

Name: _____

MYSTERY science

5th Grade

with Anchor Layer

Student Booklet

MYSTERYscience Worksheets

NGSS Grade 5 Unit

Web of Life Mysteries:



Mystery 1

Why would a hawk move to New York City?



Mystery 2

What do plants eat?



Mystery 3

Where do fallen leaves go?



Mystery 4

Do worms really eat dirt?



Mystery 5

Why do you have to clean a fish tank but not a pond?



Mystery 6

Why did the dinosaurs go extinct?

See-Think-Wonder Chart

Name: _____

See What did you observe? 	Think How can you explain what is happening? 	Wonder What questions do you have? 

Biosphere Bites

Name: _____

Challenge: You are moving into a dome that has enough water, heat and oxygen to support your crew. Your job is to make sure that there will be enough food for the crew to eat. You'll start with enough food for a few months and a pantry stocked with as much salt, sugar, and baking soda as you need. To survive in the dome, you need to create an ecosystem that provides all the other food you need.



Part 1: Think about what you'd like to eat on a typical day inside the dome. Write down a possible menu. As you decide your menu, keep in mind that you'll make your meals from plants and animals that live inside the dome with you.

Breakfast

Lunch

Dinner

Part 2:

Make a list of the ingredients you need to make the meals on your menu.

Part 3:

Organize your ingredients into ones you can grow and ones that come from animals (along with the animals that supply them). Then write down what you need to keep all the plants and animals healthy. (If you're not sure, don't worry. You'll come back to this.)

  Ingredients

 Grow	 Comes from an Animal (include food and the animal it comes from)	What Do Those Organisms Need ?

Part 4:

Choose up to 20 organisms (living things) to put into the dome with you to make sure you have enough food for 2 years.

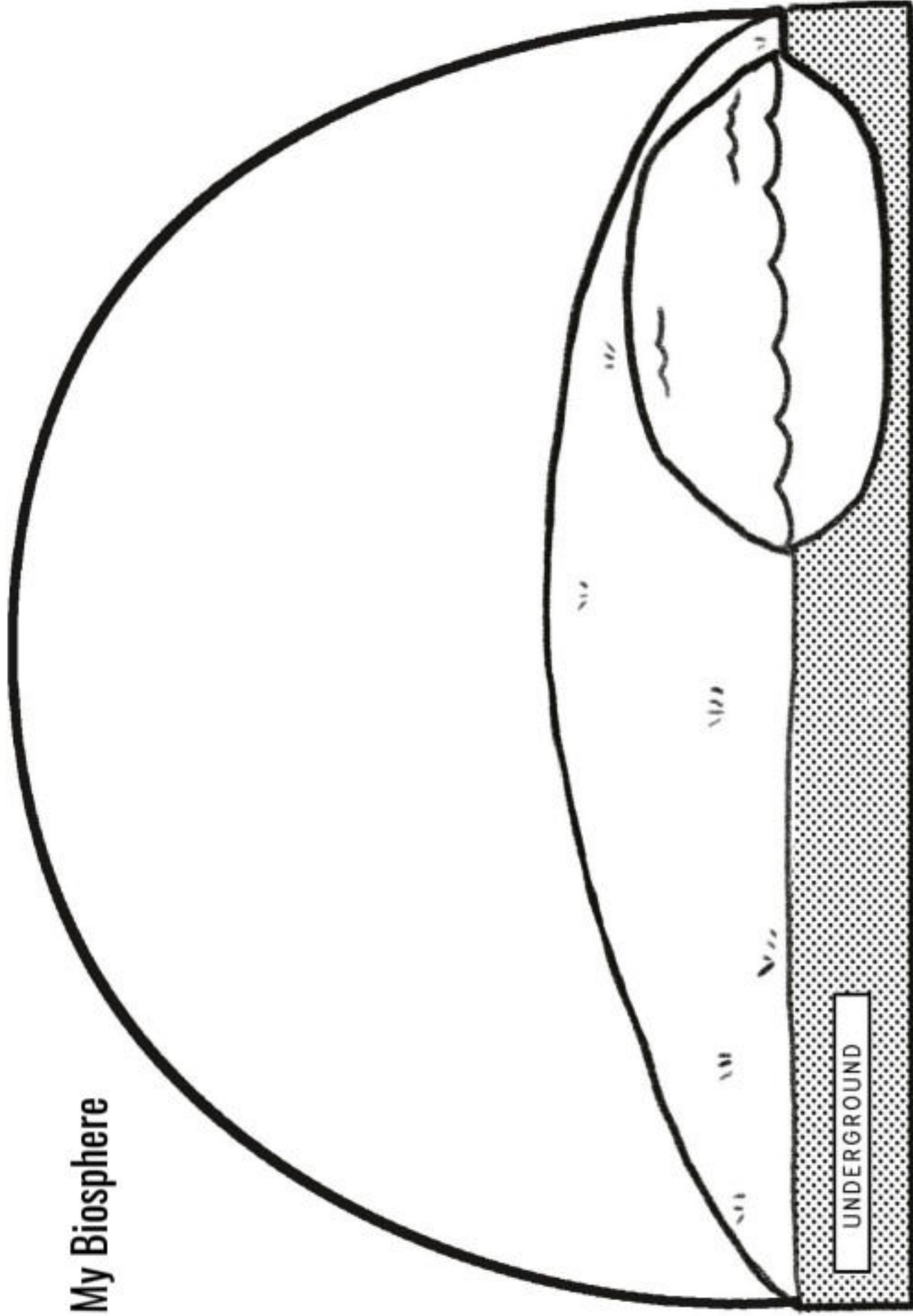
Use your menu ingredients to help you get started.



1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____
11. _____
12. _____
13. _____
14. _____
15. _____
16. _____
17. _____
18. _____
19. _____
20. _____

Part 5: Draw your organisms into the biosphere model below. Use labels and captions to help you explain your choices.

My Biosphere



Rules

MYSTERYscience

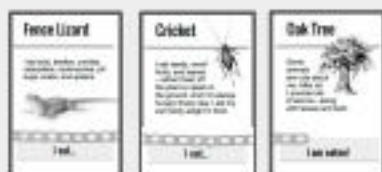
Web of Life | Mystery 1

THE GOALS OF THE GAME:

- Make as many food chains as you can.
- Make the chains as long as you can. (Longer chains get bonus points!)

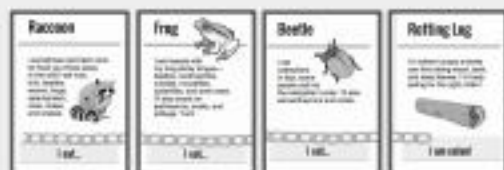
HOW SCORING WORKS:

You'll get **1 point** for every card in a food chain:



3 cards = 3 points

If your chain is 4 cards or longer, you get an extra **2 bonus points**:



**4 cards
+ 2 bonus points
= 6 points**

HOW STEALING WORKS:

- You CAN'T steal on the first round.
- Starting in the second round, you can choose a card from the center stack **or** you can **STEAL** a card from another player *if* you can use that stolen card to make a chain right away.
- You CAN'T steal a card that is already in a player's food chain.

TIP: THINK CAREFULLY

Read the cards carefully. The Cricket card says crickets eat leaves. The Oak Tree has leaves. That means the cricket can eat the oak tree!



TIP: REARRANGE YOUR CHAINS

You can rearrange your food chains whenever you want. Take them apart and put them together in different ways. Can you figure out ways to get longer chains?

Score Card

Name: _____

1. WRITE DOWN YOUR LONGEST CHAIN:

_____ eats _____ eats _____ eats
_____ eats _____ eats _____. Yum!

2. ADD UP YOUR SCORE! Use the back if you run out of room:

Chain 1: Write down how many cards are in the chain: _____
If there are 4 or more, add 2 bonus points: _____

Chain 2: Write down how many cards are in the chain: _____
If there are 4 or more, add 2 bonus points: _____

Chain 3: Write down how many cards are in the chain: _____
If there are 4 or more, add 2 bonus points: _____

Chain 4: Write down how many cards are in the chain: _____
If there are 4 or more, add 2 bonus points: _____

Chain 5: Write down how many cards are in the chain: _____
If there are 4 or more, add 2 bonus points: _____

TOTAL points = _____ points



MYSTERY
science
Web of Life | Mystery #1



EAT OR BE EATEN

a food chain game

Jumping Spider



I pounce on insects that spend time on the ground. I eat crickets, ants, cockroaches, caterpillars, and even daddy long legs.

I eat...

MYSTERY SCIENCE

Fence Lizard

I eat ants, beetles, crickets, caterpillars, cockroaches, pill bugs, snails, and spiders.



I eat...

MYSTERY SCIENCE

Dead Leaves

I may not look tasty, but I'm just what some animals want for lunch.



I am eaten!

MYSTERY SCIENCE

Mouse



Cartoon mice eat cheese. Real mice like me eat human food—when we can find it. I'll also eat seeds and nuts (like acorns), or snack on vegetables like zucchini or tomatoes. And sometimes I eat crickets and beetles.

I eat...

MYSTERY SCIENCE

Pigeon



You can feed me popcorn, bread crumbs, and peanuts. But when no one gives me human food, I eat seeds and berries—plus snails, earthworms, and crickets.

I eat...

MYSTERY SCIENCE

Web-spinning Spider



I eat flying insects. House flies, butterflies, and even honeybees can get caught in my web. Dinner is served.

I eat...

MYSTERY SCIENCE

Crow



I eat almost anything: acorns, fruits, seeds, and human food. I like beetles, crickets, and cockroaches. I hunt for animals like frogs, moles, mice, and lizards. I'll even steal eggs from the nests of robins, sparrows, and pigeons.

I eat...

MYSTERY SCIENCE

House Cat

Yes, I eat cat food. But I like to hunt, too. I prey on mice, gophers, squirrels, small birds—and even lizards.



I eat...

MYSTERY SOURCE

Swallowtail Butterfly



I drink nectar from flowers—and I'm not picky about what flowers. I'm happy in a flower garden, vegetable garden, or a clover patch. Even a parsley plant is fine with me.

I eat...

MYSTERY SOURCE

Sparrow



I eat seeds, grains, grass, and berries. I'll also eat bread crumbs if they're around. And sometimes I'll snack on ants.

I eat...

MYSTERY SOURCE

Clover

I have leaves, flowers, and small seeds. They're a great snack if you like that sort of thing.



I am eaten!

MYSTERY SOURCE

Opossum

I eat all kinds of things. I catch frogs, moles, snakes, mice, and salamanders. I snack on beetles, cockroaches, earthworms, crickets, and snails. I'm also happy to eat vegetables, seeds, even human food!



I eat...

MYSTERY SOURCE

Snail

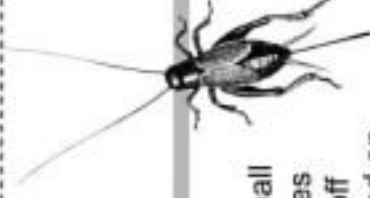


I eat soft green plant leaves—lettuce, parsley, flower leaves, clover, and even grass. Oak leaves are too tough for me, but if I'm hungry I'll nibble on dead leaves.

I eat...

MYSTERY SOURCE

Cricket



I eat seeds, small fruits, and leaves—either fresh off the plant or dead on the ground. And I'm always hungry! Every day, I eat my own body weight in food.

I eat...

MYSTERY SOURCE

Lunch Leftovers



I'm the lunch some kid didn't finish—half a peanut-butter sandwich and an apple with a bite out of it. That's OK—I'm the perfect treat for some hungry animal.

I am eaten!

MYSTERY SOURCE

Robin



I hop around searching for worms, caterpillars, snails, beetles, crickets, ants, spiders, and even daddy long legs. I'll also eat fruits and berries off bushes and trees.

I eat...

MYSTERY SOURCE

Caterpillar of a Moth

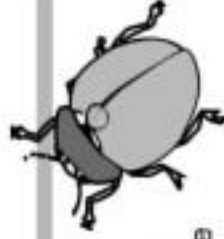


I chow down on rotting wood and dead leaves. That's why you can usually find me hiding under a rotting log.

I eat...

MYSTERY SOURCE

Beetle



I eat caterpillars. In fact, some people call me the caterpillar hunter. I'll also eat earthworms and snails.

I eat...

MYSTERY SOURCE

Rotting Log

I'm where hungry animals can find rotting wood, bark, and dead leaves. I'm tasty eating for the right critter!



I am eaten!

MYSTERY SOURCE

Raccoon

I sometimes raid trash cans for food you threw away. In the wild I eat nuts, fruit, beetles, worms, frogs, salamanders, mice, moles, and snakes.



I eat...

MYSTERY SOURCE

Salamander



I eat nice crunchy beetles, ants, crickets, along with snails, spiders, ants, and pillbugs. Want to join me for lunch?

I eat...

MYSTERY SOURCE

Frog



I eat insects with my long sticky tongue—beetles, cockroaches, crickets, houseflies, butterflies, and even bees. I'll also snack on earthworms, snails, and pillbugs. Yum!

I eat...

MYSTERY SOURCE

Parsley Plant



I'm where animals can find leaves, flowers, and small seeds. In fact, I'm one of the *only* plants that swallowtail caterpillars eat! Bragging rights.

I am eaten!

MYSTERY SOURCE

Hawk



I swoop down to grab small animals with my sharp claws. I eat gophers, mice, pigeons, robins, sparrows, even lizards and snakes!

I eat...

MYSTERY SCIENCE

Daddy

Longlegs



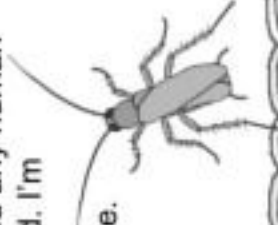
I eat insects of all kinds—along with worms, snails, and pill bugs. I'm not a spider, but I eat spiders when I catch them.

