SURVEY/POSTT	E	S	T	I
LIVING SYSTEMS	•	•	•	•

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1. Coral reefs are complex ecosystems that include many different kinds of organisms. They are found in warm tropical oceans where it is shallow and they are exposed to a lot of sunlight. Coral reefs are made up of thousands of tiny animals called coral polyps.

Organism	Where the organisms get the matter they need to live
Bacteria	Detritus
Phytoplankton	?
Zooplankton	Phytoplankton
Coral polyps	Phytoplankton, zooplankton, bacteria
Puffer fish	Fan worms
Fan Worms	
Blue chromis fish	Zooplankton
Sea sponges	
Butterfly fish	Corol polyme
Sea slug	
Angelfish	Sea sponges
Reef shark	Blue chromis fish, butterfly fish, angelfish

- Write Y (yes) next to each kind of matter that phytoplankton need to live and grow.
 Write N (no) next to each kind of matter that is not needed by phytoplankton.
 - _____ Zooplankton
 - _____ Carbon dioxide
 - ____ Oxygen
 - _____ Water
 - _____ Coral polyps
 - _____ Bacteria
 - _____ Sunlight

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SURVEY/POSTTEST LIVING SYSTEMS

Item 1 (continued)

b. Draw a food-web model to represent the feeding relationships of these organisms: phytoplankton, zooplankton, coral polyps, blue chromis fish, sea slugs, and bacteria.

c. Explain how organisms in the food web you drew get the energy they need to live.

- d. Write A next to each sentence that describes an abiotic change in this ecosystem.Write B next to each sentence that describes a biotic change.
 - _____ Dust from a volcanic eruption reduces sunlight for a few months.
 - _____ Invasive bacteria infects the zooplankton.
 - _____ A change in water temperature kills the phytoplankton.
 - _____ Overfishing reduces the population of fish that reef sharks eat.

SURVEY/POSTTEST LIVING SYSTEMS

2. Some avoidance behaviors need to be experienced only once by humans. For example, a young child touches a burning birthday candle. After that experience, she knows not to do it again.

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Explain how a human's sensory system responds the first time a burning candle is touched and then how that human knows not to touch it again.

3. The rabbit population in a certain ecosystem sometimes decreases dramatically. One possible explanation for this decrease is _____.

- O A an increase in the field mouse population
- **O B** a decrease in the owl population
- O C an increase in the grass population
- **O D** an increase in the coyote population



 Some people choose not to throw away organic plant waste with the rest of their garbage. Instead, they compost the organic material. Some people who compost add redworms to the mix.

Write \mathbf{T} if the sentence true; write \mathbf{F} if the sentence is false.

- _____ Redworms break down organic materials into tiny pieces.
- _____ Redworms are the decomposers that reduce materials to simple minerals.
- _____ Redworms help make room for air and water in the decaying material.
- _____ Redworms' main role is to grow big so they can be used for fishing bait.
- 5. Students learned about how organisms obtain, transport, and release gases and water into the environment. A student said, "Plants and humans each have one set of little tubes that carry water back and forth to all cells. Plants can't breath like humans because they don't have lungs."

Which short paragraph below explains why this student's claim is incorrect?

- **O A** Humans have arteries that transport water and gases to and from their cells. Humans get rid of gases by breathing. Plants have xylem and phloem tubes that transport water, but not gases.
- **O B** Humans have veins that transport gases and arteries that carry water. Plants have two sets of tubes. Humans get and release gases in their lungs. Plants get and release gases and water in their roots.
- O C Humans have one set of tubes that transport water and gases to and from cells. Plants also have one set of tubes that transport water and gases. They get and release gases through their leaves.
- **O D** Humans have only one circulatory system that transports water and gases. Plants have two sets of tubes to transport water and gases. Humans get and release gases in their lungs. Plants take in and get rid of gases through their leaves.

6. Two students were talking. Student A was examining the lettuce leaves in a salad he was eating. He said, "Did you know that I am eating energy from the Sun?" Student B was eating a hamburger. She said, "Did you know that I am eating energy that came from the Sun, too?"

Do you agree with these two students? Explain in words or with a drawing why you agree or disagree with each student.



7. Redwood trees start out as little seeds and can grow over 100 meters tall. Where do most of the materials for the increased mass of the tree come from?

