



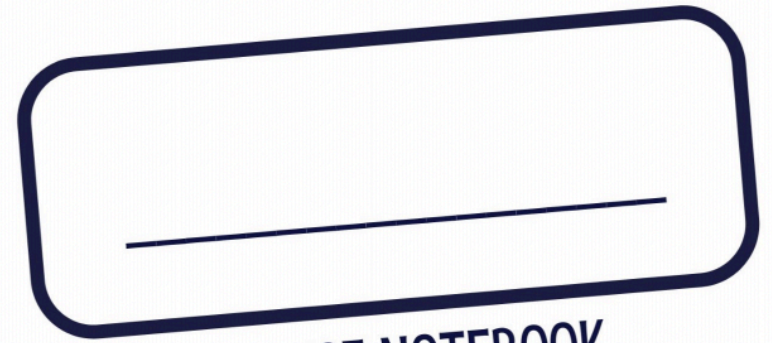
SCIENCE NOTEBOOK



LIVING SYSTEMS

5TH GRADE

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<div>Focus Question</div> <div>How can you identify a system?</div>	<div>Focus Question</div> <div>How can you identify a system?</div>

“Physical Systems” Video Review

1. What effect did the eruption of Mount St. Helens have on the geosphere, atmosphere, hydrosphere, and biosphere of the region?
2. What is an ecosystem?
3. In what ways do people affect the balance of production and consumption within an ecosystem?
4. What was the dust bowl?
5. What are invasive species? Why are they considered one of the greatest threats to an ecosystem?
6. When is a system said to be in a state of equilibrium?
7. What are renewable resources? Provide some examples.

“Physical Systems” Video Review

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Woods Ecosystem

Make several food chains of at least three organisms. Use arrows to show how the energy of food moves from organism to organism.

- American robin
- Aquatic snail
- Bacteria
- Black bear
- Brook trout
- Chipmunk
- Coyote
- Dead plants and animals
- Earthworm
- Grama grass
- Great blue heron
- Green algae
- Grouse
- Hare
- Mayfly
- Pine trees
- Red-tailed hawk
- Scuds
- *Tubifex* worm
- Wild blueberry

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<div>Focus Question</div> <div>Is planet Earth a system?</div>	<div>Focus Question</div> <div>Is planet Earth a system?</div>

Kelp Forest Food Web

Make a food web using all the organisms in the kelp forest ecosystem.

- Bat star
- Garibaldi
- Giant kelp
- Kelp crab
- Marine bacteria
- Phytoplankton
- Purple sea urchin
- Red octopus
- Sea otter
- Señorita fish
- Turban snail
- Zooplankton

Kelp Forest Food Web

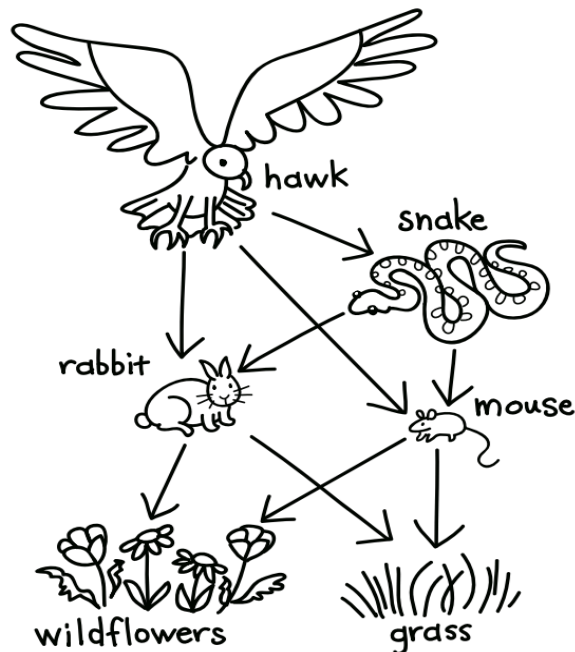
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Response Sheet—Investigation 1

A student drew this food web in his notebook. Another student was looking at it and said, "I agree with the organisms you've used for the food web, but I disagree with the direction you drew arrows. I also think you are missing something. Food webs usually include producers, consumers, and the Sun."

