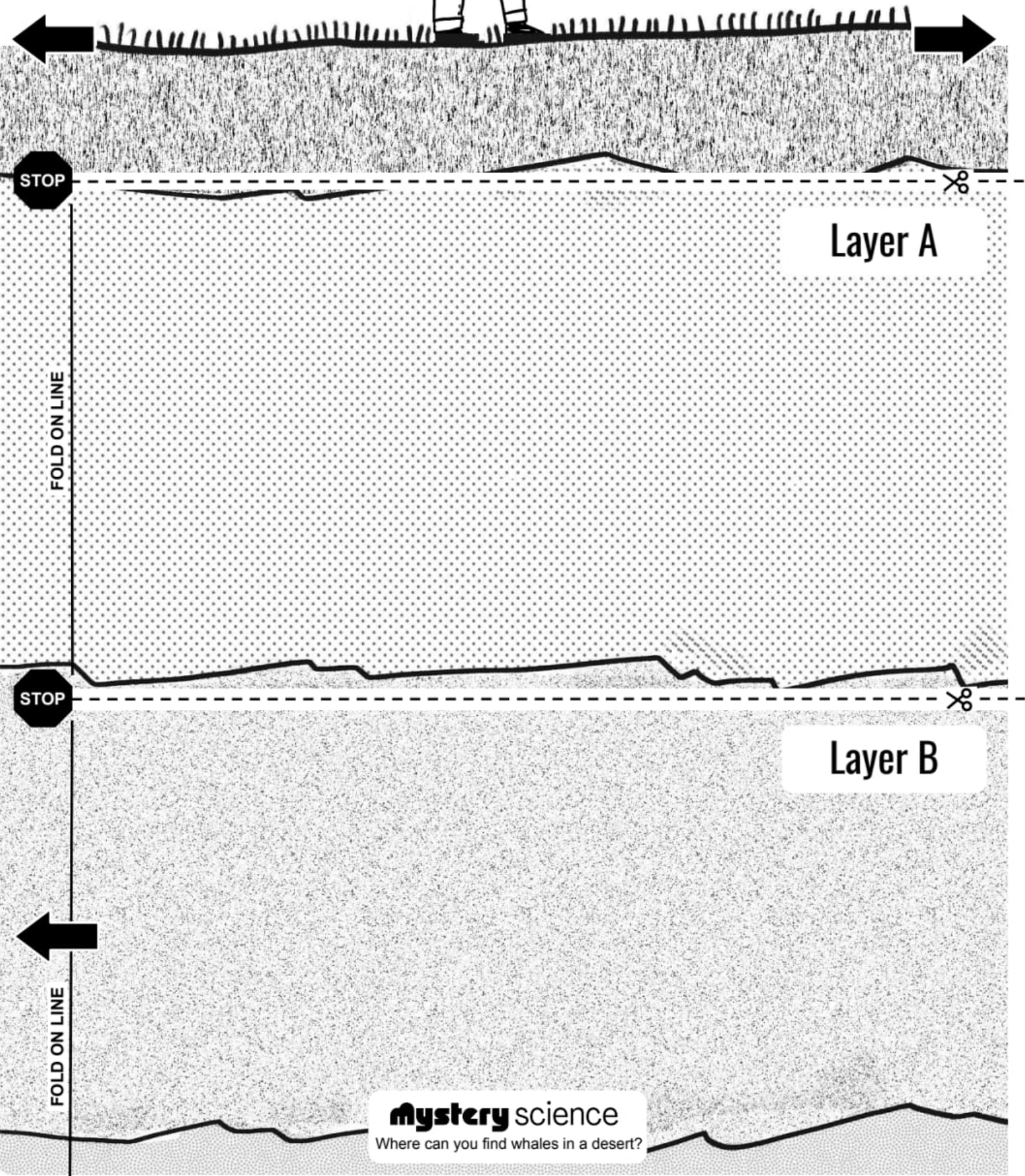
4) I think the habitat **DID** / **DID NOT** change between Layer A and Layer B. I think this because...

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



# Fossil Dig

Name: \_\_\_\_\_



STOP

Layer A

FOLD ON LINE

STOP

Layer B

FOLD ON LINE

**mystery science**  
Where can you find whales in a desert?

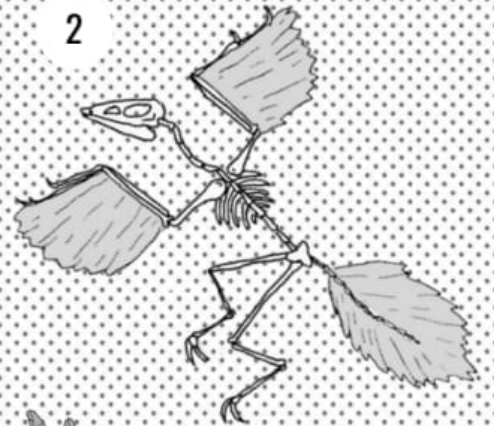


1

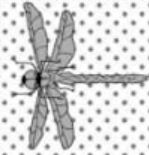


**Layer A**

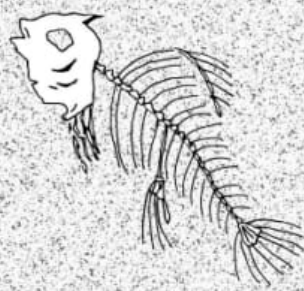
2



3

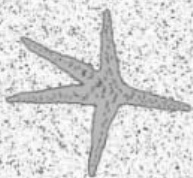


4

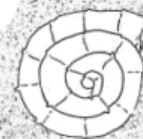


**Layer B**

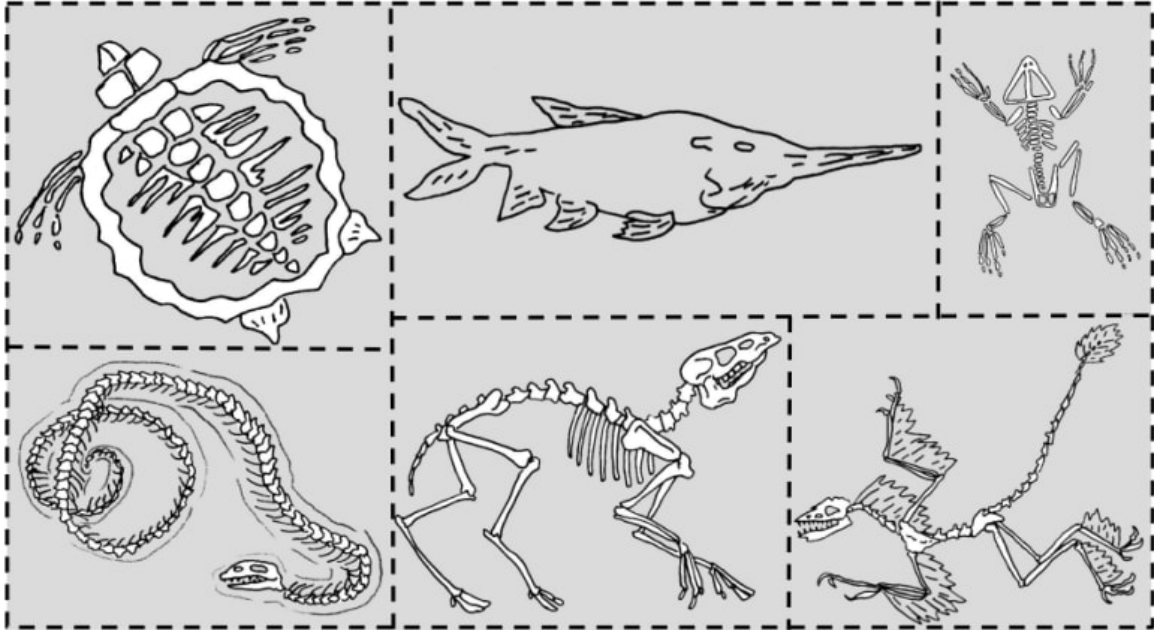
5



6



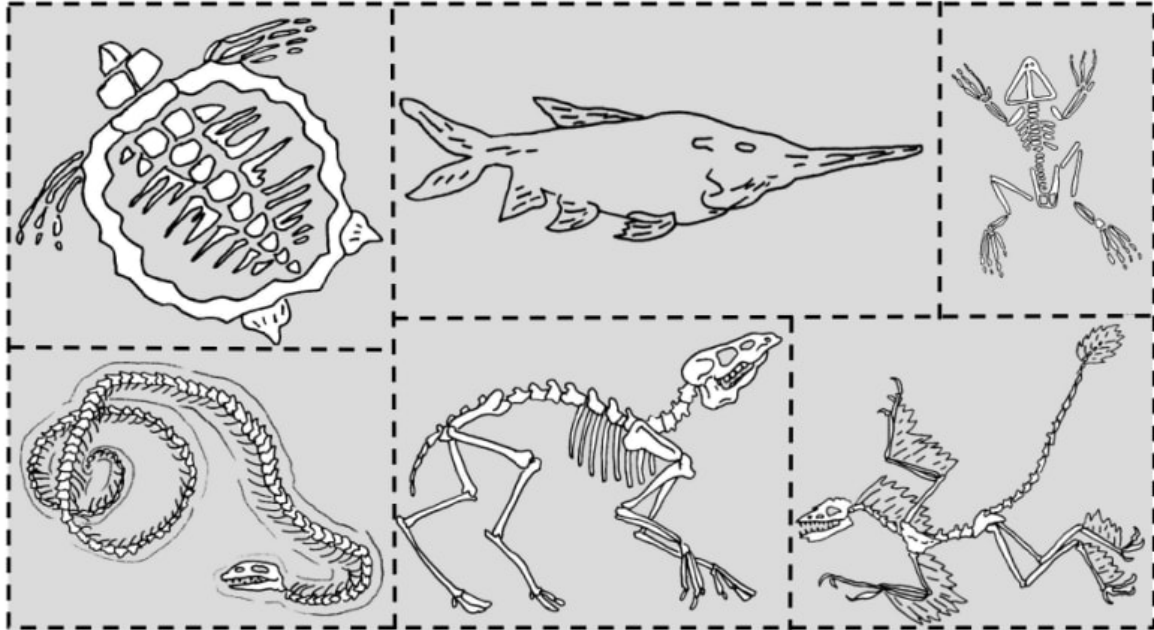
# Mystery Fossils



**mystery science**

Where can you find whales in a desert?

# Mystery Fossils



**mystery science**

Where can you find whales in a desert?

## Lesson Assessment



1. You take a trip to the local quarry. You walk all the way to the very bottom. At the bottom of the quarry you find the fossils shown in the image above. What kind of habitat do you think was in this location when these animals were alive?

- a. Grassland
- b. River
- c. Ocean
- d. Desert

2. Why did you choose this answer? What evidence do the fossils give you to support your claim?

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3. Kayla went swimming so she could see sharks and sea turtles. When she started swimming, she saw many tree trunks on the ocean floor. What kind of habitat do you think was in this location a long time ago?

- a. Forest
- b. Grassland
- c. Ocean
- d. Desert

4. The tree trunks are evidence that the habitat in this location has changed. What other evidence could you look for to support this claim?

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5. Your friend Martha just found a crab shell on the ground. She's really excited because she thinks it might be a fossil. She thinks this is evidence that your town used to be an ocean a very long time ago. The picture above shows you the location where she found the crab shell. Do you think your friend Martha found a fossil? Why or why not?

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6. You tell Martha that one crab shell is not enough evidence. If this habitat did use to be an ocean, what are examples of evidence that would support Martha's claim?

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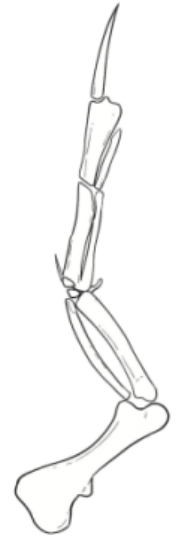
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How do we know what dinosaurs look like?

**mystery scienc**

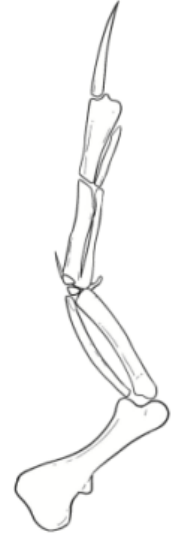


**6**



How do we know what dinosaurs look like?

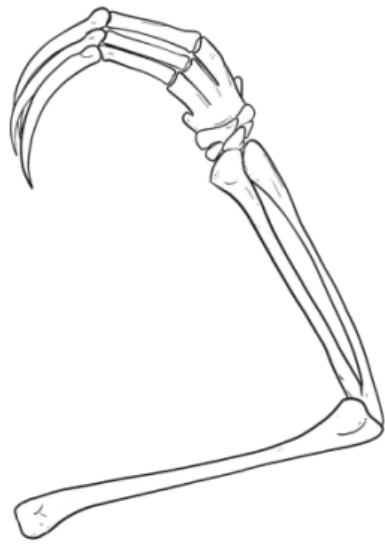
**mystery scienc**



**6**



**8**



**8**

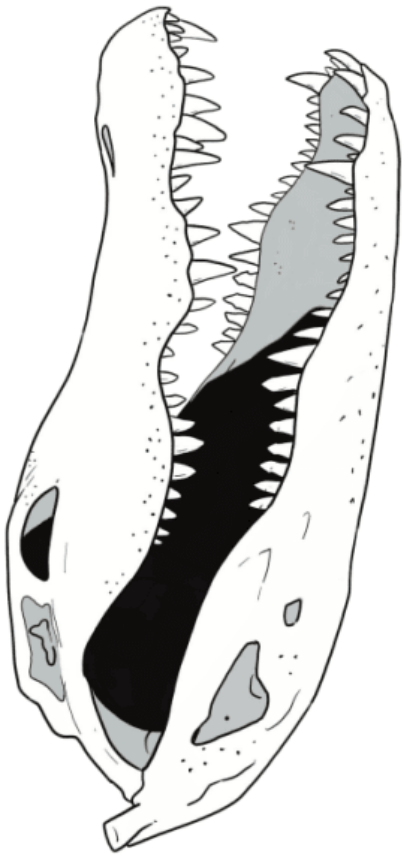


**7**



**7**

A



**mystery science**  
How do we know what dinosaurs looked like?

1

A



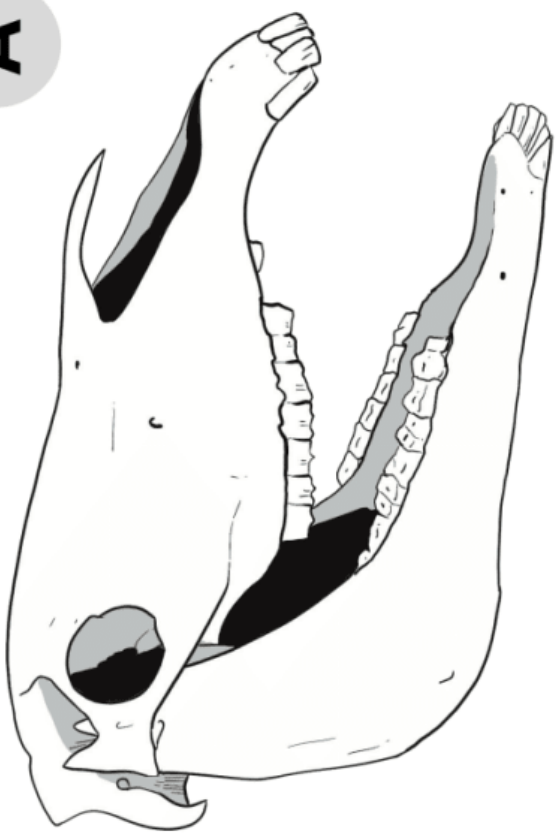
2

A



3

A

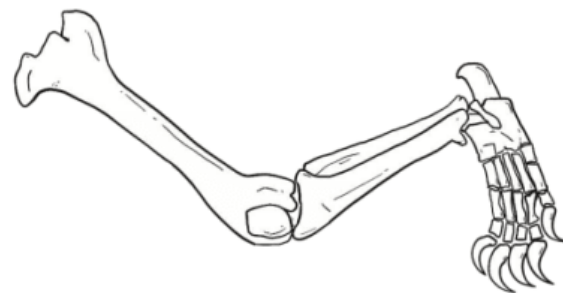


4

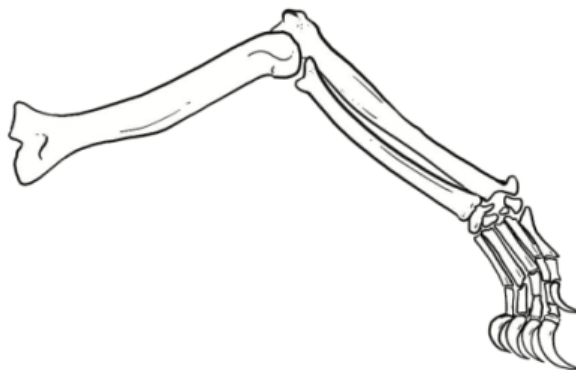


**B**

Back



Front

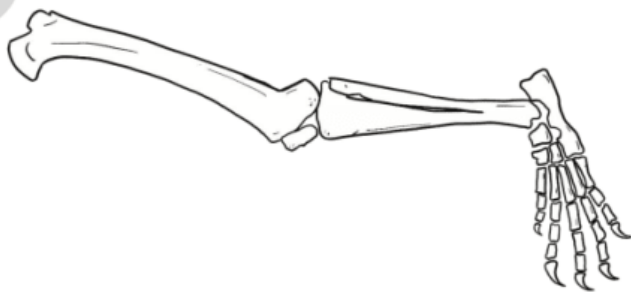


**4**

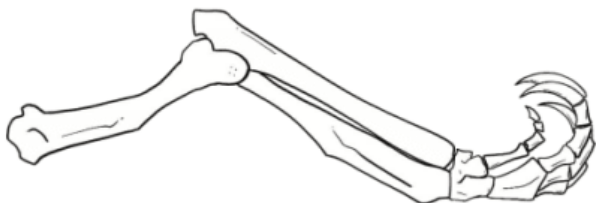


**B**

Back



Front

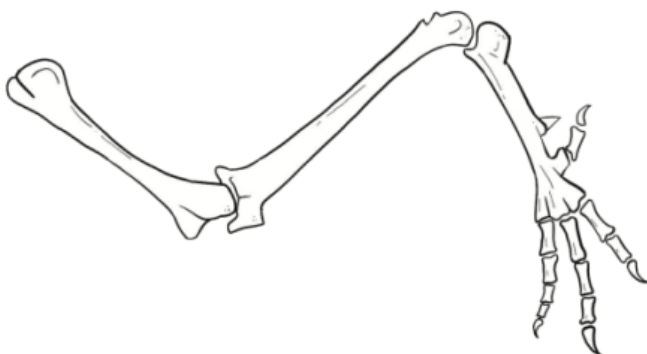


**2**



**B**

Back



Front



**1**

**B**

Back

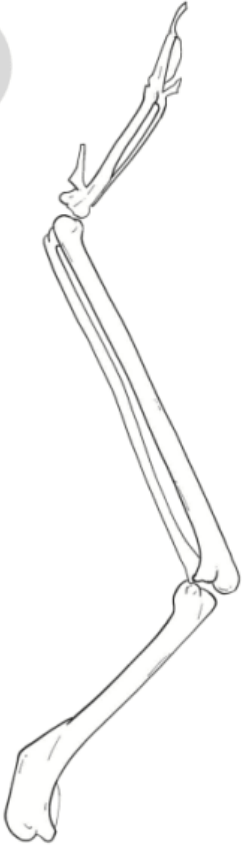


Front



**3**

C



2



C



4

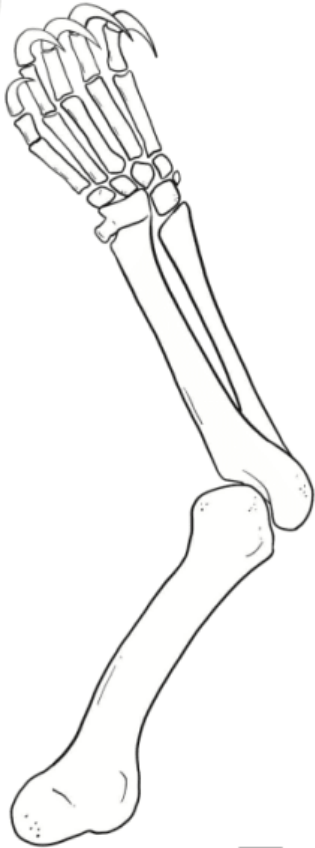


C



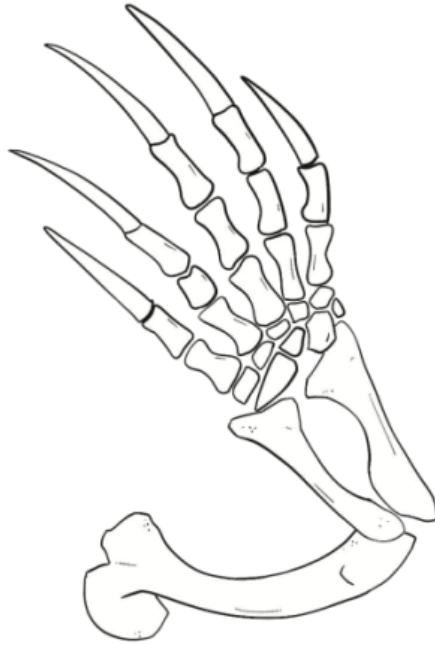
6

C



1

C



3

C



5



# Dinosaur Decisions



Name: \_\_\_\_\_

**mystery** science

How do we know what dinosaurs looked like?

## A

### What did it eat?

1. What evidence did you use to sort the modern animal bones the way you did?

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2. I think this dinosaur ate **meat / plants** (circle 1).

3. What evidence did you use from the fossil to make this decision?

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## C

### What did its front limbs look like?

7. What evidence did you use to sort the modern animal bones the way you did?

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8. I think this dinosaur's front limbs were **wings / flippers / claws** (circle 1).

9. What evidence did you use from the fossil to make this decision?

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## B

### How did it walk?

4. What evidence did you use to sort the modern animal bones the way you did?

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5. I think this dinosaur walked on **its back two limbs / all four limbs** (circle 1).

6. What evidence did you use from the fossil to make this decision?

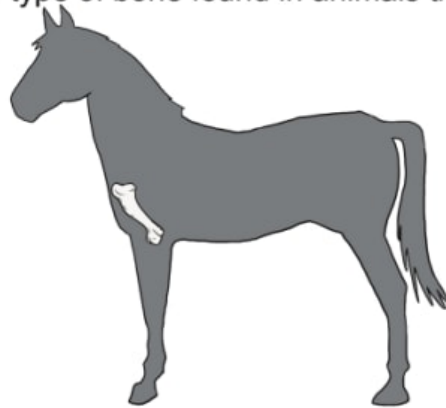
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## Lesson Assessment

Alice is a paleontologist who has discovered a new fossil! She has figured out that the fossil is a bone from the front limb of a dinosaur. Alice wants to figure out how big this dinosaur was when it was alive. So she studies the front limb bones of several animals that are alive today: horses, wolves, and chickens. Look closely at the fossil and compare it to the same type of bone found in animals that are alive today.



**Dinosaur Fossil Bone**

**Horse**

**Wolf**

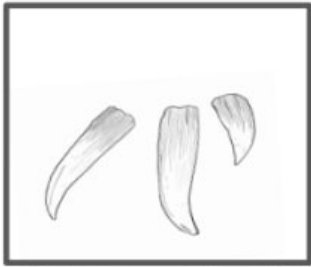
**Chicken**

1. The table below organizes information about the type of animal, the bone size, and the overall body size of the animals shown in the images above. Use information from the images above to correctly fill in the three blank spaces in the table.

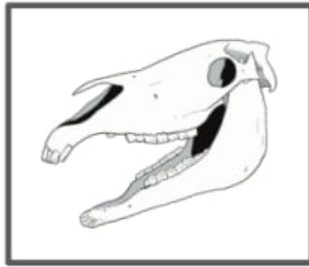
<b>Type of Animal</b>	Dinosaur	Horse		Chicken
<b>Bone Size</b>	Extra Large	Large	Medium	
<b>Size of Animal</b>	Unknown		Medium	Small

2. Which of the following claims has the **STRONGEST** evidence from the table above to support it?

- The dinosaur was probably smaller than a chicken.
- The dinosaur was probably about the same size as a wolf.
- The dinosaur was probably smaller than a wolf.
- The dinosaur was probably about the same size as a horse.
- The dinosaur was probably larger than a horse.
- The fossil bone does not give any evidence about the size the dinosaur.



**Dinosaur Fossil Teeth**



**Horse Skull**



**Wolf Skull**



**Chicken Skull**

3. Alice finds fossil teeth of the dinosaur. Alice is curious if the dinosaur ate meat (carnivore) or ate plants (herbivore). She compares the fossil teeth to the teeth of animals that are alive today – horses, wolves, and chickens. The table below lists information about the types of food that horses, wolves, and chickens eat and their teeth characteristics. Use information from the images above to correctly fill in the three blank spaces in the table.

<b>Type of Animal</b>	Dinosaur		Wolf	Chicken
<b>What the Animal Eats</b>	not known	hay, grain	deer, elk, moose	grain
<b>Meat or Plants</b>	not known	eats plants	eats meat	
<b>Teeth Characteristics</b>		flat teeth	sharp teeth	no teeth

4. Which of the following claims has the STRONGEST evidence to support it?
- The dinosaur probably ate plants (herbivore) because it had flat teeth.
  - The dinosaur probably ate plants (herbivore) because it had sharp teeth.
  - The dinosaur probably ate meat (carnivore) because it had flat teeth.
  - The dinosaur probably ate meat (carnivore) because it had sharp teeth.
  - There is no evidence about what the dinosaur ate.

5. Alice only has three fossil teeth. You only have evidence that the horse has flat teeth and eats plants. You only have evidence that the wolf has sharp teeth and eats meat. This is not much evidence. What would be more evidence to support the claim in question 4?

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# Run for your life!

**mystery science**  
Can you outrun a dinosaur?

Name: \_\_\_\_\_

## Find out which dinosaur you'll race:

1. Calculate your leg length: ( \_\_\_\_\_ x 12 inches) + \_\_\_\_\_ inches = \_\_\_\_\_ inches  
number of whole ruler lengths

2. Circle the dinosaur that's your leg length or less:



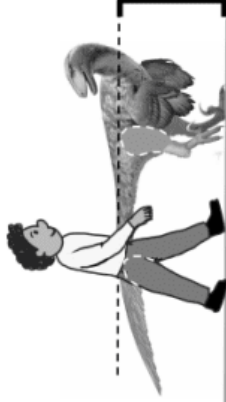
**VeeLo**  
(*Velociraptor*)

Leg length: about **20** inches



**SanJuan**  
(*Sanjuansaurus*)

Leg length: about **25** inches



**DeeNo**  
(*Deinonychus*)

Leg length: about **30** inches

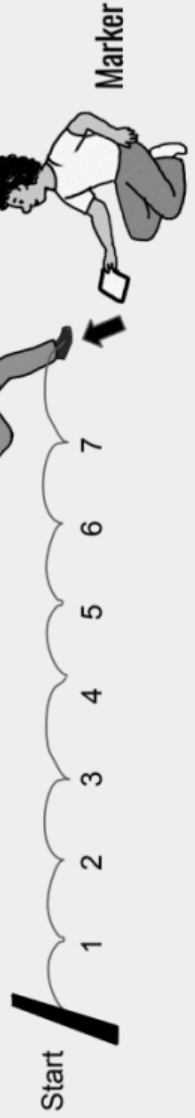


**CeeLo**  
(*Coelophysis*)

Leg length: about **35** inches

## Remember how to race:

Runner **8**



**PARTNER'S NAME**  
on sticky note

Can you outrun a dinosaur?

## Lesson Assessment

1. How do scientists know that the footprints they found came from dinosaurs?

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2. How can you tell if someone was walking or running just by looking at their footprints?

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3. What can you do to figure out if you can run faster than CeeLo?

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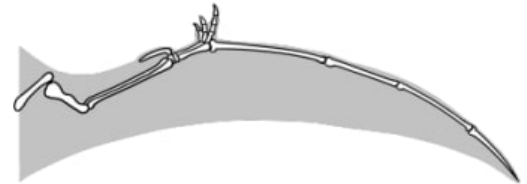
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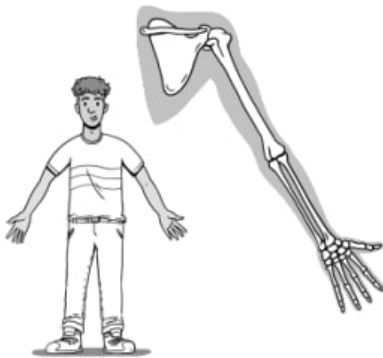
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## Unit Assessment

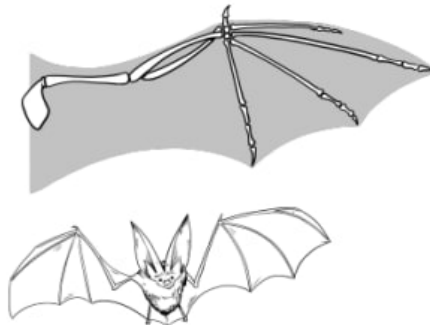
Vivian, a paleontologist, just discovered a new fossil! Vivian wants to figure out what the ancient animal was like when it was alive. She decides to compare the arm bones of the mystery fossil with the arm bones of some modern animals. Compare the bones below with the mystery fossil bones.



