

Grade 5 Science

Unit 2: Energy and Matter in Ecosystems

16 lessons and a unit quiz. Use this pack with the **Energy and Matter in Ecosystems Student Reader** (print it, or download it once from the course) to teach the whole unit without the internet.

What is in this pack

- A lesson plan for each chapter: the Big Question, words to know, which pages to read, questions to talk over and the activity pages.
- The unit quiz, ready to print.
- Answers for the teacher at the back: every discussion question and the quiz key.

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Lesson schedule

Two or three lessons a week, about 30 minutes each. Tick each one off as you go.

	Lesson	Reader pages	Activity pages
☐	Lesson 1: Living Things Grow and Change	—	AP 1.1, AP 1.2
☐	Lesson 2: Producers, Consumers, and Decomposers	PDF pages 7–16	AP 2.1
☐	Lesson 3: Living Things Use Energy	PDF pages 17–20	AP 3.1
☐	Lesson 4: Modeling the Flow of Energy	—	AP 4.1, AP 4.2
☐	Lesson 5: Growing Plants Without Soil	—	—
☐	Lesson 6: What Plants Need	PDF pages 21–28	AP 6.1
☐	Lesson 7: Modeling Photosynthesis	—	AP 7.1
☐	Lesson 8: Energy Relationships Among Plants and Animals	PDF pages 29–34	AP 8.1
☐	Lesson 9: Explaining Energy Relationships Among Plants and Animals	—	AP 9.1
☐	Lesson 10: Ecosystems	PDF pages 35–40	AP 10.1
☐	Lesson 11: A Local Ecosystem	—	AP 11.1
☐	Lesson 12: Food Chains and Food Webs	PDF pages 41–46	AP 12.1
☐	Lesson 13: Modeling the Cycle of Matter in an Ecosystem	PDF pages 47–52	AP 13.1
☐	Lesson 14: Changes in Ecosystems	PDF pages 53–58	AP 14.1
☐	Lesson 15: People and the Environment	—	AP 15.1
☐	Lesson 16: Energy and Matter Review Game	—	—
☐	Unit review and assessment	—	AP UR.1, AP UR.2, AP UR.3
☐	Words quiz	—	—

Page numbers are the PDF page numbers of the Student Reader file, so they match what your PDF reader shows.

Lesson 1: Living Things Grow and Change

THE BIG QUESTION

What makes living things alive?

Words to know

- **energy** — the capacity to do work, such as the chemical energy found in sugar
- **energy transfer** — the movement of energy from one location to another
- **energy transformation** — the change of energy from one form to another
- **food** — any material with nutrients that organisms consume to obtain energy for life processes Student Reader page numbers are not vocabulary terms related to the that are often used within the Student s listed. Vocabulary words are not
- **living** — alive, able to respond to stimuli and reproduce

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 25–31: the steps, materials and timing for this lesson.

Talk it over

1. 20 What things in this classroom are not alive?

Answers are at the back of this pack.

Check for understanding

- Answer the Big Question in a sentence or two: What makes living things alive?
- Use one of today's words in a sentence of your own.

Activity pages

- Activity Page 1.1: Library Scavenger Hunt — Teacher Guide PDF page 133
- Activity Page 1.2: Plant Data Sheet — Teacher Guide PDF pages 134–135

Lesson 2: Producers, Consumers, and Decomposers

THE BIG QUESTION

Where do organisms get the energy they need for living?

Words to know

- **organism** — a single living thing
 - **producer** — a living thing that makes its own food
 - **consumer** — a living thing that gets energy by eating other organisms for food
 - **scavenger** — an animal that eats organisms that have already died
 - **decomposer** — an organism that breaks down dead plant and animal matter and returns nutrients to the soil
 - **glucose** — a form of sugar made by plants through the process of photosynthesis
 - **energy** — the capacity to do work, such as the chemical energy found in sugar
 - **food** — any material with nutrients that organisms consume to obtain energy for life processes
- Student Reader page numbers are not listed. Vocabulary words are not listed.
- **living** — alive, able to respond to stimuli and reproduce

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 32–39: the steps, materials and timing for this lesson.

Read

Read Student Reader, Chapter 1: “Producers, Consumers, and Decomposers”: PDF pages 7–16. Look at the pictures and maps together.

Talk it over

1. Name an organism that needs food. What kind of food does it consume, or eat?
2. Name an organism that grows. How does it grow, or change, throughout its life?
3. Name an organism that reproduces. How does it make new life?
4. Name an organism that is made of cells. Does it have only one cell, or does it have many cells?
5. Where do you get your food?
6. Do you get it from other living things?
7. Are you a producer or a consumer?
8. What would happen to a banana peel if it never turned brown and was broken down?