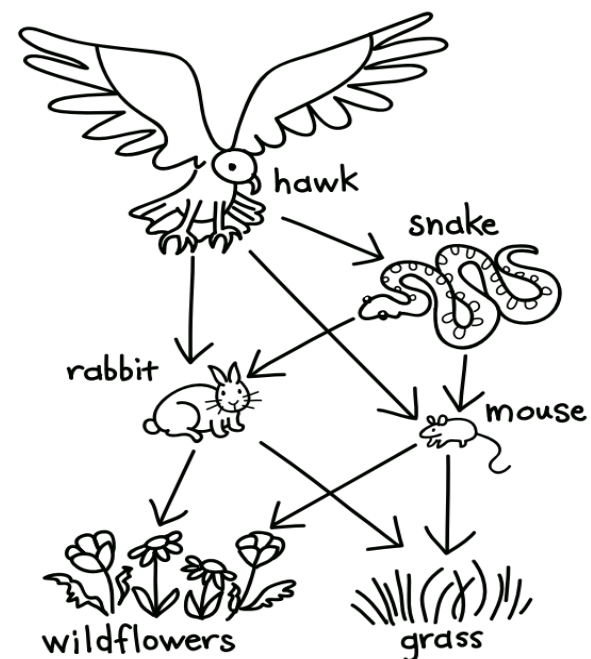
If you were a third student taking part in this conversation, what would you tell the other two?



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If you were a third student taking part in this conversation, what would you tell the other two?



Focus Question	Focus Question
What organisms are both predators and prey in the kelp forest ecosystem?	What organisms are both predators and prey in the kelp forest ecosystem?

Making a Redworm Habitat

1. Put about 1–2 centimeters (cm) of garden soil in the jar.
2. Tear two large sheets of newspaper into thin strips. Moisten the paper strips with water. They should be moist, but not dripping wet. A spray mister is a good way to moisten the newspaper.
3. Fill the jar with the damp newspaper strips until it is almost full, about 6–7 cm from the top.
4. Add some natural leaf litter (five or six dead leaves, two or three dead twigs) and a small amount of fresh household waste (apple cores, lettuce scraps, crushed eggshells, coffee grounds, melon rinds, etc.).
5. When the materials are all in the jar, screw on the lid and give the container a shake to mix the contents a bit.
6. If necessary, use a spray mister to moisten the habitat. The contents should be very moist, but not dripping wet.
7. When the container is ready, count 15–18 redworms and drop them into the container. Screw on the lid. It has air holes for ventilation.

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Focus Question What happens when compost worms interact with organic litter?	Focus Question What happens when compost worms interact with organic litter?

Activating Yeast

What does yeast need to break its dormancy?

1. Get two 1-liter zip bags. Label one bag “cookie.”
2. Put two level 5-milliliter (mL) spoons of yeast into each zip bag.
3. Use a syringe to put 50 mL of hot water in each bag.
4. Put two animal crackers in the “cookie” bag, and nothing in the other bag.

Zoo Parade Cookies

Ingredients: Wheat flour, sugar, partially hydrogenated vegetable shortening, whole eggs, butter, high-fructose corn syrup, salt, vanilla, baking soda, whey.

Choco-Chunk Cookies

INGREDIENTS: Wheat flour, sugar, sweet chocolate, corn syrup, partially hydrogenated vegetable shortening, nonfat milk, cornstarch, invert syrup, vanilla, pectin, baking soda, salt, citric acid, caramel color.

Big Bite Snaps

Ingredients: Unbleached wheat flour, sugar, milk chocolate, partially hydrogenated vegetable shortening, whole eggs, brown sugar, nonfat milk, butter, baking soda, egg whites, vanilla, salt.