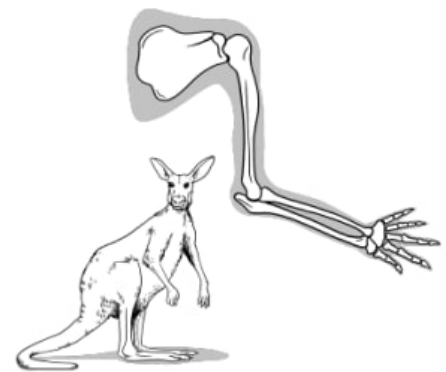
**Mystery Fossil Arm Bones**



**Human Arm Bones**



**Bat Arm Bones**



**Kangaroo Arm Bones**

1. Which of the following claims has the **STRONGEST** evidence to support it?

- a. The mystery animal walked on two legs.
- b. The mystery animal walked on four legs.
- c. The mystery animal lived in the water.
- d. The mystery animal flew or glided through the air.
- e. The mystery animal was a carnivore.

2. Explain the reason for your answer to question 1. Support your answer with evidence.

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3. Marcus is a paleontologist who is studying the fossils found at three different fossil dig locations. Marcus has discovered 2 clam fossils in a forest habitat. Marcus has found 3 shark tooth fossils, 2 clam fossils, and 1 fish fossil in a grassland habitat. Marcus hasn't found any fossils in a desert habitat.

Draw the type and number of each fossil that Marcus has discovered in each habitat. [Don't worry about the details of your drawing – a simple outline of the shape is just fine!]



= Shark Tooth Fossil

= Clam Fossil

= Fish Fossil

### Fossils Found in Each Habitat

<b>Forest</b>	<b>Grassland</b>	<b>Desert</b>
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4. Modern sharks, clams, and fish that are alive today usually live in ocean habitats. Marcus thinks that some of the habitats where he is currently finding fossils have changed over time. Which of the following claims has the **STRONGEST** evidence to support it?

- a. The desert habitat used to be an ocean.
- b. The grassland habitat used to be an ocean.
- c. The forest habitat used to be an ocean.
- d. Sharks used to walk on land.

5. Explain the reason for your answer to question 4. Support your answer with evidence.

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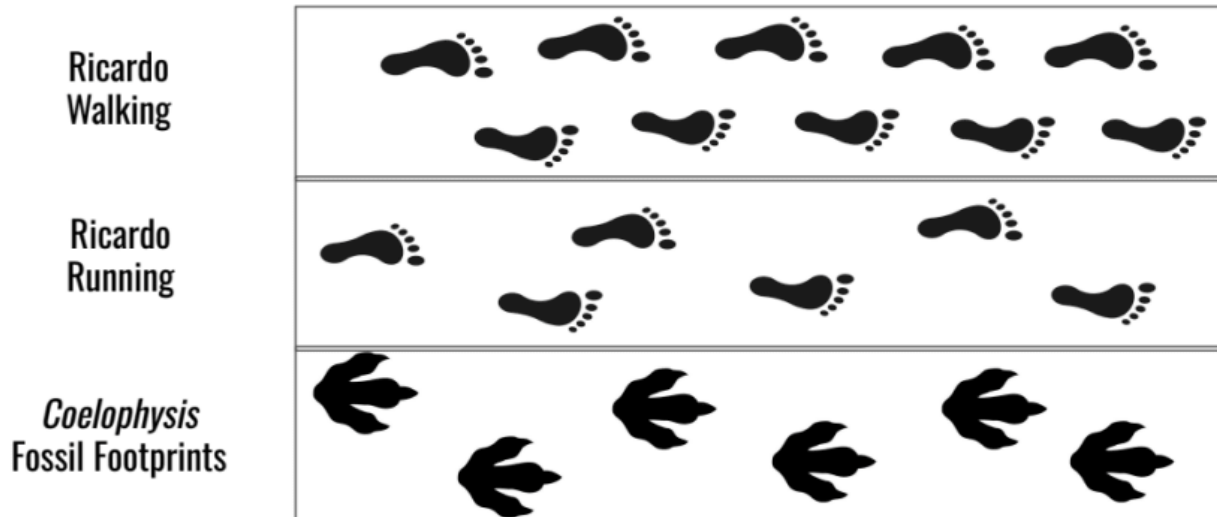


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Ricardo was researching an extinct dinosaur called *Coelophysis* and noticed his own legs are the same exact height as this dinosaur's legs.



Scientists have discovered trace fossils of *Coelophysis* footprints and Ricardo wants to compare his footprints to these fossils. Ricardo walked on the beach and took a photo of his footprints. He also ran on the beach and took a photo of his footprints. Compare the fossil footprints with Ricardo's footprints.



6. Which of the following claims has the STRONGEST evidence to support it?

- a. The dinosaur *Coelophysis* never ran when it was alive.
- b. The dinosaur *Coelophysis* was always running when it was alive.
- c. The dinosaur *Coelophysis* was probably walking when it stepped in the mud that made the trace fossils.
- d. The dinosaur *Coelophysis* was probably running when it stepped in the mud that made the trace fossils.
- e. Humans and dinosaurs lived at the same time.

7. Explain the reason for your answer to question 6. Support your answer with evidence.

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# Life Cycles

3rd Grade • NGSS • Unit Worksheets

## Lesson 1



How is your life like an alligator's life?

## Lesson 2



What's the best way to get rid of mosquitoes?

## Lesson 3



Why do plants grow flowers?

## Lesson 4



Why do plants give us fruit?

## Lesson 5



Why are there so many different kinds of flowers?

I am also curious about...

# Birthday Buddies Animal Cards

## Ostrich (bird)

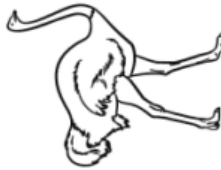
0

Chick hatches



2

Grows to adult size



4

Adult ostrich lays eggs



Lives up to 70 years

## Gray Squirrel (mammal)

0

Baby squirrel is born



1

Half a year

Grows to adult size



1

Adult squirrel has babies



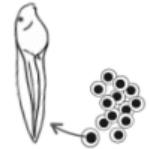
10

Lives up to 10 years

## Bullfrog (amphibian)

0

Tadpole hatches



2

Tadpole turns into frog



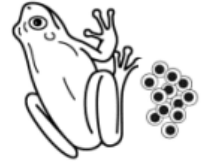
3

Grows to adult size



4

Adult frog lays eggs



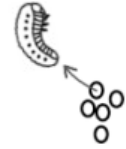
8

Lives up to 8 years

## Hercules Beetle (insect)

0

Beetle larva hatches



1

Beetle larva grows



2

Larva turns into adult beetle and lays eggs



3

Lives up to 3 years

# Birthday Buddies Timeline

Name: \_\_\_\_\_

**mystery science**

How is your life like an alligator's life?

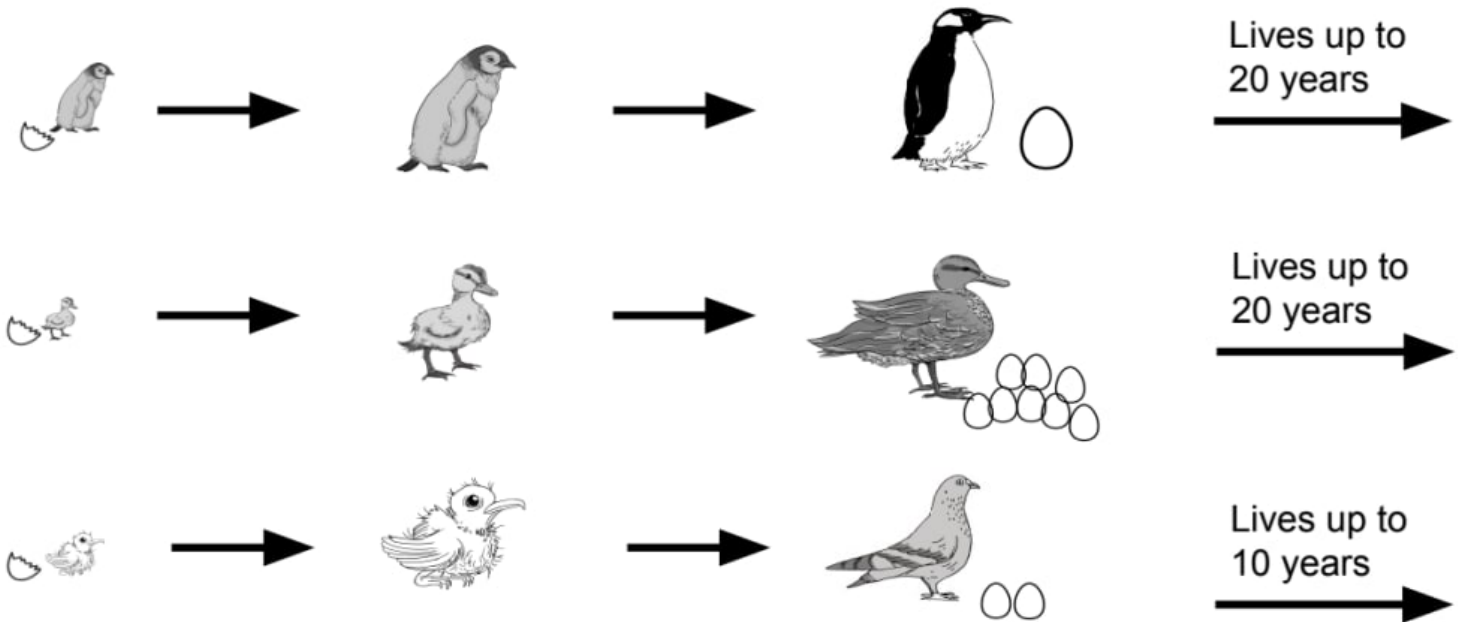
*Birthday Buddy #1*



*Birthday Buddy #2*



## Lesson Assessment



1. The images above show the major events in the lives of three different kinds of birds—penguins, ducks, and pigeons. Look carefully for patterns of what is the same and what is different about these three life cycles.

Using information from above, circle **True** or **False** for each sentence.

- True   False   All baby birds hatch from an egg.
- True   False   Birds all live for the same amount of time.
- True   False   All birds grow during their life cycle.
- True   False   All birds lay the same number of eggs during their life cycle.

2. The images above are a model for the life cycles of these three types of birds. What do the arrows represent in this model?

- The arrows represent a major event in the life cycle of each bird.
- The arrows represent a certain amount of time passing.
- The arrows don't represent anything in the model.



3. The images above show a frog at different points in its life cycle. Draw arrows to show the correct order of events in the life of a frog.

4. Animals have life cycles. This means that life continues, even though death is a part of the cycle. Look closely at your model of the frog life cycle. Add a **dashed line** to this model to show how the frog life cycle will continue, even though death is part of the life cycle.

5. Add to your model of the frog's life cycle above by adding one of the four descriptions to each of the images.

**Birth**  
**(Hatch from an Egg)**

**Growth**

**Have Babies**

**Death**

6. Imagine that there is something in the pond water where these frogs live that prevents the eggs from hatching into tadpoles. Use your model of the frog's life cycle to explain what would happen to the frogs over time.

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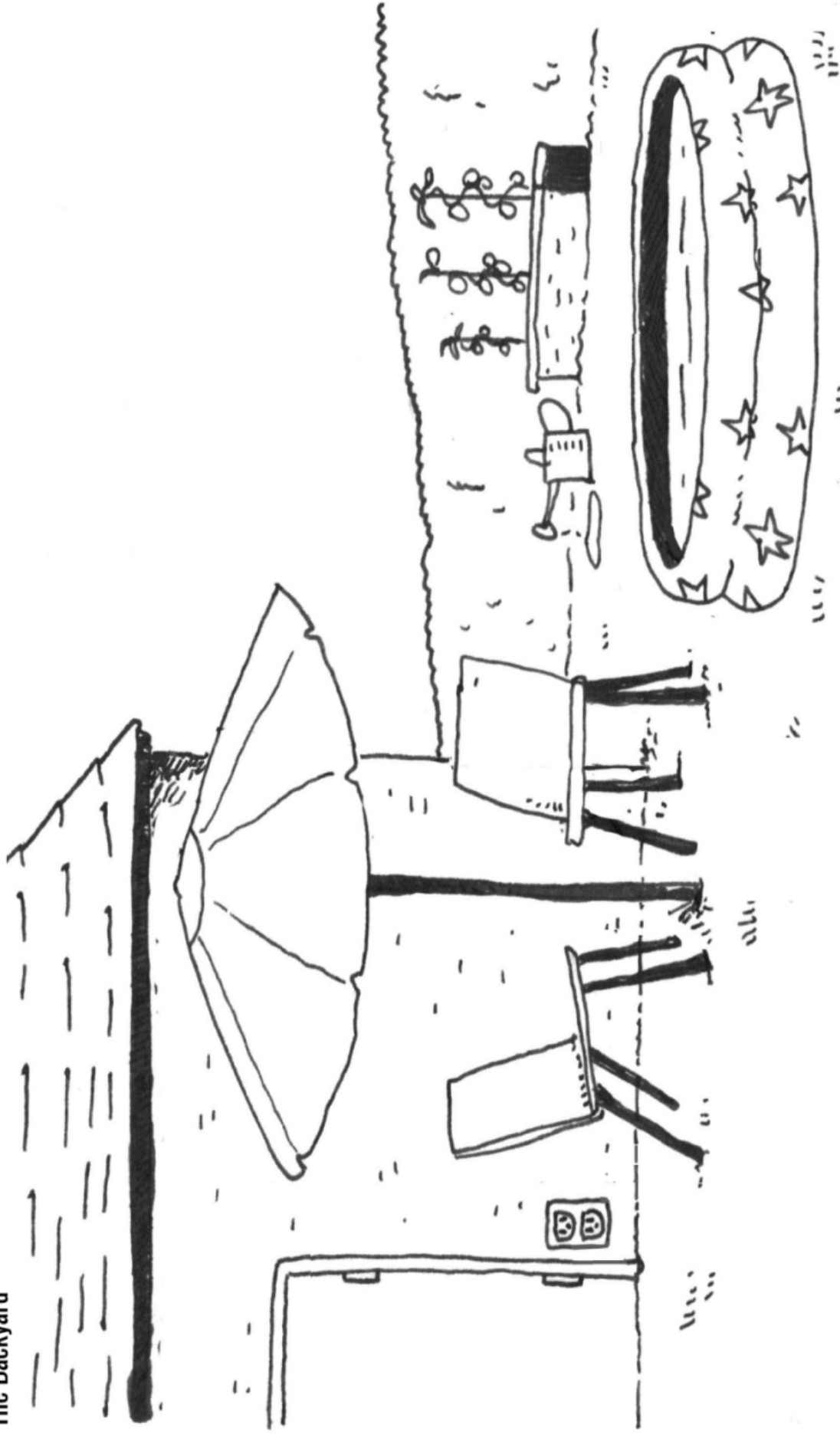
# Bug Off Worksheet #3

## The Backyard

**mystery science**

What's the best way to  
get rid of mosquitoes?

Name: \_\_\_\_\_



This is how I will solve the mosquito problem in this backyard: \_\_\_\_\_

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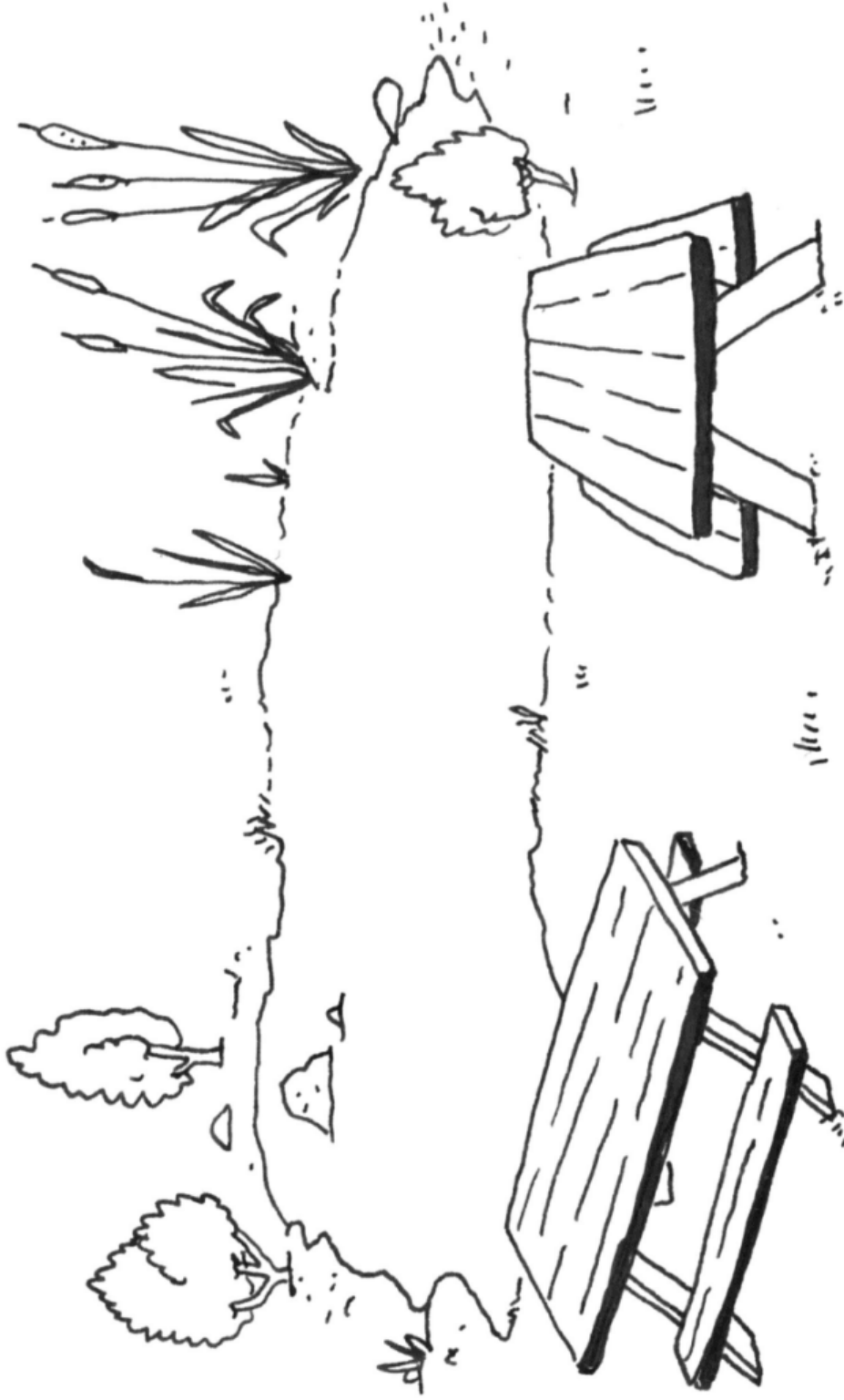
# Bug Off Worksheet #2

The Picnic Area

**mystery science**

What's the best way to  
get rid of mosquitoes?

Name: \_\_\_\_\_



This is how I will solve the mosquito problem at the picnic area: \_\_\_\_\_

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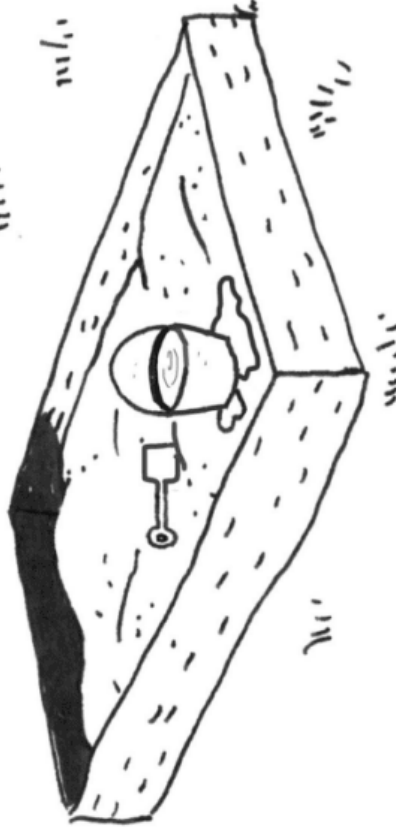
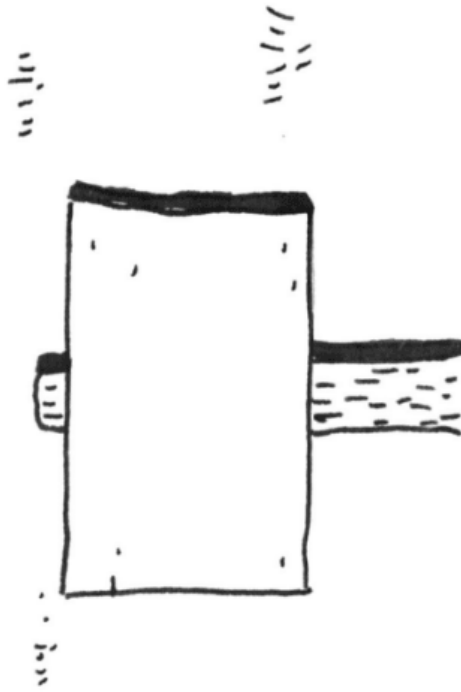
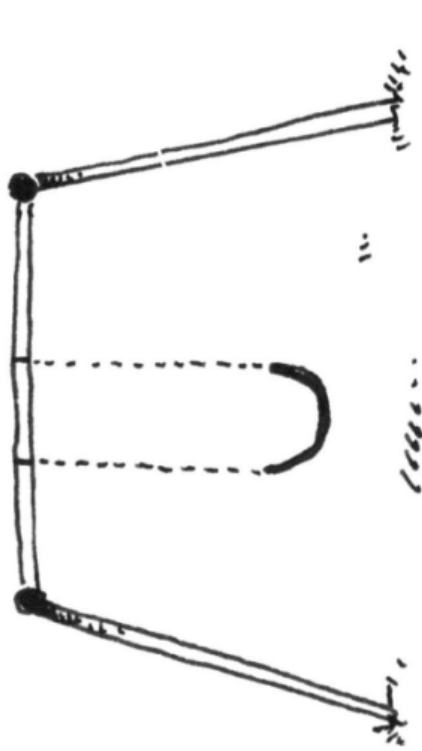
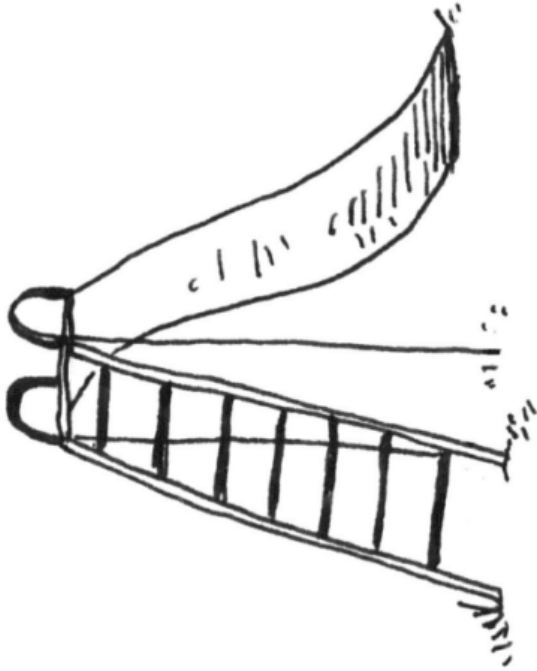
# Bug Off Worksheet #1

## The Playground

### mystery science

What's the best way to get rid of mosquitoes?

Name: \_\_\_\_\_



This is how I will solve the mosquito problem at the playground: \_\_\_\_\_

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# Problem Solver's Sheet

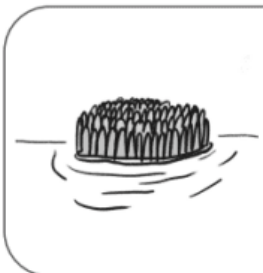
## PROBLEM

1) What's the problem you need to solve? Problem: \_\_\_\_\_

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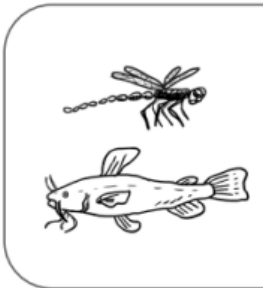
## SOLUTIONS

2) After listening to each expert, write down any ideas you have about how to solve the mosquito problem. The more ideas, the better!




**PARK RANGER:**  
"Mosquitoes need water for their eggs and larvae."

Ideas: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



**FISHERMAN:**  
"Fish eat mosquito eggs and larvae. Dragonflies eat mosquitoes."

Ideas: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



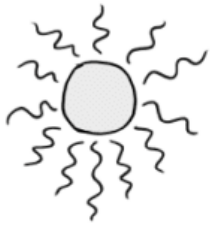
**WEATHER REPORTER:**  
"Mosquitoes can't fly in wind over 10 miles per hour." (16 km/h)

Ideas: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



**HOME REPAIR EXPERT:**  
"Mosquitoes can't get through screens or netting."

Ideas: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



**HIKER:**

"Mosquitoes bite most at sunrise and sunset."

Ideas: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



**BIRD WATCHER:**

"Birds and bats eat lots of mosquitoes."

Ideas: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



**DAD & KID:**

"Insect repellent keeps them away, but it's icky."

Ideas: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

3) Look at your "Bug Off" sheet. Are there any solutions that will NOT work here? Why won't they work?

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

4) How will you figure out how well your solution worked? For example, is there some way you could compare what it was like in the town before and after your solution?

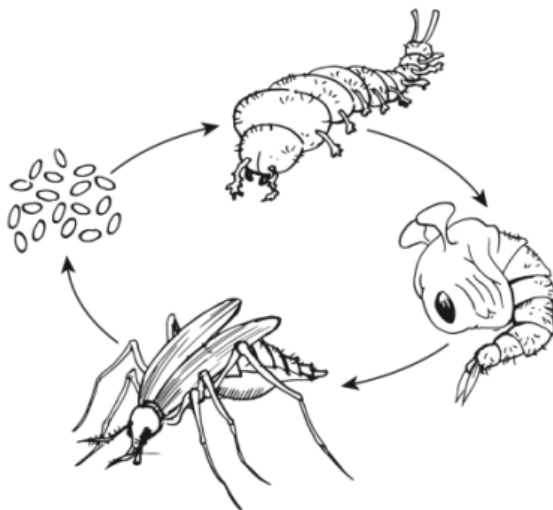
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

What's the best way to get rid of mosquitoes?

## Lesson Assessment

1. Which is a disease carried by mosquitoes?
  - a. Asthma
  - b. Flu
  - c. Chicken pox
  - d. Malaria
2. Which of the following would NOT protect people from getting diseases carried by mosquitoes?
  - a. Leaving buckets outside to catch rainwater
  - b. Covering porches and beds with mosquito nets
  - c. Using powerful fans in doorways where insects might get in
  - d. Spraying uncovered skin with mosquito repellent
3. You are most likely to find mosquitoes in a habitat that is...
  - a. dry and hot
  - b. cold and wet
  - c. warm and wet
  - d. cold and dry

4. Label the stages of the mosquito life cycle using words from the word bank.



**Word Bank:**

Pupa  
Eggs  
Adult  
Larva

5. If Pondville has a drought next year, will mosquitoes become more or less common? Support your answer with reasoning.

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6. A friend tells you, "Mosquitoes are just annoying, they're not dangerous." Do you agree? Why or why not?