9. What would happen if all the leaves in a tree fell on the ground but never broke down?
10. What would happen to the remaining nutrients in living things after they died?
11. If the nutrients never went anywhere, how would they get back into the ecosystem?
12. When you run, jump, or play, do you get hotter or colder?
13. After your head lies on a pillow for a while, is the pillow still cold, or has it gotten warmer?
14. Are there any similarities in the organisms that produce their own food?
15. Are there any similarities in the organisms that gain their energy from producers and consumers?
16. Are there any similarities in the organisms that gain their energy only from other consumers?
17. How are warm-blooded animals similar?

Answers are at the back of this pack.

Check for understanding

- Answer the Big Question in a sentence or two: Where do organisms get the energy they need for living?
- Use one of today's words in a sentence of your own.

Activity pages

- Activity Page 2.1: Organisms and Chemical Energy — Teacher Guide PDF page 136

Lesson 3: Living Things Use Energy

THE BIG QUESTION

How do organisms use energy that originally comes from the sun?

Words to know

- **sugar** — a carbohydrate that living things break down to get energy
- **glucose** — a form of sugar made by plants through the process of photosynthesis
- **photosynthesis** — the process used by producers to make glucose and oxygen from sunlight, water, and carbon dioxide
- **metabolism** — the continuing chemical reactions in living things that release and use energy
- **chemical** — any pure substances consisting of matter
- **chemical reaction** — a change in the atomic structure of a chemical

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 40–45: the steps, materials and timing for this lesson.

Read

Read Student Reader, Chapter 2: “Living Things Use Energy”: PDF pages 17–20. Look at the pictures and maps together.

Talk it over

1. What are the three things that plants need to produce food?
2. What type of food (chemical energy) does the plant produce for energy?
3. What does the plant release back into the air after the process is finished?
4. Where does the energy that plants need for photosynthesis come from?
5. What else do plants need for the process of photosynthesis?
6. Where does the process of photosynthesis take place?

Answers are at the back of this pack.

Check for understanding

- Answer the Big Question in a sentence or two: How do organisms use energy that originally comes from the sun?
- Use one of today's words in a sentence of your own.

Activity pages

- Activity Page 3.1: Photosynthesis Model — Teacher Guide PDF page 137

Lesson 4: Modeling the Flow of Energy

THE BIG QUESTION

How can I model the flow of energy through living things?

Words to know

- **producer** — a living thing that makes its own food
- **consumer** — a living thing that gets energy by eating other organisms for food
- **glucose** — a form of sugar made by plants through the process of photosynthesis
- **photosynthesis** — the process used by producers to make glucose and oxygen from sunlight, water, and carbon dioxide
- **metabolism** — the continuing chemical reactions in living things that release and use energy
- **energy transfer** — the movement of energy from one location to another
- **energy transformation** — the change of energy from one form to another

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 46–51: the steps, materials and timing for this lesson.

Talk it over

1. Which kind of organism begins the food chain?
2. Do all food chains follow the same pattern?

Answers are at the back of this pack.

Check for understanding

- Answer the Big Question in a sentence or two: How can I model the flow of energy through living things?
- Use one of today's words in a sentence of your own.

Activity pages

- Activity Page 4.1: Model Checklist — Teacher Guide PDF page 138
- Activity Page 4.2: Energy's Path Through Living Things — Teacher Guide PDF page 139

Lesson 5: Growing Plants Without Soil

THE BIG QUESTION

Can I grow a plant without soil?

Words to know

- **energy** — the capacity to do work, such as the chemical energy found in sugar
- **food** — any material with nutrients that organisms consume to obtain energy for life processes Student Reader page numbers are not used for the same purpose as the page numbers that are often used within the Student's listed. Vocabulary words are not
- **living** — alive, able to respond to stimuli and reproduce
- **matter** — anything that has mass and takes up space

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 54–58: the steps, materials and timing for this lesson.

Talk it over

1. How do you know the plant grew?
2. Why do you think the plant grew?
3. What does the plant need for growth?

Answers are at the back of this pack.

Check for understanding

- Answer the Big Question in a sentence or two: Can I grow a plant without soil?
- Use one of today's words in a sentence of your own.

Lesson 6: What Plants Need

THE BIG QUESTION

Where do plants get the materials they need for growth?

Words to know

- **glucose** — a form of sugar made by plants through the process of photosynthesis
- **transpiration** — the release of water vapor through tiny openings in plants' leaves
- **hydroponics** — the practice of growing plants without soil
- **air** — the mixture of gases in the atmosphere
- **carbon dioxide** — a gas released from organisms when they breathe
- **sunlight** — energy released by the sun in the form of light
- **water** — a chemical made up of hydrogen and oxygen necessary for all life

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 59–64: the steps, materials and timing for this lesson.

Read

Read Student Reader, Chapter 3: “What Plants Need”: PDF pages 21–28. Look at the pictures and maps together.