I eat...

MYSTERY SCIENCE

Cockroach

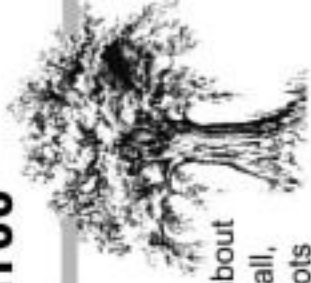
I eat many things, including bark, paper, leaves (living and dead), and any human food I can find. I'm particularly fond of cheese.



I eat...

MYSTERY SCIENCE

Oak Tree



Some animals are nuts about me. After all, I provide lots of acorns—along with leaves and bark.

I am eaten!

MYSTERY SCIENCE

Mole



I chow down underground (and under logs). I'll eat beetles, earthworms, pill bugs, and crickets. I stay hidden in my tunnel, safe from hawks and housecats!

I eat...

MYSTERY SCIENCE

Ant



I'm happy to eat human food (like peanut butter), but when that's not around, I'll eat nectar from flowers, seeds from grasses, and any dead insects I find lying around.

I eat...

MYSTERY SCIENCE

Gopher

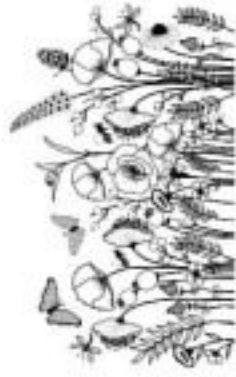


I tunnel underground and gnaw the roots of plants—any plants! Sometimes I leave my hole to snack on leaves—keeping an eye out for animals that want to snack on me!

I eat...

MYSTERY SCIENCE

Flower Garden

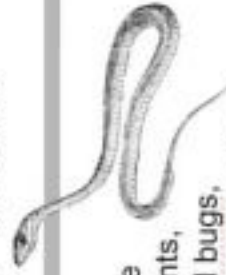


Come and get it! I have lots of flowers with sweet nectar, plus lots of leaves and seeds.

I am eaten!

MYSTERY SCIENCE

Garter Snake



I hunt in the grass for ants, beetles, pill bugs, cockroaches, crickets, earthworms, and spiders. I also eat mice, frogs, salamanders, & lizards. Don't be scared of me...unless you're on my list of snacks.

I eat...

MYSTERY SCIENCE

Swallowtail Caterpillar



Like many caterpillars, I'm a picky eater. I only eat carrot leaves and parsley plants from vegetable gardens.

I eat...

MYSTERY SCIENCE

Gray Squirrel



I eat nuts, like acorns from the oak tree. But that's not all! I eat seeds, fruit, birds' eggs, even lunch leftovers! Peanut butter sandwich? Yes please!

I eat...

MYSTERY SCIENCE

Grass



I have lots of leaves and lots of seeds. That's lunch for lots of critters.

I am eaten!

MYSTERY SCIENCE

Earthworm



I eat bits of plants—like dead leaves or rotting wood. Anywhere that leaves are falling, I can find something for lunch.

I eat...

MYSTERY SCIENCE

Honeybee



I eat pollen and nectar from flowers. I'm happy anywhere flowers bloom—a flower garden, a vegetable garden, a parsley plant, or a patch of clover.

I eat...

MYSTERY SCIENCE

Pill bug



I eat dead leaves, rotting wood, and the fungi that grow on them. Look for me under logs. Poke me, and I roll in a ball—that's why some people call me a roly poly.

I eat...

MYSTERY SCIENCE

Veggie Garden



If you're looking for lettuce, tomatoes, cucumbers, and zucchini squash, I'm the place. Stop by for some leaves and flowers too!

I am eaten!

MYSTERY SCIENCE

Web of Life

Mystery 1: Why would a hawk move
to New York City?

Name: _____

Date: _____

End of Mystery Assessment

1. How would you describe a food chain to someone who hasn't thought about that idea before?

2. When you go "down" the food chain by continuing to ask "What does it eat?" at what category of living things do you always end up?

3. Rather than showing just one food chain, the images below show a habitat, where several food chains are linked to each other. Draw arrows connecting each of these living things by what they eat, then answer question #4.



hawk



falcon



cat



lizard



snake



caterpillar



garden plant (parsley)



gopher

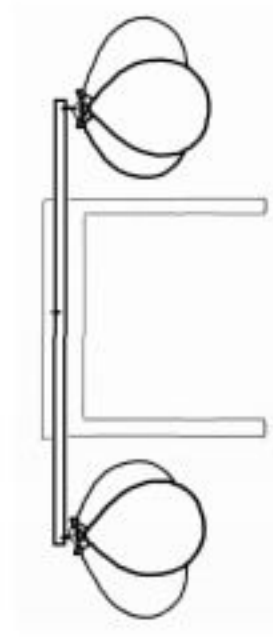
4. When you connect all the different food chains within one habitat, like you did above, what words or phrase do you think best describe how this diagram looks? Why?

5. **Research:** Choose any animal, such as your favorite animal, then use a trustworthy source of information to find out the answers to the two "food chain" questions, which you should write below. (If your animal isn't eaten by anything else, that's okay, just be sure to say so.)

Animal: _____

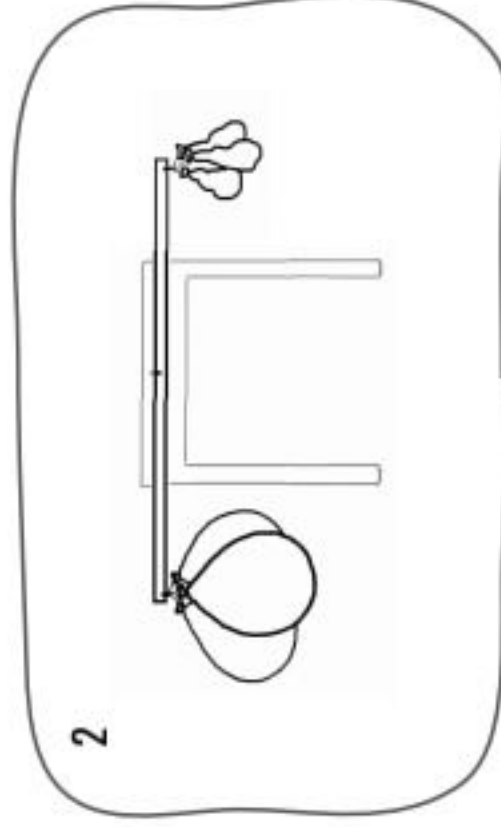
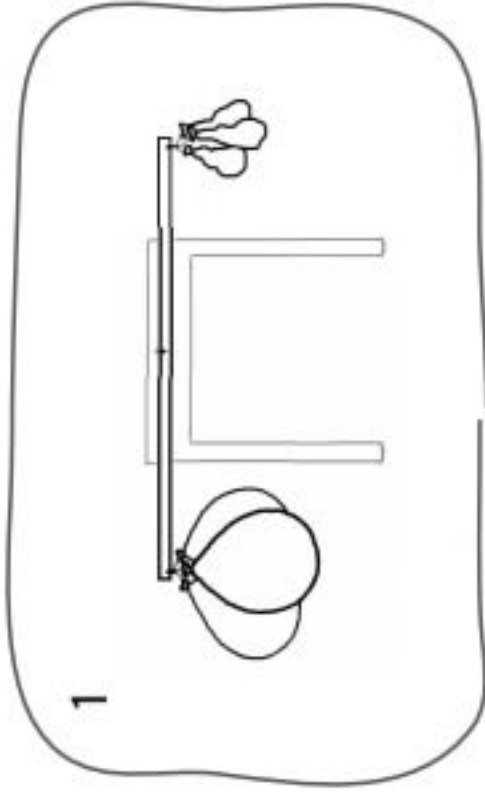
Weighing Air

Name: _____



Right now, your set-up looks something like this. But soon your teacher will let out all the air from one side. What will happen? Answer the questions below, then find out!

1. Add arrows to the picture below to show how you think the scale will move if air **DOES** weigh something. Why do you think that?



3. Which drawing did the experiment look like in the end? (Drawing 1 or drawing 2?) What does that mean about air?

Web of Life

Mystery 2: What do plants eat?

Name: _____

Date: _____

End of Mystery Assessment

1. How do you know that a tree isn't gaining its weight from the soil?

2. What do you think would happen to a plant if you put tape on the undersides of its leaves?
Why?

3. In the experiment where the scientist weighed a tree and its soil, even though the soil barely lost any weight, it did lose a little bit of weight. Given what you know about plants, why do you think that happened?

4. Many people who haven't learned about plants believe that plants eat soil. What are some reasons why they might think that?



Your Plan & Prediction

Name: _____

Date: _____

1. Discuss with your team:

How do you want to make your team's Mold Terrarium different from the Basic Terrarium?

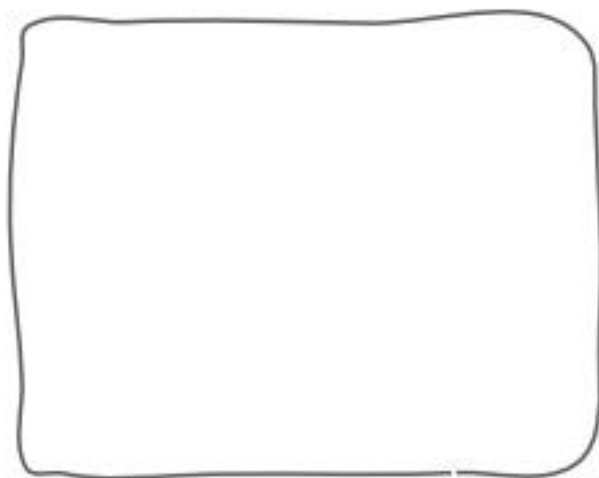
Write down at least 4 different conditions you want to test, and circle your team's two favorite ideas.

1	3
2	4

2. After the group discussion, what's your team's plan?

3. What's your team name? _____

4. Draw your set up (the bag, plate, & food)



What our set-up looked like on (date) _____

5. Do you think mold in your terrarium will grow faster or slower than mold in the basic terrarium? Why do you think that?



Growth & Observations

Name: _____

Date started: _____

TEAM: _____

CONDITION: _____

Example: Color in the bottom three circles when mold covers $\frac{1}{2}$ the food

More than $\frac{1}{2}$
 $\frac{1}{2}$ moldy
 $\frac{1}{4}$ moldy
First mold



Mark the days when you check for mold →		1	2	3	4	5	6	7	8	9	10	11	12	Describe or draw the mold (shape, color...)
Food 1: _____	More than $\frac{1}{2}$ $\frac{1}{2}$ moldy $\frac{1}{4}$ moldy First mold No mold	○ ○ ○ ○ ○	○ ○ ○ ○ ○	○ ○ ○ ○ ○	○ ○ ○ ○ ○	○ ○ ○ ○ ○	○ ○ ○ ○ ○	○ ○ ○ ○ ○	○ ○ ○ ○ ○	○ ○ ○ ○ ○	○ ○ ○ ○ ○	○ ○ ○ ○ ○	○ ○ ○ ○ ○	
Food 2: _____	More than $\frac{1}{2}$ $\frac{1}{2}$ moldy $\frac{1}{4}$ moldy First mold No mold	○ ○ ○ ○ ○	○ ○ ○ ○ ○	○ ○ ○ ○ ○	○ ○ ○ ○ ○	○ ○ ○ ○ ○	○ ○ ○ ○ ○	○ ○ ○ ○ ○	○ ○ ○ ○ ○	○ ○ ○ ○ ○	○ ○ ○ ○ ○	○ ○ ○ ○ ○	○ ○ ○ ○ ○	
Food 3: _____	More than $\frac{1}{2}$ $\frac{1}{2}$ moldy $\frac{1}{4}$ moldy First mold No mold	○ ○ ○ ○ ○	○ ○ ○ ○ ○	○ ○ ○ ○ ○	○ ○ ○ ○ ○	○ ○ ○ ○ ○	○ ○ ○ ○ ○	○ ○ ○ ○ ○	○ ○ ○ ○ ○	○ ○ ○ ○ ○	○ ○ ○ ○ ○	○ ○ ○ ○ ○	○ ○ ○ ○ ○	
Food 4: _____	More than $\frac{1}{2}$ $\frac{1}{2}$ moldy $\frac{1}{4}$ moldy First mold No mold	○ ○ ○ ○ ○	○ ○ ○ ○ ○	○ ○ ○ ○ ○	○ ○ ○ ○ ○	○ ○ ○ ○ ○	○ ○ ○ ○ ○	○ ○ ○ ○ ○	○ ○ ○ ○ ○	○ ○ ○ ○ ○	○ ○ ○ ○ ○	○ ○ ○ ○ ○	○ ○ ○ ○ ○	
Food 5: _____	More than $\frac{1}{2}$ $\frac{1}{2}$ moldy $\frac{1}{4}$ moldy First mold No mold	○ ○ ○ ○ ○	○ ○ ○ ○ ○	○ ○ ○ ○ ○	○ ○ ○ ○ ○	○ ○ ○ ○ ○	○ ○ ○ ○ ○	○ ○ ○ ○ ○	○ ○ ○ ○ ○	○ ○ ○ ○ ○	○ ○ ○ ○ ○	○ ○ ○ ○ ○	○ ○ ○ ○ ○	

Web of Life

Mystery 3: Where do fallen leaves go?

Name: _____

Date: _____

End of Mystery Assessment

1. Mushrooms and plants both have roots that grow in the soil. But how are mushroom roots different from plant roots?

2. Why do you think that scientists group mushrooms and mold together in the same category, the fungi?

3. In the mold terrarium experiment, why do you think it was important to only change one condition per plate? For example, why not change two conditions at once, like adding salt to the food while also putting the plate near a heater?