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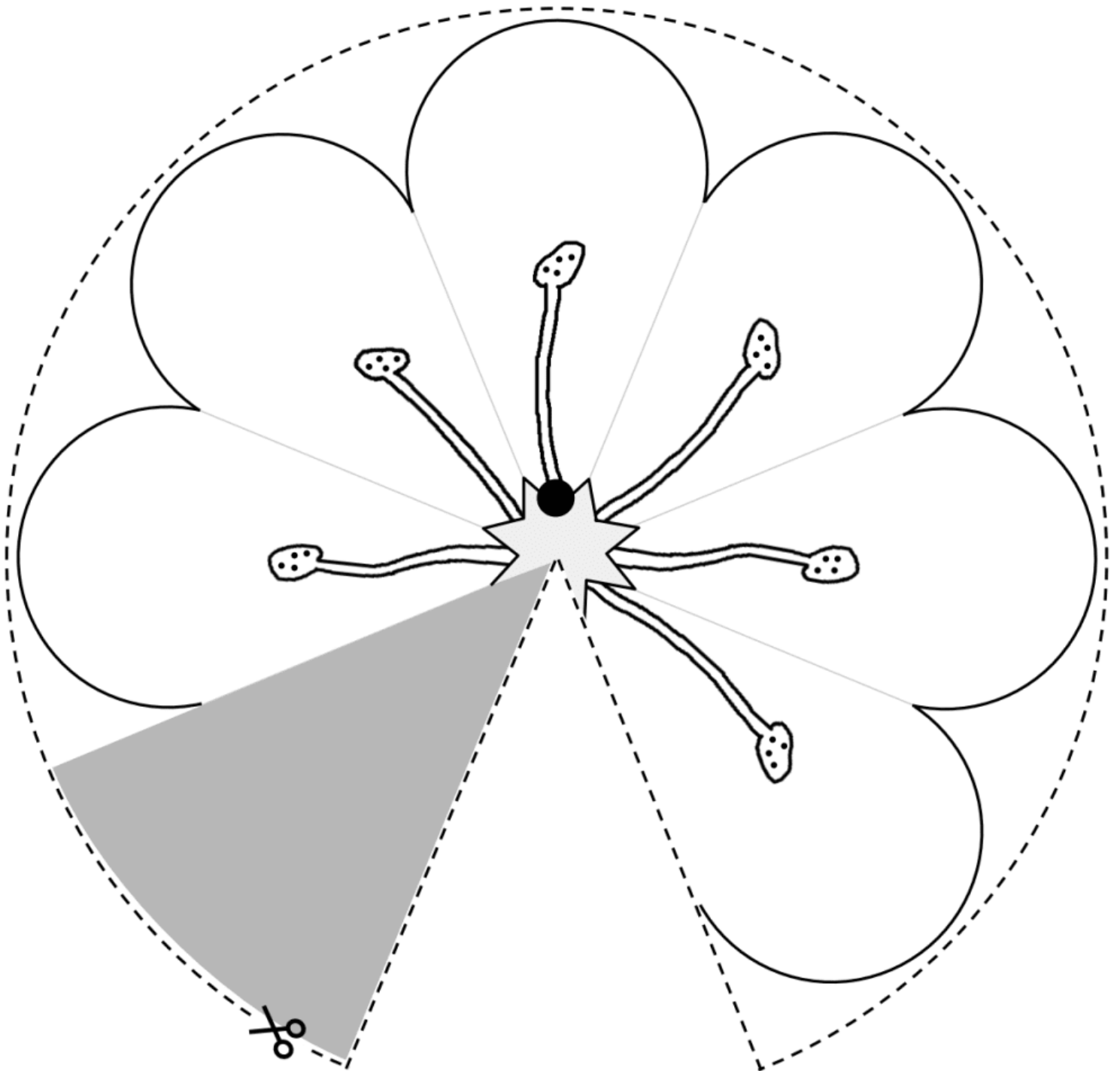
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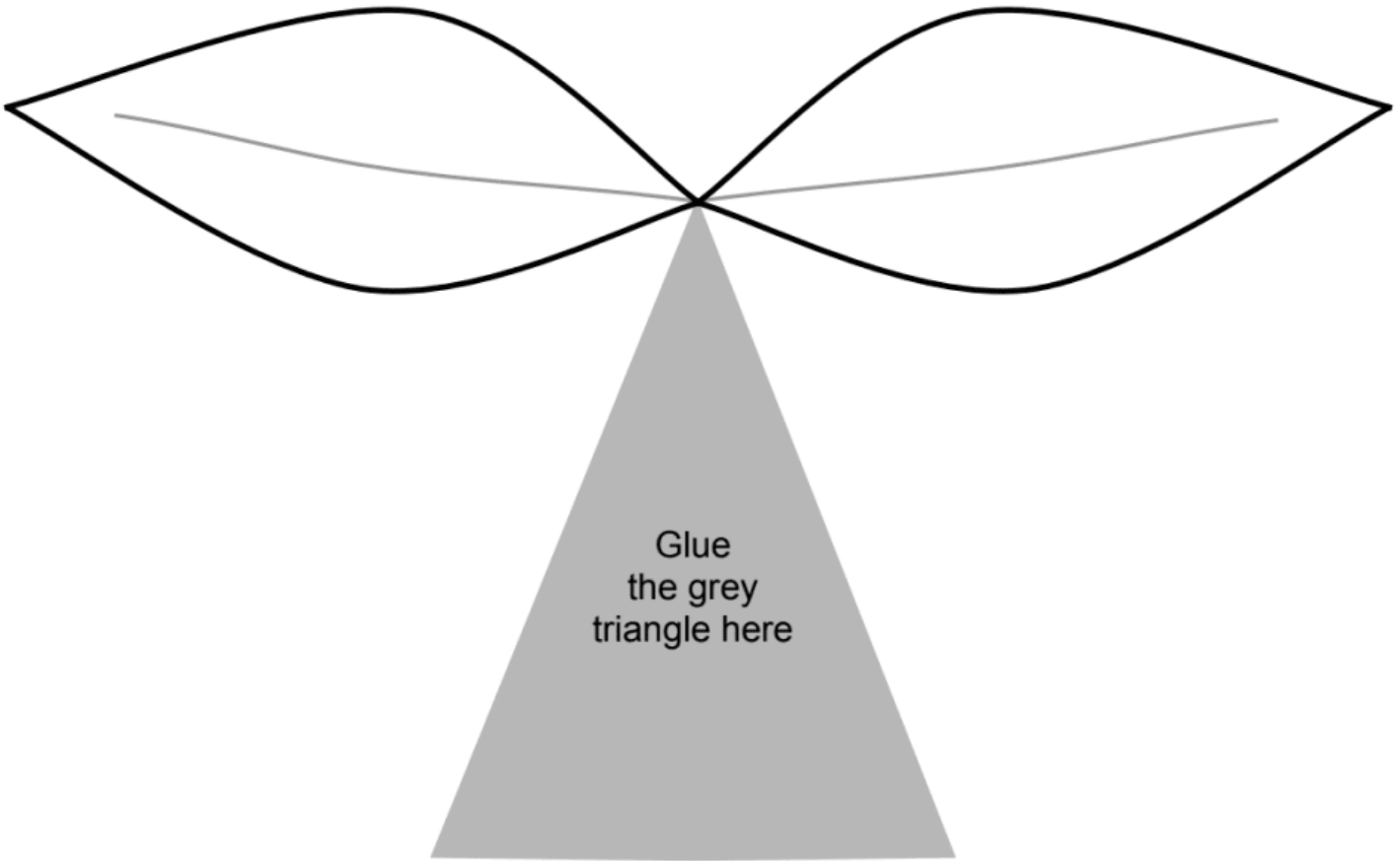
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# Make a Flower



# Flower Base



Name: \_\_\_\_\_

1. Circle what pollen you see on the sticky stigma:

Pollen from  
my flower

Pollen from my  
partner's flower

Pollen from  
both flowers

2. Do you think your flower will make seeds?

Yes

No

## KEY

pollen  
duster



sweet  
nectar



Why do plants grow flowers?

## Lesson Assessment

1. How do bees help flowers make seeds?

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2. If you take a flower's pollen and then put it on that same flower's stigma, will that make a seed pod grow? Why or why not?

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3. Why do bees like crawling into flowers?

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# Science Fruit or Science Vegetable?

Circle your answers for each food.

## Radish:

What do you think it is?	science fruit	science vegetable
Did you find seeds?	Yes, I found seeds!	No seeds here.
What did the class decide?	science fruit!	science vegetable!

## Tomato:

What do you think it is?	science fruit	science vegetable
Did you find seeds?	Yes, I found seeds!	No seeds here.
What did the class decide?	science fruit!	science vegetable!

## Cucumber:

What do you think it is?	science fruit	science vegetable
Did you find seeds?	Yes, I found seeds!	No seeds here.
What did the class decide?	science fruit!	science vegetable!

## Potato:

What do you think it is?	science fruit	science vegetable
Did you find seeds?	Yes, I found seeds!	No seeds here.
What did the class decide?	science fruit!	science vegetable!

## Celery:

What do you think it is?	science fruit	science vegetable
Did you find seeds?	Yes, I found seeds!	No seeds here.
What did the class decide?	science fruit!	science vegetable!

Why do plants give us fruit?

## Lesson Assessment

1. Why do flowers grow fruit?

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2. What part of an apple reminds you that it was once a flower?

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3. How could you tell if something is a “science fruit?”

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4. What is an example of a “science fruit” that is normally called a vegetable in the grocery store? Why do you think it’s called a vegetable in the grocery store?

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# Rules

## GOAL OF THE GAME:

Have the most Plant Cards in your Fruit & Seed Basket at the end of the game.



## What to do on your turn:

### FIRST, DRAW A CARD

Draw 1 Plant Card. **or** Draw 1 Bee Card (only if you have plants in your garden.)

### THEN, PLANT & POLLINATE (if you can!) (as much as you can!)

**1 ADD PLANTS TO YOUR GARDEN**

If 2 Plant Cards match, add them to your garden.

If you don't have any plant cards that match, keep them in the Plant Zone.

**2 CHECK YOUR BEE CARDS**

Read your Bee Cards to see if they can pollinate any plants in your garden.

If they can, then **Pollinate** your plants

This bee card says it can pollinate these tomatoes!

**3 POLLINATE PLANTS & MOVE THEM TO THE BASKET**

- Pretend your bee pollinates the flowers of your plants. Those flowers now turn into fruits! Move both Plant Cards to your Fruit & Seed Basket. (You just scored two points!)
- Keep the Bee Card in the Bee Zone. You can use that bee again.

### GAME ENDS:

The game ends when there are no more cards to draw. (You probably didn't get to pollinate all your plants and that's okay!)

**mystery science**

Why are there so many different kinds of flowers?

mystery science



**Strawberry**  
Plant

mystery science



**Strawberry**  
Plant

mystery science



**Strawberry**  
Plant

mystery science



**Strawberry**  
Plant

mystery science



**Strawberry**  
Plant

mystery science



**Strawberry**  
Plant

mystery science



**Tomato**  
Plant

mystery science



**Tomato**  
Plant

mystery science



**Tomato**  
Plant

mystery science



**Tomato**  
Plant

mystery science



**Tomato**  
Plant

mystery science



**Tomato**  
Plant

mystery science  
Why are there so many  
different kinds of flowers?



**Watermelon**  
Plant

mystery science



**Watermelon**  
Plant

mystery science



**Watermelon**  
Plant

mystery science



**Watermelon**  
Plant

# Card Station

**mystery science**  
Why are there so many  
different kinds of flowers?

Plant Cards



Plant Cards

Bee Cards



Bee Cards

mystery science



**Pumpkin**  
Plant

mystery science



**Pumpkin**  
Plant

mystery science



**Pumpkin**  
Plant

mystery science



**Pumpkin**  
Plant

mystery science



**Watermelon**  
Plant

mystery science



**Watermelon**  
Plant

mystery science



**Pumpkin**  
Plant

mystery science



**Pumpkin**  
Plant

Name: \_\_\_\_\_

# Scorecard

## How Many Plants Were Pollinated?

### YEAR 1:

Strawberry: \_\_\_\_\_

Tomato: \_\_\_\_\_

Watermelon: \_\_\_\_\_

Pumpkin: \_\_\_\_\_

**Total:** \_\_\_\_\_

### YEAR 2:

Strawberry: \_\_\_\_\_

Tomato: \_\_\_\_\_

Watermelon: \_\_\_\_\_

Pumpkin: \_\_\_\_\_

**Total:** \_\_\_\_\_

1. If you removed all the bees from the garden, what would happen? Why?

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Name: \_\_\_\_\_

# Scorecard

## How Many Plants Were Pollinated?

### YEAR 1:

Strawberry: \_\_\_\_\_

Tomato: \_\_\_\_\_

Watermelon: \_\_\_\_\_

Pumpkin: \_\_\_\_\_

**Total:** \_\_\_\_\_

### YEAR 2:

Strawberry: \_\_\_\_\_

Tomato: \_\_\_\_\_

Watermelon: \_\_\_\_\_

Pumpkin: \_\_\_\_\_

**Total:** \_\_\_\_\_

1. If you removed all the bees from the garden, what would happen? Why?

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

mystery science

### Squash Bees



Pollinate:

**Pumpkin** flowers  
**Zucchini** flowers

mystery science

### Bumble Bees



Pollinate:

**Tomato** flowers  
**Pepper** flowers

mystery science

### Long-horned Bees



Pollinate:

**Watermelon** flowers  
**Cantaloupe** flowers

mystery science

### Andrena Bees



Pollinate:

**Strawberry** flowers  
**Cucumber** flowers

mystery science

### Squash Bees



Pollinate:

**Pumpkin** flowers  
**Zucchini** flowers

mystery science

### Bumble Bees



Pollinate:

**Tomato** flowers  
**Pepper** flowers

mystery science

### Long-horned Bees



Pollinate:

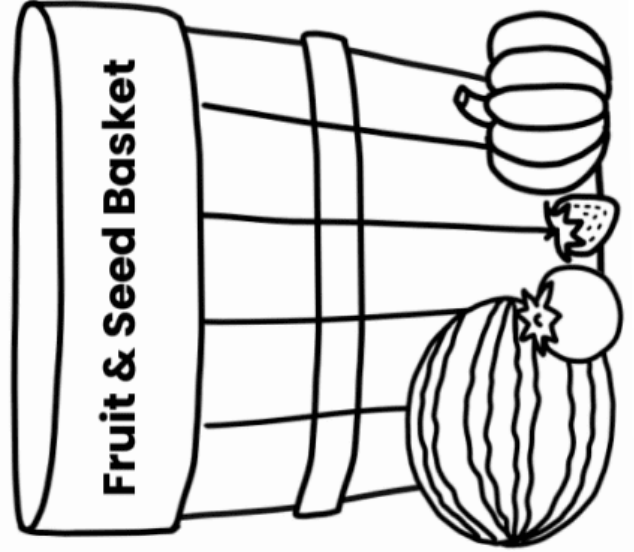
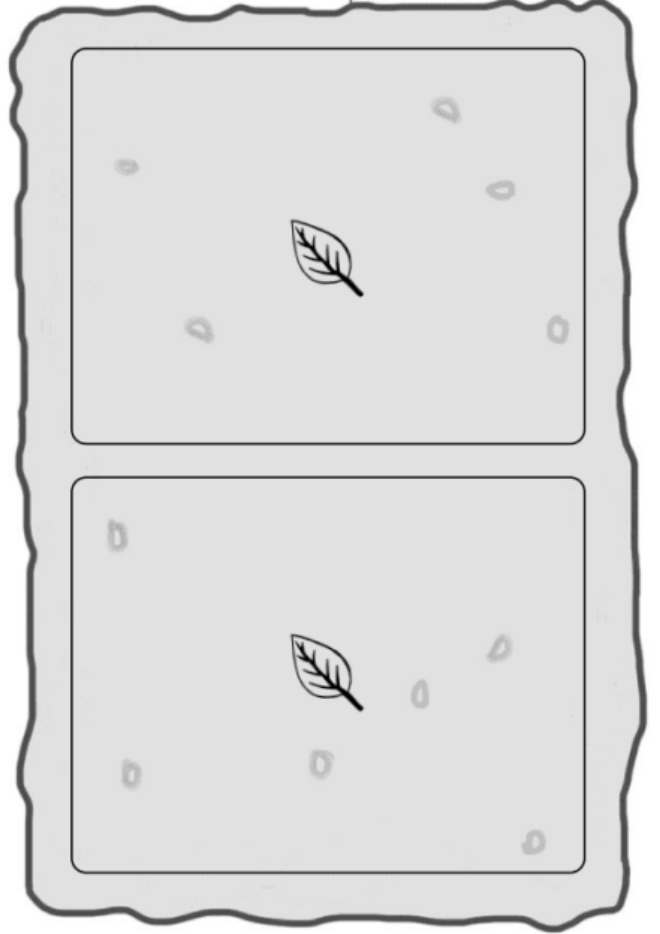
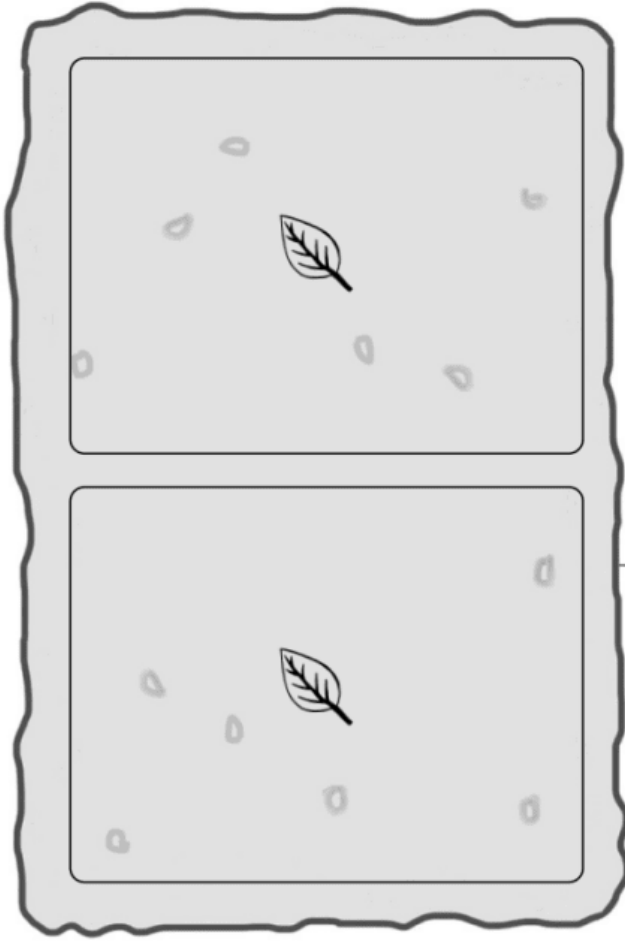
**Watermelon** flowers  
**Cantaloupe** flowers

**mystery science**

Why are there so many different kinds of flowers?

← **Plant Zone** 

 **Bee Zone** →

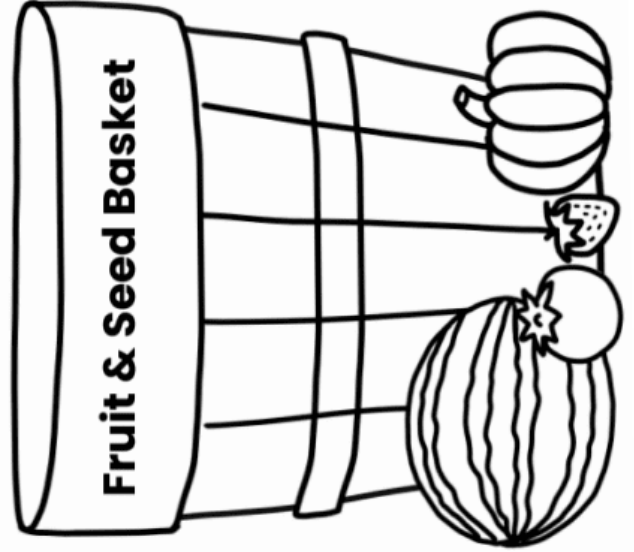
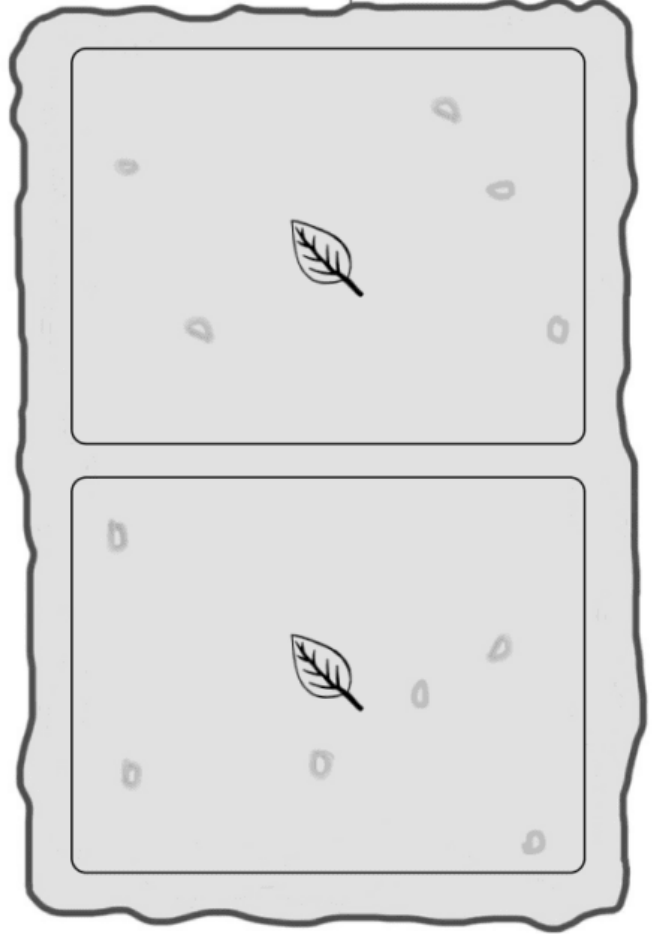


Bees fly back  
to the Bee Zone

**mystery science**  
Why are there so many  
different kinds of flowers?

← **Plant Zone** 

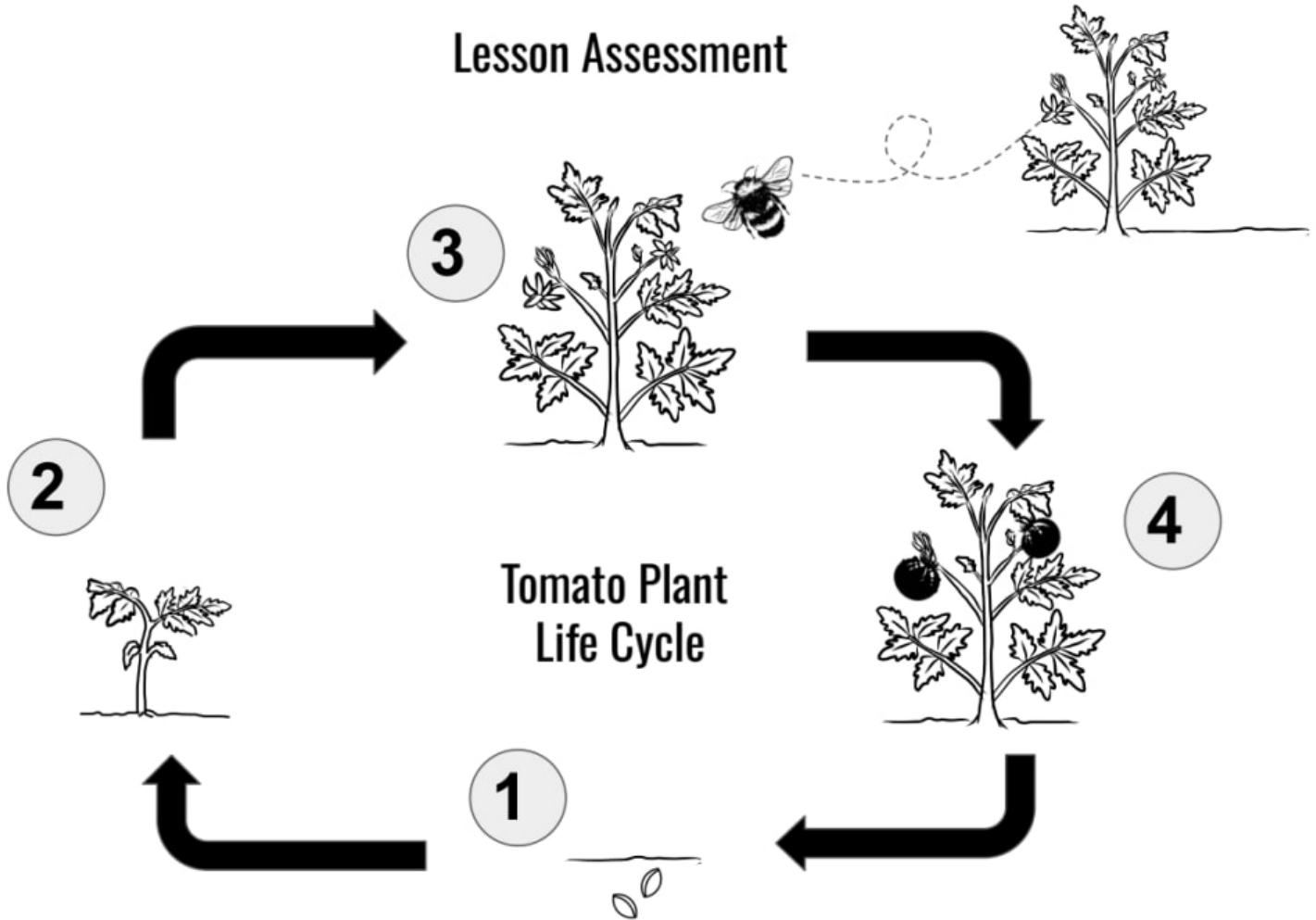
 **Bee Zone** →



Bees fly back  
to the Bee Zone

**mystery science**  
Why are there so many  
different kinds of flowers?

**Lesson Assessment**



Use the model of the tomato plant life cycle shown above to help you answer the questions.

1. Where did the seeds shown in part 1 of the model come from?

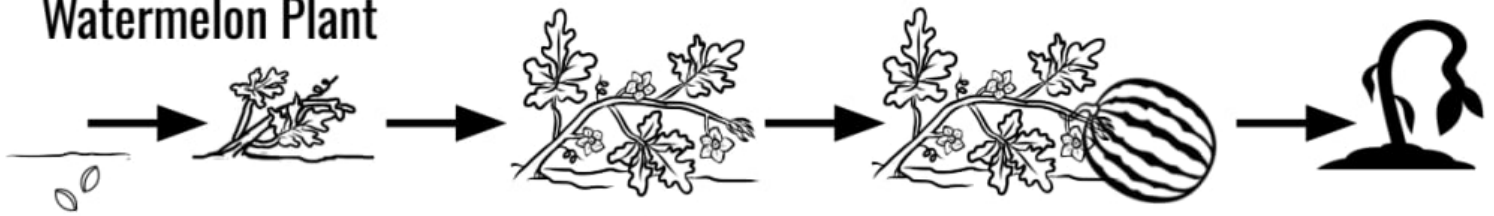
- a. Seeds come from the roots of the adult plant.
- b. Seeds are always present under the ground.
- c. Seeds come from the fruit of the adult plant.
- d. Seeds come from the leaves of the adult plant.

2. What would happen if you removed the bumblebee from part 3 of the model?

There may be more than one correct answer. Circle all correct answers.

- a. The plant will produce less fruit (tomatoes) because the bumblebee helps pollinate the flowers.
- b. The plant will produce fewer seeds because there will be less fruit. With fewer seeds there will be fewer tomato plants in the future.
- c. The current adult tomato plant will die because it needs the bumblebee to survive.
- d. The current plant will not produce flowers because the plant needs the bumblebee to grow flowers.

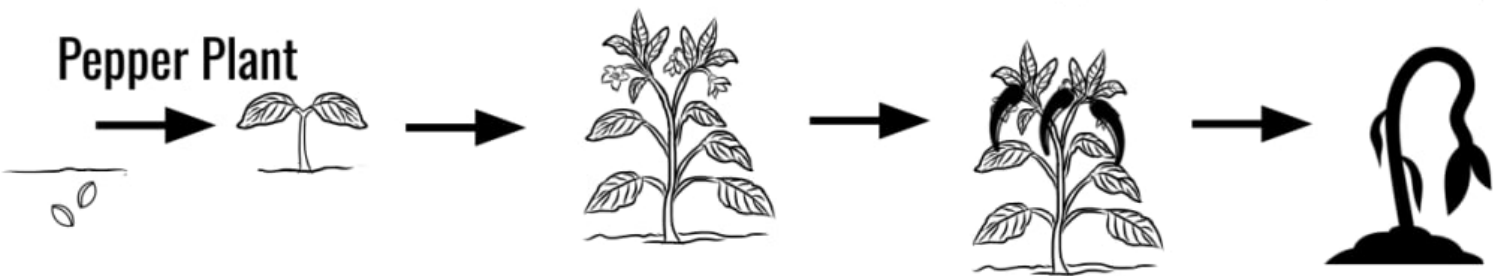
## Watermelon Plant



## Tomato Plant



## Pepper Plant



3. The images above are models that show different stages of the life cycle for three different kinds of plants: watermelon, tomato, and pepper. Use these models to find patterns of what is the same and different for these plants. Circle **True** or **False** for each sentence.

True   False   All plants start small and grow into larger plants.

True   False   All plants eventually die.

True   False   All plants produce the same number of fruits.

4. A plant life cycle should continue in a loop (or circle). Add one arrow to each life cycle to show how the life cycle will continue, even though death is a part of the life cycle.

5. Imagine that you have a garden with watermelon plants, tomato plants, and pepper plants. This garden gets plenty of water and sunshine. But you only have bees in your garden that pollinate watermelon flowers. Describe what will happen to your garden in the next few years if everything stays the same.

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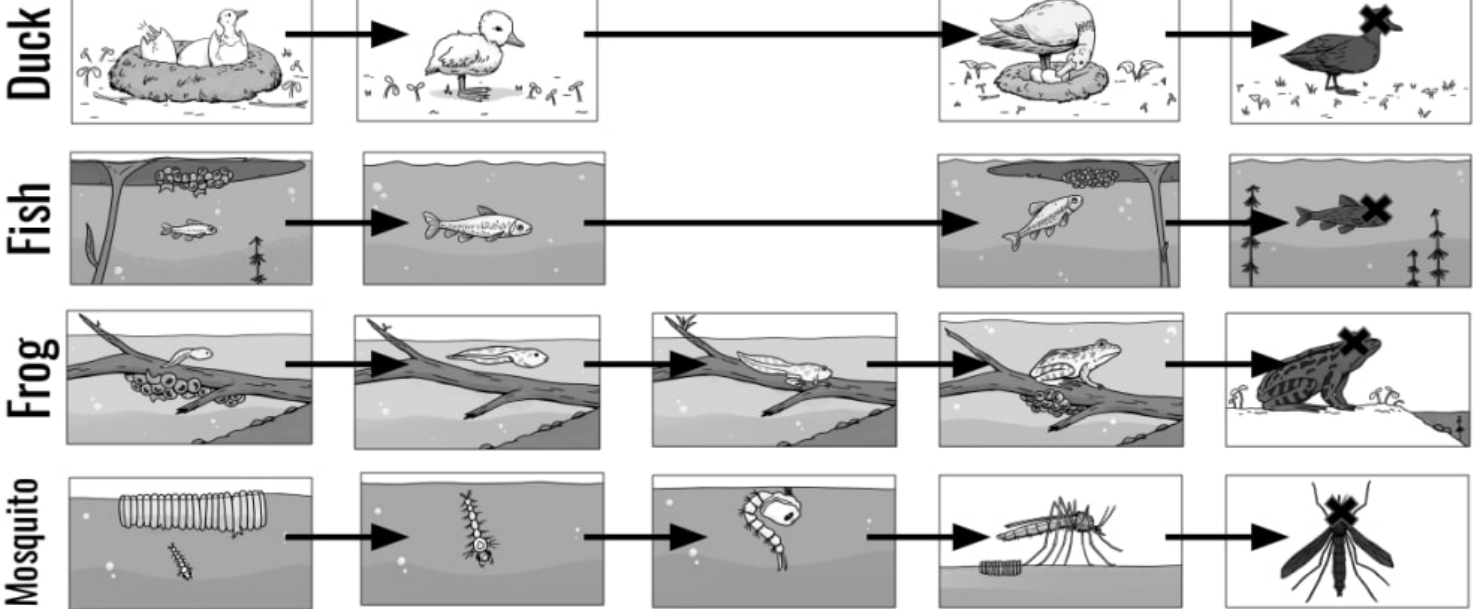
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## Unit Assessment

1. Sheena makes a visit to her local pond. She sees ducks, frogs, and fish living there. She also gets bitten by a few mosquitoes. Sheena wants to learn more about the life cycles of the animals living in this habitat. To help her understand similarities and differences, Sheena makes some life cycle models. Use the terms in the word bank to label each life stage shown in the models. Write the correct term for each stage in the empty boxes below.