Talk it over

1. What else do plants use?
2. Do you think your experiment with the plant cuttings will have similar results to Jan van Helmont's experiment?
3. Have you ever seen a large rock and looked under it? What kind of plants did you see under the rock?
4. What did you see under the rock?
5. Why were there no or very few plants under the rock?
6. What are these holes for?
7. What do plants need from the air?
8. What do plants release through the holes?
9. How do plants start every food chain?
10. How do plants help animals breathe?
11. How do plants help prevent erosion?
12. What did all the plants need to survive and grow?
13. What did all plants produce, and where do they belong in the food chain?

Answers are at the back of this pack.

Check for understanding

- Answer the Big Question in a sentence or two: Where do plants get the materials they need for growth?
- Use one of today's words in a sentence of your own.

Activity pages

- Activity Page 6.1: A Needy Plant in the Neighborhood — Teacher Guide PDF page 140

Lesson 7: Modeling Photosynthesis

THE BIG QUESTION

How can I model photosynthesis?

Words to know

- **glucose** — a form of sugar made by plants through the process of photosynthesis
- **photosynthesis** — the process used by producers to make glucose and oxygen from sunlight, water, and carbon dioxide
- **air** — the mixture of gases in the atmosphere
- **carbon dioxide** — a gas released from organisms when they breathe
- **energy** — the capacity to do work, such as the chemical energy found in sugar
- **sunlight** — energy released by the sun in the form of light
- **transfer** — to move from one location to another

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 65–69: the steps, materials and timing for this lesson.

Talk it over

1. How did you represent the production of glucose and oxygen in your model?
2. How did you represent where the plant gets light?

Answers are at the back of this pack.

Check for understanding

- Answer the Big Question in a sentence or two: How can I model photosynthesis?
- Use one of today's words in a sentence of your own.

Activity pages

- Activity Page 7.1: A Rough Draft of Your Model — Teacher Guide PDF page 141

Lesson 8: Energy Relationships Among Plants and Animals

THE BIG QUESTION

Where do different organisms get their energy?

Words to know

- **scavenger** — an animal that eats organisms that have already died
- **decomposer** — an organism that breaks down dead plant and animal matter and returns nutrients to the soil
- **herbivore** — an animal that eats plants to meet its energy needs
- **carnivore** — an animal that eats other animals to meet its energy needs
- **omnivore** — an animal that eats both plants and other animals to meet its energy needs

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 70–75: the steps, materials and timing for this lesson.

Read

Read Student Reader, Chapter 4: “Energy Relationships Among Organisms”: PDF pages 29–34. Look at the pictures and maps together.

Talk it over

1. What is the purpose of consuming, or eating, food?
2. Which consumers in the image are herbivores, or eat producers?
3. Which consumers in the image are carnivores, or eat other consumers?
4. How does energy flow in a coral reef system?

Answers are at the back of this pack.

Check for understanding

- Answer the Big Question in a sentence or two: Where do different organisms get their energy?
- Use one of today's words in a sentence of your own.

Activity pages

- Activity Page 8.1: Energy from the Sun to You — Teacher Guide PDF page 142

Lesson 9: Explaining Energy Relationships Among Plants and Animals

THE BIG QUESTION

Where do different organisms get their energy?

Words to know

- **consumer** — a living thing that gets energy by eating other organisms for food
- **scavenger** — an animal that eats organisms that have already died
- **herbivore** — an animal that eats plants to meet its energy needs
- **carnivore** — an animal that eats other animals to meet its energy needs
- **omnivore** — an animal that eats both plants and other animals to meet its energy needs
- **energy** — the capacity to do work, such as the chemical energy found in sugar
- **environment** — a geographic area
- **matter** — anything that has mass and takes up space

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 76–83: the steps, materials and timing for this lesson.

Talk it over

1. Does my organism live in the water or on land?
2. Does my organism get its energy directly from the sun?
3. Does my organism live in hot or cold climates? Rainy or dry?
4. Did the group use all the Core Vocabulary terms?
5. Which Core Vocabulary terms did the group not use?
6. How do you know whether something is a producer?
7. How do you know whether something is a consumer?
8. How do you know whether something is a scavenger?
9. Did your group identify an omnivore that would live in your environment?

Answers are at the back of this pack.

Check for understanding

- Answer the Big Question in a sentence or two: Where do different organisms get their energy?
- Use one of today's words in a sentence of your own.

Activity pages

- Activity Page 9.1: Research Guide — Teacher Guide PDF pages 143–145

Lesson 10: Ecosystems

THE BIG QUESTION

What is an ecosystem, and what are some different types of ecosystems?

Words to know

- **ecosystem** — all the living and nonliving things that interact in a given area
- **energy** — the capacity to do work, such as the chemical energy found in sugar
- **matter** — anything that has mass and takes up space

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 86–93: the steps, materials and timing for this lesson.

Read

Read Student Reader, Chapter 5: “Ecosystems”: PDF pages 35–40. Look at the pictures and maps together.