Worm Watcher Worksheet

- 1) Observe your worm and draw it here. It has no legs, yet it moves around. How does it manage that? If you like, draw a cartoon strip showing how your worm changes as it moves around. If you need more space, use the back of the paper.

Tips for a good observation

- Don't disturb the worm after putting it on the plate. You want to see what it does all on its own.
- Be patient. It can take a while for it to start moving.
- While waiting for your worm to move, check out what other people's worms are doing.

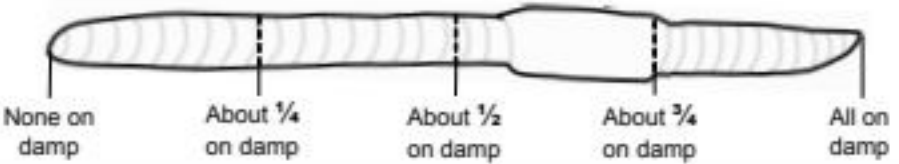
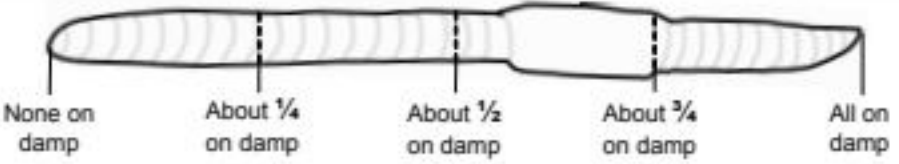
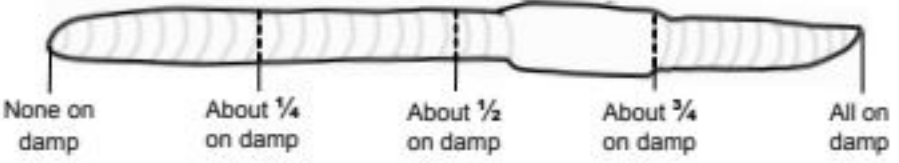
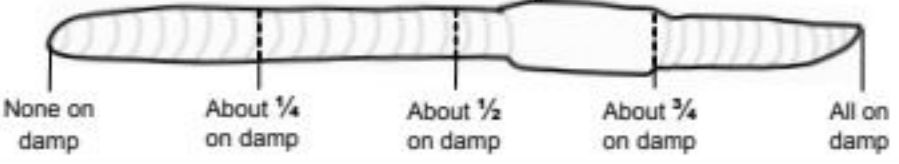
- 2) Watch your worm for a few minutes and write down what it does. (After a few minutes, most worms stop exploring and settle down where they are most comfortable.)

- 3) Look at all the worms in your group. What do you notice about the places the worm chose to settle? Are those places wet or dry, dark or bright, in the open or under cover?

Name: _____

Ask a Worm Worksheet

Experiment to test the conclusion that worms like damp places. Note what happens below:

Names	Results. Shade in how much of the worm is on the damp side.
1) My name:	
2) Partner's name:	
3) Partner's name:	
4) Partner's name:	

5) What might affect a worm's behavior (like light vs. dark)?

6) Think of some questions you have about what worms like (or what they dislike):

Name: _____

Ask a Worm Worksheet, continued



- 7) Write the question you've decided to explore: _____
- 8) Describe or draw a picture of an experiment that you could do to find out the answer to your question.
(Use the back if you need more space.)

- 9) What can you do to make sure your experiment is a fair test?

Web of Life

Mystery 4: Do worms really eat dirt?

Name: _____

Date: _____

End of Mystery Assessment

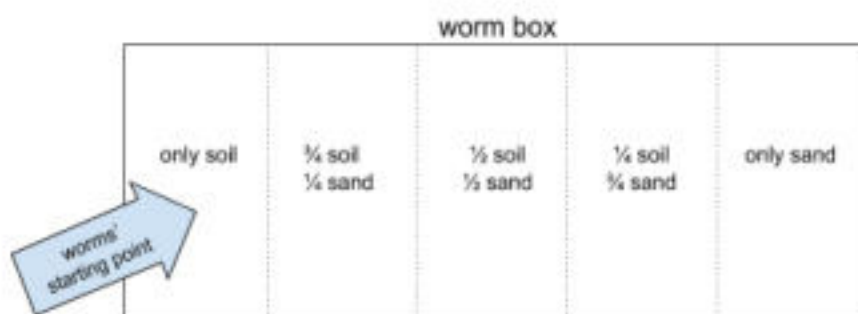
1. Which is NOT true about earthworms' role in the environment?
 - a. They mix and loosen soil
 - b. They break down decaying plant material
 - c. They eat plants' roots
 - d. They release nutrients plants need to grow
2. Which of the following is NOT a good example of using evidence to support a claim about earthworms?
 - a. Worms burrow underground and hide under things away from the light. Therefore, worms like darkness.
 - b. Worms look a lot like caterpillars, which are pests. Therefore, worms must also be pests.
 - c. Worms dig burrows and move the soil like farmers do with plows. Therefore, worms help plants to grow because they move and loosen the soil.
 - d. Worm castings have more nutrients than the dirt around them. Therefore, worms are helpful to plants, because worms add nutrients to the soil that plants need.
3. TRUE or FALSE (circle one) Worms are the ONLY kind of decomposers.
4. Which of the following correctly describes earthworms' bodies and behavior? Put an 'X' next to any statements you think are correct:

☐ have soft, flexible bodies	☐ like damp places
☐ can move forward or backward	☐ have large chewing mouths
☐ have a dry, scaly outer layer	☐ can sense light
☐ live in burrows underground	☐ often come out when it rains

Looking at the answers you chose above, how do you think these characteristics make worms adapted (well-suited) to living underground?

(more space on next page...)

5. Below is an experiment that students designed to test whether earthworms prefer soil with or without sand. The students filled a worm box with different mixtures of soil and sand.



They got 5 worms and put all 5 into the box at the same time, at the end of the box with only soil (the arrow on the diagram shows the worms' starting point).

They waited for ten minutes, and they found that all 5 worms stayed in the end of the box with the soil. They concluded that worms prefer soil with no sand.

A. Do you think this is a fair test? Why or why not?

B. How could you improve the experiment?

BIG FISH

Ecosystem Cards
Page 1



Big Fish

+6

carbon
dioxide
points

A Big Fish needs:

- at least 3 Big Fish
- Foods and 2 Decomposers
- a healthy carbon dioxide level

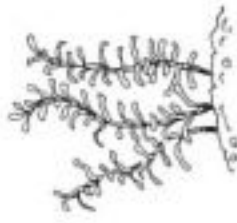


Underwater Plants (Producers)

-3

carbon
dioxide
points

These plants take all their carbon dioxide from the water.



Underwater Plants (Producers)

-3

carbon
dioxide
points

These plants take all their carbon dioxide from the water.



Phytoplankton (Producer)

-2

carbon
dioxide
points

These microscopic plants take carbon dioxide from the water.

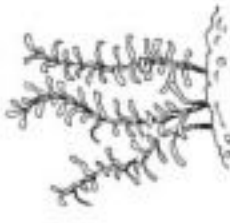


Phytoplankton (Producer)

-2

carbon
dioxide
points

These microscopic plants take carbon dioxide from the water.



Underwater Plants (Producers)

-3

carbon
dioxide
points

These plants take all their carbon dioxide from the water.



Fungi (Decomposers)

+3

carbon
dioxide
points

Fungi break down fish waste to make carbon dioxide and nutrients.



Bacteria (Decomposers)

+3

carbon
dioxide
points

Bacteria break down fish waste to make carbon dioxide and nutrients.



Bacteria (Decomposers)

+3

carbon
dioxide
points

Bacteria break down fish waste to make carbon dioxide and nutrients.



Fungi (Decomposers)

+3

carbon
dioxide
points

Fungi break down fish waste to make carbon dioxide and nutrients.

BIG FISH

Ecosystem Cards Page 2



Algae (Producers)

-3

carbon
dioxide
points

Algae take all their
carbon dioxide
from the water.



Algae (Producers)

-3

carbon
dioxide
points

Algae take all their
carbon dioxide
from the water.



**Aquatic
Sowbugs
(Big Fish Food)**

+1

carbon
dioxide
points

Your pond needs
plants, algae, or
phytoplankton for
these aquatic
sowbugs to eat.



**Snails
(Big Fish Food)**

+2

carbon
dioxide
points

Your pond needs
plants, algae, or
phytoplankton for
these snails to eat.



Tadpoles (Big Fish Food)

+2

carbon
dioxide
points

Your pond needs
plants, algae, or
phytoplankton for
these tadpoles to
eat.



Guppies (Big Fish Food)

+2

carbon
dioxide
points

Your pond needs
plants, algae, or
phytoplankton for
these guppies to
eat.

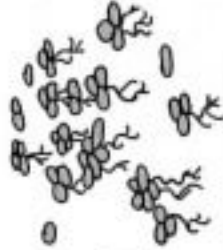


**Freshwater
Shrimp
(Big Fish Food)**

+2

carbon
dioxide
points

Your pond needs
plants, algae, or
phytoplankton for
these shrimp to
eat.

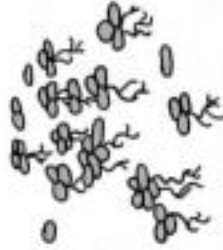


**Duckweed
(Producer)**

-1

carbon
dioxide
points

This floating plant
takes carbon from
the air as well as
the water.

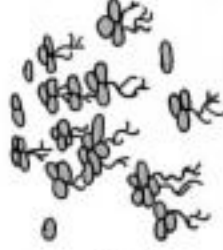


**Duckweed
(Producer)**

-1

carbon
dioxide
points

This floating plant
takes carbon from
the air as well as
the water.



**Duckweed
(Producer)**

-1

carbon
dioxide
points

This floating plant
takes carbon from
the air as well as
the water.



**Sludge
Worms
(Big Fish Food)**

+1

carbon
dioxide
points

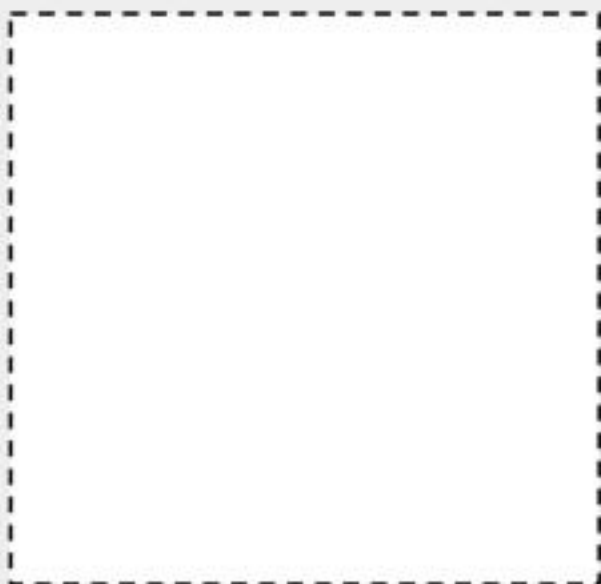
Your pond needs
fish waste for
these worms to
eat.



- When it's your turn, pick a card. Then play any card from your hand. You can:
 - Put a card in your pond and adjust the carbon dioxide level, OR
 - Read an Action Card if you have one, follow its instructions, then put it in the discard pile, OR
 - Throw a card away in the discard pile.
- You cannot add something to your pond if it will move the carbon dioxide into the unhealthy range.
- When your pond will support a Big Fish, say "Big Fish!" The Pond Checker will use the worksheet to make sure your pond has everything your Big Fish needs.
- Note: If you run out of cards in the pick-a-card pile, shuffle the discard pile and make it into the pick-a-card pile.

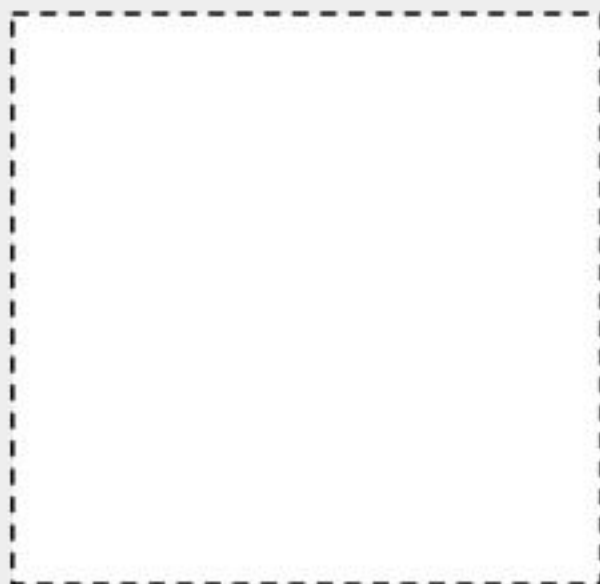
Here's how to play:

PICK A CARD



PICK A CARD

DISCARD PILE



DISCARD PILE

Here's how to play:

- When it's your turn, pick a card. Then play any card from your hand. You can:
 - Put a card in your pond and adjust the carbon dioxide level, OR
 - Read an Action Card if you have one, follow its instructions, then put it in the discard pile, OR
 - Throw a card away in the discard pile.
- You cannot add something to your pond if it will move the carbon dioxide into the unhealthy range.
- When your pond will support a Big Fish, say "Big Fish!" The Pond Checker will use the worksheet to make sure your pond has everything your Big Fish needs.
- Note: If you run out of cards in the pick-a-card pile, shuffle the discard pile and make it into the pick-a-card pile.



BIG FISH

Action Cards

(and two more big fish!)

ACTION CARD

(READ THIS ALOUD)

Every player passes one card to the player on their right.

ACTION CARD

(READ THIS ALOUD)

Migrating ducks land in all the ponds and feast on duckweed.

All players remove duckweed from their ponds and adjust the pond's carbon dioxide levels.

ACTION CARD

(READ THIS ALOUD)

Trade cards with any player.