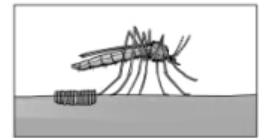
Growth	Birth (Hatching)	Have Babies (Reproduction)	Death	Metamorphosis
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2. Sheena notices a pattern in the life cycles of frogs and mosquitoes. Use evidence from the life cycle models. Circle all the correct answers. There may be more than one correct answer.

- Frogs and mosquitoes never die.
- Frogs and mosquitoes go through a major change in their bodies called metamorphosis.
- Frogs and mosquitoes have the same number of life stages as ducks and fish.
- Frogs and mosquitoes go through a growth stage after they hatch from eggs.

3. Sheena notices another pattern. The adult ducks, fish, frogs, and mosquitoes can have babies (reproduce). When the animals lay eggs, babies can then hatch from those eggs and grow into adults. But every year there are about the same number of animals at the pond. If animals are having lots of babies every year, why isn't the pond overflowing with too many animals? Look back at Sheena's life cycle models on Page 1 to help you answer.




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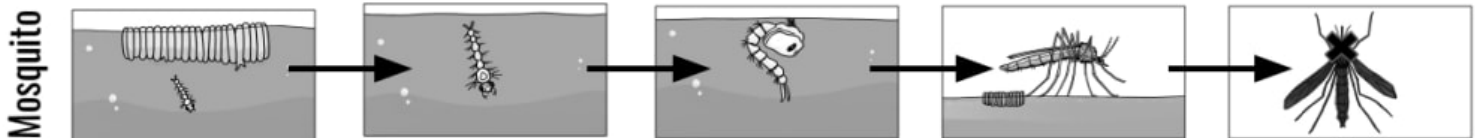


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There is a mosquito problem near the pond that Sheena visits. Mosquitoes do well in warm weather, so when the temperature gets warmer in the summer, there are more and more adult mosquitoes. The adult mosquitoes fly around and bite people.



Omar knows about a chemical that will kill mosquito eggs. He thinks we should spray the chemical into the pond water.



4. Do you think Omar's solution will solve the problem? Look at the mosquito life cycle model again to help you choose the best answer.

- No, Omar's solution will not work because the mosquito eggs are not biting people.
- No, Omar's solution will not work because the chemical does not kill the adult mosquitoes that are biting people.
- Yes, Omar's solution will work because it will kill the adult mosquitoes that are biting people.
- Yes, Omar's solution will work because if it kills the eggs, then they won't hatch and grow into adult mosquitoes that will bite people.

5. The chemical that Omar wants to spray into the pond water not only kills mosquito eggs. It will kill the eggs of other animals in the water.

Look back at Sheena's life cycle models on Page 1. Use evidence from those life cycle models to describe why Omar's idea may not be a good solution to solve the mosquito problem.

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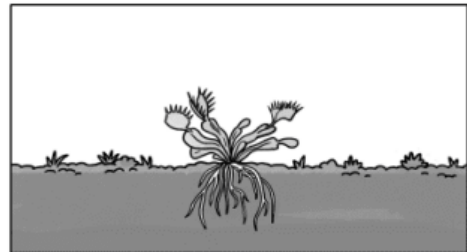
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6. Zara has a different solution to solve the mosquito problem at the pond. An interesting plant grows around the pond called a Venus Flytrap.

The plant has little traps. When a bug lands in the trap, the trap slams shut, and kills the bug.



**Venus Flytrap**

Zara notices that adult mosquitoes get caught in the traps and die. Zara thinks the town should gather a bunch of Venus Flytrap seeds and plant them around the pond.

Do you think Zara's idea will solve the problem this year? Why or why not?

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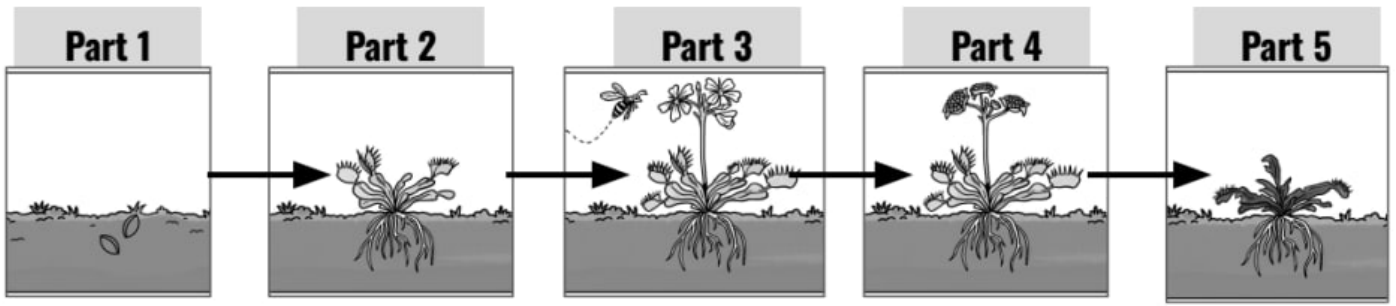
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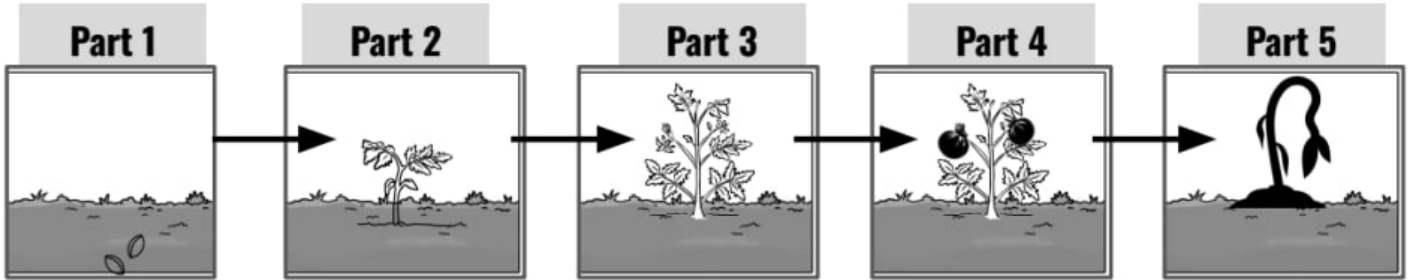
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Venus Flytrap Plant



Tomato Plant



7. Sheena wants to know more about the Venus Flytrap plant. She wants to know if the Venus Flytrap has anything in common with a tomato plant. So she makes a life cycle model of a Venus Flytrap and a life cycle model of a tomato plant, which are shown above. Using information from above, circle **True** or **False** for each sentence.

True    False    Both plants begin their life as a seed and then grow into bigger plants.

True    False    The tomato plant has flowers in Part 3, but the Venus Flytrap does not.

True    False    Both plants will eventually die as shown in Part 5 of both models.

8. Sheena is amazed to see that a Venus Flytrap actually has several things in common with other plants. So she wonders if something as different as a frog and a tomato have anything in common too!

Frog



Compare the frog life cycle model to the tomato plant life cycle model. Even though they are SO different, write down everything their life cycles have in common!

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# Heredity, Survival, & Selection

3rd Grade • NGSS • Unit Worksheets

## Lesson 1



How do you identify a mysterious fruit?

## Lesson 2



What do dogs and pigeons have in common?

## Lesson 3



How could a lizard's toes help it survive?

## Lesson 4



Why do dogs wag their tails?

## Lesson 5



How long can people (and animals) survive in outer space?

I am also curious about...

# Fruit Cards

**mystery science**

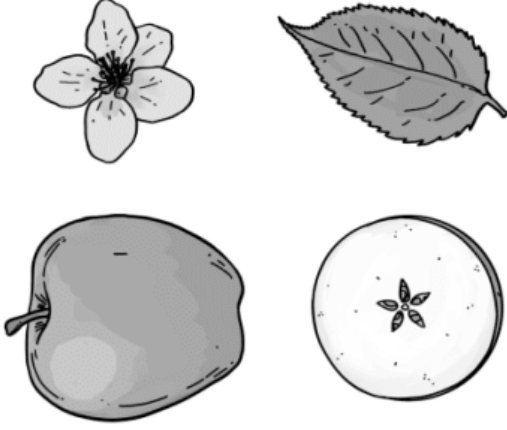
How do you identify a mysterious fruit?

**burr gherkin**



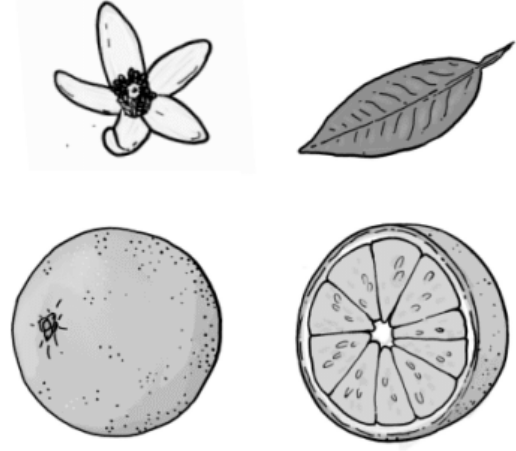
**mystery science**

**apple**



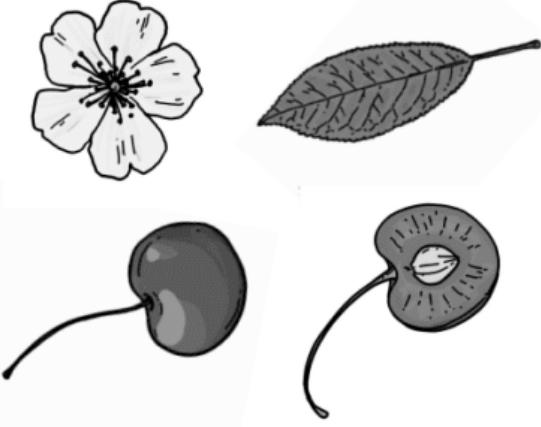
**mystery science**

**orange**



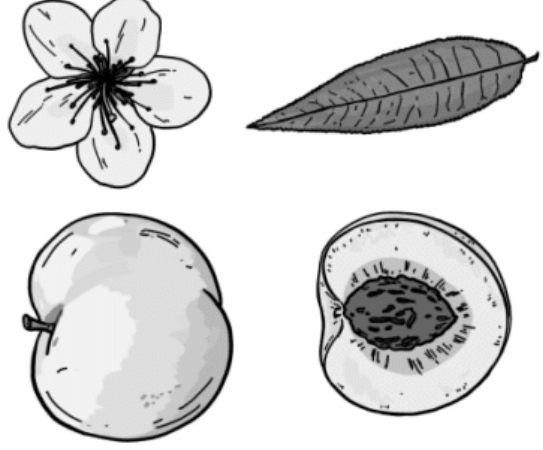
**mystery science**

**cherry**



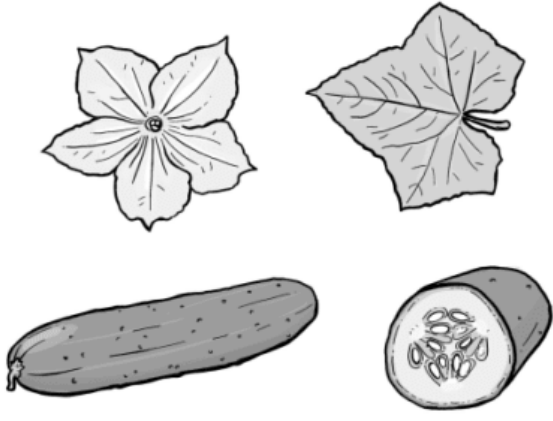
**mystery science**

**peach**



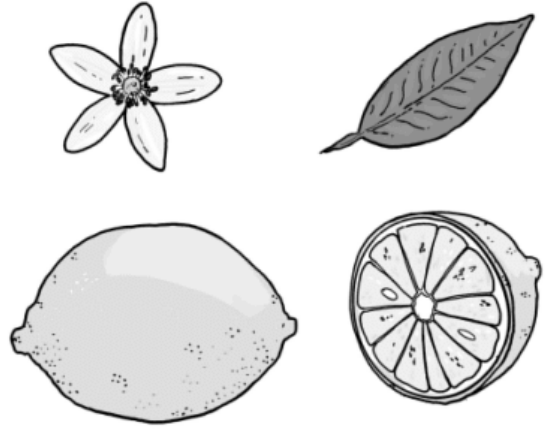
**mystery science**

**cucumber**



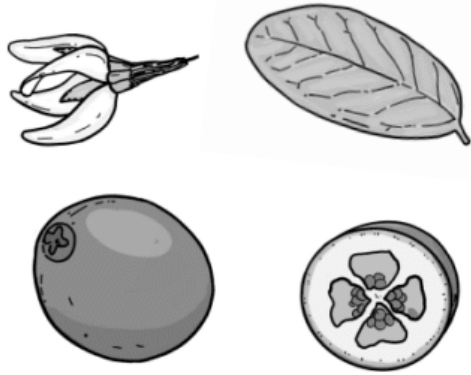
**mystery science**

**lemon**



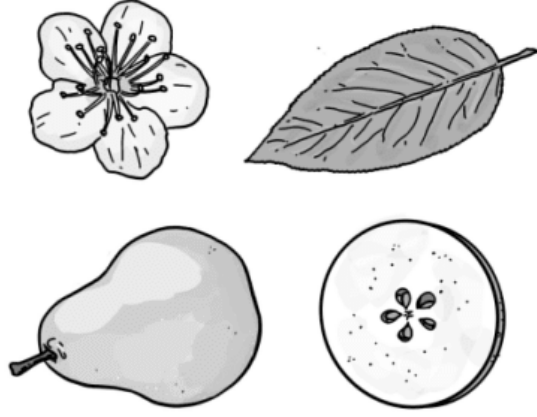
**mystery science**

cranberry



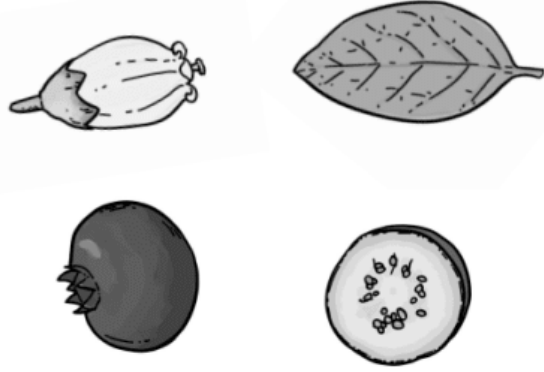
**mystery science**  
How do you identify a mysterious fruit?

pear



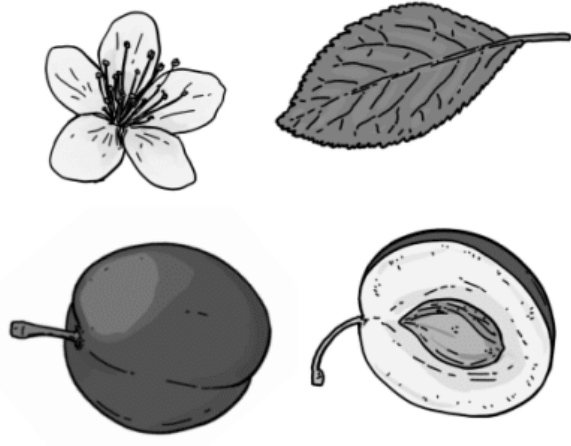
**mystery science**

blueberry



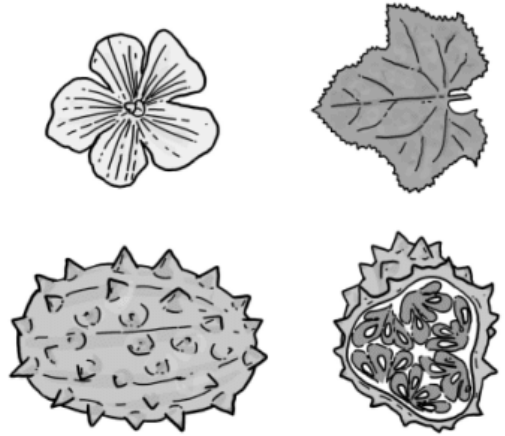
**mystery science**

plum



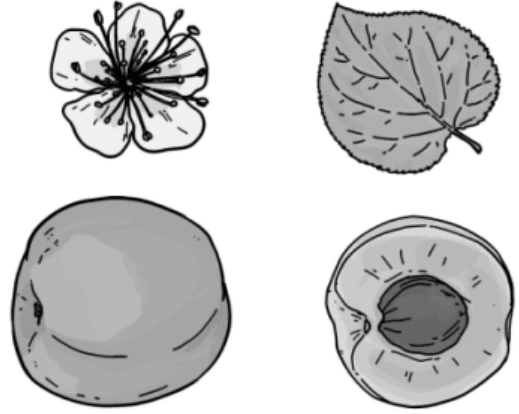
**mystery science**

horned melon



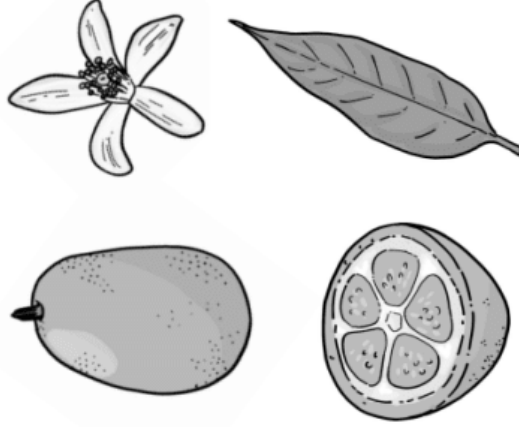
**mystery science**

apricot



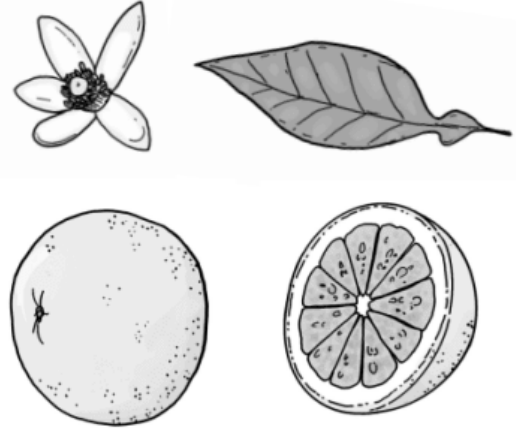
**mystery science**

kumquat



**mystery science**

grapefruit



**mystery science**

# Fruit Market Mysteries



Name: \_\_\_\_\_

## **mystery** science

How do you identify a mysterious fruit?

### Round 1

1. Circle the 2 fruits you would group together by looking at the outside:

cherry plum grape

2. Circle the 2 fruits you would group together by looking at their insides, flowers, & leaves:

**cherry plum grape**

What is your **evidence** for grouping these fruits together? List three traits they share:

- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

### Round 2

3. Circle the 2 fruits you would group together by looking at the outside:

cucumber lemon dosakai

4. Circle the 2 fruits you would group together by looking at their insides, flowers, & leaves:

**cucumber lemon dosakai**

What is your **evidence** for grouping these fruits together? List three traits they share:

- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

### Round 3

5. Circle the 2 fruits you would group together by looking at the outside:

tomato watermelon zebra fruit

6. Circle the 2 fruits you would group together by looking at their insides, flowers, & leaves:

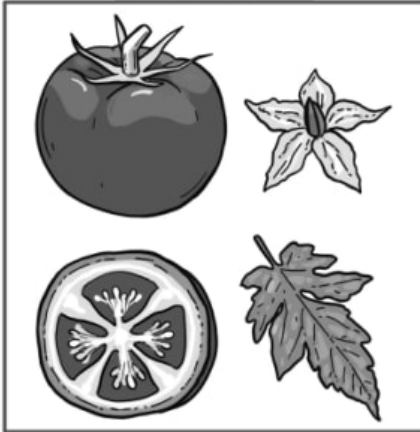
**tomato watermelon zebra fruit**

What is your **evidence** for grouping these fruits together? List three traits they share:

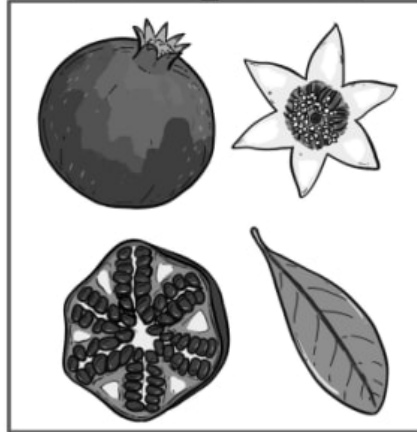
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

## Lesson Assessment

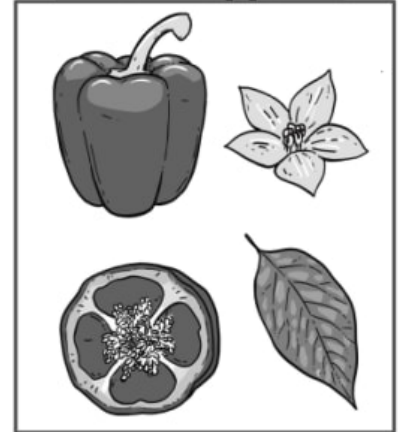
**Tomato**



**Pomegranate**



**Bell Pepper**



1. Jamie visits the grocery store and finds three different fruits: a tomato, a pomegranate, and a bell pepper. Above are images of the outside of each fruit, the inside of each fruit, their leaves, and their flowers. Look carefully at their traits and complete the table below.

	Tomato	Pomegranate	Bell Pepper
<b>Leaf Tip Shape</b>	Pointed	Rounded	
<b>Number of Fruit Sections</b>		6	4
<b>Number of Flower Petals</b>			5

2. Which two fruits would you place in a group together based on the traits they have in common? Circle your answer.

**Tomato & Pomegranate**

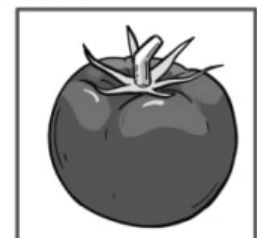
**Tomato & Bell Pepper**

**Pomegranate & Bell Pepper**

3. If you plant a tomato seed in the ground, the seed will sprout and eventually grow into a plant with flowers and fruits. The fruits of that adult plant most likely look like this:

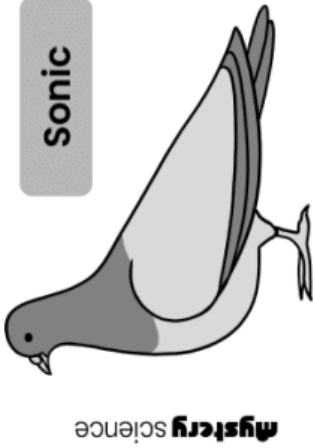
Why is that? Circle the correct answer.

- a. Fruits always look the exact same way.
- b. Plants inherit traits from the parent plants.
- c. Parent plants inherit traits from their babies.

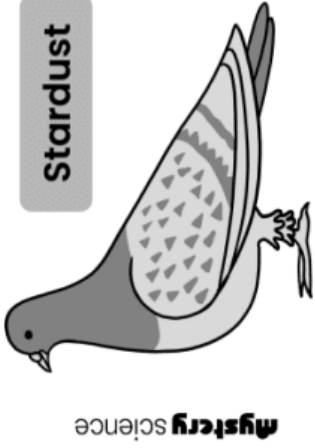


# Pigeon Cards

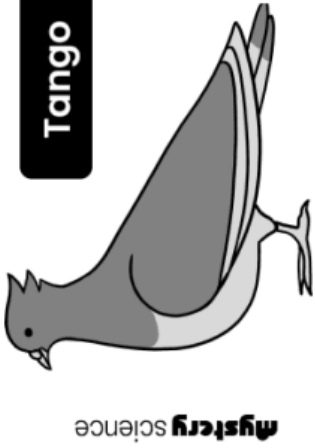
Parents:



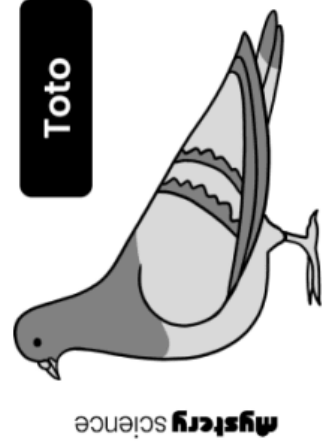
mystery science



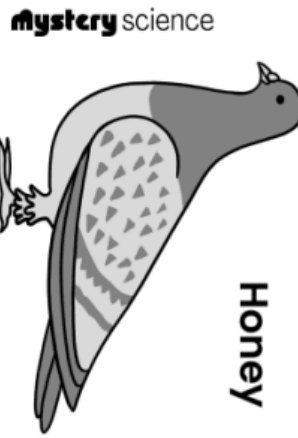
mystery science



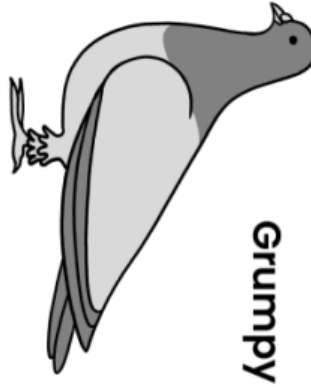
mystery science



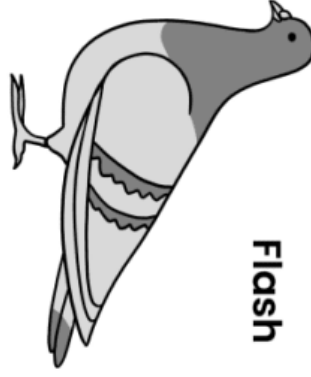
mystery science



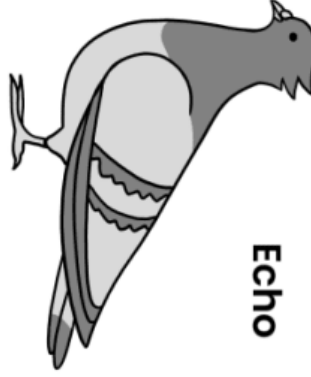
mystery science



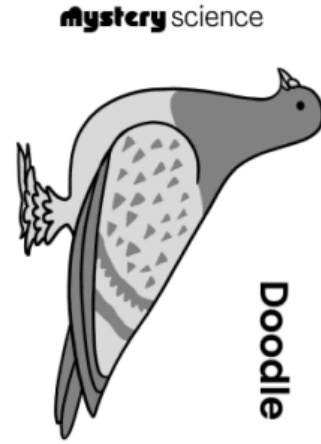
mystery science



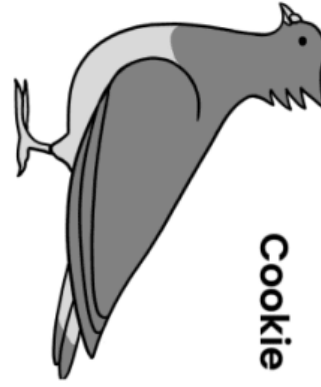
mystery science



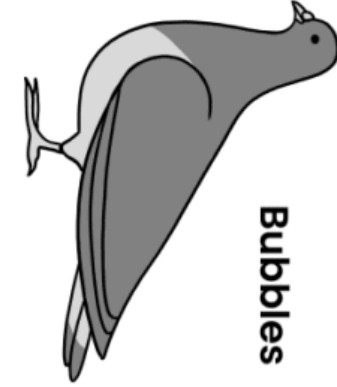
mystery science



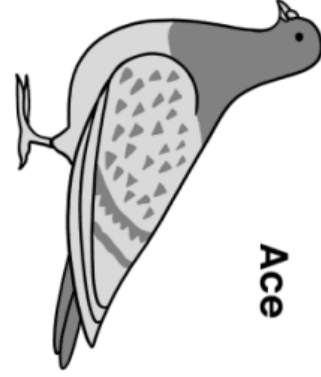
mystery science



mystery science



mystery science



mystery science

Offspring:

Name: \_\_\_\_\_

# Pigeon Pairings

**Sonic & Stardust**

1. What traits helped you match the offspring to these parents?

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2. What differences do you notice among the traits of these siblings?

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3. Look at the two pigeon families side by side. How are the traits in the Sonic & Stardust family *different* from the traits in the Tango & Toto family?