Talk it over

1. What do the non-ecosystem pictures have in common?
2. What do the ecosystem pictures have in common?
3. What kinds of things do you notice in the ecosystem pictures?
4. What kinds of things do you notice in the non-ecosystem pictures?
5. Do you think ecosystems are a mix of living and nonliving things?
6. What are some organisms found in your ecosystem?
7. What are the nonliving things found in your ecosystem?
8. What do the plants need to survive?
9. What do the animals need to survive?
10. How do the living and nonliving things work together to sustain life in this ecosystem?
11. How did the living organisms get to live on the island?
12. What happens when the organisms die?
13. What are some of the nonliving things found in the Hawaiian ecosystem?
14. What are some of the living things found in the Hawaiian ecosystem?
15. How do you think these living and nonliving things interact?
16. Why do organisms survive well in healthy ecosystems?
17. What did you read about in the reading selection that is similar to these activities?
18. How do you think this would affect an ecosystem?

Answers are at the back of this pack.

Check for understanding

- Answer the Big Question in a sentence or two: What is an ecosystem, and what are some different types of ecosystems?
- Use one of today's words in a sentence of your own.

Activity pages

- Activity Page 10.1: Ecosystem: Yes or No — Teacher Guide PDF page 146

Lesson 11: A Local Ecosystem

THE BIG QUESTION

What lives where I live?

Words to know

- **ecosystem** — all the living and nonliving things that interact in a given area
- **energy** — the capacity to do work, such as the chemical energy found in sugar
- **environment** — a geographic area
- **matter** — anything that has mass and takes up space
- **system** — a set of things or parts that form a complex whole

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 94–97: the steps, materials and timing for this lesson.

Talk it over

1. What is an ecosystem?
2. What can you find in an ecosystem?
3. Are nonliving things essential to an ecosystem?
4. What are some nonliving things that are essential to an ecosystem?

Answers are at the back of this pack.

Check for understanding

- Answer the Big Question in a sentence or two: What lives where I live?
- Use one of today's words in a sentence of your own.

Activity pages

- Activity Page 11.1: Ecosystem Investigation — Teacher Guide PDF page 147

Lesson 12: Food Chains and Food Webs

THE BIG QUESTION

What are food chains and food webs?

Words to know

- **food chain** — a series of organisms listed in a way that shows which is a food source for another
- **food web** — multiple connected food chains in an ecosystem
- **energy** — the capacity to do work, such as the chemical energy found in sugar
- **matter** — anything that has mass and takes up space

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 98–105: the steps, materials and timing for this lesson.

Read

Read Student Reader, Chapter 6: “Food Chains and Food Webs”: PDF pages 41–46. Look at the pictures and maps together.

Talk it over

1. What is a food chain?
2. Which organisms are part of the food chain being shown?
3. What is at the top of this food chain?
4. What does it mean to be at the top of the food chain?
5. What is the producer in this ecosystem?
6. What are the consumers that eat the producers?
7. What are the consumers that eat other consumers?
8. What would be the top consumer?
9. How do energy and matter cycle through the ecosystem?
10. What are some producers shown in the video?
11. What are some consumers shown in the video?
12. How does a food chain relate to a food web?
13. What is the difference between a food chain and a food web?
14. What did you read about in the reading selection that is like these activities?
15. Why can't you identify all the relationships in a food web?
16. What does it mean to be at the top of a food chain?

Answers are at the back of this pack.

Check for understanding

- Answer the Big Question in a sentence or two: What are food chains and food webs?
- Use one of today's words in a sentence of your own.

Activity pages

- Activity Page 12.1: Chains and Webs — Teacher Guide PDF page 148

Lesson 13: Modeling the Cycle of Matter in an Ecosystem

THE BIG QUESTION

How can I show cycles of matter in an ecosystem?

Words to know

- **scavenger** — an animal that eats organisms that have already died
- **decomposer** — an organism that breaks down dead plant and animal matter and returns nutrients to the soil
- **ecosystem** — all the living and nonliving things that interact in a given area
- **energy** — the capacity to do work, such as the chemical energy found in sugar
- **matter** — anything that has mass and takes up space

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 106–112: the steps, materials and timing for this lesson.

Read

Read Student Reader, Chapter 7: “Rain Forest Ecosystem Field Diary”: PDF pages 47–52. Look at the pictures and maps together.

Check for understanding

- Answer the Big Question in a sentence or two: How can I show cycles of matter in an ecosystem?
- Use one of today's words in a sentence of your own.

Activity pages

- Activity Page 13.1: Modeling the Cycling of Matter and Energy — Teacher Guide PDF page 149

Lesson 14: Changes in Ecosystems

THE BIG QUESTION

What happens when ecosystems are disrupted?

Words to know

- **disruption** — a disturbance that interrupts a process
- **interruption** — an action or factor that stops a process

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 113–119: the steps, materials and timing for this lesson.