Write **M** next to each material that is the source of most of the matter that trees use to grow. Write **X** next to each material that is not a source of matter for trees and other plants.

- _____ Nutrients from the soil
- _____ Oxygen from the air
- _____ Water from the soil
- _____ Carbon dioxide from the air
- _____ Plant food from the soil
- _____ Nitrogen from the air

8. Study the tables below that show the results of a stimulus/response investigation.

The object of the investigation was to see how quickly students could move their hands out of the way of a falling cup.

Height of drop 20 cm Stimulus Vision Response Right hand 5 х 4 х 3 х х 2 х x 1 x х Hit Miss

Height of drop 20 cm				
Stimulus _	Visia)n		
Response	Left 1	nand		
5		×		
4		×		
3		×		
2	×	×		
1	×	×		
	Hit	Miss		

Write numbers in the blanks to describe a model of how the person processes this game in order to respond to the falling cup.

- _____ The brain sends a signal to the hand to move out of the way.
- _____ The person uses the sense of sight to watch for the cup to fall.
- _____ The hand moves away from the falling cup.
- _____ Information from the eyes travels to the brain, where it is processed.

- 9. Scientists recently reported that the thick layer of frozen ground in Alaska (called permafrost) is thawing very quickly. Melting ice from the permafrost is flooding into rivers and streams. Organisms that died centuries ago did not decompose because they were trapped in the frozen ground. Now that the ground is thawing, microorganisms like bacteria are consuming this organic matter and releasing carbon dioxide and methane gases into the atmosphere. Increased concentrations of these gases in the air traps heat from the Sun and causes the Earth's climate to warm.
 - a. Write Y (yes) next to each system that is likely to be affected by permafrost thawing.
 Write N (no) next to each system that should not be affected.
 - _____ The geosphere
 - _____ The hydrosphere
 - _____ The biosphere
 - _____ The atmosphere
 - b. Based on the paragraph above, complete the sentence below to describe the relationship between carbon dioxide and methane gas in the atmosphere and Earth's average temperature.

As the concentration of carbon dioxide and methane in the atmosphere ______, Earth's average temperature ______.

- 10. Many characteristics and behaviors of organisms are inherited from parents. One inherited behavior is that some animals eat a lot before they hibernate for the winter and then do not eat until spring.
 - Write ${\bf T}$ if the sentence true; write ${\bf F}$ if the sentence is false.
 - _____ Animals don't need energy while they are sleeping.
 - _____ Energy from stored fat is released during hibernation.
 - _____ The life processes of animals slow down during hibernation.
 - _____ Animals that hibernate get energy from oxygen in the air.

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SURVEY/POSTTEST LIVING SYSTEMS

11. The Hood Canal is a fjord, or steep-sided inlet of water, in Washington State. Shellfish, especially oysters and clams, are of great economic and cultural importance there.

The Hood Canal watershed includes an estimated 25,000 homes. Septic tanks remove waste from the water that comes from bathrooms and kitchens in those homes. As long as the systems are in good working order, there is no problem. Clean water flows into the fjord. But if a system is not working properly, fecal bacteria can get into streams that empty into the water and cause problems for shellfish and other organisms that live there.

Imagine that you are a scientist living near the Hood Canal. The community of people who live there have hired you to come up with a plan to make sure that the water flowing into the Hood Canal is always free from bacteria. Write a short outline explaining how you would monitor the situation and what you might do if you found water that contained unwanted bacteria.

IN	IVES	TIG	ATI	ON	1	I-C	HE	ECk	(
LI	VING S	YSTE	MS		• •	• • •		• • •	•
4	T 1		1.	1 1	1.		.1		

Name		
Date		

- 1. The organisms listed here live together in an ecosystem.
 - a. Draw arrows to complete the food web that models how matter moves in the ecosystem among producers, consumers, and decomposers. In this food web, chipmunks eat grass and blueberries; bears eat chipmunks and blueberries.

	Bears	
		Bacteria
Chipmunks		

Grass

Blueberries

b. Write **P** in front of the organisms listed below that are producers. Write **C** in front of the organisms that are consumers. Write **D** in front of the organisms that are decomposers.

 Bacteria	_ Chipmunks	_ Blueberries
Bears	Grass	

2. Think about evidence you gathered about decomposition from investigations in class and information you learned from reading and videos.

Write T if the sentence is true; write F if the sentence is false.