You choose which card from your hand you will trade, and the other player does the same.

ACTION CARD

(READ THIS ALOUD)

The tadpoles in all the ponds grow up into toads and leave.

All players remove tadpoles from their ponds and adjust the pond's carbon dioxide levels.

ACTION CARD

(READ THIS ALOUD)

Every player passes one card to the player on their left.

ACTION CARD

(READ THIS ALOUD)

Trade cards with any player.

You choose which card from your hand you will trade, and the other player does the same.

ACTION CARD

(READ THIS ALOUD)

Steal one card from anyone's pond and put it in your pond.



Big Fish

+6

carbon dioxide points

A Big Fish needs:

- at least 3 Big Fish Foods and 2 Decomposers
- a healthy carbon dioxide level



Big Fish

+6

carbon dioxide points

A Big Fish needs:

- at least 3 Big Fish Foods and 2 Decomposers
- a healthy carbon dioxide level

ACTION CARD

(READ THIS ALOUD)

A neighbor sprays to kill mosquito larvae. The spray gets into ponds and kills all the guppies.

All players remove guppies from their ponds and adjust the pond's carbon dioxide levels.

Big Fish Holding Tank

Keep your Big Fish card here until the pond has everything a Big Fish needs:



FISH-O-METER



BIG FISH'S FOOD
At least **three**

PRODUCERS
As many as
you want

DECOMPOSERS
At least **two**

CARBON DIOXIDE TRACKER

HEALTHY ZONE

6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
---	---	---	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----

Bad for plants

Start  here

Bad for fish/animals



Check the Pond!



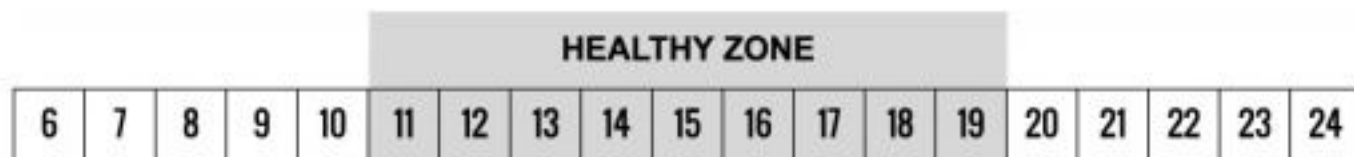
Name: _____

To make sure the pond is ready for a big fish, answer the questions below.

- 1) Are there at least three foods for the big fish? Yes No
- 2) Are there at least two decomposers to clean up the waste? Yes No
- 3) Use this chart and the carbon dioxide double-checker at the bottom of this page to make sure the pond is healthy:

	Add up the carbon dioxide number on the cards write them in this column.	Move the pointer to track the carbon dioxide points.
Big Fish Food		Start at 15. Move the pointer to add these points.
Producers		Move the pointer to subtract these points.
Decomposers		Move the pointer to add these points.
Big Fish	6 points	Move the pointer to add these points.
	What's the final carbon dioxide level? (add the above numbers) Is that a healthy level? Yes No	

Carbon Dioxide Double-Checker:



MYSTERY
science

Web of Life | Mystery 5

Web of Life

Name: _____

Date: _____

Mystery 5: Why do you have to clean a fish tank
but not a pond?

End of Mystery Assessment

1. Producers...

- a. use carbon dioxide and release oxygen.
- b. include plants, algae, and phytoplankton.
- c. make their own food, rather than eating other living things.
- d. all of the above

2. Decomposers...

- a. are all microscopic (can only be seen under a microscope).
- b. create nutrients out of the air that help plants grow.
- c. break down waste and dead material into nutrients for plants.
- d. release oxygen for animals to breathe.

3. _____ take in carbon dioxide, but _____ release carbon dioxide.

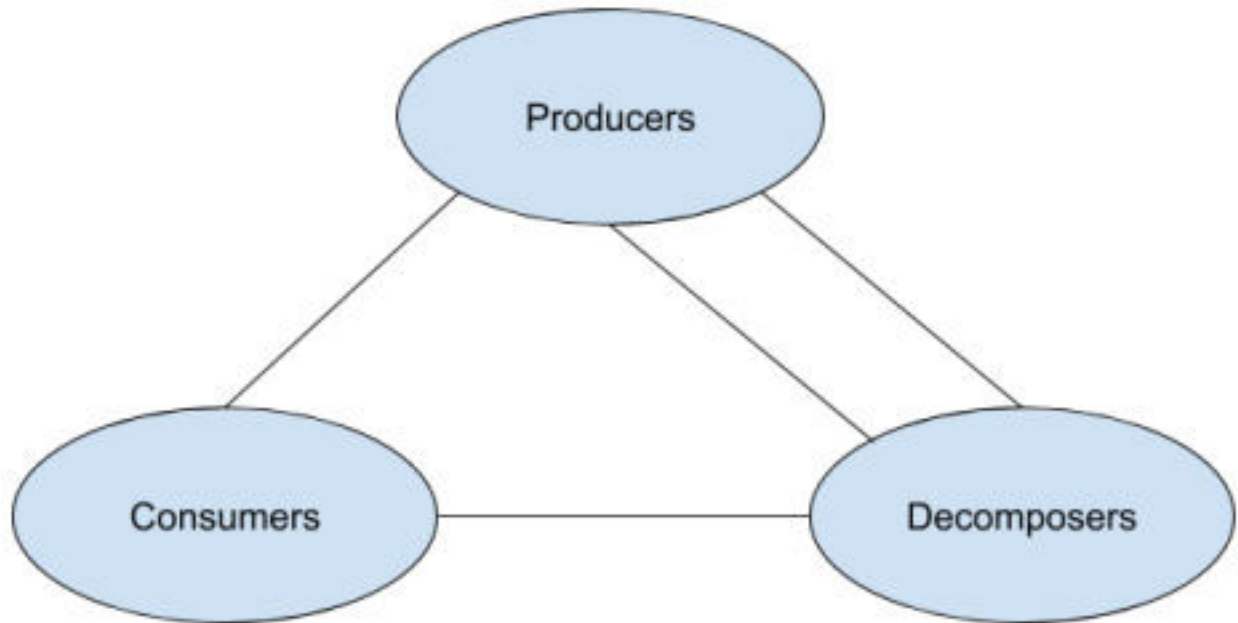
- a. Decomposers and plants..... consumers
- b. Plants..... decomposers and consumers
- c. Decomposers and consumers..... plants
- d. Consumers..... decomposers and plants

4. TRUE or FALSE (circle one) An ecosystem includes all the producers, consumers, and decomposers in an environment.

5. In your own words, why do you have to clean a fish tank but not a pond?

6. **Draw arrows** on the ends of the connecting lines to show the directions of the movement of *matter* through an ecosystem. Then, **label each line** using the answer choices below.

A) get eaten by	B) die/excrete waste	C) release nutrients for	D) lose leaves/die
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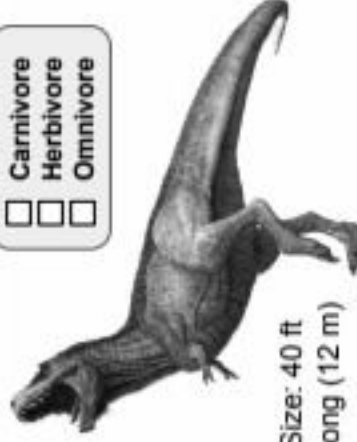
7. Why do scientists find it helpful to create models of interactions in an ecosystem?

DINO DIE-OFF

a food web model

Tyrannosaurus rex

- ☐ Carnivore
☐ Herbivore
☐ Omnivore



Size: 40 ft
long (12 m)

I get my energy by eating other dinosaurs. I like to munch on Triceratops or duckbill dinosaurs—but I'll eat smaller ones, too. I'm big, so I need a lot of food to keep going.

MYSTERY science

Didelphodon

- ☐ Carnivore
☐ Herbivore
☐ Omnivore

Size: 14 in
long (35 cm)

I'm a mammal! I get my energy by eating crickets, beetles, and worms. I have jaws that will crunch through turtle shell—or through the bones of dead animals. I also eat berries, if they're available.



MYSTERY science

Duckbill dinosaur (Corythosaurus)

- ☐ Carnivore
☐ Herbivore
☐ Omnivore

Size: 32 ft
long (10 m)



I get my energy by eating twigs, leaves, and seeds from living plants. I always keep an eye out for *Tyrannosaurus*, who thinks I make a good snack.

MYSTERY science

Earthworm

- ☐ Carnivore
☐ Herbivore
☐ Omnivore

Size: up to
8 in (20 cm)

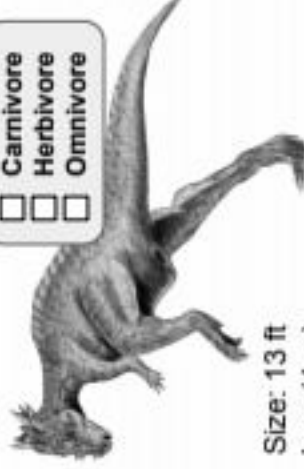
I get my energy from rotting wood, dead leaves, and rotting animals. I burrow underground.



MYSTERY science

Dracorex hogwartsia

- ☐ Carnivore
☐ Herbivore
☐ Omnivore



Size: 13 ft
long (4 m)

I get my energy from leaves, seeds, and fruits of living plants. My name means "dragon king of Hogwarts." I got my name when the scientists who found my skull in 2016 donated me to a museum.

MYSTERY science

Prehistoric turtle (Compsemys)

- ☐ Carnivore
☐ Herbivore
☐ Omnivore

Size: 12 in
(30 cm)

I get my energy by eating worms and crickets. Like modern turtles, I can hibernate underwater when the weather is cold.



MYSTERY science

Dryptosaurus

- ☐ Carnivore
☐ Herbivore
☐ Omnivore

Size: 21 ft
long (6.4 m)



I get my energy from eating other dinosaurs. I hunt plant eaters that are my size or a little bit bigger.

MYSTERY science

Triceratops

Size: 30 ft
long (9 m)

- ☐ Carnivore
☐ Herbivore
☐ Omnivore

I get my energy by munching on living plants. And I'm big, so I need a lot of food to keep going. That means a lot of plants. Good thing that palm trees grow so well around here.



MYSTERY science

Sinornithoides

- ☐ Carnivore
☐ Herbivore
☐ Omnivore



Size: 3 ft
long (1 m)

I've got feathers. If you saw me, you'd probably say I was a bird. I get my energy by eating worms and crickets and other small animals.

MYSTERY science

Prehistoric cricket

Size: up to
4 in (10 cm)

- ☐ Carnivore
☐ Herbivore
☐ Omnivore

I get my energy by eating seeds, berries, and leaves—either fresh off the living plant or dead on the ground. And I'm always hungry! Every day, I eat my own body weight in food.



MYSTERY science

Sunlight

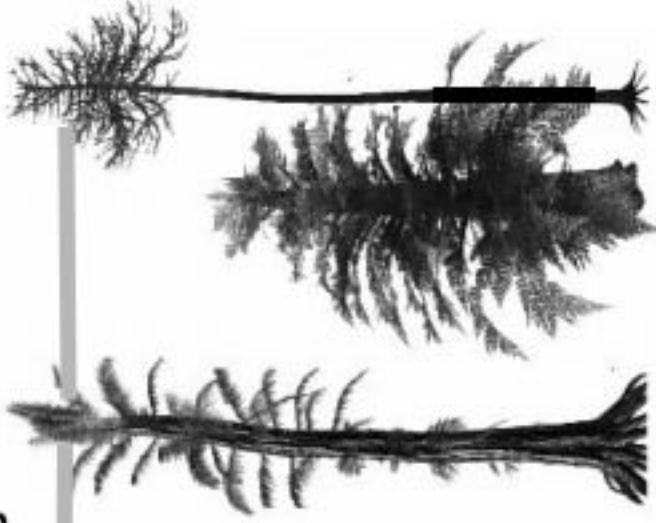


I'm the sun. My light and heat are both forms of energy. Every living thing—from palm trees to *Tyrannosaurus*—needs energy to move, to grow, to stay warm, and to heal when they are injured.

MYSTERY science

Living green plants

We're the plants of the Cretaceous period: leafy palm trees, evergreen trees, ferns, flowering plants, plants that grow berries, and more! All of us plants provide abundant food and energy for herbivores.



MYSTERY science

Dead plants & dead animals

Earthworms and crickets chow down on us dead plants—our fallen leaves and rotting wood make great food.

Didelphodon and other animals that scavenge for food munch on us dead animals. Our rotting meat and bones make great snacks.

All dead plants and animals store food energy that some animals can use later.



MYSTERY science

Name: _____

Dinosaur Food Web

1. What animals do you think *Tyrannosaurus rex* would eat? Why do you think that?

2. List the animals you think can survive when the sunlight is blocked.

3. Why did some animals go extinct while other animals survived? Construct an explanation using evidence from your food web.

Web of Life

Name: _____

Date: _____

Mystery 6: Why did the dinosaurs go extinct?

End of Mystery Assessment

- Which correctly shows the flow of energy through a food web?
 - Producers → decomposers → consumers
 - Producers → consumers → decomposers
 - Decomposers → consumers → producers
- Choose the statement that most accurately describes why the dinosaurs died.
 - The dinosaurs died from earthquakes set off by the asteroid impact.
 - The dinosaurs burned up instantly from a giant fireball caused by the asteroid.
 - Most dinosaurs starved due to the collapse of their food webs.
 - Most dinosaurs suffocated because they couldn't breathe air full of asteroid dust.
 - The dinosaurs froze to death when the sun was blocked out.
- Which organisms were most likely to survive the Cretaceous extinction? Circle as many choices as you want.

Omnivores

Herbivores

Small animals

Large animals

Carnivores

Decomposers

Plants

For each of the answers you circled, explain why you chose it.