Read

Read Student Reader, Chapter 8: “Changes in Ecosystems”: PDF pages 53–58. Look at the pictures and maps together.

Talk it over

1. How does introducing a new species/overhunting/drought change an ecosystem?
2. Do you think a volcanic eruption has a small or large impact on an ecosystem?
3. What do you think is an example of a small change to an ecosystem? Why?
4. What do you think is an example of a large change to an ecosystem? Why?
5. What kinds of natural processes can cause species to end up in new places?
6. What kinds of human activities can cause species to end up in new places?
7. Which human activity contributes the most to deforestation?
8. How does deforestation disrupt ecosystems?
9. What can people do to help reverse the effects of deforestation?
10. How does human population affect ecosystems?
11. In what way does pollution harm ecosystems?
12. How can climate change negatively impact ecosystems and food webs?
13. How do you think protecting endangered species helps ecosystems?
14. What kinds of changes can disrupt an ecosystem?
15. What did you read about in the reading selection that is like these activities?

Answers are at the back of this pack.

Check for understanding

- Answer the Big Question in a sentence or two: What happens when ecosystems are disrupted?
- Use one of today's words in a sentence of your own.

Activity pages

- Activity Page 14.1: Things That Disrupt Ecosystems — Teacher Guide PDF page 150

Lesson 15: People and the Environment

THE BIG QUESTION

What happens when human activity disrupts an ecosystem?

Words to know

- **ecosystem** — all the living and nonliving things that interact in a given area
- **disruption** — a disturbance that interrupts a process
- **energy** — the capacity to do work, such as the chemical energy found in sugar
- **environment** — a geographic area
- **evidence** — information that supports an argument or point of view
- **matter** — anything that has mass and takes up space

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 120–125: the steps, materials and timing for this lesson.

Talk it over

1. What's an example of a natural disaster that can disrupt an ecosystem?
2. What would happen during a forest fire?
3. If there are no trees, what happens to the animals that lived in the trees?
4. If there are no trees, what happens to the animals that ate the leaves of those trees?
5. If the animals could no longer eat or did not have trees for hiding and protection, they might die. What happens to the stability of that ecosystem?
6. What is the human activity that you chose to focus on?
7. What kind of evidence did you find?
8. How would an ecosystem be able to recover from this disruption?
9. What is a proposed solution to this problem (the human activity)?
10. What evidence supports your conclusion?

Answers are at the back of this pack.

Check for understanding

- Answer the Big Question in a sentence or two: What happens when human activity disrupts an ecosystem?
- Use one of today's words in a sentence of your own.

Activity pages

- Activity Page 15.1: Research and Writing Guide — Teacher Guide PDF pages 151–152

Lesson 16: Energy and Matter Review Game

THE BIG QUESTION

What have I learned about ecosystems?

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 126–130: the steps, materials and timing for this lesson.

Check for understanding

- Answer the Big Question in a sentence or two: What have I learned about ecosystems?

UNIT REVIEW

Unit review and assessment

- Unit Assessment (print for your student): Teacher Guide PDF pages 158-164
- How to mark it (for the teacher): Teacher Guide PDF pages 167-169
- Activity page answer key (for the teacher): Teacher Guide PDF pages 165-166
- Activity Page UR.1: Energy and Matter Review Game — Teacher Guide PDF page 153
- Activity Page UR.2: Vocabulary Crossword Puzzle — Teacher Guide PDF page 154
- Activity Page UR.3: Vocabulary Review — Teacher Guide PDF page 156

WORDS QUIZ

Energy and Matter in Ecosystems

Name: _____ Date: _____

Circle the letter of the best answer.

1. Which word means “an animal that eats both plants and other animals to meet its energy needs”?
 - a) hydroponics
 - b) omnivore
 - c) disruption
 - d) decomposer
2. Which word means “a living thing that makes its own food”?
 - a) photosynthesis
 - b) decomposer
 - c) omnivore
 - d) producer
3. Which word means “the process used by producers to make glucose and oxygen from sunlight, water, and carbon dioxide”?
 - a) carnivore
 - b) glucose
 - c) herbivore
 - d) photosynthesis
4. Which word means “an animal that eats other animals to meet its energy needs”?
 - a) decomposer
 - b) carnivore
 - c) herbivore
 - d) photosynthesis
5. Which word means “a form of sugar made by plants through the process of photosynthesis”?
 - a) metabolism
 - b) decomposer
 - c) photosynthesis
 - d) glucose
6. Which word means “multiple connected food chains in an ecosystem”?
 - a) organism
 - b) decomposer
 - c) food web
 - d) hydroponics