- _____ Decomposers break down organic material that provides nutrients for plants.
- _____ Organisms like fungi aid decomposition because they break down dead organisms.
- _____ Plants get energy that they need to live from decomposed materials.
- _____ Animals like wolves are decomposers because they eat other animals.

INVESTIGATION 1 I-CHECK LIVING SYSTEMS

3. In most ecosystems, the energy used by all the organisms comes from the Sun. Explain how energy gets from the Sun to a second-level consumer.

4. You've been developing a model that describes the movement of matter and energy among organisms in the environment.

Write \mathbf{M} next to the words that describe matter in an ecosystem. Write \mathbf{E} next to the words that describe energy in an ecosystem. Write \mathbf{ME} next to words that describe both matter and energy in an ecosystem.

_____ Air

_____ Sunlight

_____ Food

_____ Water

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INVESTIGATION 1 I-CHECK LIVING SYSTEMS

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- 5. In a pond behind the school, students observed several interactions. Read the notebook entries to find out what they observed.
 - a. Choose at least three organisms to construct a food chain. Make sure that you include a producer.

4-19-20	
Group 2	- -
· Aquatic snails are only on alarge	- -
_ covered rocks.	- -
· Shails, Frogs, and small Ed	- -
harder to find after a Tal	- -
herons came to the and	_ _
· Frogs sat in the dial	_ _
when adult may li	
- Small Fish water	
mayfly lating	
· There were in the water.	
where were more mayflies present	
when the amount of algae	-
increased in the pond.	-
	-

b. Construct a food web based on all the organisms observed. Label as specifically as you can which are producers, consumers, and decomposers.

INVESTIGATION 1 I-CHECK LIVING SYSTEMS

6. You have learned that Earth's four major systems interact. Describe an example of how the biosphere might be affected by a change in one of the other three systems (geosphere, hydrosphere, or atmosphere). The change can be natural or human-caused.

7. Tarantulas live in a desert ecosystem. These large spiders rest in their burrows all day. At night they come out to look for food, water, and mates. When day approaches, the tarantulas return to their burrows. Tarantulas are carnivores and need energy to move about at night.

Write \mathbf{T} if the sentence is true; write \mathbf{F} if the sentence is false.

- _____ Tarantulas don't use energy from the Sun because they don't eat when the Sun is out.
- _____ Tarantulas don't use energy from the Sun because they don't eat plants.
- _____ Tarantulas use energy from the Sun because they eat plant-eating insects.
- _____ Tarantulas use energy from the Sun because they get enough sunlight as the Sun is rising and they are moving back into their burrows.

INVESTIGATION 1 I-CHECK LIVING SYSTEMS

8. Study the food-web model shown here.



a. What type of organism is missing from this food web?

(Mark the one best answer.)

- O A Producers
- O B Consumers
- O C Decomposers
- O D Carnivores
- b. If the frog population suddenly increased, which organism would be most likely to decrease right away?

- O F Owls
- O G Snakes
- O H Grass
- O J Snails

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INVESTIGATION 1 I-CHECK LIVING SYSTEMS

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A student said, "Plants don't have energy. Only animals have energy. I know that because only 9. animals move on their own."

Write Y (yes) next to each sentence that you agree with. Write N (no) next to each sentence you disagree with.

- The student is right; only movement is evidence that energy is present.
- The student is wrong; plants store energy from the Sun.
- The student is right; animals get food from plants, not energy.
- The student is wrong; plants provide energy to animals.
- 10. After learning about what plants and animals need to grow, a student said, "I know that plants need air and sunlight to live. Animals need air, too. So air and sunlight must be food for plants and animals."

Write \mathbf{T} if the sentence is true; write \mathbf{F} if the sentence is false.

- Plants get material for growth from the Sun and air; it's their food.
- Plants get energy from both the air and from the Sun.
- Plants get new material for growth only from the air and water.
- Animals get material for growth from what they eat.

INVESTIGATION 2 I-CHECK

1. Two students set up an investigation to see what plants need to produce their own food. They planted a bean in several sets of identical cups of soil. Then they placed them in identical chambers. Chamber A was the control; all factors were present. The other chambers excluded one of the factors.