Package labels list the ingredients in order from most to least by quantity. What two ingredients are present in the greatest quantity in the cookies?

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Focus Question What does yeast need to break its dormancy?	Focus Question What does yeast need to break its dormancy?

Wheat-Seed Investigation

1. Fill four 1/2-liter containers (planters) almost full with soil, using about 1.5 cups of soil.
2. Sprinkle one 5-milliliter (mL) spoon of wheat seeds over the surface of the soil (1 spoon is about 100 seeds).
3. Sprinkle an additional 50 mL of soil to cover the seeds.
4. Pour 100 mL of water carefully over the planted seeds.
5. Close two of the planters in clear plastic bags. Small binder clips can be used to close the top.
6. Close the other two planters in black plastic bags.
7. Place the four bagged planters in a warm, lighted location.

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Focus Question How do plants get the food they need?	Focus Question How do plants get the food they need?

“Getting Nutrients” Review

1. What is the difference between heterotrophs and autotrophs?
2. What does food provide for organisms?
3. A food pyramid describes levels in a feeding relationship involving producers, consumers, and decomposers. What information does a food pyramid describe that a food web might not?
4. What level of consumer are humans?

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“The Human Digestive System” Review

1. What is digestion?
 2. How might the human and painted lady butterfly digestive systems be similar?
 3. Why do you think the digestive system is called a system?
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Experiment on Chemical Digestion in the Stomach

The students in the video conducted an experiment to find out what happens to food (hard-boiled egg white) in different environments. Talk in your groups about this experiment.

1. What was the question?
2. What was controlled, and what changed in the experiment?
3. What were the results?
4. What was the conclusion?

Experiment on Chemical Digestion in the Stomach

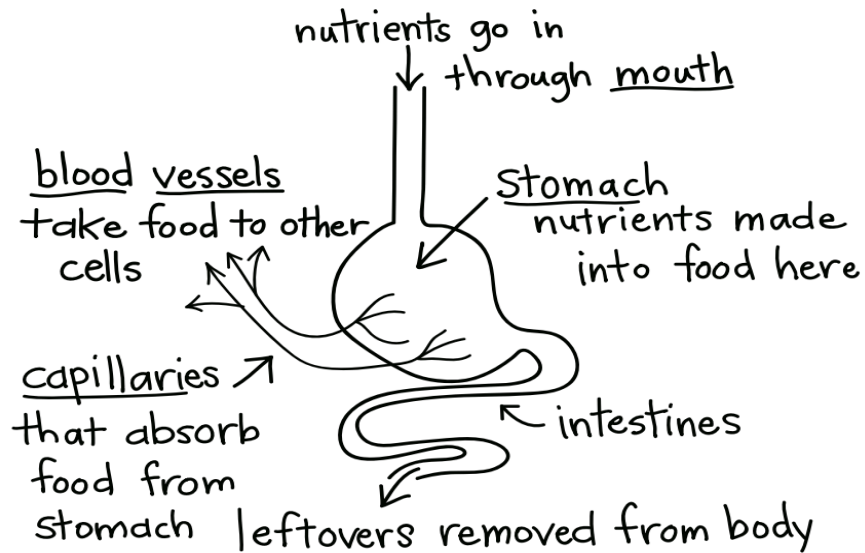
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Response Sheet—Investigation 2

A student said, "I have a model of how digestion works! In the stomach, nutrients are made into food. The food is then used by the cells for energy."