7. Which word means “an organism that breaks down dead plant and animal matter and returns nutrients to the soil”?

- a) decomposer
- b) producer
- c) hydroponics
- d) herbivore

8. Which word means “a disturbance that interrupts a process”?

- a) decomposer
- b) organism
- c) transpiration
- d) disruption

9. Which word means “a series of organisms listed in a way that shows which is a food source for another”?

- a) food web
- b) transpiration
- c) food chain
- d) ecosystem

10. Which word means “an animal that eats plants to meet its energy needs”?

- a) organism
- b) producer
- c) herbivore
- d) ecosystem

11. Which word means “the continuing chemical reactions in living things that release and use energy”?

- a) omnivore
- b) consumer
- c) herbivore
- d) metabolism

12. Which word means “the practice of growing plants without soil”?

- a) hydroponics
- b) metabolism
- c) disruption
- d) herbivore

Answers

Lesson 1: Living Things Grow and Change

1. **20 What things in this classroom are not alive?**

Students may point to books, desks, chairs, computers, or other inanimate objects as not being alive.

Lesson 2: Producers, Consumers, and Decomposers

1. **Name an organism that needs food. What kind of food does it consume, or eat?**

Sample answer: A giraffe eats leaves.

2. **Name an organism that grows. How does it grow, or change, throughout its life?**

Sample answer: A tadpole changes into a frog as it grows into an adult.

3. **Name an organism that reproduces. How does it make new life?**

Sample answer: A bird lays eggs, and the eggs can hatch into baby chicks.

4. **Name an organism that is made of cells. Does it have only one cell, or does it have many cells?**

Sample answer: A tree has many cells and many kinds of cells.

5. **Where do you get your food?**

From producers or other consumers

6. **Do you get it from other living things?**

Yes

7. **Are you a producer or a consumer?**

A consumer

8. **What would happen to a banana peel if it never turned brown and was broken down?**

Nothing; it would just be wherever it ended up.

9. **What would happen if all the leaves in a tree fell on the ground but never broke down?**

There would be piles of leaves covering everything over time.

10. **What would happen to the remaining nutrients in living things after they died?**

The nutrients would go nowhere.

11. **If the nutrients never went anywhere, how would they get back into the ecosystem?**

The nutrients would not be returned to the ecosystem where living things needed the nutrients.

12. **When you run, jump, or play, do you get hotter or colder?**

Hotter

13. **After your head lies on a pillow for a while, is the pillow still cold, or has it gotten warmer?**
Gotten warmer
14. **Are there any similarities in the organisms that produce their own food?**
Sample answer: Trees are not all the same type, but they all make their own food in their leaves.
15. **Are there any similarities in the organisms that gain their energy from producers and consumers?**
Sample answer: The fruit of an apple tree can provide energy to many organisms, such as people, animals, birds, and worms.
16. **Are there any similarities in the organisms that gain their energy only from other consumers?**
Sample answer: Snakes eat small animals, and mountain lions eat larger animals.
17. **How are warm-blooded animals similar?**
Many jungle animals and farm animals are warm-blooded mammals that have four legs.

Lesson 3: Living Things Use Energy

1. **What are the three things that plants need to produce food?**
Sunlight, carbon dioxide, water
2. **What type of food (chemical energy) does the plant produce for energy?**
The sugar glucose
3. **What does the plant release back into the air after the process is finished?**
Oxygen
4. **Where does the energy that plants need for photosynthesis come from?**
The sun
5. **What else do plants need for the process of photosynthesis?**
Carbon dioxide, water
6. **Where does the process of photosynthesis take place?**
In leaves of the plant

Lesson 4: Modeling the Flow of Energy

1. **Which kind of organism begins the food chain?**
Producer/plant/microbe
2. **Do all food chains follow the same pattern?**
Basically, yes

Lesson 5: Growing Plants Without Soil

1. **How do you know the plant grew?**
We used a ruler to see whether the cutting is longer. We compared current measurements to the original measurements. The scale says that the container with water and plant cuttings weighs more than it did on Day 1.

2. **Why do you think the plant grew?**
It had the things it needed for growth.
3. **What does the plant need for growth?**
Air and water

Lesson 6: What Plants Need

1. **What else do plants use?**
Carbon dioxide, water
2. **Do you think your experiment with the plant cuttings will have similar results to Jan van Helmont's experiment?**
Encourage students to make a yes or no guess and explain their thinking.
3. **Have you ever seen a large rock and looked under it? What kind of plants did you see under the rock?**
Most students will say that they did not see any plants or that they saw mold or something similar. Some may say that there was flattened grass or that the grass was turning brown or yellow.
4. **What did you see under the rock?**
Most students will answer dirt. A few may say that they saw grass.
5. **Why were there no or very few plants under the rock?**
Because they were not receiving sunlight, they could not grow and died.
6. **What are these holes for?**
To allow air to get in and out
7. **What do plants need from the air?**
Carbon dioxide
8. **What do plants release through the holes?**
Oxygen and water
9. **How do plants start every food chain?**
They produce the glucose, the food that begins the chain.
10. **How do plants help animals breathe?**
They release oxygen, which animals breathe in.
11. **How do plants help prevent erosion?**
Their network of roots can help hold soil or sand together.
12. **What did all the plants need to survive and grow?**
Sunlight, water, air
13. **What did all plants produce, and where do they belong in the food chain?**
Glucose/food; They belong at the beginning of the food chain.