4. Many scientists think that an asteroid caused the dinosaurs to go extinct.

Claim: An asteroid impact caused the dinosaurs to go extinct.

What are two pieces of evidence that support this claim? Make sure to explain your reasoning.

5. TRUE or FALSE? (circle one) Scientists have reason to think that NOT ALL of the dinosaurs died in the Cretaceous extinction. Explain your answer:

Web of Life Performance Task

Part 2 Cards

Gopher



I tunnel underground and gnaw the roots of plants—any plants! Sometimes I leave my hole to snack on leaves—keeping an eye out for animals that want to snack on me!

2

MYSTERYscience

Earthworm

I eat bits of plants—like dead leaves or rotting wood. Anywhere that leaves are falling, I can find something for lunch.



2

MYSTERYscience

Garter Snake



I hunt in the grass for ants, beetles, pill bugs, cockroaches, crickets, earthworms, and spiders. I also eat mice, frogs, salamanders, and lizards. Don't be scared of me...unless you're on my list of snacks.

2

MYSTERYscience

Pill bug

I eat dead leaves, rotting wood, and the fungi that grow on them. Look for me under logs. Poke me, and I roll into a ball—that's why some people call me a roly poly.



2

MYSTERYscience

Mushroom

I may look like a plant because I grow in the ground, but I'm actually a fungus! I break down dead or decaying matter and use the nutrients to grow.



2

MYSTERYscience

Ant

I'm happy to eat human food (like peanut butter), but when that's not around, I'll eat nectar from flowers, seeds from grasses, and any dead insects I find lying around.



2

MYSTERYscience

Honeybee

I eat pollen and nectar from flowers. I'm happy anywhere flowers bloom—a flower garden, a vegetable garden, a parsley plant, or a patch of clover.



2

MYSTERYscience

Mars Ecosystem Argument

Name: _____

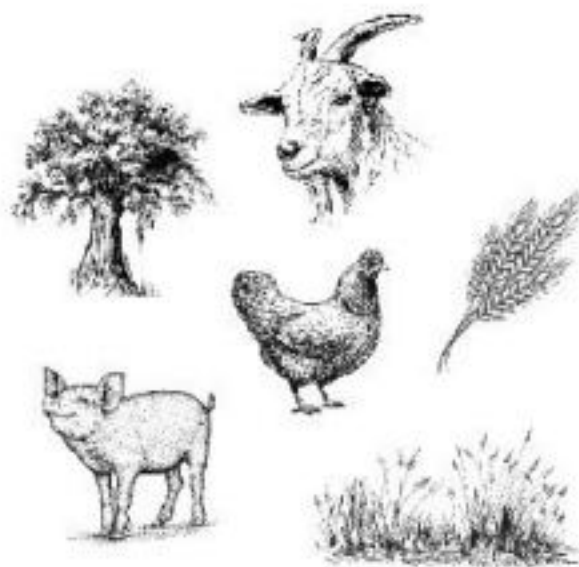
Part 1

Introduction: A team of NASA engineers has come up with a design idea for a Mars Habitat. They have made sure there is enough water, oxygen, carbon dioxide levels and heat to start with. They have proposed 15 living things that will be in the ecosystem for food.

Step 1: Look over the list of proposed organisms.

On each line, write the type of organism it is: **D** = *decomposer*, **P** = *producer/plant*, or **A** = *animal*.

Corn _____	Wheat _____	House Cat _____
Chicken _____	Grass _____	Goat _____
Beetles _____	Apple Tree _____	Pig _____
Jumping Spider _____	Veggie Garden with Parsley _____	Swallowtail Caterpillar _____
Frog _____	Mouse _____	Dairy Cow _____



Step 2: Use the provided Part 1 cards to arrange the organisms into a food web. Add your food web below. *Remember:* Use arrows to show how nutrients and energy move through the ecosystem.

Step 3: Evaluate the proposed ecosystem. Identify what will work and what will not work.

What will work in the proposed ecosystem? 	Why will this work? What science idea have you learned that helps you know this will work?
What will NOT work (or what is missing) in the proposed ecosystem? 	Why will this NOT work? What science idea that you learned explains why this will NOT work?

Step 4: **Make a claim** about whether the proposed ecosystem will work or not:

I think the ecosystem will _____

Support with evidence and reasoning. Use the science ideas you have learned during this unit to support your answer.

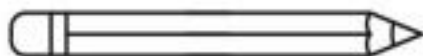
I think this because _____

Mars Ecosystem Argument

Name: _____

Part 2

Step 5: How would you improve the proposed ecosystem? List what organisms you would add and explain why. List what organisms you would remove and explain why.



Step 6: The Mars ecosystem began with a healthy level of carbon dioxide, but changing the organisms will change the carbon dioxide level.

ADDED organism	Type of Organism (<i>Producer, Animal, Decomposer</i>)	Does adding the organism INCREASE or DECREASE the carbon dioxide level?
REMOVED organism	Type of Organism (<i>Producer, Animal, Decomposer</i>)	Does removing the organism INCREASE or DECREASE the carbon dioxide level?

CHALLENGE QUESTION: If your carbon dioxide levels are too LOW, how could you raise them?

If your carbon dioxide levels are too HIGH, how could you lower them?

Web of Life Performance Task

Part 1 Cards

Mouse



Cartoon mice eat cheese. Real mice like me eat human food—when we can find it. I'll also eat seeds and nuts (like acorns), or snack on vegetables like zucchini or tomatoes. And sometimes I eat crickets and beetles.

1

Jumping Spider



I pounce on insects that spend time on the ground. I eat crickets, ants, cockroaches, caterpillars, and even daddy long legs.

1

Frog

I eat insects with my long sticky tongue—beetles, cockroaches, crickets, houseflies, butterflies, and even bees. I'll also snack on earthworms, snails, and pillbugs. Yum!



1

House Cat

Yes, I eat cat food. But I like to hunt, too. I prey on mice, gophers, squirrels, small birds—and even lizards.



1

Beetle

I eat caterpillars. In fact, some people call me the caterpillar hunter. I'll also eat corn, earthworms, and snails.



1

Dairy Cow

I could munch on grass all day. I even like dried grass, called hay. If you have corn and wheat, I'll eat that too.



1

Corn

I'm a farm favorite! Cows, mice, beetles, chickens, pigs, and goats love my sweet kernels.



1

Chicken

I love plants like vegetables, fruits, grass, flowers, seeds, corn, and grains! I also like tiny bugs I can find by scratching the ground.



1

MYSTERYscience

Goat

I'm known for eating everything! But to stay healthy I like plants. My favorites are hay (dried grass), veggies, trees, wheat, and shrub



1

MYSTERYscience

Swallowtail Caterpillar

Like many caterpillars, I'm a picky eater. I only eat carrot leaves and parsley plants from vegetable gardens.

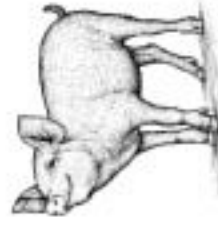


1

MYSTERYscience

Pig

I love fruit, corn, leaves, and even flowers.



1

MYSTERYscience

Apple Tree

I'm a nutritious snack for many critters. Before apples grow on my branches, there are flowers! Over time, the flowers turn into apples with seeds inside.



1

MYSTERYscience

Wheat

I'm a grain that needs sunlight to grow. I have lots of seeds! Many animals find me tasty, even humans!



1

MYSTERYscience

Grass

I have lots of leaves and lots of seeds. That's lunch for lots of critters.



1

MYSTERYscience

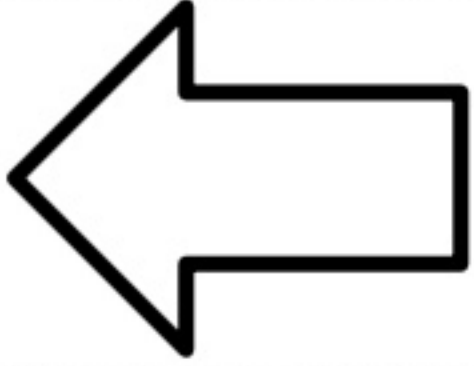
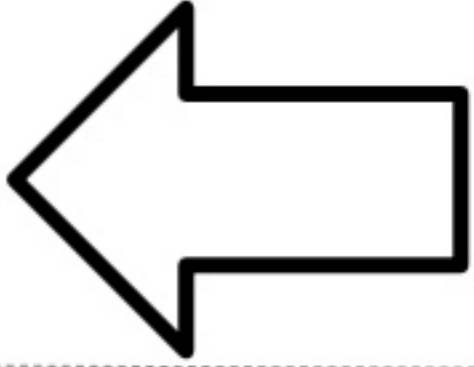
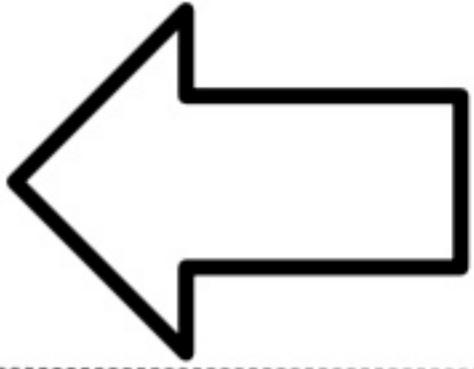
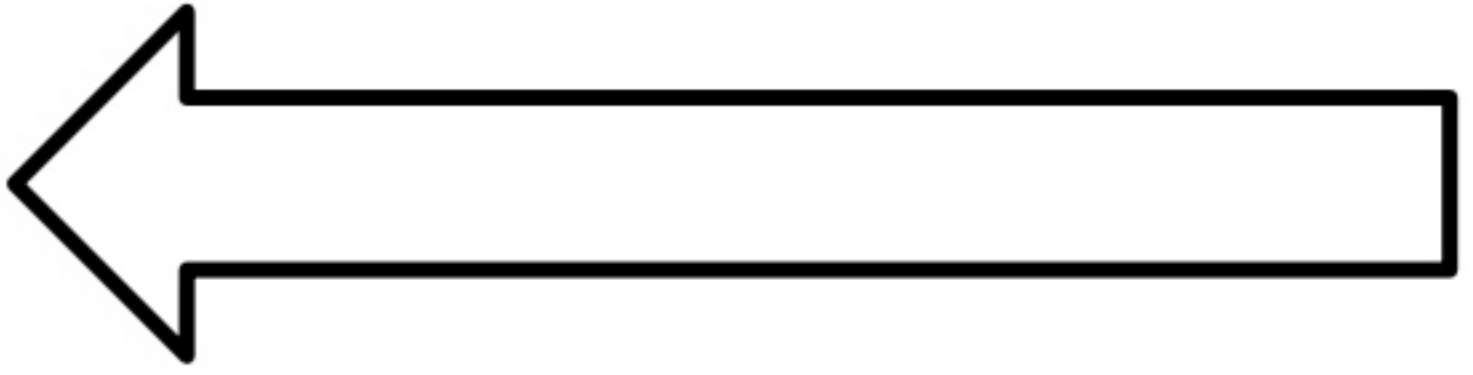
Veggie Garden

If you're looking for lettuce, tomatoes, cucumbers, carrots, and parsley I'm the place. Stop by for some leaves and flowers too!

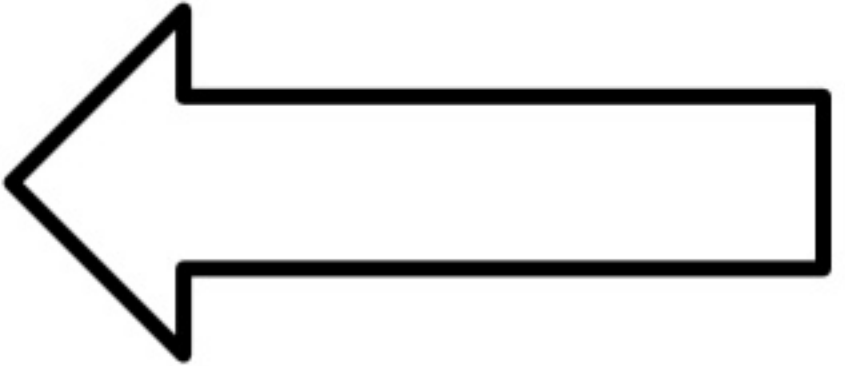
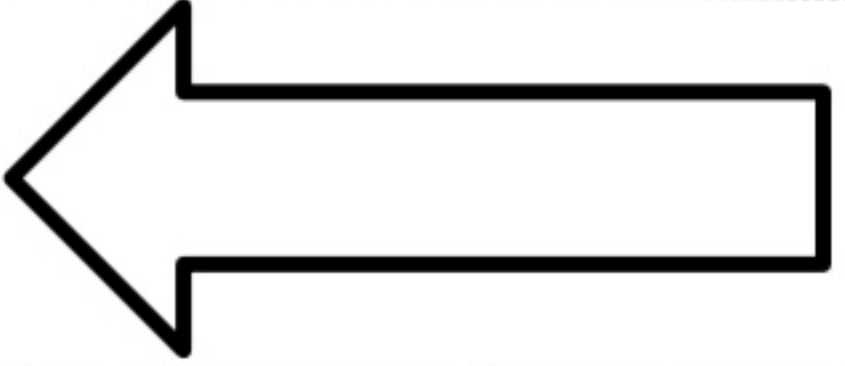
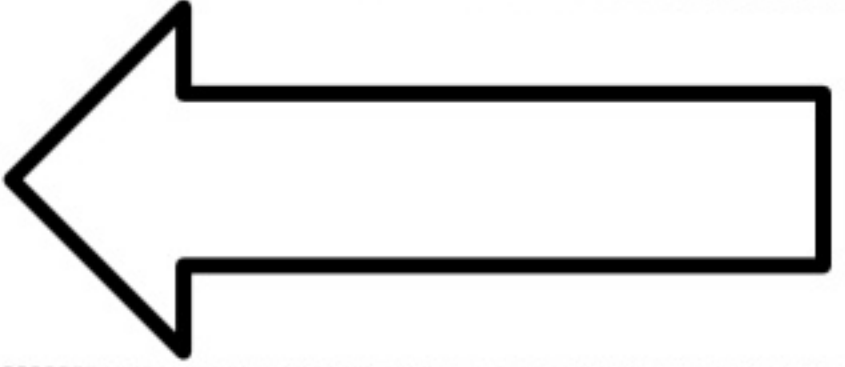
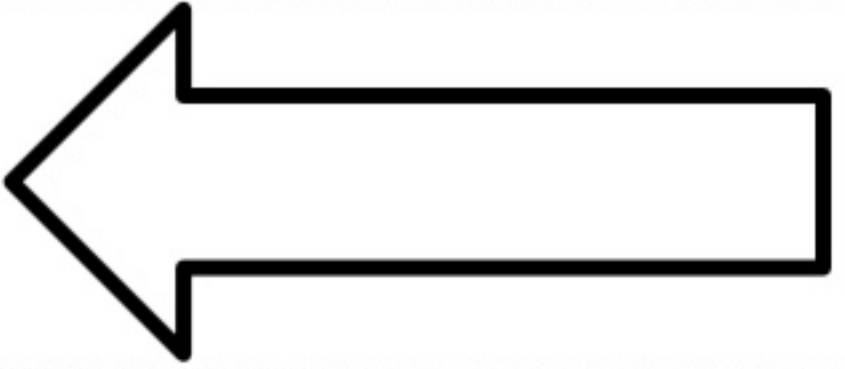