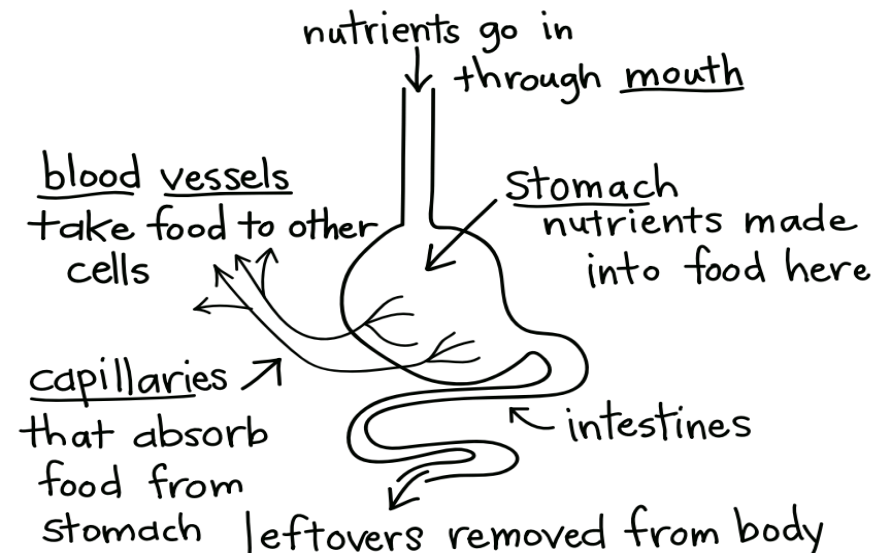
Do you agree with this student? If not, what information can you provide to this student to clarify his understanding of digestion?



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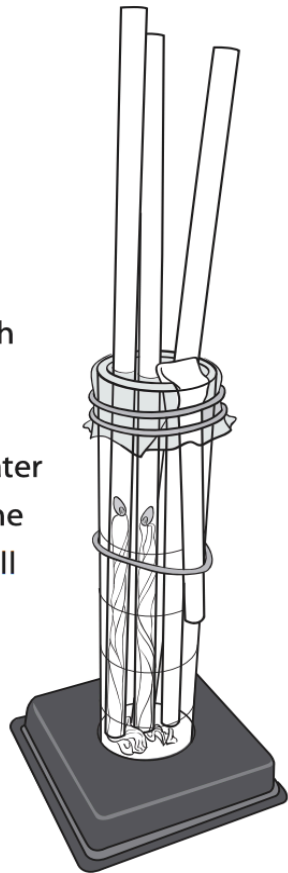
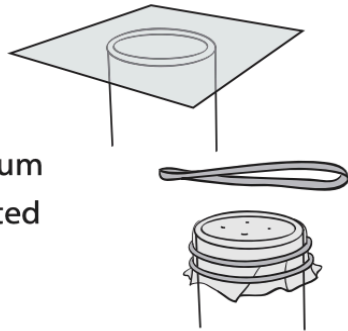
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Focus Question How do animals get the nutrients they need?	Focus Question How do animals get the nutrients they need?

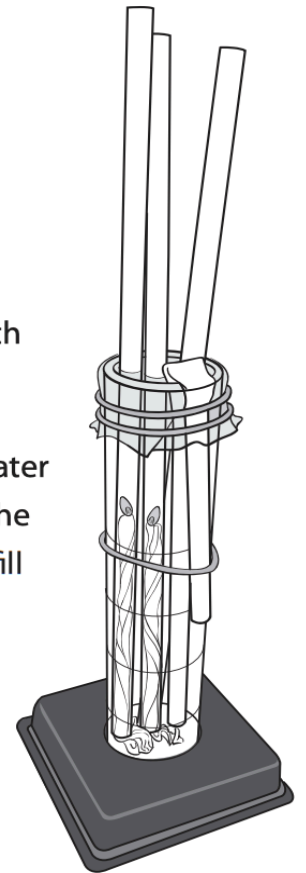
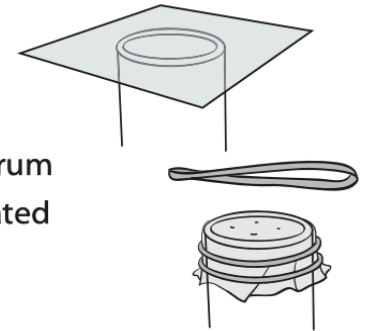
Wheat-Seed Chamber Setup