Lesson 7: Modeling Photosynthesis

1. **How did you represent the production of glucose and oxygen in your model?**
Sample answer: I used arrows to show small circles coming out of the leaves to represent oxygen. I labeled sugar in the leaves.

2. **How did you represent where the plant gets light?**

Sample answer: I used yellow construction paper to make the sun and yellow craft wire to show the rays from the sun shining down onto the plant's leaves.

Lesson 8: Energy Relationships Among Plants and Animals

1. **What is the purpose of consuming, or eating, food?**

To get energy

2. **Which consumers in the image are herbivores, or eat producers?**

Jackrabbits and lizards

3. **Which consumers in the image are carnivores, or eat other consumers?**

Snakes and foxes

4. **How does energy flow in a coral reef system?**

How does energy flow in a desert?

Lesson 9: Explaining Energy Relationships Among Plants and Animals

1. **Does my organism live in the water or on land?**

Sample answer: water

2. **Does my organism get its energy directly from the sun?**

Sample answer: Everything on Earth gets some energy from the sun, but an octopus lives too deep in the ocean to get direct energy from the sun.

3. **Does my organism live in hot or cold climates? Rainy or dry?**

Sample answer: It lives in the cold, deep parts of oceans.

4. **Did the group use all the Core Vocabulary terms?**

Students' sorted stacks of Core Vocabulary cards should reveal which terms were used.

5. **Which Core Vocabulary terms did the group not use?**

Students should verify with one another examples of terms that were not included, if any.

6. **How do you know whether something is a producer?**

It makes its own food.

7. **How do you know whether something is a consumer?**

It eats producers or other consumers.

8. **How do you know whether something is a scavenger?**

It eats dead consumers.

9. **Did your group identify an omnivore that would live in your environment?**

If so, what is the omnivore?

Lesson 10: Ecosystems

1. **What do the non-ecosystem pictures have in common?**

Sample answer: They are pictures of just one feature, such as a rock.

2. **What do the ecosystem pictures have in common?**

Sample answer: They show things that work together to make places where different

organisms live.

3. **What kinds of things do you notice in the ecosystem pictures?**

Sample answer: The pictures show more than one thing.

4. **What kinds of things do you notice in the non-ecosystem pictures?**

Sample answer: They are pictures of just one thing.

5. **Do you think ecosystems are a mix of living and nonliving things?**

Sample answer: yes, because it looks like some parts are able to move and some parts look like they might always be still

6. **What are some organisms found in your ecosystem?**

Accept reasonable student answers and question responses that may not be true for the chosen ecosystem.

7. **What are the nonliving things found in your ecosystem?**

Sample answers: sand, rocks, water

8. **What do the plants need to survive?**

Sample answers: sun, water, the right temperature for the plants

9. **What do the animals need to survive?**

Sample answers: sources for food, ways to keep warm

10. **How do the living and nonliving things work together to sustain life in this ecosystem?**

Students should address the concepts of needs and dependencies in the relationships.

11. **How did the living organisms get to live on the island?**

Wind, water, wings

12. **What happens when the organisms die?**

They decompose and turn into rich mulch that lets other things grow.

13. **What are some of the nonliving things found in the Hawaiian ecosystem?**

Volcanoes, lava, water, sunshine, air, mud/soil

14. **What are some of the living things found in the Hawaiian ecosystem?**

Fungi, birds, trees, spiders

15. **How do you think these living and nonliving things interact?**

Sample answer: The birds drink the water from the lake; the trees grow from the soil and water on the island.

16. **Why do organisms survive well in healthy ecosystems?**

Organisms have what they need to survive, and a healthy ecosystem is balanced and provides those things to the organisms.

17. **What did you read about in the reading selection that is similar to these activities?**

Ecosystems are made up of living and nonliving parts that work together to sustain life.

18. **How do you think this would affect an ecosystem?**

What would happen to the organisms if their ecosystem suddenly stopped getting as

much sunlight? How would this affect the ecosystem as a whole?

Lesson 11: A Local Ecosystem

1. What is an ecosystem?

Sample answer: living and nonliving things that form a community of organisms and their environment

2. What can you find in an ecosystem?

Sample answer: living things and the living and nonliving things that affect them

3. Are nonliving things essential to an ecosystem?

Yes

4. What are some nonliving things that are essential to an ecosystem?

Sample answer: shelter and a way to move from place to place, such as water for swimming or sand for walking on

Lesson 12: Food Chains and Food Webs

1. What is a food chain?

A series of organisms listed in a way that shows which is a food source for another

2. Which organisms are part of the food chain being shown?

Eagle, its prey, and the food sources of its prey

3. What is at the top of this food chain?

Eagles

4. What does it mean to be at the top of the food chain?

Nothing eats the top consumer.