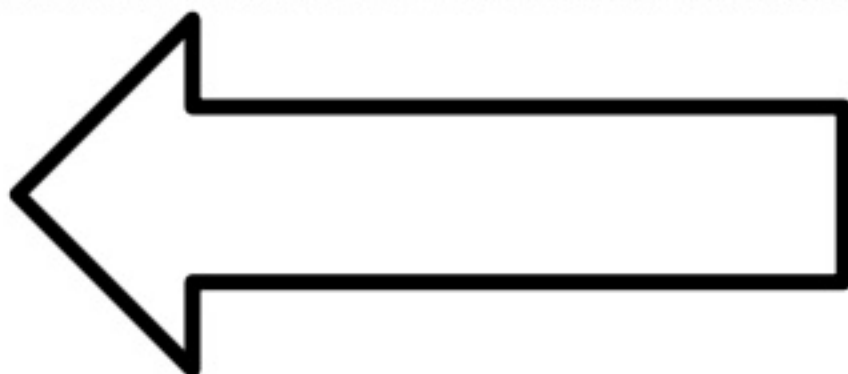
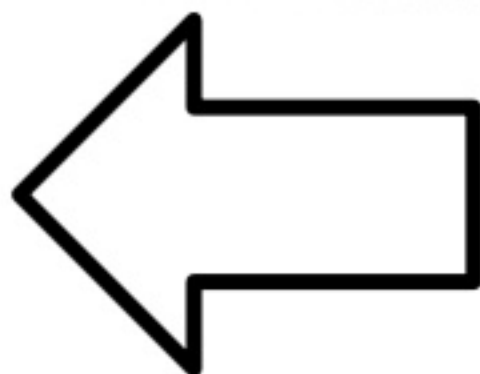
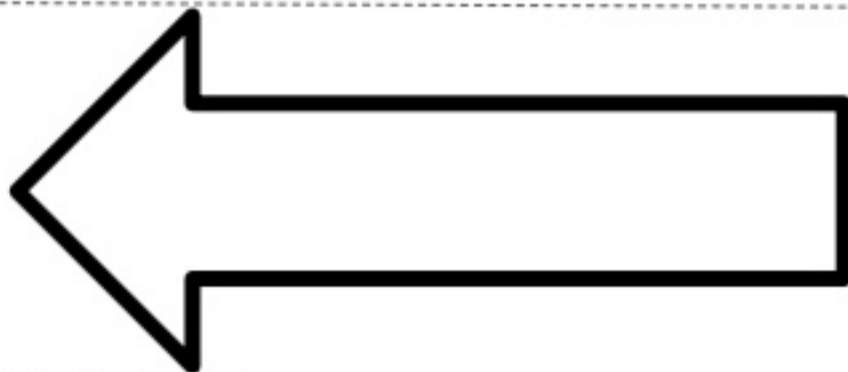
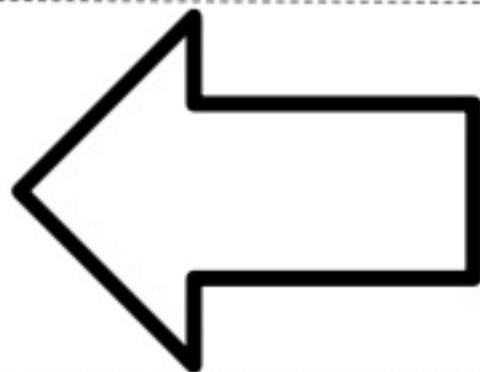
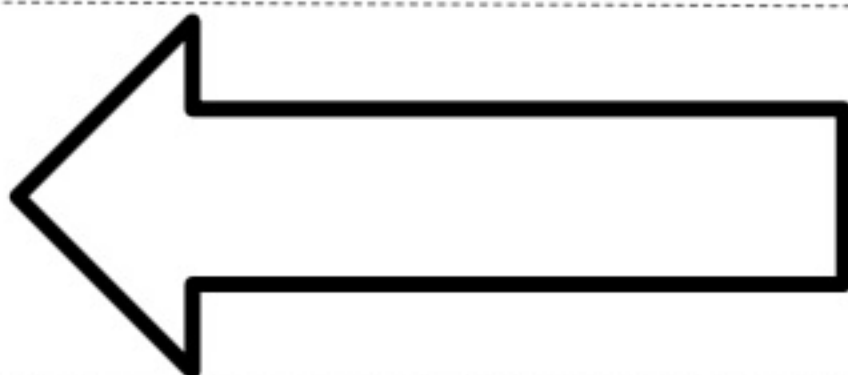
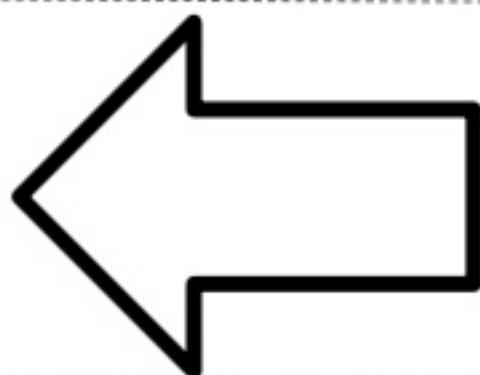
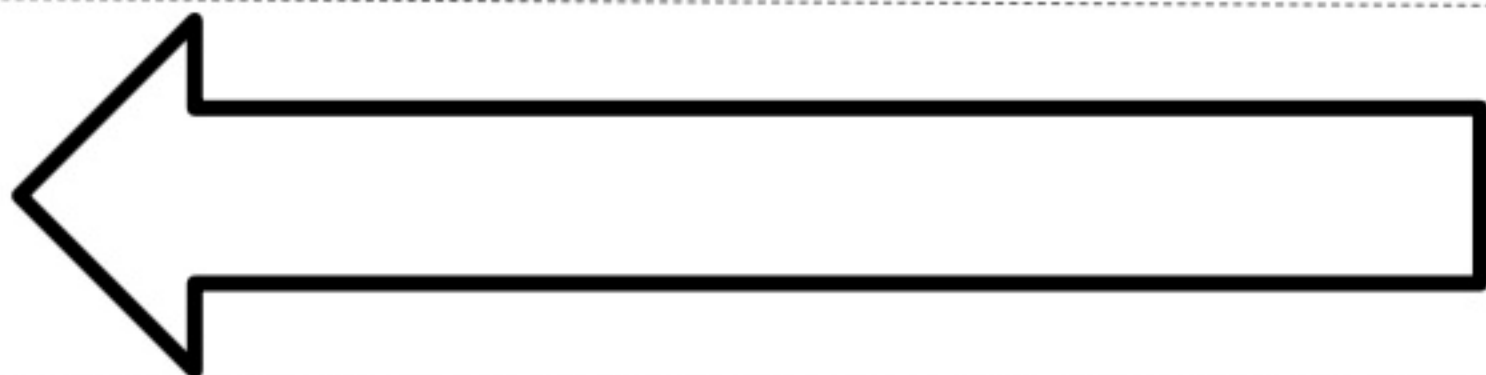
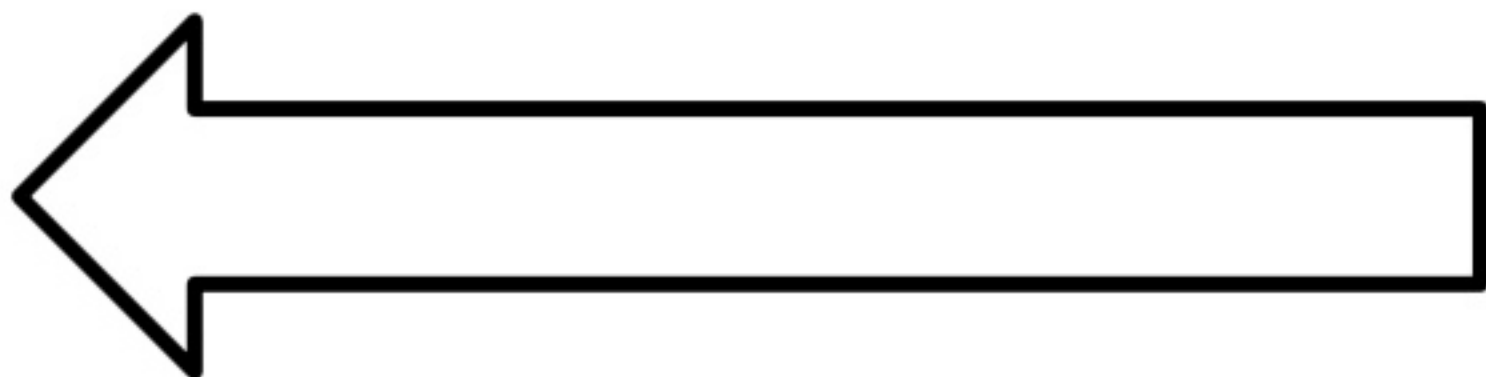
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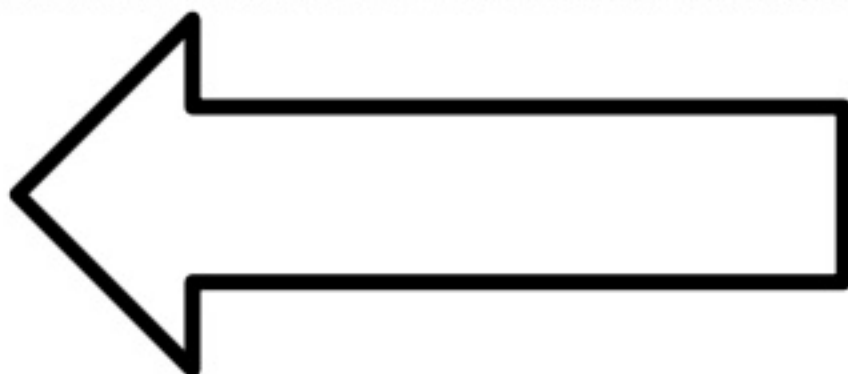
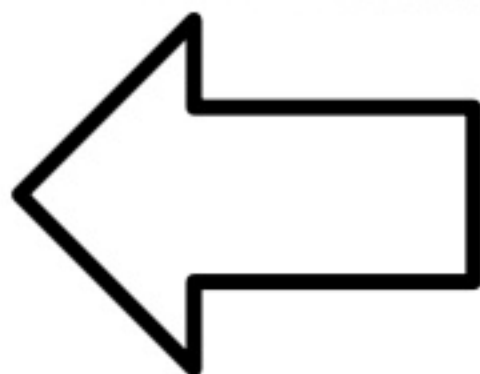
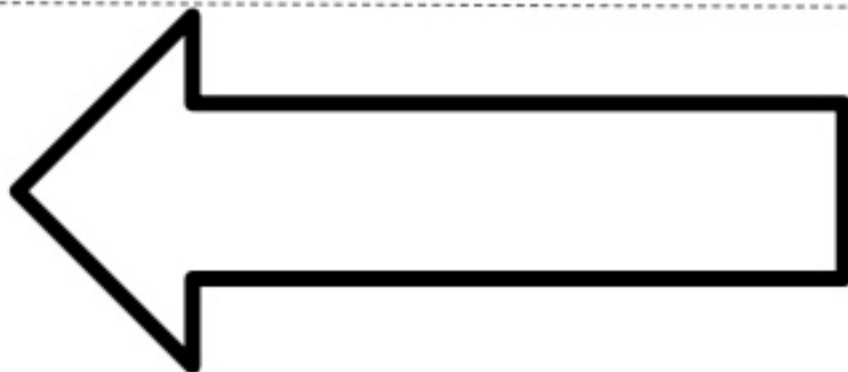
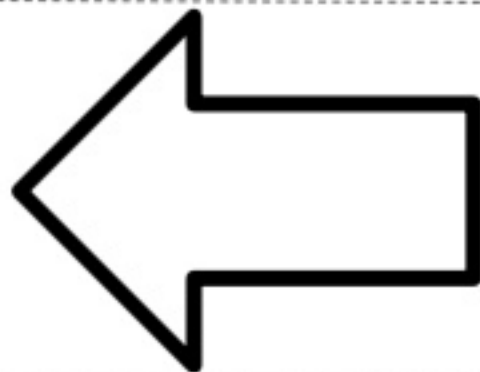