1. Stretch the small piece of plastic film across the top of a graduated cylinder, and secure it there with a rubber band, like a drum head across the top of the graduated cylinder.
2. Use a sharp pencil to carefully poke four holes in the drum head.
3. Carefully insert three wheat straws through three of the holes, with the paper-towel side down, inside the graduated cylinder.
4. Insert a plain clear straw into the fourth hole in the drum head.
5. Use a syringe to carefully introduce water into the graduated cylinder through the plain plastic straw. The water should fill the graduated cylinder only up to the 10 mL mark. After the water is in the graduated cylinder, bend the plain straw over along the side of the graduated cylinder, and secure with a rubber band.



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“Plant Vascular Systems” Review

1. What kinds of vessels are in leaf veins?
 2. How does water get to the cells at the top of a plant?
 3. What is sap? What does it do?
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Focus Question How are nutrients transported to cells in a plant?	Focus Question How are nutrients transported to cells in a plant?

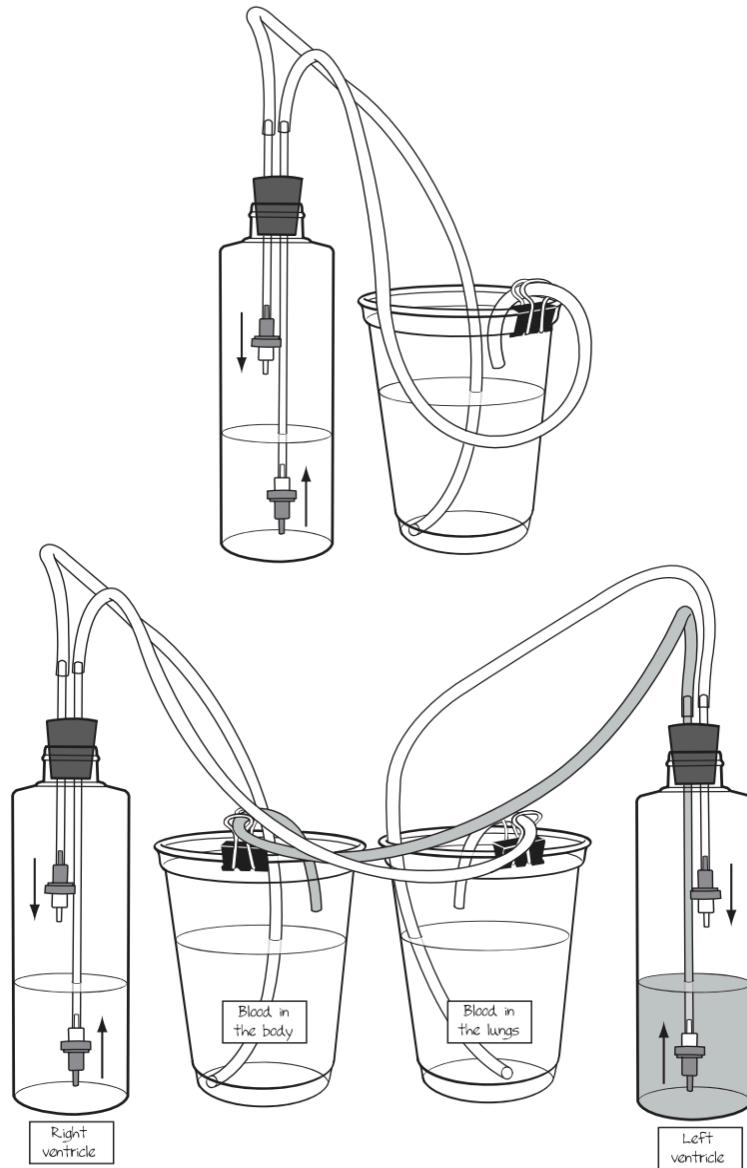
“The Human Circulatory System” Review

1. What is the heart and what is its role in the circulatory system?
2. What are heart valves and what do they do?
3. Where are the heart valves?
4. What is the main function of the left side of the human heart?
5. What is the main function of the right side of the human heart?