5. What is the producer in this ecosystem?

Sample answer: green plant

6. What are the consumers that eat the producers?

Sample answer: tree frogs, squirrels, deer

7. What are the consumers that eat other consumers?

Sample answer: lizards, jackrabbits, mountain lions

8. What would be the top consumer?

Sample answer: mountain lions, bobcats, coyotes

9. How do energy and matter cycle through the ecosystem?

Producers make energy from the sun that gets eaten and transferred from one organism to another.

10. What are some producers shown in the video?

Sunflower, oak tree

11. What are some consumers shown in the video?

Squirrel, hawk, humans

12. How does a food chain relate to a food web?

A food chain shows the order in which energy and matter flow through organisms, and a food web shows how all of the organisms are interrelated. There can be multiple

food chains in a food web.

13. What is the difference between a food chain and a food web?

A food chain shows the order in which energy and matter flow through a series of organisms, and a food web shows how all the organisms are interrelated.

14. What did you read about in the reading selection that is like these activities?

Energy and matter cycle through organisms, beginning with producers and ending with consumers, and then the cycle starts over again even after organisms die.

15. Why can't you identify all the relationships in a food web?

There are too many, some microscopic, to quantify.

16. What does it mean to be at the top of a food chain?

Nothing eats the organism at the top of the food chain until after it dies.

Lesson 14: Changes in Ecosystems

1. How does introducing a new species/overhunting/drought change an ecosystem?

Sample answer: These types of events change whether there is enough food in an ecosystem.

2. Do you think a volcanic eruption has a small or large impact on an ecosystem?

Large

3. What do you think is an example of a small change to an ecosystem? Why?

Sample answer: If a fire burns a small area of a crop but is quickly put out, the change is small in comparison to burning the whole crop.

4. What do you think is an example of a large change to an ecosystem? Why?

Sample answer: If a fire is out of control and burns large areas of crops, it can cause a big loss of available foods for many people and animals.

5. What kinds of natural processes can cause species to end up in new places?

Wind, water

6. What kinds of human activities can cause species to end up in new places?

Keeping exotic pets, boats and planes traveling from place to place

7. Which human activity contributes the most to deforestation?

Agriculture/ farming

8. How does deforestation disrupt ecosystems?

Many animals depend on the forests for food and shelter. Without those forests, the organisms can go hungry or die.

9. What can people do to help reverse the effects of deforestation?

Plant new trees

10. How does human population affect ecosystems?

Growing populations put a strain on ecosystems because more people need more resources.

11. **In what way does pollution harm ecosystems?**
Water, air, and soil can become polluted and harm the organisms that need these factors to survive.
12. **How can climate change negatively impact ecosystems and food webs?**
As the climate changes, certain organisms may not be able to survive in certain parts of the world anymore. If those organisms die and become extinct, this will impact the food web.
13. **How do you think protecting endangered species helps ecosystems?**
Protecting endangered species prevents them dying off, so this human activity can preserve their place in a food web to have a balanced ecosystem.
14. **What kinds of changes can disrupt an ecosystem?**
Natural events such as drought and earthquakes, as well as human activities such as deforestation, can disrupt ecosystems.
15. **What did you read about in the reading selection that is like these activities?**
Ecosystems react to changes that occur naturally and through human activities.

Lesson 15: People and the Environment

1. **What's an example of a natural disaster that can disrupt an ecosystem?**
Forest fire
2. **What would happen during a forest fire?**
Trees would burn down.
3. **If there are no trees, what happens to the animals that lived in the trees?**
They wouldn't have a place to live; they would have to move and find a new home.
4. **If there are no trees, what happens to the animals that ate the leaves of those trees?**
They wouldn't be able to eat; they would have to find new things to eat.
5. **If the animals could no longer eat or did not have trees for hiding and protection, they might die. What happens to the stability of that ecosystem?**
It gets thrown off balance.
6. **What is the human activity that you chose to focus on?**
Student answers will vary.
7. **What kind of evidence did you find?**
Provide prompts as needed, such as asking how the evidence is connected to a specific human action.
8. **How would an ecosystem be able to recover from this disruption?**
Student answers may include plans for rebuilding, replanting, or planning ways to prevent a similar disruption later.
9. **What is a proposed solution to this problem (the human activity)?**
Sample answer: Replant the trees once the debris has been cleared.

10. **What evidence supports your conclusion?**

How would an ecosystem be able to recover from this disruption? (Student answers may include plans for rebuilding, replanting, or planning ways to prevent a similar disruption later.)

Unit quiz key

1. b 2. d 3. d 4. b 5. d 6. c 7. a 8. d 9. c 10. c 11. d 12. a