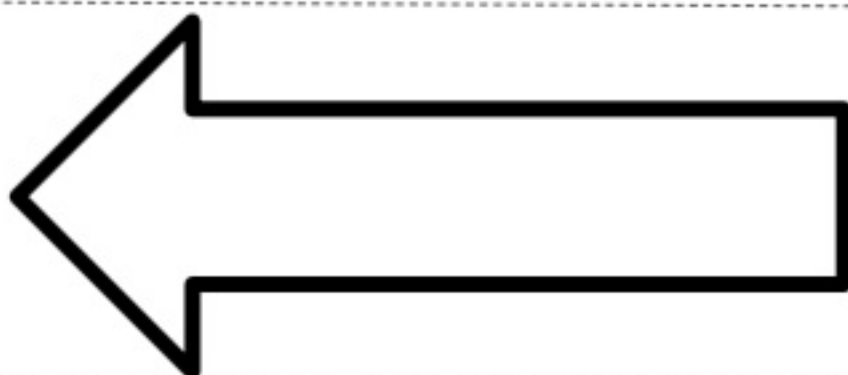
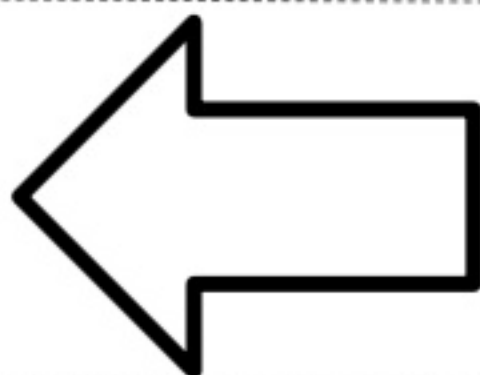
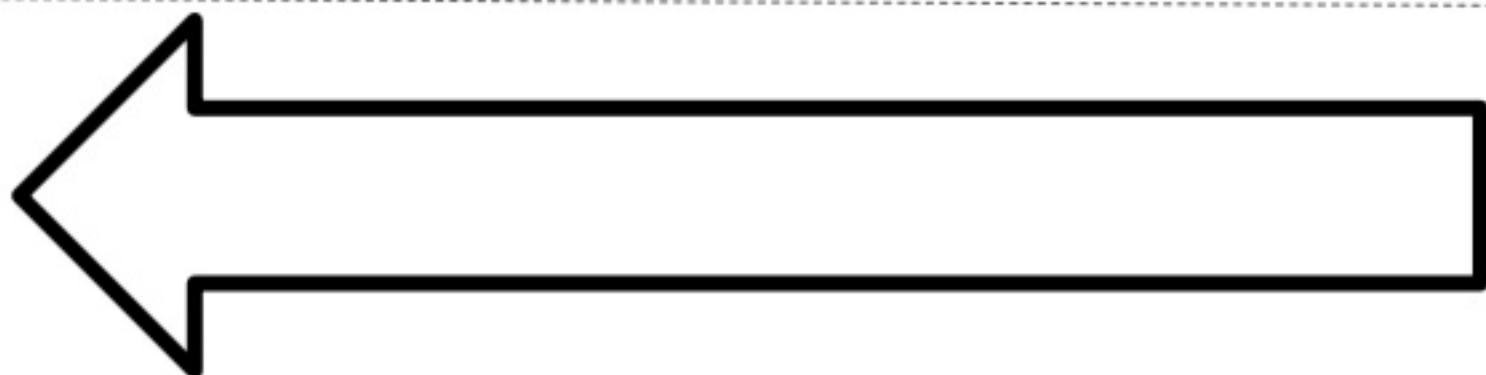
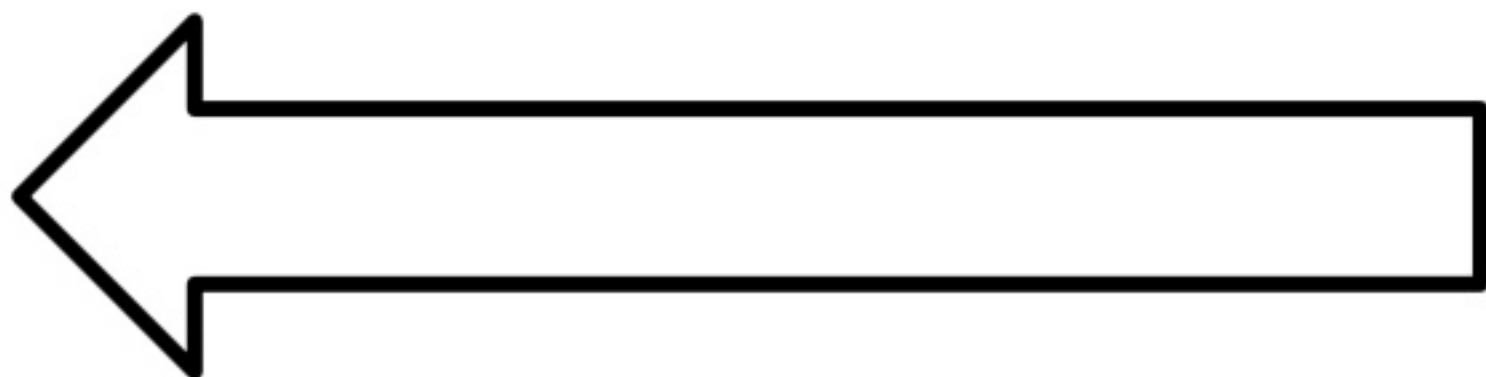
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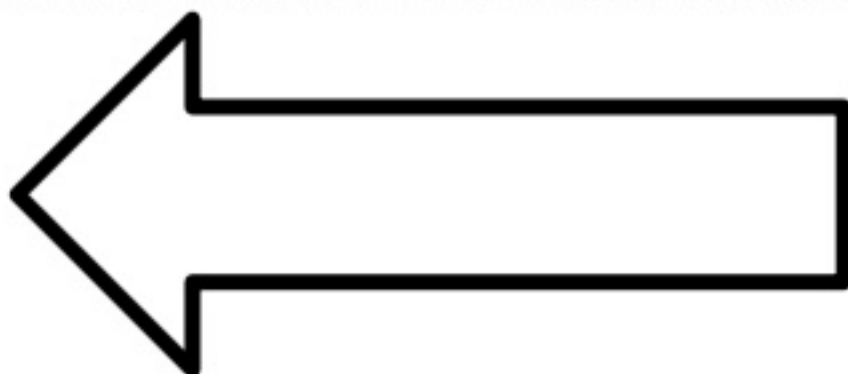
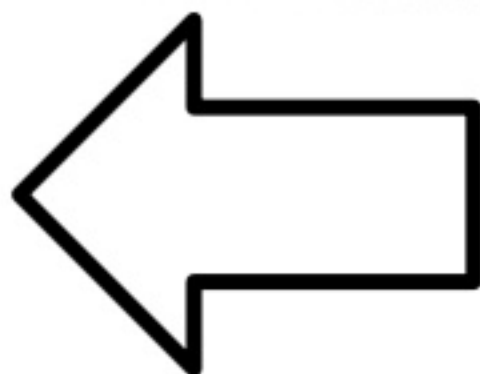
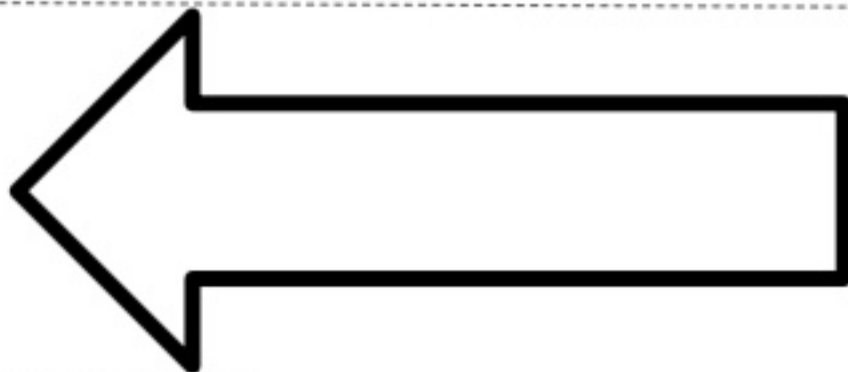
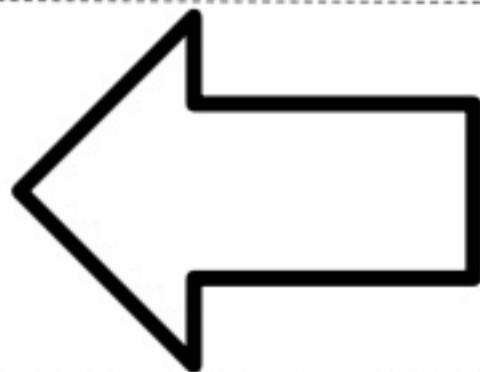
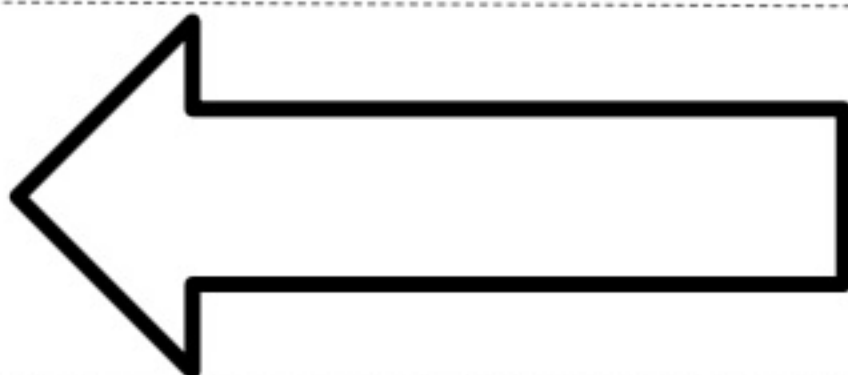
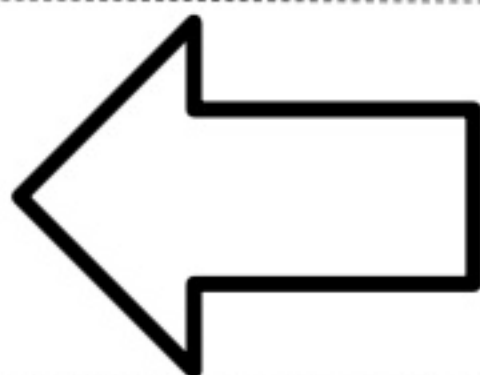
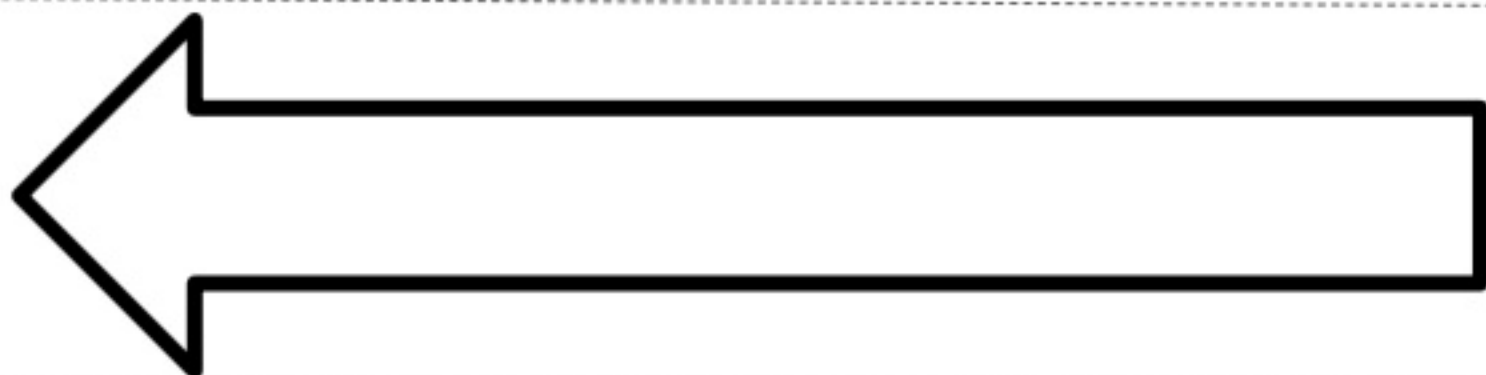
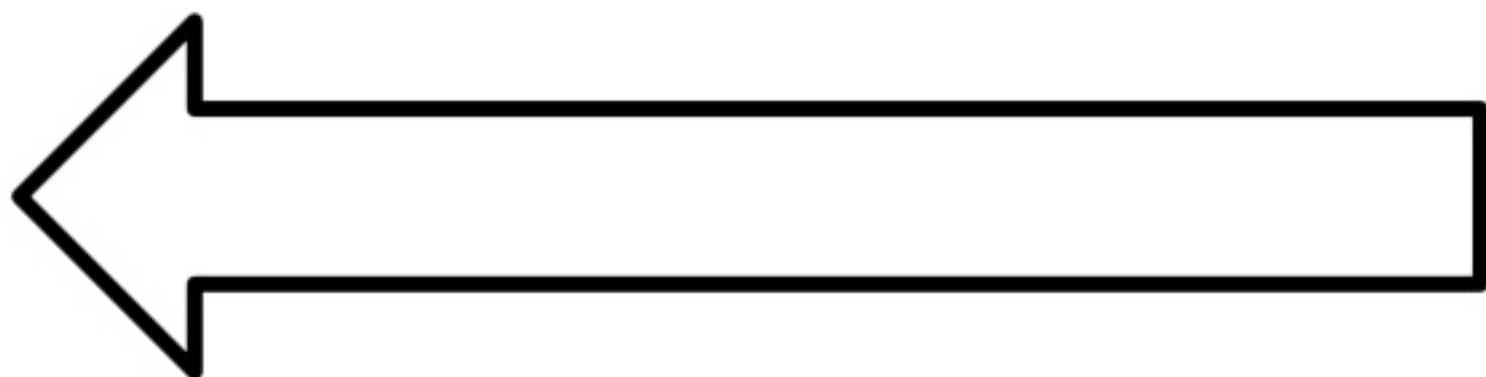