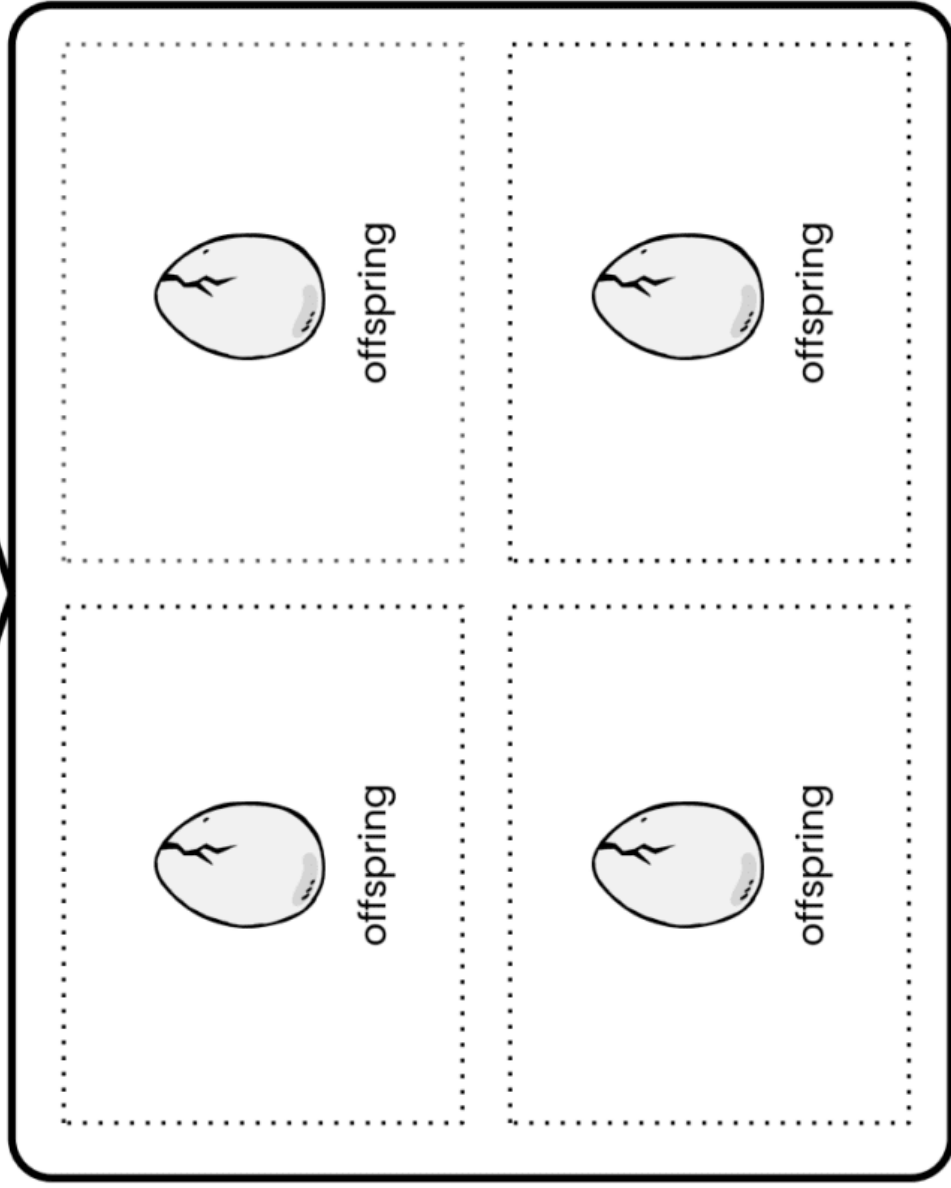
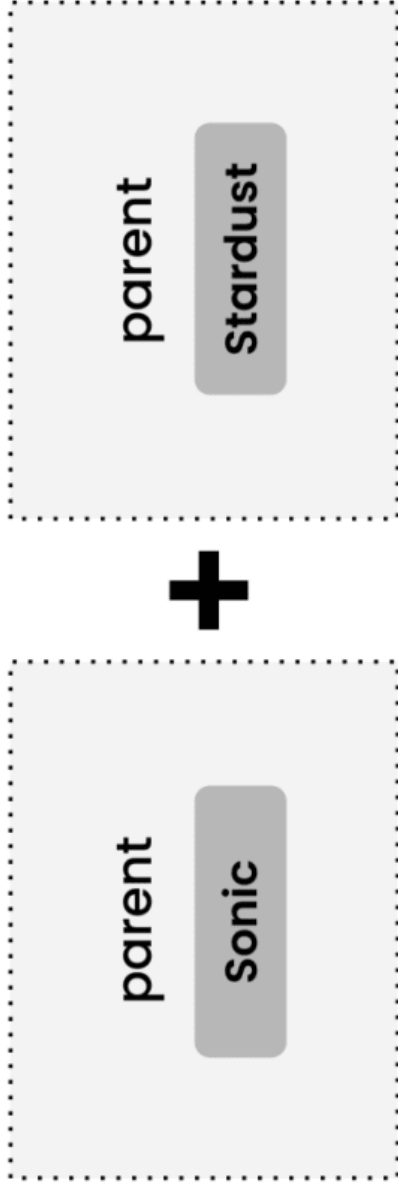
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**mystery science**

What do dogs and pigeons have in common?

Name: \_\_\_\_\_

# Pigeon Pairings

**Tango & Toto**

1. What traits helped you match the offspring to these parents?

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2. What differences do you notice among the traits of these siblings?

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3. Look at the two pigeon families side by side. How are the traits in the Sonic & Stardust family *different* from the traits in the Tango & Toto family?

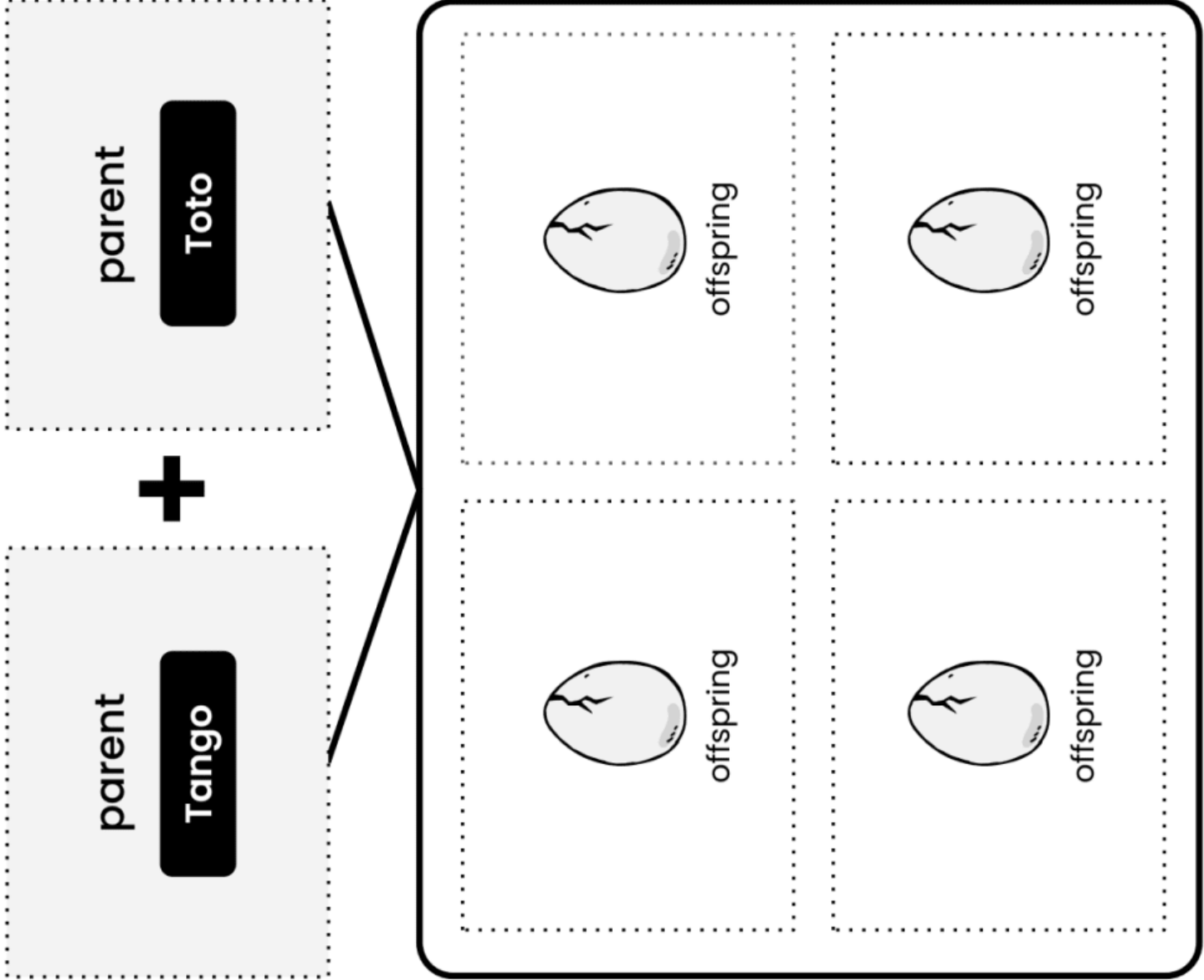
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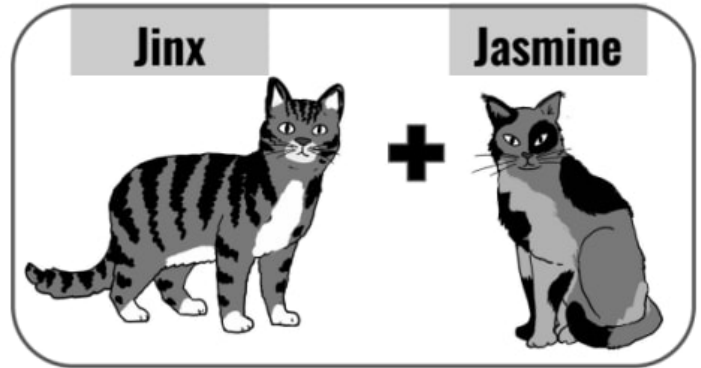
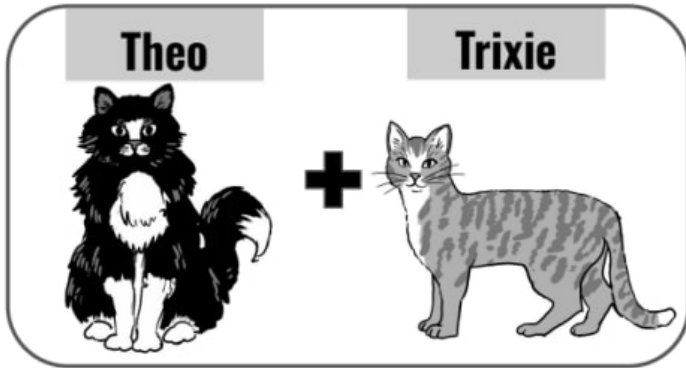
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## Lesson Assessment

Theo and Trixie are adult cats that had three kittens. Jinx and Jasmine are adult cats that also had three kittens. All six kittens are shown below. Which ones are Theo and Trixie's kittens and which ones are Jinx and Jasmine's kittens?



1. Look closely at the traits of the parents and the traits of all the kittens. Write a "T" above each of Theo and Trixie's kittens. Write a "J" above each of Jinx and Jasmine's kittens.

2. Which traits helped you match Theo and Trixie with their kittens? Circle all correct answers. **Hint:** These are traits that the kittens of Theo and Trixie have in common with at least one of their parents.

- a. Black stripes
- b. Black on the tip of their tails
- c. Light gray stripes
- d. White on the tip of their tails

3. The kittens of Jinx and Jasmine are all siblings, but they don't all look exactly the same. Which traits do at least two of the Jinx and Jasmine siblings have in common? Circle all correct answers.

- a. Black stripes.
- b. Black on the tip of their tails.
- c. Light gray stripes.
- d. White on the tip of their tails.

4. Take a closer look at the trait of white paws.

Circle **True** or **False** for each statement.

True   False     Some kittens inherited the trait of white paws from one of their parents.

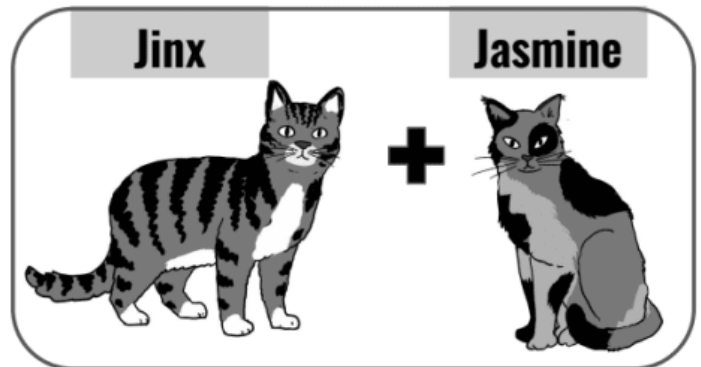
True   False     The trait of white paws in all the kittens looks exactly the same.

True   False     The trait of white paws in the kittens looks slightly different.

5. Even though Theo and Trixie's kittens have different traits, it was still possible to identify their 3 kittens because the kittens inherited their traits from their parents. Why **DON'T** Theo and Trixie's kittens look **EXACTLY** like them? Circle all correct answers.

- a. Each trait can be inherited from either parent.
- b. There is variation in the traits.
- c. The parents wanted their offspring to look different.

6. If Jinx and Jasmine have another 3 kittens together, do you think these kittens will look **EXACTLY** the same as the other 3 kittens that Jinx and Jasmine had? Why or why not? Explain in terms of inherited traits.



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# HOW MANY LIZARDS?

Name: \_\_\_\_\_

## ORIGINAL LIZARDS (GENERATION 1)

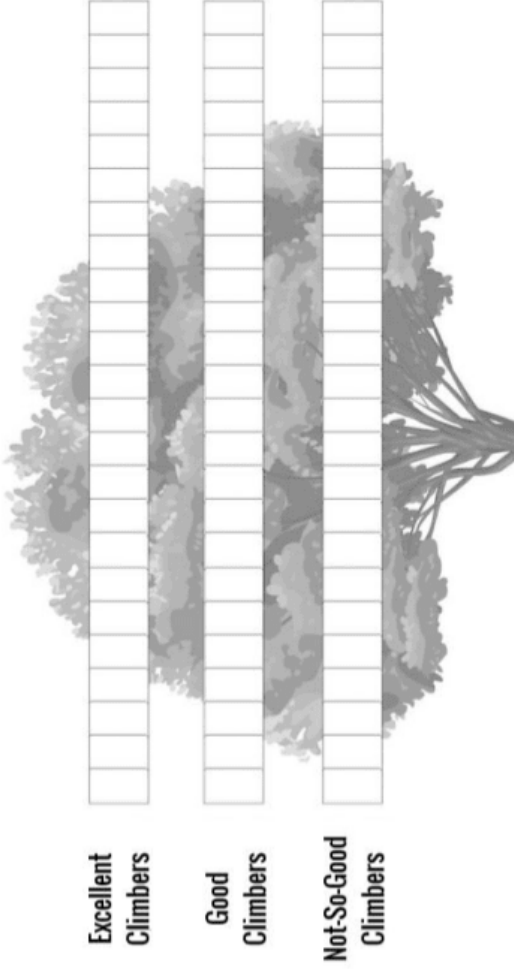
When brown lizards came to the island, the green lizards could climb trees. But some green lizards were better climbers than others.

There are \_\_\_\_\_ Excellent Climbers

There are \_\_\_\_\_ Good Climbers

There are \_\_\_\_\_ Not-So-Good Climbers

To make a bar graph, color in a box for each lizard.



## BABY LIZARDS (GENERATION 2)

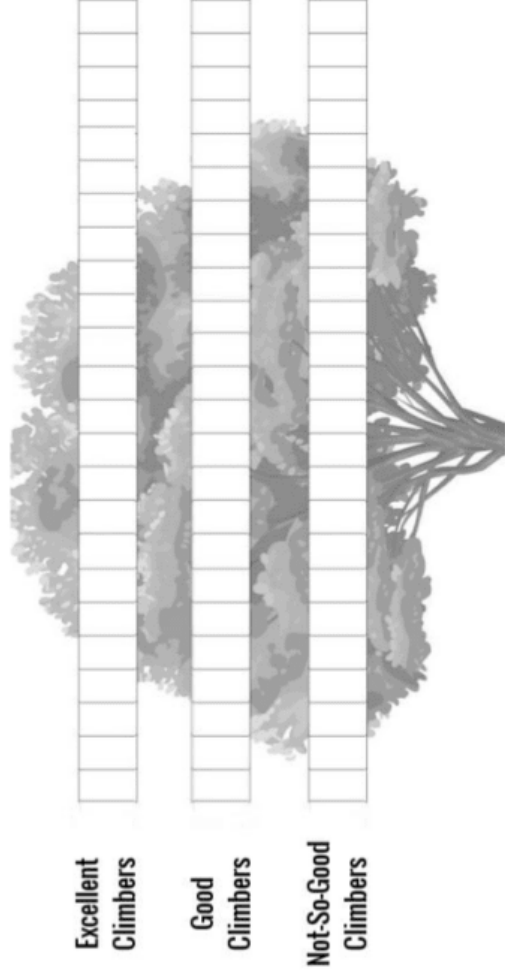
This is what the green lizard babies were like after the brown lizards arrived.

There are \_\_\_\_\_ Excellent Climbers

There are \_\_\_\_\_ Good Climbers

There are \_\_\_\_\_ Not-So-Good Climbers

To make a bar graph, color in a box for each lizard.





Name: \_\_\_\_\_

## mystery science

How could a lizard's toes help it survive?

# Baby Lizard

**How many toe scales does your baby lizard have?**

**Step 1:** Write down how many toe scales each parent has.

Toe scales on parent #1: \_\_\_\_\_

Toe scales on parent #2: \_\_\_\_\_

**Step 2:** Add those numbers together.

The sum of the parents' toe scales equals \_\_\_\_\_

**Step 3:** Divide the sum by 2.

The sum divided by 2 equals \_\_\_\_\_

This is how many toe scales the baby has.

**Circle the kind of climber this lizard is.**

23 or more scales =

Excellent  
Climber

19 to 22 scales =

Good  
Climber

18 or fewer scales =

Not-So-Good  
Climber



Name: \_\_\_\_\_

## mystery science

How could a lizard's toes help it survive?

# Baby Lizard

**How many toe scales does your baby lizard have?**

**Step 1:** Write down how many toe scales each parent has.

Toe scales on parent #1: \_\_\_\_\_

Toe scales on parent #2: \_\_\_\_\_

**Step 2:** Add those numbers together.

The sum of the parents' toe scales equals \_\_\_\_\_

**Step 3:** Divide the sum by 2.

The sum divided by 2 equals \_\_\_\_\_

This is how many toe scales the baby has.

**Circle the kind of climber this lizard is.**

23 or more scales =

Excellent  
Climber

19 to 22 scales =

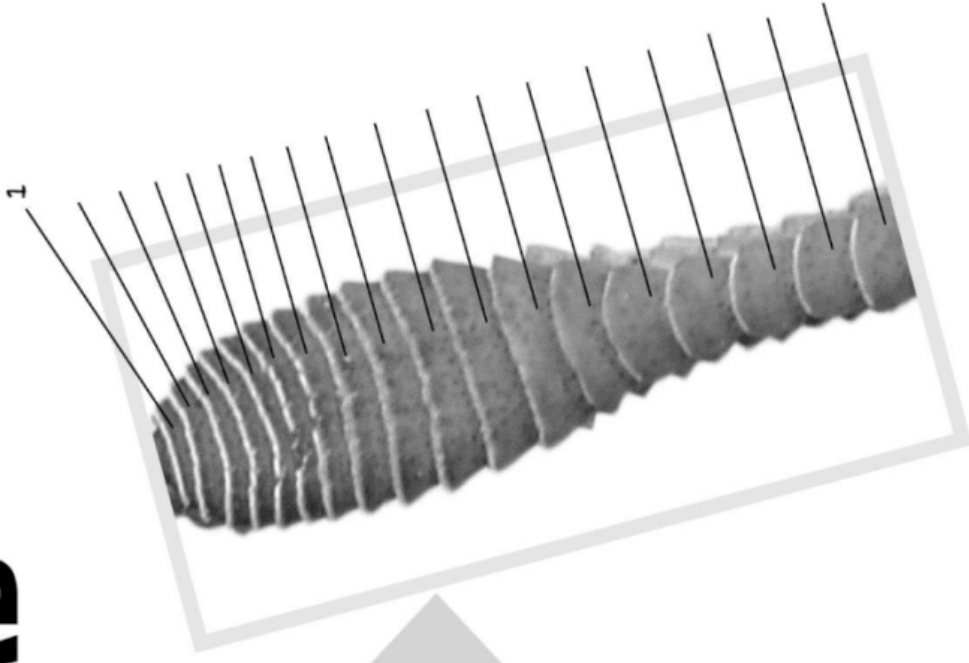
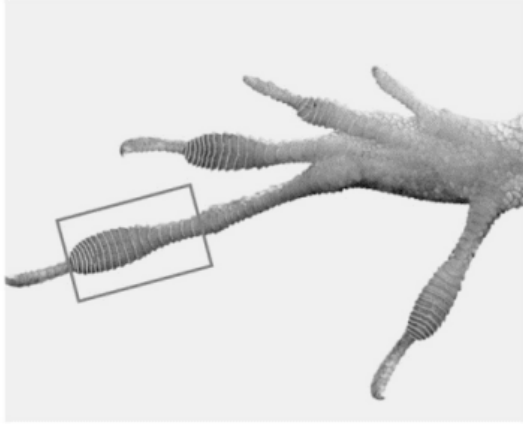
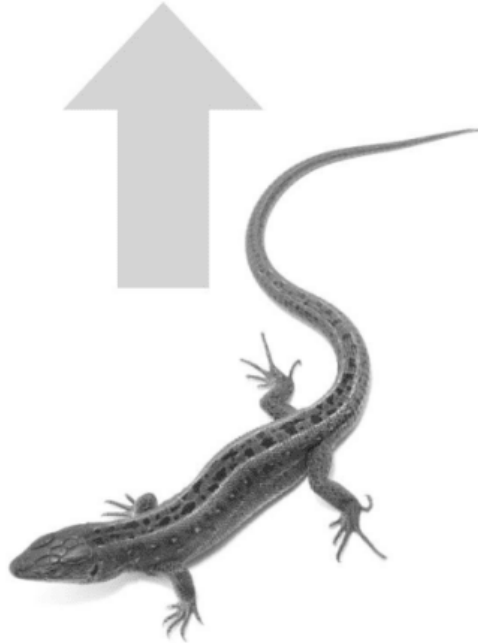
Good  
Climber

18 or fewer scales =

Not-So-Good  
Climber

# ADOPT A LIZARD

Count the scales on  
the big toe.



My lizard's toe has \_\_\_\_\_ scales.

Circle the kind of climber this lizard is:

23 or more scales =

**Excellent Climber**

19 to 22 scales =

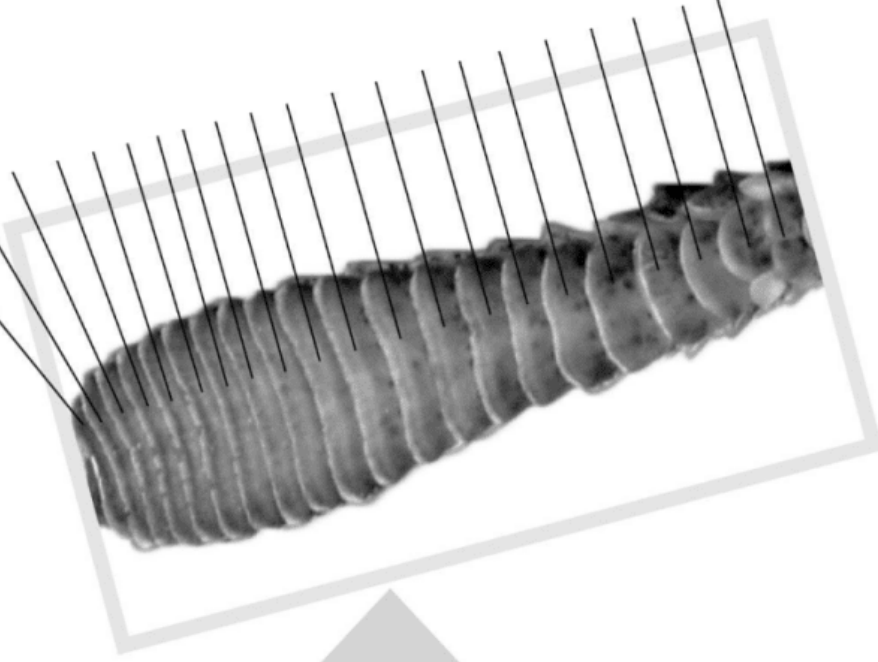
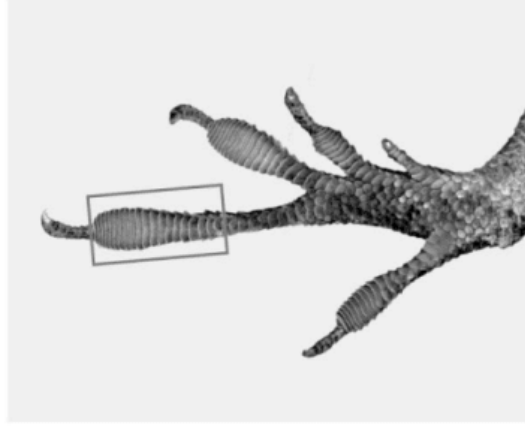
**Good Climber**

18 or fewer scales =

**Not-So-Good Climber**

# ADOPT A LIZARD

Count the scales on  
the big toe.



My lizard's toe has \_\_\_\_\_ scales.

Circle the kind of climber this lizard is:

23 or more scales =

**Excellent Climber**

19 to 22 scales =

**Good Climber**

18 or fewer scales =

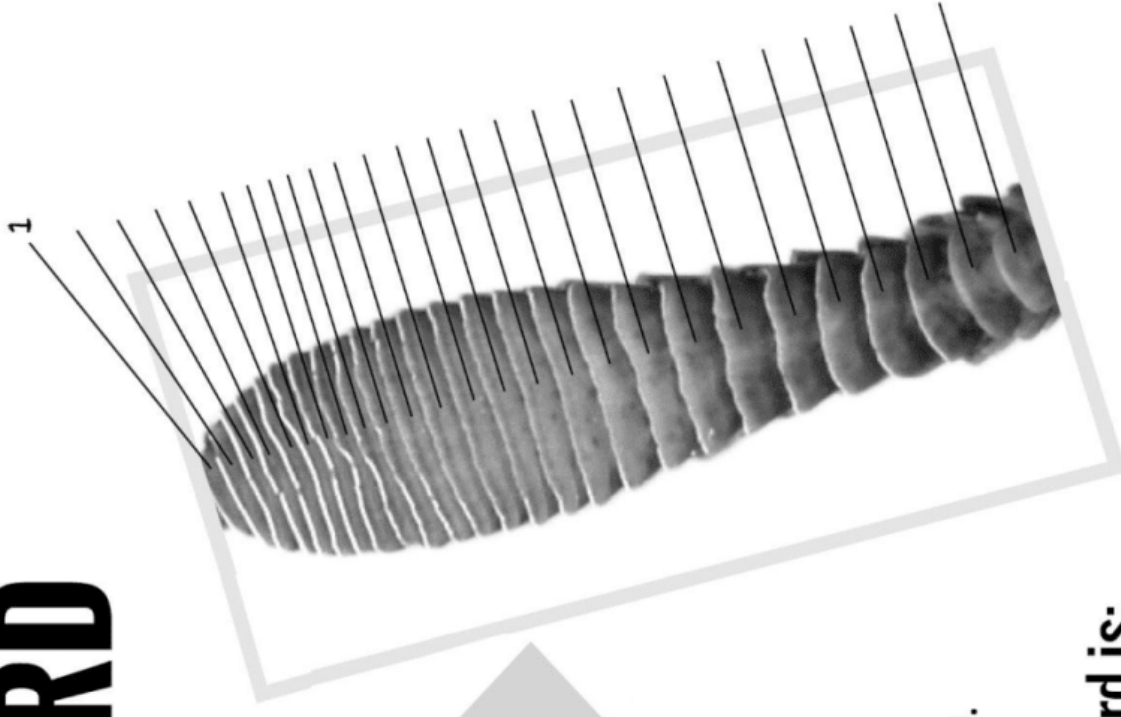
**Not-So-Good Climber**

# ADOPT A LIZARD

Name: \_\_\_\_\_



Count the scales on  
the big toe.



My lizard's toe has \_\_\_\_\_ scales.

Circle the kind of climber this lizard is:

23 or more scales =

**Excellent Climber**

19 to 22 scales =

**Good Climber**

18 or fewer scales =

**Not-So-Good Climber**

## Lesson Assessment

There is a species of moth that varies in the color of its wings. Some moths have black wings, some have gray wings, and some have white wings.

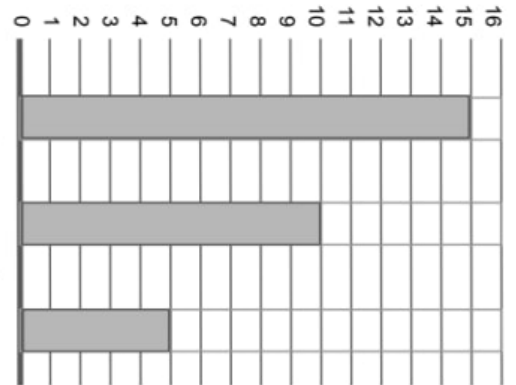


These moths live in a habitat where the trees have very dark-colored bark. During the day, the moths rest on the trunks of these trees. Birds hunt for these moths and eat the ones they find on the tree trunks.