	Water	Light	Oxygen	Carbon dioxide	Nitrogen
Chamber A	yes	yes	yes	yes	yes
Chamber B	yes	yes	yes	yes	no
Chamber C	yes	yes	yes	no	yes
Chamber D	yes	yes	no	yes	yes
Chamber E	yes	no	yes	yes	yes
Chamber F	no	yes	yes	yes	yes

The students weighed the beans and soil before starting the investigation. After 3 weeks, the students weighed the beans, seedlings (if they were growing), and soil again. Their data are shown here.

	Bean starting mass (g)	Bean ending mass (g)	Soil starting mass (g)	Soil ending mass (g)
Chamber A—control	500	551	10,000	10,000
Chamber B—no nitrogen	500	552	10,000	10,000
Chamber C—no carbon dioxide	500	500	10,000	10,000
Chamber D—no oxygen	500	549	10,000	10,000
Chamber E—no sunlight	500	500	10,000	10,000
Chamber F—no water	500	500	10,000	10,000

a. Write **Y** (yes) next to each environmental factor these data show is needed for plants to make food and increase their mass. Write **N** (no) next to each factor not needed.

_____ Water _____ Carbon dioxide

- ____ Light ____ Nitrogen
- ____ Oxygen
- b. Mark **X** next to the one factor that is the best supporting evidence for your conclusion.
 - _____ Bean starting mass
 - _____ Bean ending mass
 - _____ Soil starting mass
 - _____ Soil ending mass

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INVESTIGATION 2 I-CHECK LIVING SYSTEMS

2. The students in item 1 presented their findings to the class. Another student said, "Hold on a minute. Interesting experiment, but I found this box on the shelf in a plant nursery. The label says, *All Purpose Plant Food*. Why would you need to give plants food if they already make it themselves?"

If you were the students presenting the findings to this class, what would you tell this student?

3. Fungi are a group of organisms that includes mold and mushrooms. Fungi are neither plants nor animals. Like plants, they cannot move on their own. Like animals, some mold and mushrooms feed on dead or decaying matter from other organisms. Sometimes fungi live in dark or damp places.

Which statement best identifies the role of fungi in the cycle of matter and energy in the environment?

- O A Fungi are producers because they need sunlight to produce their own food.
- O B Fungi are decomposers because they break down decaying plants and animals.
- O C Fungi are consumers because they get nutrition from other organisms.
- O D Fungi are producers because they provide nutrition to some animals that eat them.

INVESTIGATION 2 I-CHECK LIVING SYSTEMS

4. Scientists were interested in the ecosystem around a pond. The table below describes the animals they found in and around the pond.

Animal type	Animal	Food
	Alligator	Bass
Carnivore	Egret, bass	Crayfish, minnow
	Bat	Mosquito
Omnivere	Crayfish	Minnow, water plants
Omnivore	Minnow	Mayfly, mosquito
Herbiyere	Mosquito	Algae
Herbivore	Mayfly	Algae, water plants

Draw a model (food web or food chain) to show how at least four of the organisms get the energy they need to live. Include at least one producer, one carnivore, one omnivore, and one herbivore.

5. A gardener wanted to start growing lettuce by putting soil and lettuce in seedling trays. He planted one seed in each compartment. He placed some trays on a windowsill, and he placed other trays in a garage with no window. He watered them regularly with the same amount of water.

Mark the table to show your predictions about observations that will be made 1 week after the seeds are planted.



Dark garage		Window sill		
Color	Height	Color	Height	
Dark green	No growth	🖵 Dark green	🖵 No growth	
🖵 Light green	🖵 3–5 cm	🖵 Light green	□ 3–5 cm	
Yellow	🖵 5–10 cm	Yellow	🖵 5–10 cm	

Name ____

INVESTIGATION 2 I-CHECK LIVING SYSTEMS

6. Hummingbirds are known for having incredibly fast wing beats. The ruby-throated hummingbird has an average 55 wing beats per second during most of the year. That takes a lot of energy.

Hummingbirds eat plant-eating insects and nectar (sugar) from many flowering plants.

Write E next to each word that describes something that helps release energy from the food birds eat. Write N next to each word that does not describe something that helps release energy from food.

____ Bladder ____ Saliva ____ Wings ____ Blood

7. A class was learning about decomposition in ecosystems. One student said, "Animal waste and rotten plants are yucky. I wish we could just collect it all and dump it into outer space. That would solve the problem—no smelly waste."

Write a scientific argument, explaining why you agree or disagree with this statement.