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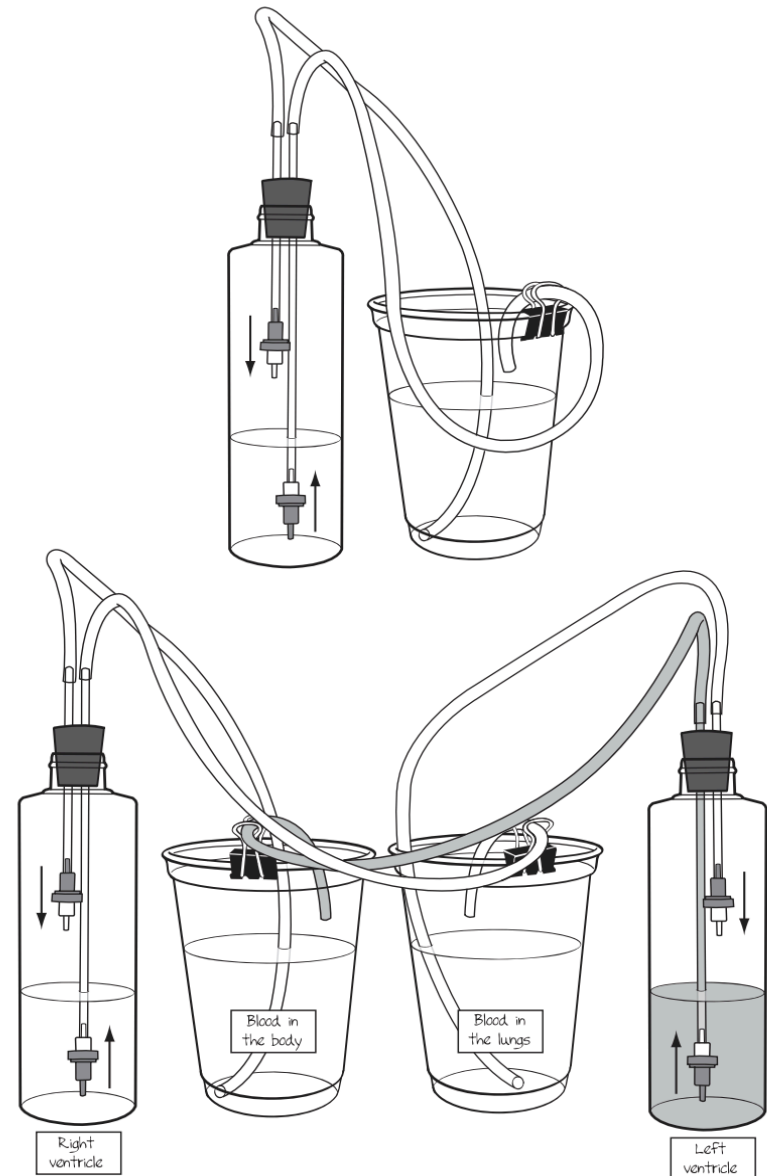
Human Heart Model



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Living Systems Module
Investigation 3: Transport Systems
No. 15—Notebook Master

Human Heart Model



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Response Sheet—Investigation 3

Both plants and animals use systems to transport materials to and from their cells. Compare the vascular system of a plant to the circulatory system of a human. How are they alike and how are they different?

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<p>Focus Question</p> <p>How do humans transport nutrients to all their cells?</p>	<p>Focus Question</p> <p>How do humans transport nutrients to all their cells?</p>

“The Human Respiratory System” Review

1. What are the parts of the respiratory system?
What is the system’s function?
2. What are alveoli and what happens there?