At the start of summer, there were 60 moths living in the forest: 20 moths had black wings, 20 moths had gray wings, and 20 moths had white wings. The graph shows the number of moths that did NOT get eaten by birds.

### Moth Survival

Number of Moths



1. Which is correct? Circle the correct answer.

- a. More moths with black wings survived.
- b. More moths with gray wings survived.
- c. More moths with white wings survived.



Black Wings



Gray Wings



White Wings

2. What does the graph provide evidence for? Circle all correct answers.

- a. Birds prefer eating moths with black wings.
- b. Birds are able to find moths with white wings easier than moths with black wings.
- c. There were more moths with black wings at the start of the summer.
- d. Moths with black wings are better camouflaged on trees with dark bark.

3. Think about what would happen if there was suddenly no variation in the color of the moths' wings. If suddenly all the moths had ONLY white wings, would that affect their survival? Why or why not? Use information from the graph to support your answer.

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# Snow Monkeys

These monkeys live in northern Japan, where it snows in the winter. No other monkey lives in such a cold place!



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Do you think the ravens help each other? Explain.

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List at least two things the ravens did. (You can write more if you noticed more.)

## Raven Field Notes:

# Snow Monkey Field Notes:

A

Describe what the snow monkeys do.

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Do you think the snow monkeys help each other? Explain.

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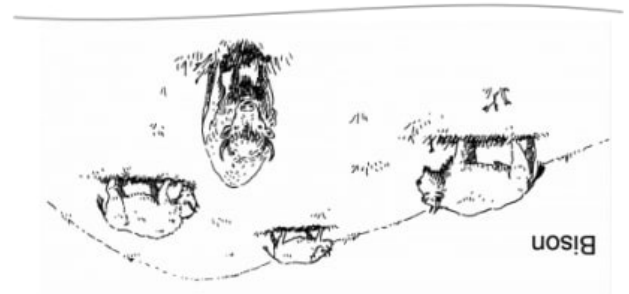
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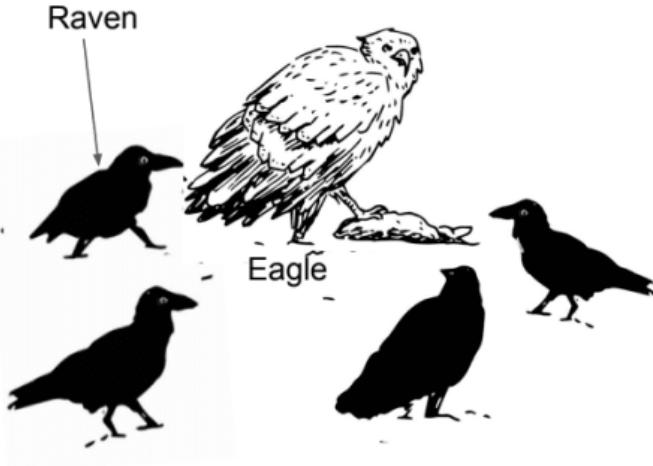


Bison eat grass, leaves, and twigs. Some people call these animals buffalo. One bison can weigh more than 5 football players.

## Bison

# Ravens

Ravens live in flocks of many birds. Ravens will eat almost anything they can find—or steal!



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Do you think the meerkats help each other? Explain.

List at least two things the meerkats did. (You can write more if you noticed more.)

## Meerkat Field Notes:

# Bison Field Notes:

**B**

List at least two things the bison did. (You can write more if you noticed more.)

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Do you think bison help each other? Explain.

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Here are ways that I saw animals that live in groups help each other:

## Here's what I noticed:

# Meerkats

Families of meerkats live together in underground burrows. They come out to search for insects and small lizards to eat.



C

Suppose your friend told you, "Animals live in groups just to be with their friends. It's not like they do it to stay alive." Do you agree or disagree? Explain.

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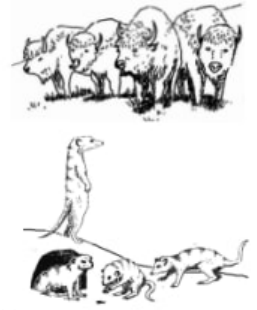
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10

## Field Journal

My Name: \_\_\_\_\_

Date: \_\_\_\_\_

staple

staple

**mystery science**  
Why do dogs wag their tails?

Why do dogs wag their tails?

## Lesson Assessment

1. Animals that live in groups are **less** likely to...
  - a. share their food
  - b. feel lonely
  - c. get eaten by predators
  - d. survive when their environment changes, like when it floods
  
2. Which is an example of how **living in a group** can help animals **get food**?
  - a. Penguins huddle together to stay warm in winter.
  - b. Seagulls scavenge for food in city trash cans.
  - c. Adult dolphins swim in a group around their calves.
  - d. Bees in a hive make honey for their larvae to eat.
  
3. Which is an example of how **living in a group** can **provide protection**?
  - a. One meerkat keeps lookout while the rest of the group collects food.
  - b. Monkeys shout an alarm call if they see a leopard, and all other monkeys in the group run into the trees.
  - c. Elephants form a circle around their calves to protect them from lions.
  - d. All of the above
  
4. TRUE or FALSE? (circle one) All animals would be better off living in groups.
  
5. TRUE or FALSE? (circle one) Animals that live in groups, like dogs, need ways to communicate with one another.

6. Choose one of the following examples of an animal that lives in a group:

Meerkats      Ravens      Snow Monkeys      Bison

Explain in two to three full sentences how living in a group helps that animal survive.

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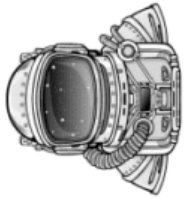
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7. BONUS: Match the animal with the name of its group. You don't need to use all the answer choices.



- \_\_\_ Ants
- \_\_\_ Wolves
- \_\_\_ Bison
- \_\_\_ Lions
- \_\_\_ Birds

- A. Flock
- B. Herd
- C. Colony
- D. Pride
- E. Pack
- F. Troop



# Traits in Space

Name: \_\_\_\_\_  
Astronaut \_\_\_\_\_ (A or B)

Traits	 <p>BEFORE MY YEAR IN SPACE</p>	 <p>AFTER MY YEAR IN SPACE</p>
<p><b>ARM STRENGTH</b></p>	<p>Before my year in space, I can do _____ push-ups.</p>	<p>After my year in space, I predict my arms would be <b>stronger / weaker / the same strength</b>. Being in space <b>would / would not</b> change this trait because...</p> <p>_____</p> <p>_____</p> <p>_____</p>
<p><b>BALANCE</b></p>	<p>Before my year in space, I can take _____ steps (out of 10) before losing my balance.</p>	<p>After a year in space, I predict that my balance would be <b>better / worse / the same</b>. Being in space <b>would / would not</b> change this trait because...</p> <p>_____</p> <p>_____</p> <p>_____</p>
<p><b>HEIGHT</b></p>	<p>Before my year in space, I am this tall: _____</p>	<p>If I stayed on Earth, I might grow one inch (2.5 cm) per year. But if I spent a year in space, I think I would <b>grow even taller / grow the same amount / get shorter</b>. I think being in space <b>would / would not</b> change this trait because...</p> <p>_____</p> <p>_____</p>

**mystery science**

How long can people (and animals) survive in outer space?

How long can people (and animals) survive in outer space?

## Lesson Assessment

1. How is the environment different for people living in space?
  - a. The force of gravity is not as strong
  - b. There is nothing to eat
  - c. There is no way to exercise
  - d. They can't communicate
  
2. Which of these are **traits** of living things?
  - a. Dimples on people's faces
  - b. The shape of plants' leaves
  - c. The color of birds' wings
  - d. All of the above
  
3. Which traits changed for astronauts living in space?
  - a. Height and hearing
  - b. Freckles and hair color
  - c. Balance and muscle strength
  - d. Weight and skin color
  
4. Which is NOT an example of cause and effect?
  - a. When people exercise, their muscles get stronger.
  - b. When people live in space, they get shorter.
  - c. When dogs are overfed, they gain weight.
  - d. When plants aren't watered enough, they wilt.

5. TRUE or FALSE? (circle one) Scientists are still studying the effects of space travel on living things.

6. Identify three traits of the Snow Leopard below. Draw an arrow to each trait and label the trait.



7. A friend tells you, "I think your traits can change in space, but if you stay on earth, the traits you were born with will never change." Do you agree or disagree? Provide evidence to support your answer.

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## Unit Assessment

1. There are so many different varieties of dogs because...
  - a. people chose to breed dogs with traits they wanted.
  - b. dogs wanted to be different from each other.
  - c. dog babies (puppies) were different from their parents.
  - d. dogs have a lot of puppies.
  
2. The green anoles are such good climbers because...
  - a. they like climbing trees.
  - b. they need to be able to climb to get food that is high up in the trees.
  - c. they need to be able to get away from brown anoles on the ground.
  - d. the green anoles that were poor climbers were more likely to get eaten by brown anoles, so they had fewer babies.
  
3. Becky has light-colored skin. During the summer, sometimes her skin turns red if she stays in the sun too long. Which of these are true?
  - a. Becky's skin color is a trait she got from her parents.
  - b. Becky's skin color changed because of her experience in the summer.
  - c. Both a and b.
  
4. Chickens living today have bigger eggs than chickens that lived a long time ago. How do you think that happened?

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## Vervet Monkeys

Vervet monkeys live in woodlands and forests on the eastern coast of Africa. They eat fruit, leaves, seeds, and some small animals. They have four common predators: eagles, snakes, leopards, and baboons. Scientists have discovered that vervet monkeys use different alarm calls for each predator. For example, when they hear a "snake" alarm call, they stand up on their back legs and look around on the ground. But when they hear the alarm call for "leopard," they climb to the very tops of the trees.



Use the passage above to answer question 5 and question 6.

5. How does living in a group help vervet monkeys survive? Choose the best answer.

- a. They show each other where to find food.
- b. They communicate in their own language.
- c. They warn each other of danger.
- d. They groom each other's fur.

6. If dry weather kills many of the plants in the vervet monkeys' habitat, how would that affect the vervet monkeys?

- a. They would be more likely to survive.
- b. They would be less likely to survive.
- c. There would be no change.

7. How does living in a group help some animals survive? Give at least two animal examples other than vervet monkeys to support your answer.

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Imagine you are a cat breeder who wants kittens. Choose two cats to be parents. Circle the two that you choose. Then answer the questions below.

8. Describe the traits their kittens might have. What will the tail and body look like? What will the face and ears look like?

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9. Why did you choose your answers to question 8? Explain your reasoning.

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10. Would all the kittens from those two cats look the same?

YES      NO  
(circle one)

# Weather & Climate

3rd Grade • NGSS • Unit Worksheets

## Lesson 1



Where do clouds come from?

## Lesson 2



How can we predict when it's going to storm?

## Lesson 3



Where's the best place to build a snow fort?

## Lesson 4



Why are some places always hot?

## Lesson 5



How can you keep a house from blowing away in a windstorm?

I am also curious about...

# GAS TRAP

Name: \_\_\_\_\_

**mystery science**  
Where do clouds come from?

## Gas Trap Tester

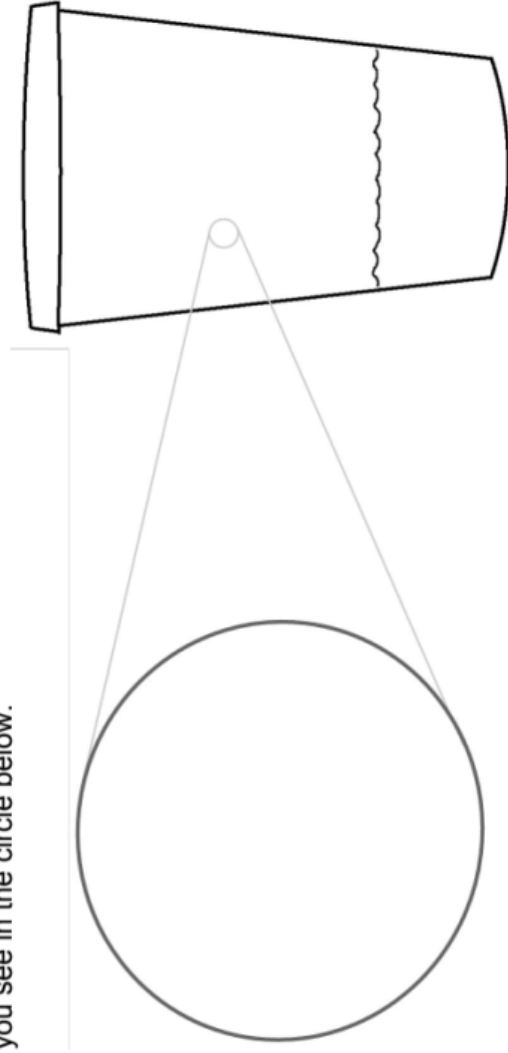


**Can you read  
all these words  
through your cup?**  
Maybe you can, maybe not.  
To find out—try it and see!

1. Before you begin the experiment, try reading your **GAS TRAP TESTER** through your cup. What's the last line you can read? Write it here:  
\_\_\_\_\_

2. Now that you have the warm water, try reading the **GAS TRAP TESTER** through your cup again. What's the last line you can read now? Write it here:  
\_\_\_\_\_

3. Look at the sides of your cup up close (as close as you can).  
Draw what you see in the circle below:



**WAIT TO DO QUESTION #4 UNTIL AFTER YOUR CLASS DISCUSSION**

4. Open the lid and feel the inside of the cup. How does it feel? \_\_\_\_\_  
Feel the bottom of the lid. How does that feel? \_\_\_\_\_

Where do clouds come from?

## Lesson Assessment

1. **Draw** a picture that shows how clouds form in the sky. **Label** the steps in your picture.



2. Explain your drawing above. Where is the water before it forms a cloud? What forms does the water take as it becomes a cloud?

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3. After a couple days, puddles on the sidewalk shrink and disappear. What happens to the water?

The liquid water \_\_\_\_\_

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4. Roberto thinks that clouds can't be made out of water because clouds are white and water is clear. What do you think? Explain to Roberto why clouds look white. Use examples to convince him!

Clouds look white because \_\_\_\_\_

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# WILL IT STORM?

Look at the screen to see the pictures in color.



## Photo #1: Rowboat

What clouds are in the sky?

cumulus    cumulonimbus    stratus    stratonimbus

Are those stormclouds?    Yes    No

If they are, how long will the storm last?

less than an hour    hours and hours    no storm

Are the clouds coming your way?    Yes    No

Would you row across the lake? Why or why not?

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## Photo #2: Picnic

What clouds are in the sky?

cumulus    cumulonimbus    stratus    stratonimbus

Are those stormclouds?    Yes    No

If they are, how long will the storm last?

less than an hour    hours and hours    no storm

Are the clouds coming your way?    Yes    No

Would you have a picnic here? Why or why not?

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# WILL IT STORM?



**Photo #3: Beach**

What clouds are in the sky?

cumulus   cumulonimbus   stratus   stratonimbus

Are those stormclouds?   Yes   No

If they are, how long will the storm last?

less than an hour   hours and hours   no storm

Are the clouds coming your way?   Yes   No

So would you go for a swim? Why or why not?

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**Photo #4: Same beach, later that day**

What clouds are in the sky now?

cumulus   cumulonimbus   stratus   stratonimbus

Are those stormclouds?   Yes   No

If they are, how long will the storm last?

less than an hour   hours and hours   no storm

Are the clouds coming your way?   Yes   No

Would you go for a swim now? Why or why not?

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# WILL IT STORM?



## Photo #5: Baseball game

What clouds are overhead?

cumulus   cumulonimbus   stratus   stratonimbus

What clouds are in the distance?

cumulus   cumulonimbus   stratus   stratonimbus

What kind of clouds are coming your way?

cumulus   cumulonimbus   stratus   stratonimbus

Are the clouds that are coming your way  
stormclouds?   Yes   No

If they are, how long will the storm last?

less than an hour   hours and hours   no storm

So would you play ball? Why or why not?

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- Nice weather—no storm

But this cloud can change!  
(See next page)

cloud \_\_\_\_\_

- Brings rain and lightning
- Storm lasts under an hour

Is it coming your way?  
(See pages 5-6)

cloud \_\_\_\_\_

- Gloomy skies—but no storm

But this cloud can change!  
(See next page)

cloud \_\_\_\_\_

- Brings rain
- Storm can last all day

Is it coming your way?  
(See pages 5-6)

cloud \_\_\_\_\_

# The

# STORM

# Spotter's

# Guide

Name: \_\_\_\_\_

Date: \_\_\_\_\_

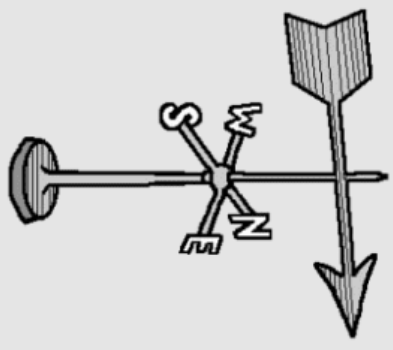
## Collect them all!

Watch the sky and make a note if you see these clouds. Can you spot them all?

Cloud Type	Date I saw it
<input type="checkbox"/> Cumulus	
<input type="checkbox"/> Cumulonimbus	
<input type="checkbox"/> Stratus	
<input type="checkbox"/> Stratocumulus	

## Is that storm cloud heading your way?

Check the wind to find out!



• Write down the city you live in: \_\_\_\_\_

• From what direction does the wind usually blow there?  
\_\_\_\_\_

• So, to see the weather coming my way, I can look toward:  
\_\_\_\_\_

## Mystery science

How can we predict when it's going to storm?

How can we predict when it's going to storm?

## Lesson Assessment

1. How would you spot each of these clouds? Describe what you would look for.

cumulus	
cumulonimbus	
stratus	
stratonimbus	

2. Denai says that clouds covering the whole sky means it's going to rain. What do you think?

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3. Why do stratonimbus storms usually last all day long, but cumulonimbus storms only last for a short time?

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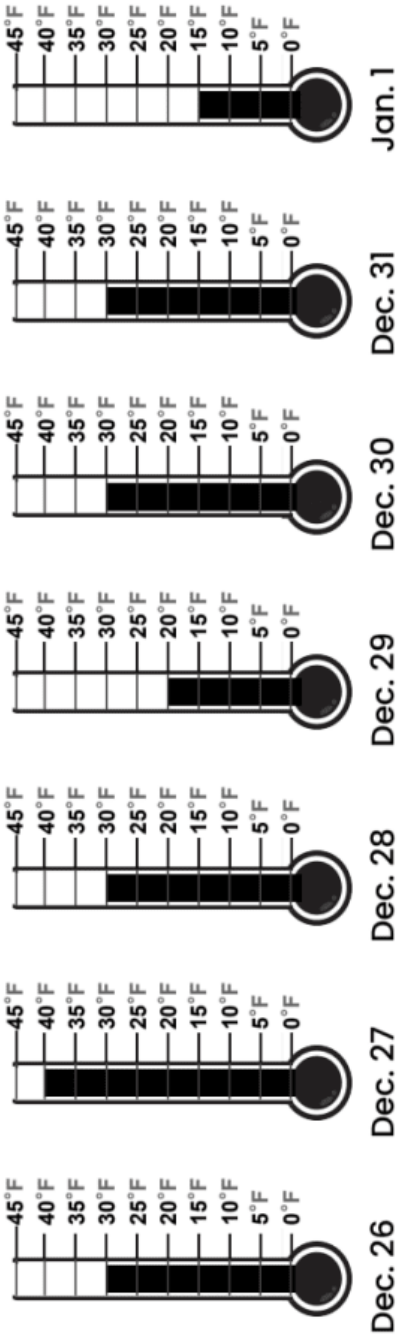
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# Thermometers

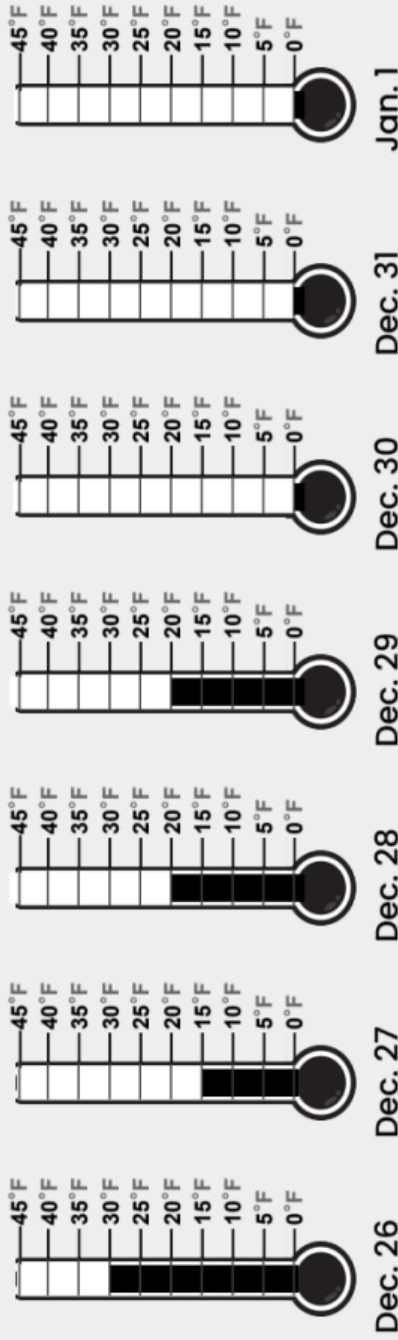
Names: \_\_\_\_\_

KEY	
Too Hot = <del>X</del> (above 32°F)	Too Cold = <del>X</del> (below 25°F)
Just Right = ○	

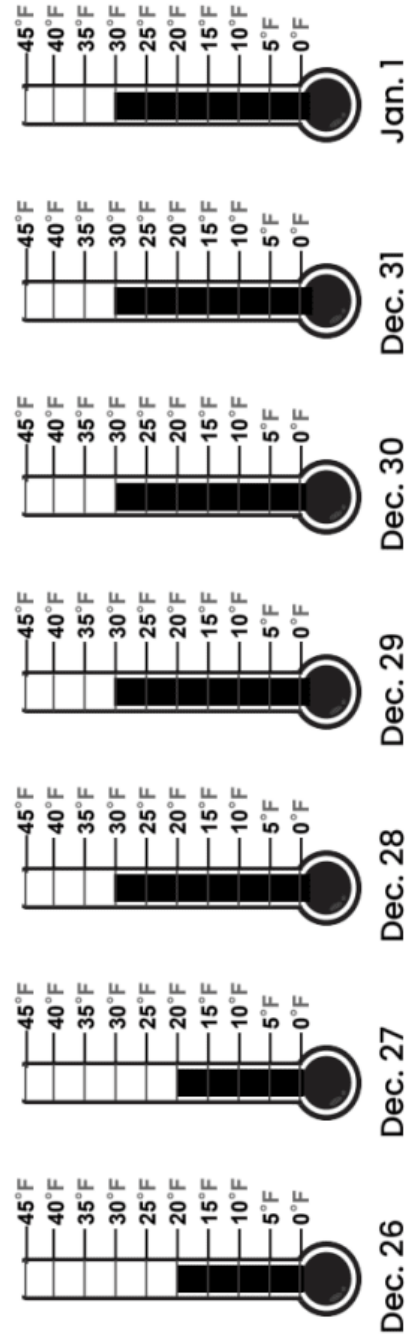
## Madison, Wisconsin



## Fairbanks, Alaska



## Truckee, California



**mystery science**  
Where's the best place to build a snow fort?

# What's the Weather?

Names: \_\_\_\_\_



Towns	Number of days that are <b>Too Hot</b> (red)	Number of days that are <b>Too Cold</b> (blue)	Number of days that are <b>Just Right</b>	More data: _____
1 _____ _____				
2 _____ _____				
3 _____ _____				

## Lesson Assessment

### Months with Snow Last Year

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
City A												
City B												
City C												

1. Jeremiah is planning a winter vacation. He is deciding between three cities. He wants to visit a place where there is the best chance for him to see snow while he's there. To help plan the trip, Jeremiah decides to look up weather information from last year. Each snowflake represents a month when it snowed last year. Fill in the table on the right.

	Number of Months with Snow Last Year
City A	
City B	
City C	









2. Use the information from Question 1 to predict which location—A, B, or C—will most likely have snow when Jeremiah visits this year. Which is the best location for Jeremiah's visit? Which location is the worst option? Provide evidence using the information in the table.

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	Location A	Location B	Location C
July (Summer)			
December (Winter)			
<b>KEY</b>  = No Rain  = Rainy Day			

3. Mei is planning a vacation. She is deciding between three locations (A, B, or C). She is also deciding between two seasons (summer or winter). Mei likes to spend time outside, so she **doesn't** want to visit when there's a chance of rain. To help plan the trip, Mei finds out how many days it rained in each location during 1 month in each season last year. Use this information and fill in the table on the right.

**Number of Rainy Days**

	Location A	Location B	Location C
July (Summer)			
December (Winter)			

4. Which location should Mei visit? During which season (winter or summer) should she visit? Provide evidence from the table.

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Name: \_\_\_\_\_

# Climates in Europe & Africa

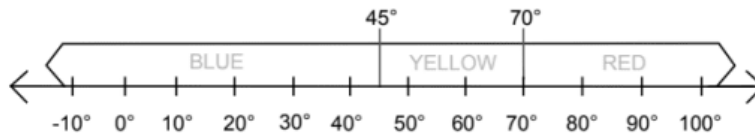


## CLIMATE KEY

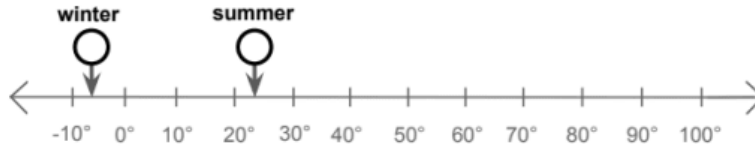
- This climate is cold all year long.
- This climate has cold winters and hot summers.
- This climate has warm winters and hot summers.
- This climate is hot all year long.