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Web of Life | Performance Task

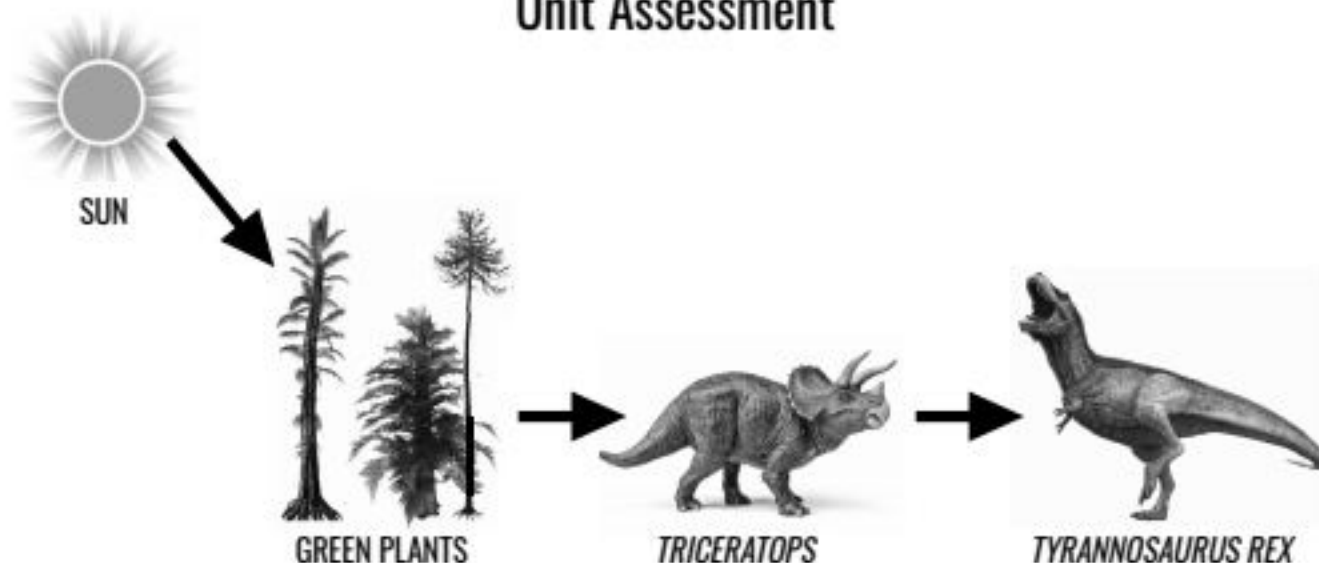








Unit Assessment

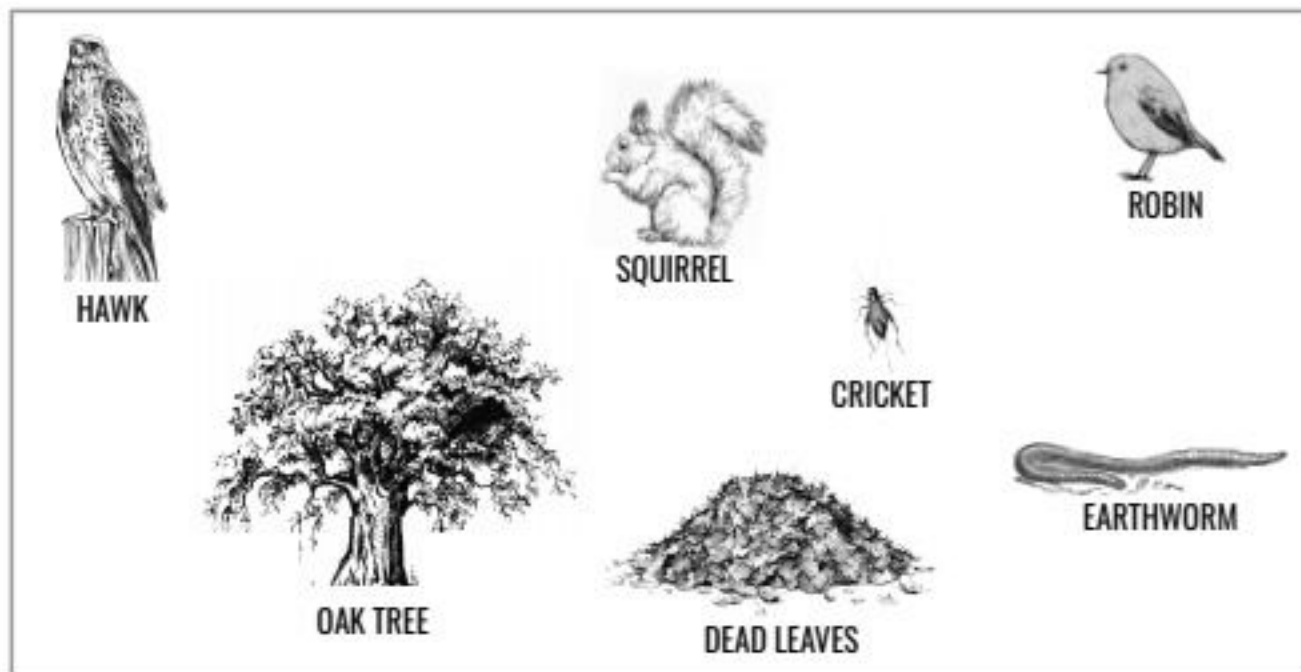


The image above is a simple model of how energy flows through a dinosaur food chain. The arrows represent energy moving through the food chain. Use this model to answer Questions 1 & 2.

1. Scientists think that *Tyrannosaurus rex* was able to run at a speed of 12 miles per hour. Where did *T. rex* get the energy that it used to run when it was alive?

- a. *T. rex* got its energy from *Triceratops*. That energy is not connected to the Sun.
- b. *T. rex* got its energy from green plants, which got their energy from the Sun.
- c. *T. rex* got its energy from eating *Triceratops*. *Triceratops* ate green plants and green plants got their energy from the Sun.
- d. *T. rex* got its energy directly from the Sun.

2. Scientists think that the dinosaurs went extinct because an asteroid hit the Earth and created a giant dust cloud that covered up the Sun. Diego doesn't think this explanation makes sense. He says, "Some dinosaurs ate other dinosaurs to get their energy. Why would removing the Sun cause the carnivores to go extinct?" Explain to Diego why carnivores would go extinct without the Sun. You can use evidence from the energy model above.



The images above show organisms that are part of a forest ecosystem. Use these images to answer Questions 3, 4, and 5.

3. Connect the organisms of the forest ecosystem with arrows to create food chains. Each arrow should point in the direction of how material (matter) travels in each food chain. For example, a squirrel eats acorns from an oak tree, so you would draw an arrow from the oak tree to the squirrel.

4. Scientists are worried that a disease that kills oak trees will spread into this forest. What would happen to this ecosystem if all the oak trees suddenly disappear? Choose all correct answers.

- If there aren't any oak trees, the squirrels will not have anything to eat. They will need to find another food source or they will not survive.
- If there aren't any oak trees, the robins will not have anything to eat. They will need to find another food source or they will not survive.
- If there aren't any oak trees, the hawks may not have anything to eat because the squirrels and robins may not survive.

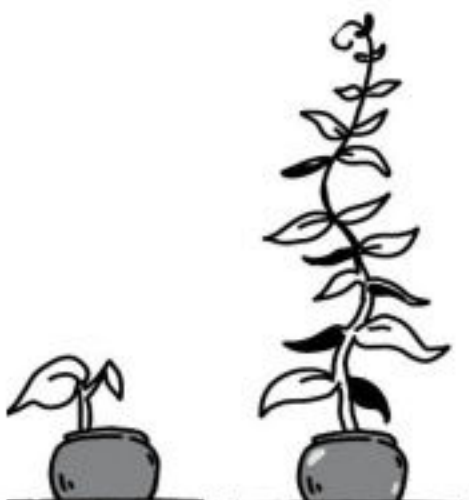
5. Amir released some pet frogs into the forest ecosystem shown above. These frogs eat earthworms and crickets. Hawks, robins, and squirrels do NOT eat these frogs. What will happen to this ecosystem if the frogs start living here? Choose all correct answers.

- The dead leaves will pile up because the frogs will eat all the decomposers. The decomposers will not be there to eat the leaves.
- The squirrels will not have anything to eat. They will need to find another food source or they will not survive.
- The robins will not have anything to eat. They will need to find another food source or they will not survive.
- The hawks will not have anything to eat. They will need to find another food source or they will not survive.



6. Ana wants to open a plant store, but she's worried that it will cost too much money. Ana thinks that as plants grow, they use the material from the soil to get bigger. Potting soil costs a lot of money. Ana is worried she will need to buy a lot of soil to feed her plants. She decides to set up an experiment. Ana grows one plant in a pot for 3 weeks. She weighs the plant and the soil at the start and end of the experiment.

The results of Ana's experiment are shown to the right. What did Ana find out with her experiment? Circle TRUE or FALSE for each of the sentences below.



	START	END
PLANT	300 grams	800 grams
SOIL	800 grams	800 grams

TRUE FALSE

The plant weighed the same at the start and end of the experiment.

TRUE FALSE

The plant weighed more at the end of the experiment.

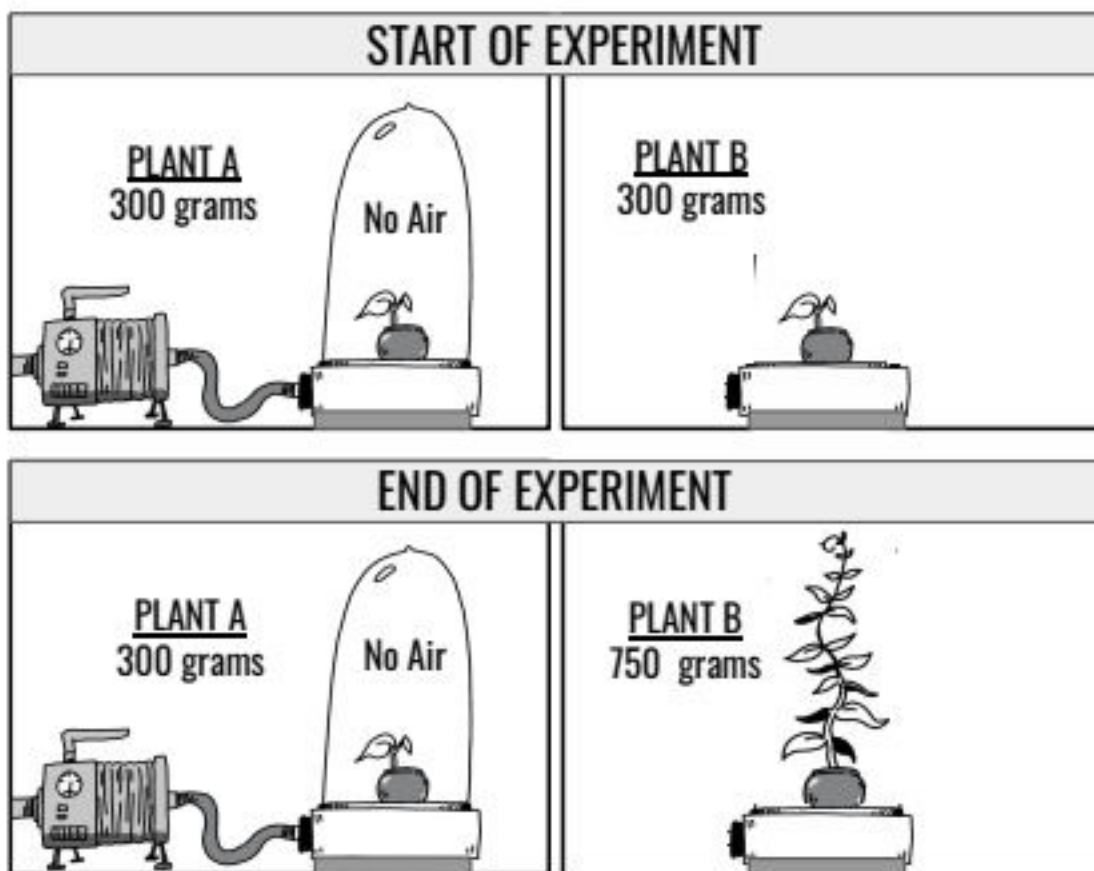
TRUE FALSE

The soil weighed the same at the start and end of the experiment.

TRUE FALSE

The soil weighed less at the end of the experiment.

7. Do you think Ana should be worried about the cost of soil for her plant store? Why or why not? Provide an argument based on the results of her experiment.



Ana decides to do another experiment. She starts with two plants, Plant A and Plant B. Each plant weighs 300 grams. She attaches Plant A to a vacuum. The vacuum pumps all of the air out of the container around Plant A. Plant B is not attached to a vacuum, so it has air around it. Ana gives Plant A and Plant B the exact same amount of water. She runs the experiment for 3 weeks and then weighs the plants at the end of the experiment.

8. Looking at Ana's experiments, what is a claim that you can make about plants and their growth?

- Plants mostly use materials from the soil for their growth.
- Plants mostly use materials from water for their growth.
- Plants mostly use materials from sunlight for their growth.
- Plants mostly use materials from the air for their growth.

9. What evidence do you have to support your claim from the question above? Provide an argument using evidence from Ana's experiments to support your claim.