INVESTIGATION 2 I-CHECK

LIVING SYSTEMS

Antarctic Food Web Smaller toothed Sperm whales whales **Baleen** whales Leopard Elephant seals seals Penguins Other birds Squid Other Fish seals Other herbivorous Krill zooplankton Carnivorous zooplankton Phytoplankton

8. A student said, "This diagram shows who eats whom, but it has a limitation, too. It doesn't show how many of each organism there are. We need a different model to show that."

Number the organisms from the food web to indicate most to least numbers in a given population, 1 being the largest population.

_____ Phytoplantkton

Fish

_____ Krill

- _____ Smaller toothed whales
- _____ Penguins

INVESTIGATION 2 I-CHECK LIVING SYSTEMS

9. A teacher asked students to draw a model to represent where plants get most of the material they need for growth. A student drew this diagram.



Write M next to the two materials that become new mass of the plant as it grows.

- _____ Sunlight
- _____ Water
- _____ Nutrients in soil
- ____ Oxygen
- _____ Carbon dioxide

INVESTIGATION 3 I-CHECK

1. Two students know that plants need water to stay alive, but they wondered what happens to all the water plants take in through their roots.

Student A said, "All of the water stays in the plant."

Student B said, "They only use some of it. The rest goes back into the air through the leaves."

They set up an experiment. They recorded the starting mass of two pieces of celery and the volume of water they put in three vials. They put a stalk of celery into two of the vials and used the third vial with water only as a control. The next day, the students recorded the mass of the celery and the volume of water in each vial.





	Vials	Starting volume of water (mL)	Ending volume of water (mL)	Starting mass of celery (g)	Ending mass of celery (g)
X	Celery with leaves	25	5	28	29
Y	Celery without leaves	25	20	26	27
Ζ	Vial of water	25	24	_	_

a. How much water was lost due to evaporation?

How did you figure out how much water was lost due to evaporation?

INVESTIGATION 3 I-CHECK LIVING SYSTEMS

Item 1 (continued)

b. Which student's claim is best supported by evidence? Explain how you know (and include the supporting evidence).

2. Which plant structure exchanges gases between a plant and the air?

- O A Phloem tubes in the stems
- **O B** Xylem tubes in the stems
- O C Alveoli in the leaves
- **O D** Stomata in the leaves

INVESTIGATION 3 I-CHECK LIVING SYSTEMS



- 3. This is a diagram of a tree's vascular system.
 - a. The solid-line arrows show _____.

(Mark the one best answer.)

- O A water and dissolved food traveling from the roots to the leaves
- O B water and dissolved nutrients traveling from the roots to the leaves
- O **C** water and CO_2 traveling from the roots to the leaves
- **O D** water and O_2 traveling from the roots to the leaves
- b. The dotted-line arrows show _____.

- O **F** water and CO_2 traveling from the leaves to the stems and roots
- O **G** water and O_2 traveling from the leaves to the stems and roots
- O H water and dissolved minerals traveling from the leaves to the stems and roots
- O J water and dissolved sugars traveling from the leaves to the stems and roots

INVESTIGATION 3 I-CHECK LIVING SYSTEMS

4. This is a model of the human circulatory and respiratory systems. Write the name of each structure and its role in transporting gases in the table below the model.

Name _____



	Structure name	Function
1		
2		
3		
4		
5		

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INVESTIGATION 3 I-CHECK LIVING SYSTEMS

5. Why do maple trees make sap?

(Mark the one best answer.)

- O A Maple trees don't need sap; people just like to eat it because it is sweet.
- **O B** Sap stores water for maple trees to use when there isn't much rain.
- O C Sap provides food to a maple tree's cells that don't make their own food.
- O D Sap helps move water through the maple tree from root to treetop.
- 6. Write **T** next to each phrase that completes the sentence and is true. Write **F** next to each phrase that completes the sentence but is not true.

It is important for blood to circulate through the lung to _____.

- _____ remove carbon dioxide from the blood
- _____ remove nitrogen from the blood
- _____ add water to the blood
- _____ add oxygen to the blood
- 7. When someone has a heart attack, the heart may stop beating. Explain why pumping blood through the body is necessary to live.

Name _____

INVESTIGATION 3 I-CHECK LIVING SYSTEMS

8. Think about two transport systems: the circulatory system in animals and the vascular system in plants. How are they alike and how are they different?