# Climates in Europe & Africa (Fahrenheit)

## Climate Decoder

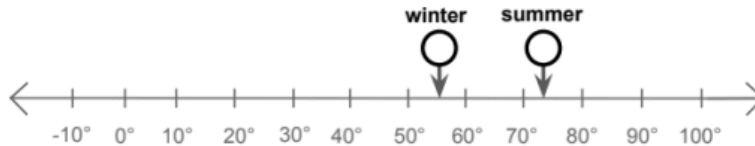


**Antarctica Research Station**



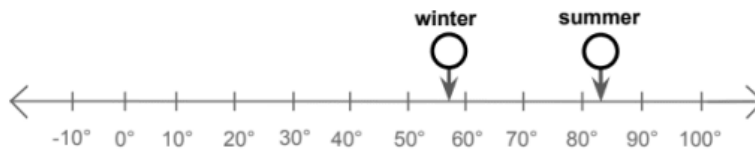
climate color

**Casablanca, Morocco**



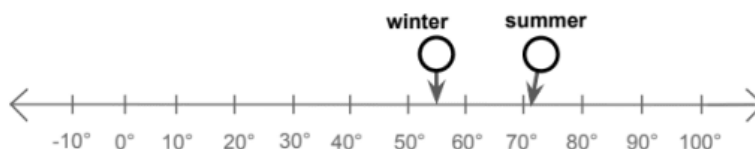
climate color

**Cairo, Egypt**



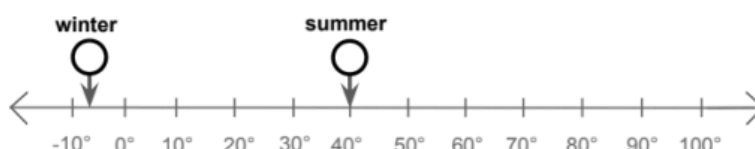
climate color

**Cape Town, South Africa**



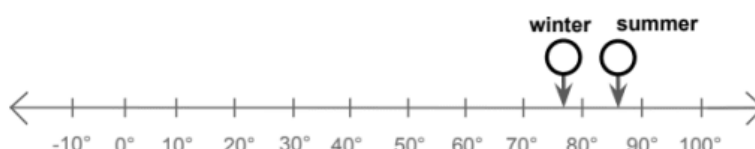
climate color

**Daneborg, Greenland**



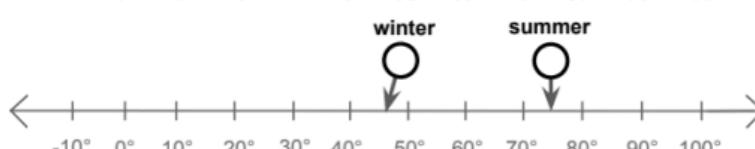
climate color

**Juba, South Sudan**



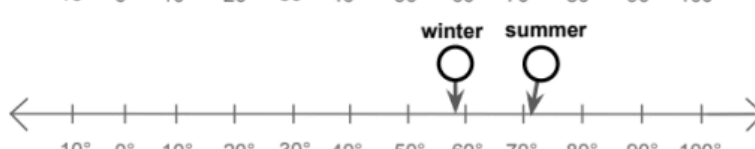
climate color

**Rome, Italy**



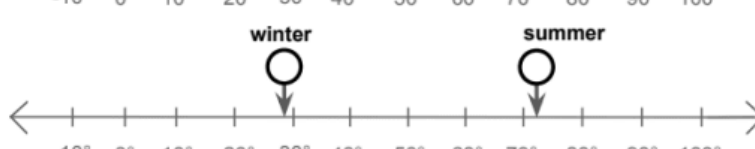
climate color

**The island of Madagascar**



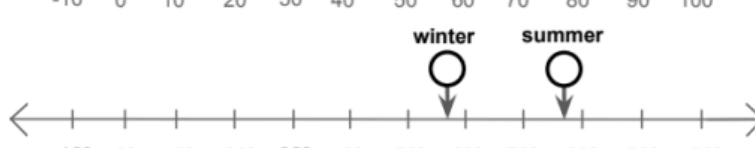
climate color

**Warsaw, Poland**



climate color

**Windhoek, Namibia**



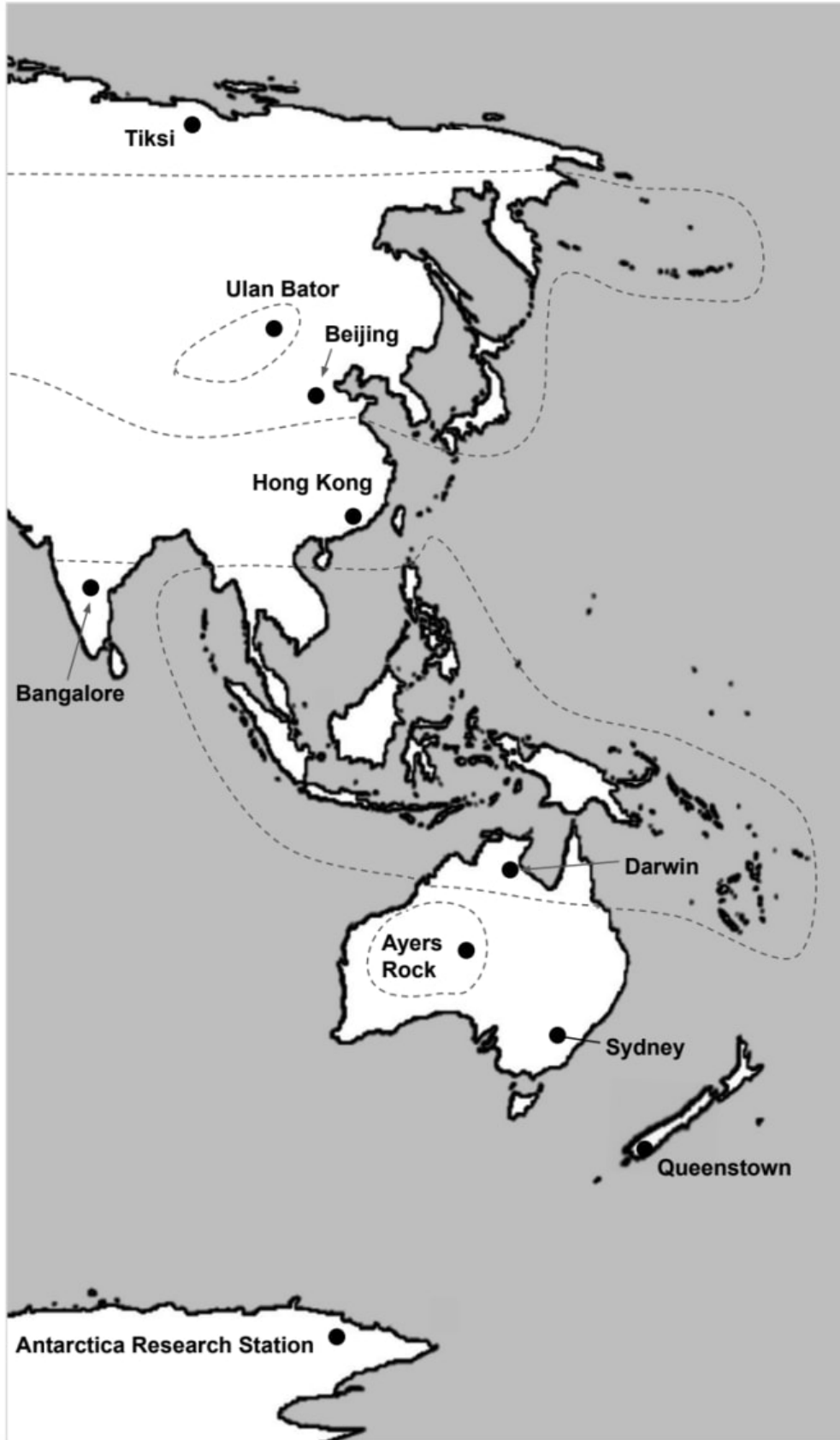
climate color

Note: All temperatures are in Fahrenheit



Name: \_\_\_\_\_

# Climates in Asia & Australia

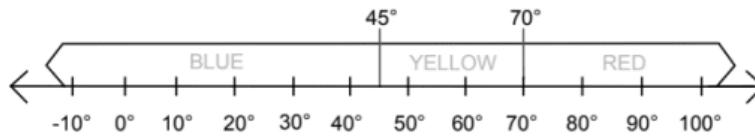


## CLIMATE KEY

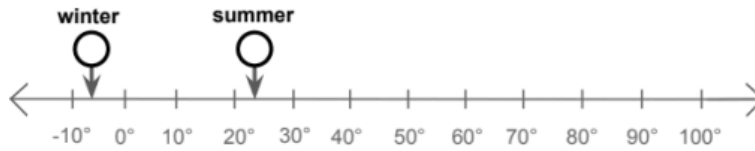
- This climate is cold all year long.
- This climate has cold winters and hot summers.
- This climate has warm winters and hot summers.
- This climate is hot all year long.

# Climates in Asia & Australia (Fahrenheit)

## Climate Decoder

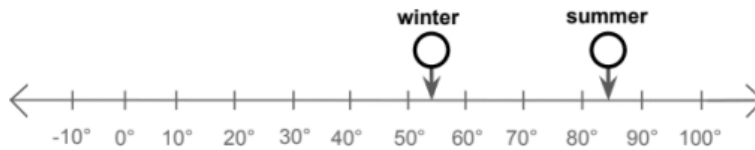


**Antarctica Research Station**



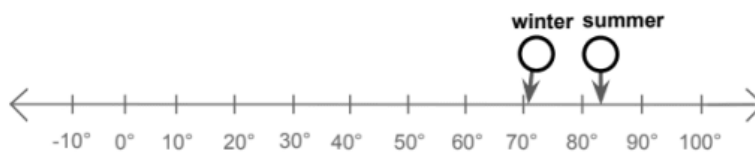
climate color

**Ayers Rock (Uluru), Australia**



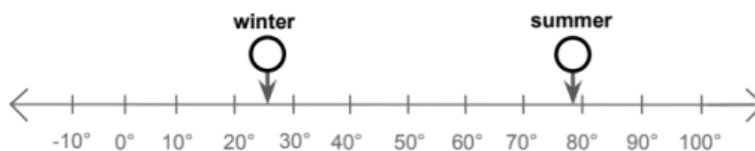
climate color

**Bangalore, India**



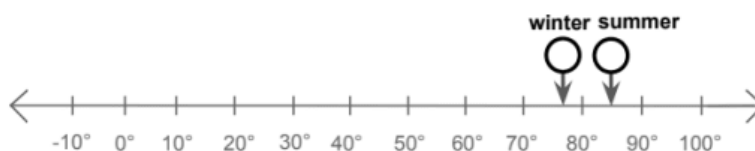
climate color

**Beijing, China**



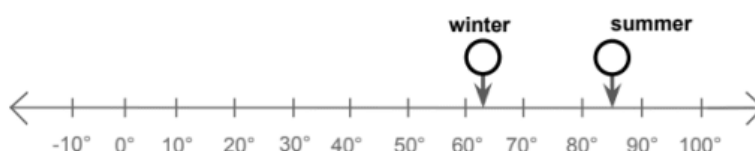
climate color

**Darwin, Australia**



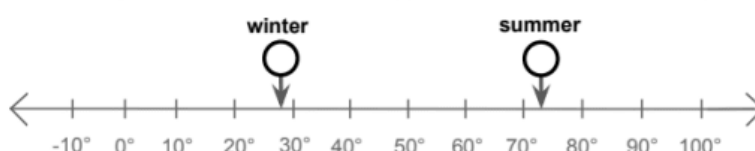
climate color

**Hong Kong**



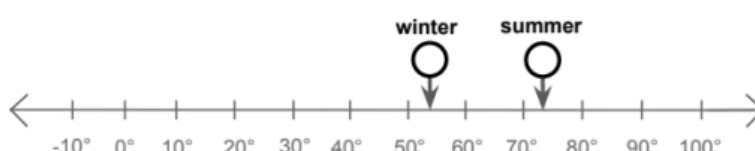
climate color

**Queenstown, New Zealand**



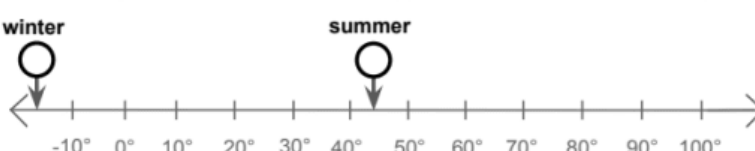
climate color

**Sydney, Australia**



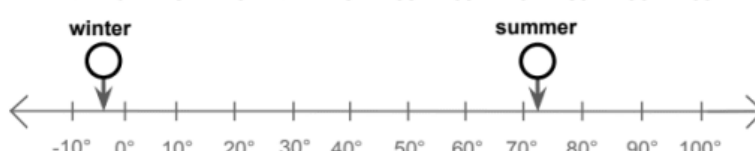
climate color

**Tiksi, Russia**



climate color

**Ulan Bator, Mongolia**



climate color

Note: All temperatures are in Fahrenheit



# Climates in the Americas

Name: \_\_\_\_\_

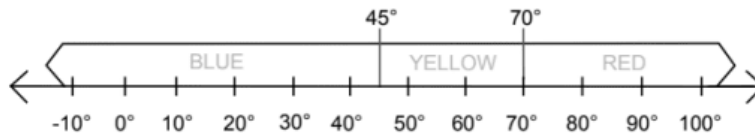


## CLIMATE KEY

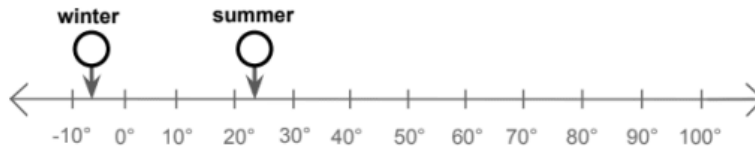
- This climate is cold all year long.
- This climate has cold winters and hot summers.
- This climate has warm winters and hot summers.
- This climate is hot all year long.

# Climates in the Americas (Fahrenheit)

## Climate Decoder

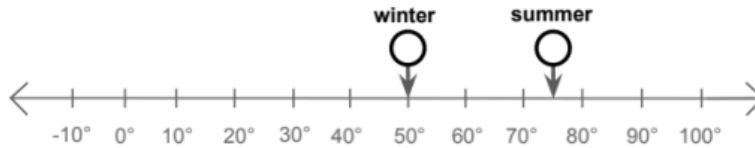


**Antarctica Research Station**



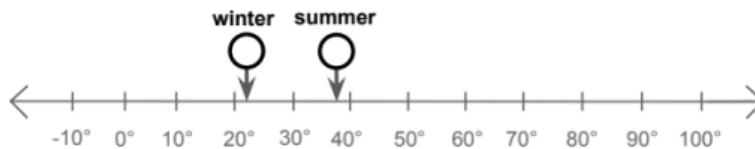
climate color

**Atlanta, Georgia, USA**



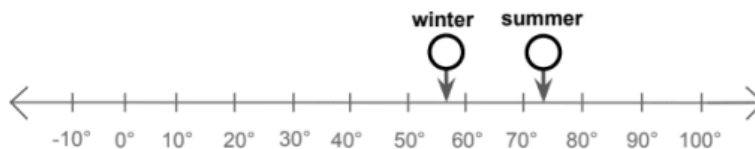
climate color

**Utqiagvik, Alaska, USA**



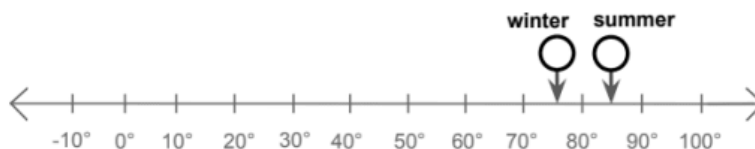
climate color

**Buenos Aires, Argentina**



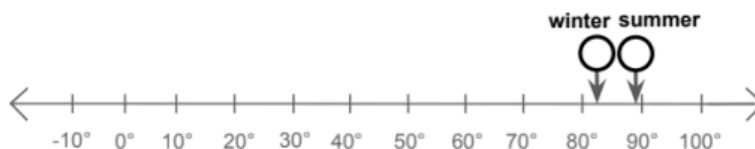
climate color

**Cancun, Mexico:**



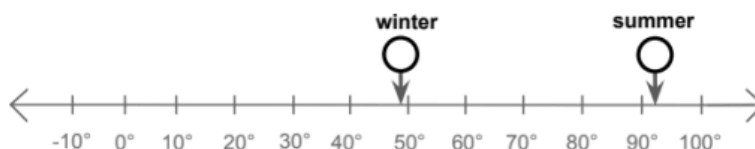
climate color

**Georgetown, Guyana**



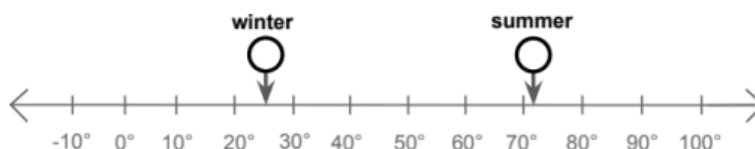
climate color

**Las Vegas, Nevada, USA**



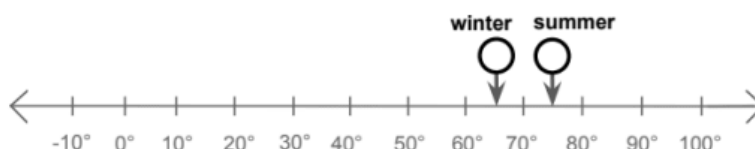
climate color

**Perito Moreno, Argentina**



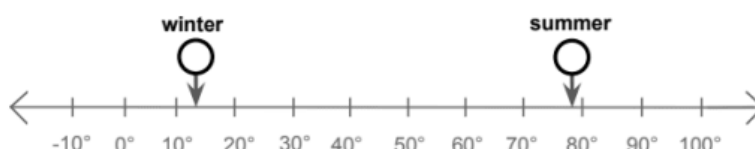
climate color

**Tacna, Peru**



climate color

**Winnipeg, Canada**



climate color

Note: All temperatures are in Fahrenheit



Why are some places always hot?

## Lesson Assessment

1. If you met someone from another country, what questions would you ask to figure out what climate he or she is from?

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2. Chantal loves warm weather and enjoys hiking in lush, green forests. What climate or climates would you suggest she visit for her vacation? Why?



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3. Why is it so much hotter near the equator than at the poles?



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# Wind Maker

paperclip

7

7

5

5

3

3

1

1

8

8

6

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4

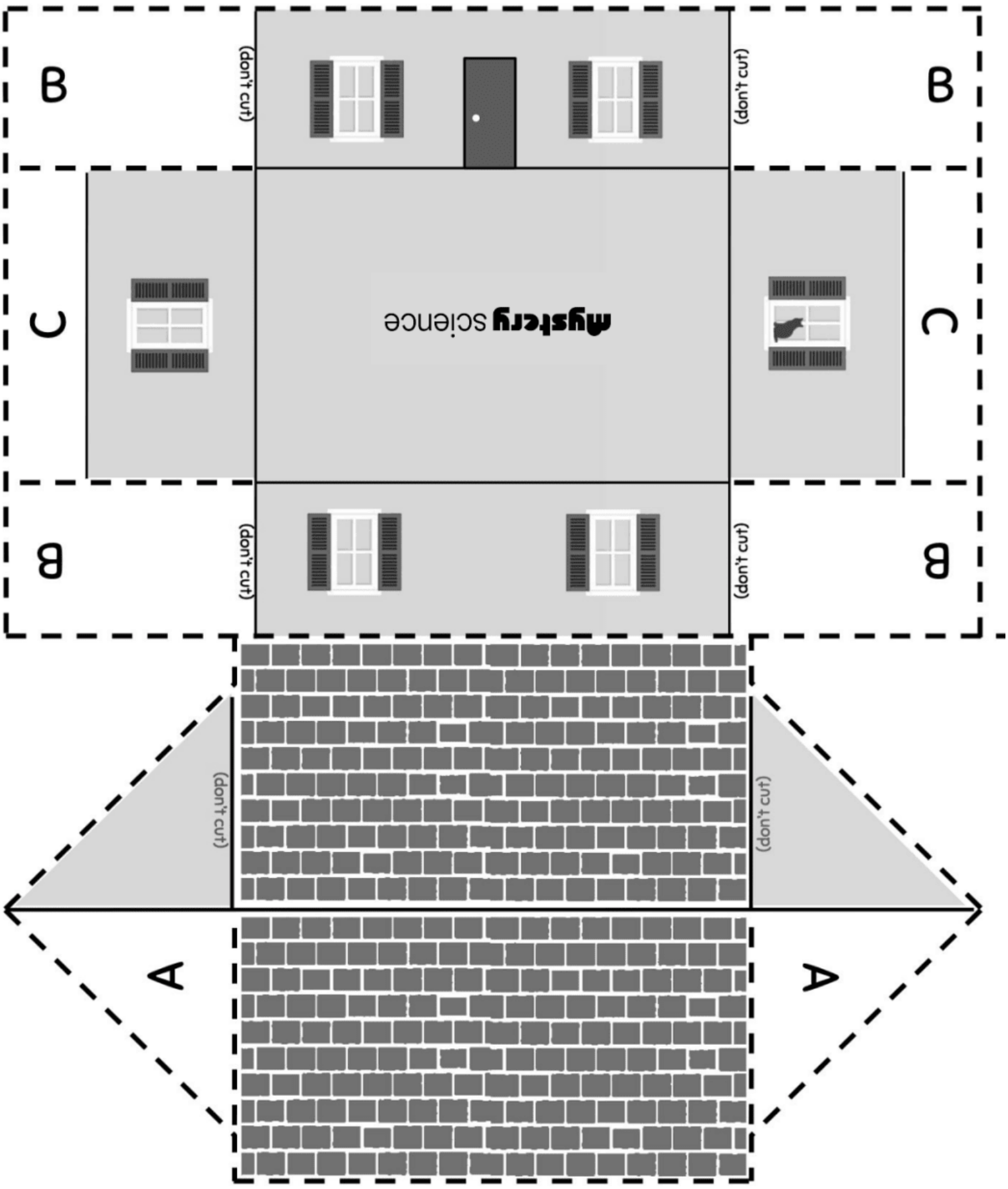
4

2

2

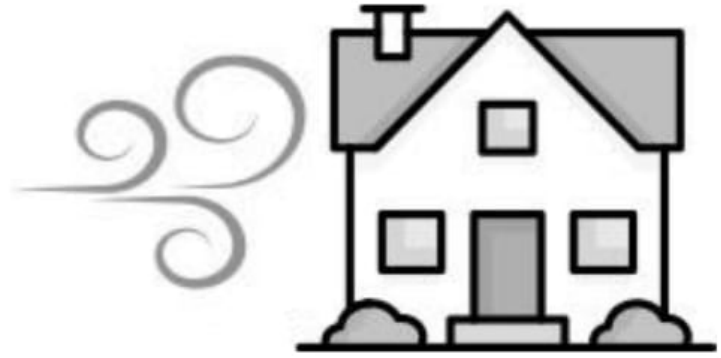
**mystery science**  
How can you keep a house from blowing away in a windstorm?

# Paper House Model



Your name: \_\_\_\_\_ Partner's name: \_\_\_\_\_

# Design a Windproof House



## 1. WHAT'S THE PROBLEM?

The problem with our house is \_\_\_\_\_

\_\_\_\_\_ (describe what you noticed when testing your house)

Why does it matter? Why is it important to fix it? \_\_\_\_\_

## 2. CREATE AND TEST YOUR FIRST DESIGN.

**Design #1:** Draw your design.



What happened when you tested

Design #1? \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Your name: \_\_\_\_\_ Partner's name: \_\_\_\_\_

### 3. CREATE AND TEST YOUR SECOND DESIGN.

**Design #2:** Draw your design.



What happened when you tested

Design #2? \_\_\_\_\_

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### 4. WHICH DESIGN WORKED BETTER AND WHY?

Which one was easiest to build? Which one used the fewest materials? Which one do you think would last the longest?

Design #1 / Design #2 (choose one) worked best because \_\_\_\_\_

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## Lesson Assessment

1. a) What do hurricanes, tornadoes, and dust storms have **in common**?

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b) How are hurricanes, tornadoes, and dust storms **different**?

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2. Reflect on your Wind-Proof House:

A. What problem were you trying to solve?

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B. How did you test your designs to see whether they worked or not?

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C. Engineers are always working to improve their designs. How could you improve your best design? What else would you try?

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D. Engineers often work together in teams to share ideas. Did you and your partner both get to share ideas? How did you work as a team?

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## Unit Assessment

### **Multiple Choice**

1. How can you tell the difference between a stratus and a stratonimbus cloud?
  - a. A stratus cloud is small and a stratonimbus cloud is very tall.
  - b. A stratonimbus cloud has a lighter color.
  - c. A stratonimbus cloud is darker than a stratus cloud, and causes rain.
  - d. A stratus cloud only covers part of the sky, and a stratonimbus cloud covers the whole sky.
  
2. Stratonimbus storms usually cause rain all day long because \_\_\_\_\_.
  - a. the clouds are very wide so they spend a long time over one area.
  - b. there is no hail in stratonimbus storms.
  - c. they turn into cumulus clouds.
  - d. they turn into stratus clouds.
  
3. Tropical climate zones are very wet and humid because \_\_\_\_\_.
  - a. the temperature is cold.
  - b. they have many types of plants.
  - c. the Earth travels in a circle around the sun.
  - d. sunbeams shine directly on them, causing more water evaporation and rainfall.

### **Short Answer**

1. Where do clouds come from?

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2. Imagine a rain cloud is coming towards you. Choose which kind of rain cloud it's going to be! **Draw** a picture of what you see, then describe your cloud below.

Type of rain cloud: \_\_\_\_\_

How long will this storm last? \_\_\_\_\_

3. Which climate is being described below? (temperate, polar, tropical, mild or desert) Write the answer in the blank.

- a) Animals that live here have blubber or thick fur: \_\_\_\_\_
- b) Trees lose their leaves in the autumn: \_\_\_\_\_
- c) Many animals hibernate in winter, come back out in springtime: \_\_\_\_\_
- d) It's hot in December and in June: \_\_\_\_\_
- e) Animals that live here don't pant to cool off, otherwise they would lose water: \_\_\_\_\_
- f) It's cold in December and in June: \_\_\_\_\_
- g) It doesn't rain here very much, ever: \_\_\_\_\_
- h) Winters here are nice and warm, but not hot: \_\_\_\_\_

4. Scientists have discovered a new species of dog. It has very large ears and a small mouth, and it doesn't pant with its mouth open like other dogs. What climate do you think this dog could be from? Explain.

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# Forces, Motion, & Magnets

3rd Grade • NGSS • Unit Worksheets

## Lesson 1



How could you win a tug-of-war against a bunch of adults?

## Lesson 2



What makes bridges so strong?

## Lesson 3



How high can you swing on a flying trapeze?

## Lesson 4



What can magnets do?

## Lesson 5



How can you unlock a door using a magnet?

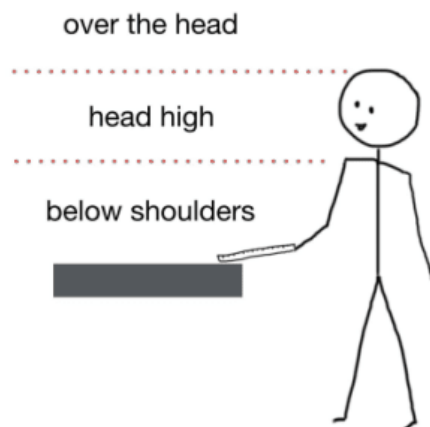
I am also curious about...

# High Hop Scorecard

Name: \_\_\_\_\_

1. Work with your partner to *estimate* how high your hopper hops (that means you'll make a very good guess). While the LAUNCHER makes their hopper jump, MISSION CONTROL will carefully watch how high it goes--over the launcher's head, about head high, or below the launcher's shoulders.

Launch 4 times and write your results on the chart below. Then switch jobs.



	<b>Below shoulders</b>	<b>Head high</b>	<b>Over the head</b>
<b>Launch 1</b>			
<b>Launch 2</b>			
<b>Launch 3</b>			
<b>Launch 4</b>			
<b>Total number</b>			

2. How do you think you could change the hopper to make it go higher?

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3. Try your idea. What happened?

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4. Based on what you observed, how else would you like to change/improve your hopper?

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## mystery science

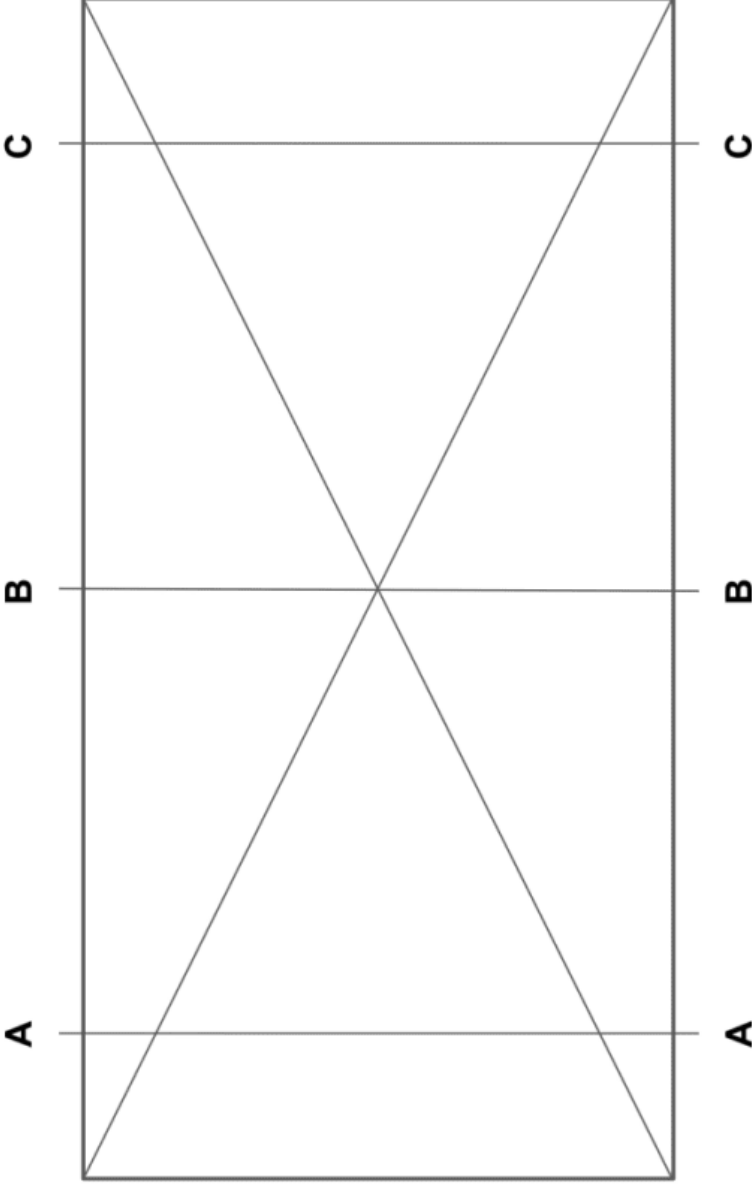
How could you win a tug-of-war against a bunch of adults?