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Measuring Vital Capacity

1. Measure and record your vital capacity (lung volume) three times.
2. Calculate your average vital capacity.

Trial	Vital capacity (L)
1	
2	
3	
Average	

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Focus Question Why do people breathe?	Focus Question Why do people breathe?

“Structures of the Brain” Review

1. Describe the components of the central nervous system. How is it a system?
 2. What functions does the brain stem control?
 3. What are sensory neurons, and what is their role?
 4. What are motor neurons, and what is their role?
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Stimulus/Response

Height of drop _____

Stimulus _____

Response _____

5		
4		
3		
2		
1		
	Hit	Miss

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Stimulus _____

Response _____

5		
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<div>Focus Question</div> <div>How do humans respond to dangers in the environment?</div>	<div>Focus Question</div> <div>How do humans respond to dangers in the environment?</div>

Attention Action Card

Name _____

I respond to these two colors: _____

and _____.

I respond to this pattern:

- | | |
|------------------------------------|-------------------------------------|
| <input type="checkbox"/> Squares | <input type="checkbox"/> Spots |
| <input type="checkbox"/> Diamonds | <input type="checkbox"/> Rectangles |
| <input type="checkbox"/> Triangles | <input type="checkbox"/> Stripes |

I prefer this habitat:

- ☐ Grass ☐ Bushes and trees ☐ Arid, rocky soil

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“Animal Communication” Review

Discuss these questions in your group.

1. Why would an organism want to call attention to itself?
2. What purpose does the rattlesnake’s rattle serve?
3. What purpose does sweet scent serve for a plant?
4. What plant or animal has features or behaviors other than color and pattern to attract attention?
5. How is an attention mechanism a stimulus/response interaction?

Write answers to these questions in your notebook.

6. What is communication?
7. What kinds of stimuli can initiate communication?
8. What kinds of things do animals need to communicate?

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Response Sheet—Investigation 4

When woodpeckers tap loudly on dead tree trunks, it is called drumming. The sound can carry a great distance in the forest.

Why might a woodpecker drum? How would you explain this behavior in terms of a stimulus/response adaptation?

Response Sheet—Investigation 4

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<div>Focus Question</div> <div>What features of organisms attract attention?</div>	<div>Focus Question</div> <div>What features of organisms attract attention?</div>

“Animal Behavior and Communication” Video Review

1. How do dogs learn to wag their tails when they are “happy”? Who teaches kittens to chase strings and other small toys?
2. What instinctive behaviors do sea turtles engage in that help them survive?
3. How do bees, ants, and termites learn how to build their complex communities?
4. What are three instinctive behaviors that some animals exhibit to deal with harsh environmental conditions?

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“Monarch Migration” Review

1. Think about the monarch migration system. What are the parts?
2. What might happen if the life cycle of the milkweed plant changed in some way?

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<p>Focus Question</p> <p>What behaviors are instinctive, and what behaviors are learned?</p>	<p>Focus Question</p> <p>What behaviors are instinctive, and what behaviors are learned?</p>

“North Atlantic Ocean Ecosystem” Review

1. What are the major producers in the North Atlantic Ocean ecosystem?
2. What is a phytoplankton bloom?
3. Why is the North Atlantic bloom important to study?
4. Describe some of the instrumentation scientists use to study the North Atlantic bloom.

“North Atlantic Ocean Ecosystem” Review

1. What are the major producers in the North Atlantic Ocean ecosystem?
2. What is a phytoplankton bloom?
3. Why is the North Atlantic bloom important to study?
4. Describe some of the instrumentation scientists use to study the North Atlantic bloom.

<p>Focus Question</p> <p>What are the parts of a marine ecosystem?</p>	<p>Focus Question</p> <p>What are the parts of a marine ecosystem?</p>