1

## MAKE IT

Follow the steps in the video.

mystery science

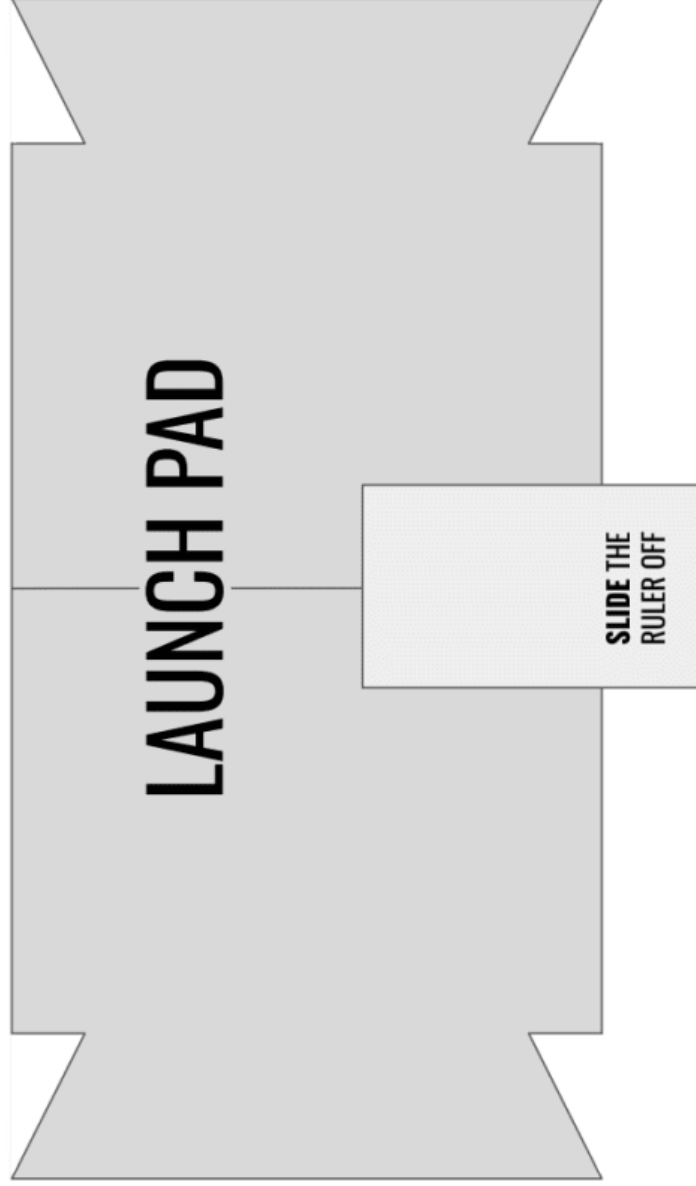


2

## LAUNCH IT

**Mission Control:** Unfold the hopper until it's flat.

**Launcher:** Lay the ruler down on top. When it's launch time, SLIDE it off!



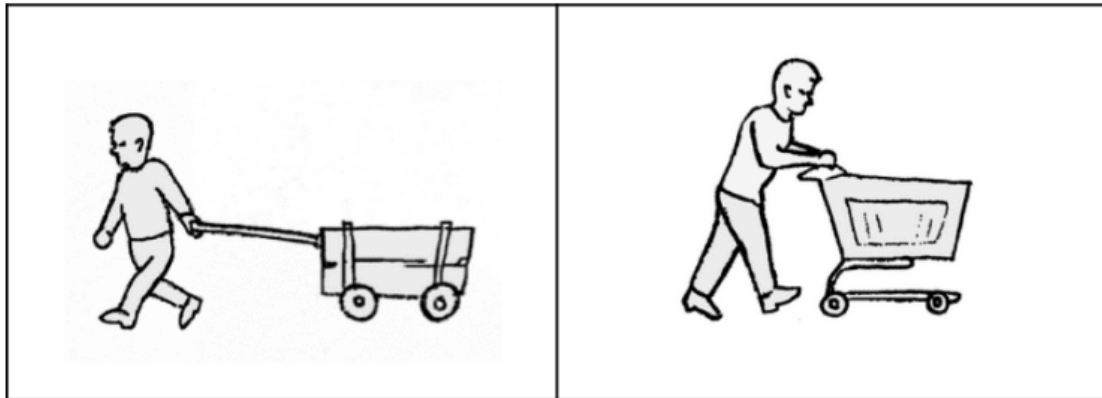
How could you win a tug-of-war against a bunch of adults?

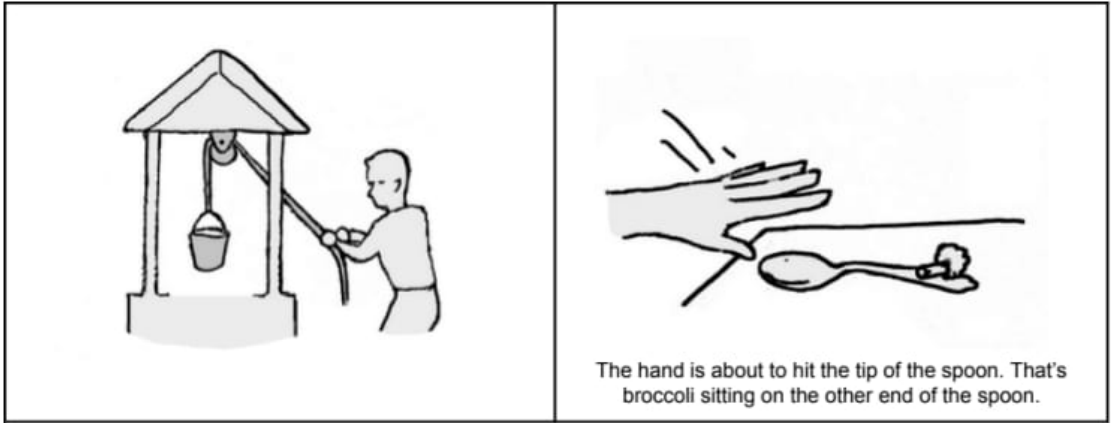
## Lesson Assessment

1. Put an "X" to show whether each of these actions is a pull or a push:

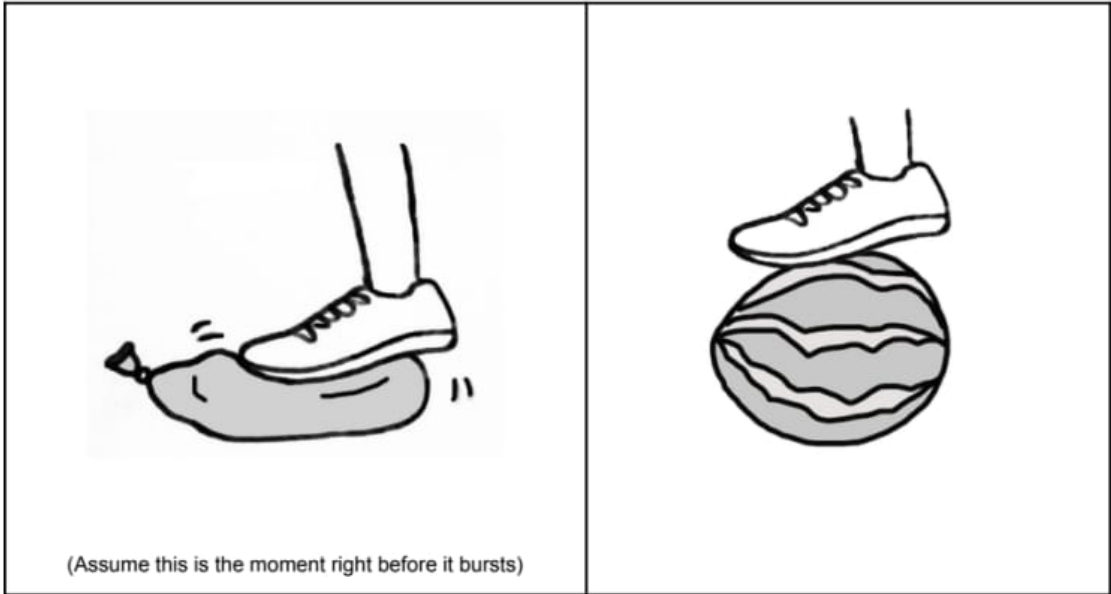
Action	Pull	Push
press		
throw		
tow		
stomp		
yank		

2. Draw arrows to show wherever there are forces (pushes or pulls):





3. Why does a water balloon pop when you step on it but a watermelon doesn't pop when you step on it? Draw the force arrows on the pictures below:



4. What was special about the one final rubber band that caused the watermelon to burst?

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# Bridge Designer's Notebook

Name: \_\_\_\_\_

<b>My Bridge Design</b> Build a bridge, then draw it here.	<b>Changes</b> Write down what you want to try next.
Bridge #1          How many pennies did this bridge hold? _____	To make a stronger bridge, I will _____ _____ _____ _____ _____ _____
Bridge #2          How many pennies did this bridge hold? _____	To make a stronger bridge, I will _____ _____ _____ _____ _____ _____
Bridge #3          How many pennies did this bridge hold? _____	To make a stronger bridge, I will _____ _____ _____ _____ _____ _____

You can use lots of paper when you are experimenting -- as long as your final bridge has only two pieces of paper.

# Bridge Challenge

## The problem:

Using only two sheets of paper, build a strong bridge that will reach across a 6-inch gap. The bridge must be at least 3 inches wide.

## The test:

How many pennies will your bridge hold before it collapses?

## You need:

- paper
- scissors
- pennies
- a pencil
- two stacks of books of about the same height
- a ruler
- a Bridge Designer's Notebook sheet

## Here's what you do:

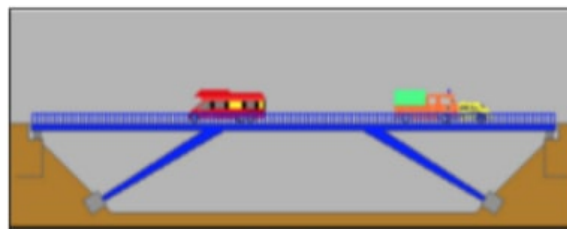
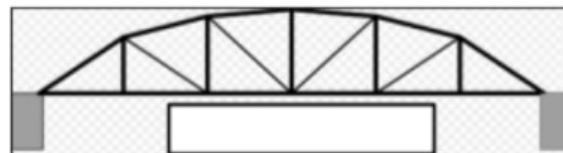
**1** Place the stacks of books 6 inches apart, using your ruler to measure the gap.

**2** Think about bridges that you have seen. Can you make something that has the same shape out of paper?

**3** Experiment!

- Make a paper bridge across the gap between the books.
- Put pennies on your bridge, one by one. Watch what happens when pennies push downward.
- Keep adding pennies until the bridge collapses.
- Think about how you could change your bridge so it's better at fighting the downward push.
- Change your bridge and try again. Build at least three different designs.

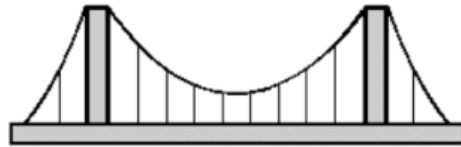
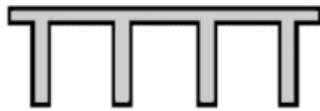
**4** Keep track of your experiments on your Bridge Designer's Notebook.



What makes bridges so strong?

## Lesson Assessment

1. Here are pictures of different bridge designs. Draw arrows to show where the bridge is being supported:



2. Why are pillar and arch bridges stronger than a simple board bridge?

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3. Why was the suspension bridge a good design for connecting San Francisco and Sausalito?

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4. When your paper bridge failed, what did you learn? What did you do differently the next time to make your bridge stronger?

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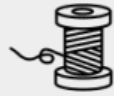
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# Trapeze Training

Name: \_\_\_\_\_



## Different lengths of string



### Long

1. The long string swung \_\_\_\_\_ times in 10 seconds.



### Short

2. The short string swung \_\_\_\_\_ times in 10 seconds.

3. I predict that a real trapeze with long ropes will \_\_\_\_\_

\_\_\_\_\_

I think this because \_\_\_\_\_

\_\_\_\_\_



## Different number of pennies



\_\_\_\_\_ pennies

4. This one swung \_\_\_\_\_ times in 10 seconds.



\_\_\_\_\_ pennies

5. This one swung \_\_\_\_\_ times in 10 seconds.

6. I predict that a real swing with more people on it will \_\_\_\_\_

\_\_\_\_\_

I think this because \_\_\_\_\_

\_\_\_\_\_

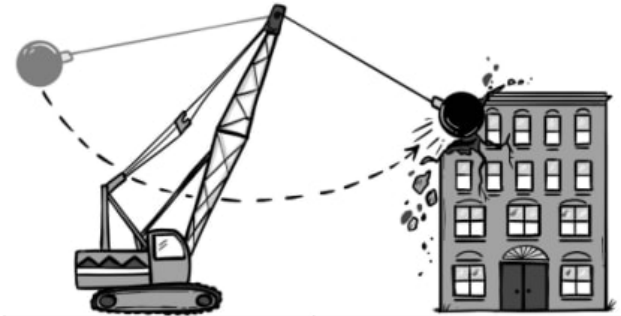
**mystery science**

How high can you swing on a flying trapeze?

## Lesson Assessment

A wrecking ball is a heavy steel ball used for tearing down large buildings. The wrecking ball is raised to a certain height and then released. The ball will swing forward and crash into the building at a certain height.

Wendy operates a wrecking ball and has collected information about how high she raises the wrecking ball and the maximum height of the building it hits. This information is shown in the table to the right.



Height of release	Maximum height of building reached
5 meters	4 meters
10 meters	9 meters
15 meters	14 meters
20 meters	19 meters
25 meters	24 meters

1. What height should Wendy raise the wrecking ball to if she wants to hit the top of a building that is 19 meters tall?

- a. 10 meters
- b. 15 meters
- c. 19 meters
- d. 20 meters

2. What **pattern** do you notice about the wrecking ball's motion?

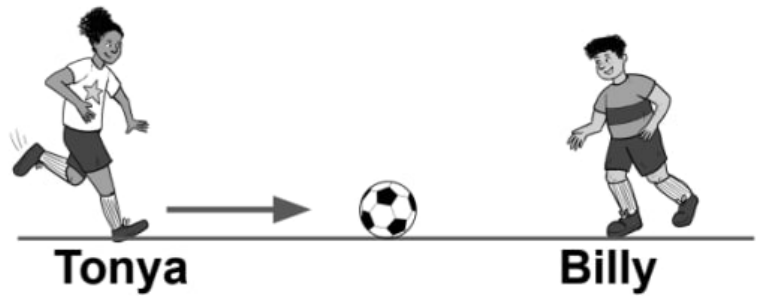
Circle all correct answers.

- a. The higher the height of release, the higher the wrecking ball can go.
- b. The higher the height of release, the lower the wrecking ball can go.
- c. The height of release is equal to the maximum height the wrecking ball can reach on the other side.
- d. The height of release is more than the maximum height the wrecking ball can reach.

3. **Predict** the height Wendy will raise the wrecking ball to if she needs to demolish the top of a building that is 29 meters tall.

- a. 15 meters
- b. 20 meters
- c. 25 meters
- d. 30 meters

Tonya and Billy are on a soccer team. During practice, they stand in the same spot and pass the ball back and forth to one another. Tonya kicked the ball, but it stopped between them before it reached Billy.

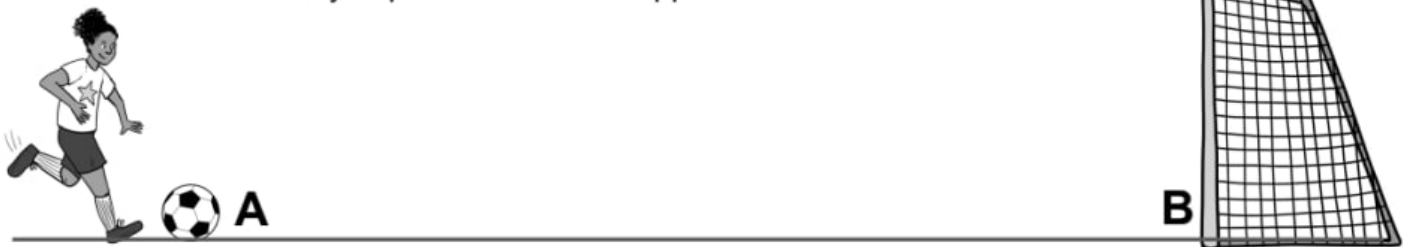


The ball is moved so that it is now in front of Billy. Billy kicks the soccer ball with the EXACT SAME amount of force that Tonya used to kick the ball earlier.



4. Based on this information, what do you **predict** the soccer ball will do?

- It will travel toward Tonya and stop right next to her.
- It will travel toward Tonya and stop before it reaches her.
- It will travel toward Tonya and keep going past her.
- There is no way to predict what will happen.



5. Tonya needs to score a goal. She needs to know how much force she should use to get the soccer ball from Point A to Point B. What kinds of information could she collect to help her answer this question? Circle all correct answers.

- Observe how far the ball travels after kicking it with different amounts of force.
- Observe how quickly the goalie stops the ball.
- Measure the distance the soccer ball travels each time it's kicked.
- Measure the size of the soccer ball.

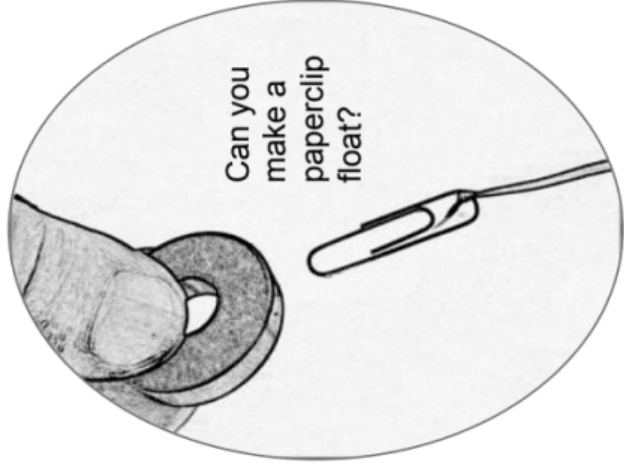
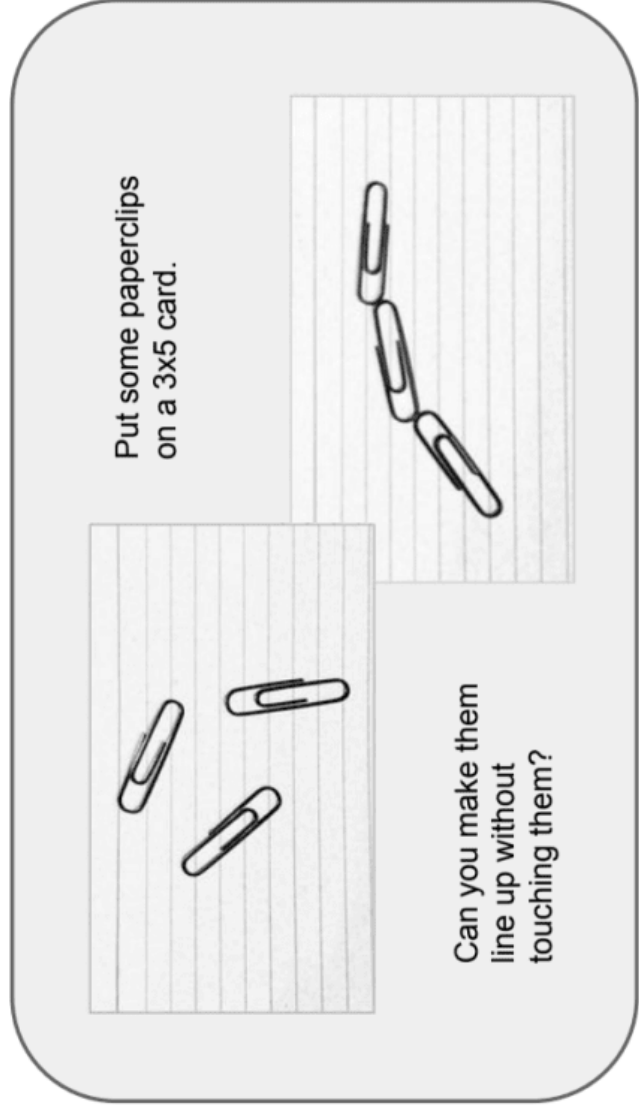
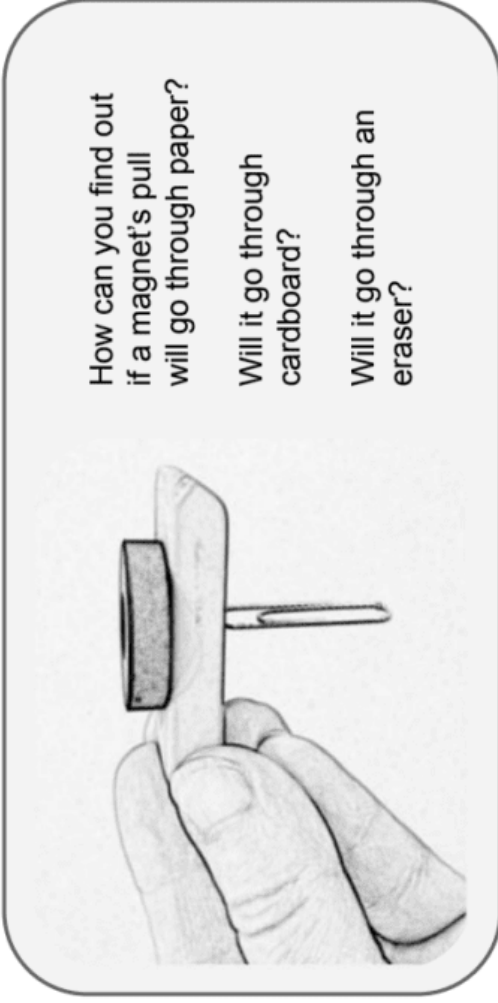
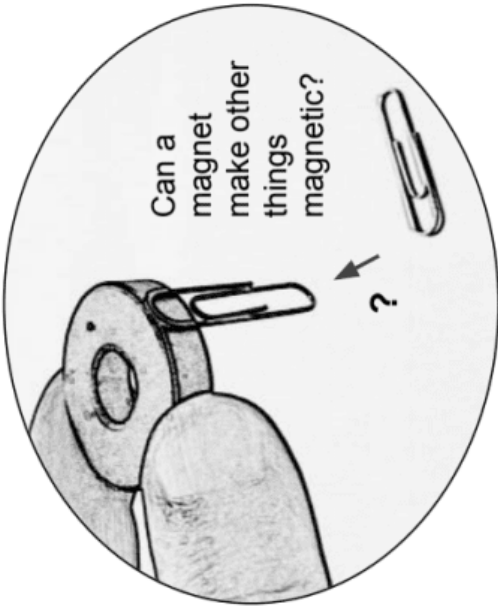
6. If Tonya kicks the soccer ball with a medium amount of force, how far do you think it will travel? Why do you think this? Explain your answer using evidence from the table on the right.

I think the soccer ball will travel \_\_\_\_\_ yards.

I think this because \_\_\_\_\_

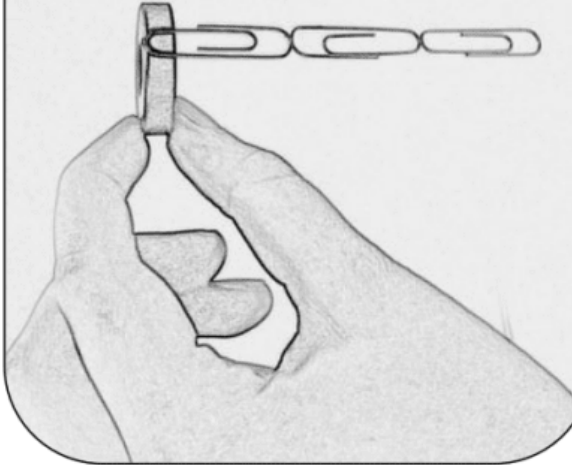
Force of Kick	Distance Ball Moves
Small	4 yards
Small	5 yards
Large	9 yards
Large	10 yards

# Ideas for Experimenters



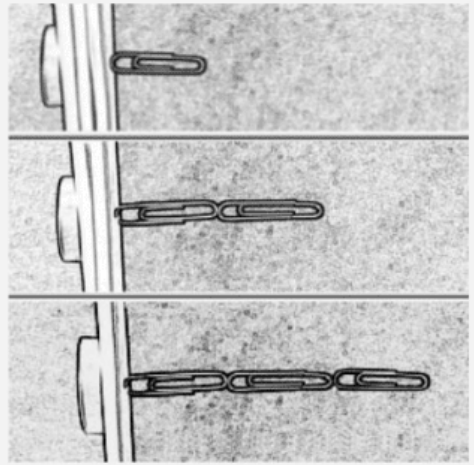
# More ideas

How many paperclips can you hang from a magnet?

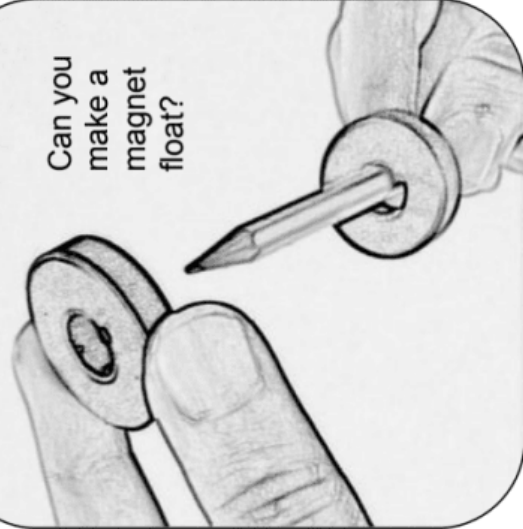


What happens if you stack up more magnets?

How can you make a magnet's pull weaker?

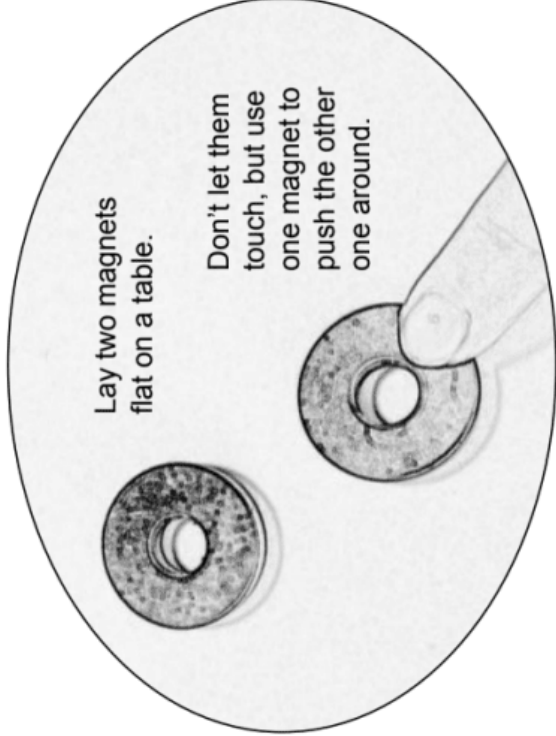


Can you make a magnet float?



Lay two magnets flat on a table.

Don't let them touch, but use one magnet to push the other one around.



**mystery science**  
What can magnets do?

# Magnets Are Weird

Name: \_\_\_\_\_

Questions:	My drawing of what I tried:	What happened:
<p>1. Will a magnet's pull go through paper?</p> <p>Will it go through cardboard?</p> <p>Other materials?</p>		<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
<p>2. Can you make a paperclip float?</p> <p>Can you make a magnet float?</p>		<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
<p>3. Write your own question:</p>		<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>

What can magnets do?

## Lesson Assessment

1. Do you think magnets are weird? Why or why not?

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2. When you pour chocolate syrup, it falls down (like in picture A). How could you get the chocolate syrup to pour upwards (like in picture B)? Explain why you think your plan would work.



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3. What invention would you make if you had a lot of magnets? Explain why you think that invention would be a good idea.

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How can you unlock a door using a magnet?

## Lesson Assessment

1. For each example, circle the property or properties of magnets being used. (There may be examples where more than one property is being used.)

**Attracting**: Magnets attract other magnets and some metals.

**Repelling**: Magnets repel other magnets.

**Working at a distance**: Magnets don't have to be touching to push and pull each other.

<u>Example</u>	<u>Which property(ies) of magnets is being used?</u>		
a. Holding things on the refrigerator with magnets	Attracting	Repelling	Working at a distance
b. Cow magnets picking up metal in a cow's stomach	Attracting	Repelling	Working at a distance
c. Magnetic train ("MagLev" train) using magnets instead of wheels	Attracting	Repelling	Working at a distance
d. Magnetic clasp on a purse or bag	Attracting	Repelling	Working at a distance
e. "Magic" trick: moving a magnet with a magnet under the table	Attracting	Repelling	Working at a distance
f. Picking up cars & other metal pieces at the junkyard	Attracting	Repelling	Working at a distance

**Bonus**: In the space below, come up with your own example. Give the property of magnets it uses.

2. Reflect on your magnetic lock design:

A. What problem were you trying to solve?

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B. Draw and label your lock design.

C. Choose one property of magnets:

attracting      repelling      working at a distance

How was this property of magnets useful in your design?

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**mystery science**

How can you unlock a door using a magnet?

## Unit Assessment

### Multiple Choice

1. Why is it hard to win a tug-of-war against a group of teachers?
  - a. Teachers try really hard.
  - b. Teachers have more legs than students.
  - c. Teachers have a lot of friction.
  - d. Teachers can push really hard.
  
2. The last rubber band caused the watermelon to burst because \_\_\_\_\_.
  - a. it was stronger than the other rubber bands.
  - b. it was thicker than the other rubber bands.
  - c. it was the last rubber band in the bag.
  - d. it created a force that was greater than the force of the watermelon rind.
  
3. Why was a suspension bridge a good design for the Golden Gate Bridge in San Francisco?
  - a. Ships had to pass underneath the bridge.
  - b. It has a lot of pillars underneath to support it.
  - c. The distance the bridge had to cross wasn't very long.
  - d. The water under the bridge was very shallow.
  
4. A trapeze won't swing forever because \_\_\_\_\_.
  - a. a trapeze is too heavy to keep swinging.
  - b. friction and air resistance slow the trapeze down.
  - c. a trapeze isn't heavy enough to keep swinging.
  - d. the ropes of the trapeze aren't long enough.
  
5. Magnets attract \_\_\_\_\_.
  - a. objects that contain iron.
  - b. only other magnets.
  - c. anything made of metal.
  - d. things that are not too heavy.

**Short Response**

1. Why do hoppers hop off the table?

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2. Why are pillar bridges and arch bridges stronger than board bridges?



pillar bridge



arch bridge



board bridge

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3. Imagine a trapeze artist wants to make their trapeze swing more slowly. How should they do this? Should they have a second trapeze artist join them, so that there is more weight? Or should they make the ropes shorter or longer? On the lines below, explain how you know which change to make.

*I think they should* \_\_\_\_\_.

*I think this because* \_\_\_\_\_

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4. Are paper clips magnets? Explain.

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