Activity Pages Answer Key: *Protecting Earth's Resources*

This answer key offers guidance to help you assess your students' learning progress. Here you will find descriptions of the expectations and correct answers for each Activity Page of this unit.

Name the Resource (AP 1.2) (page 127)

1. Answers should include the following: sunlight, water, soil, air, plants, animals, minerals, fossil fuels.

2–5. Responses based on student choices of resources will vary.

Lesson 1 Check (AP 1.3) (page 128)

1. Answers will vary. Accept the following: a stock or supply of a substance, material, or objects found in nature and of use to people

2. Answers will vary. Accept any reasonable answer, such as: For breakfast I had cereal. Cereal is made from plants, which need soil, water and sunlight to grow. The bus uses gasoline. Gasoline comes from oil. The whole time I was breathing air.

3. Answers will vary. Accept the following: Since ecosystems provide natural resources, human use of natural resources reduces available resources for organisms, and removal of natural resources can damage parts of ecosystems.

4. Answers will vary. Accept any reasonable answer, such as: I choose water as my natural resource. It should be protected since all living things need water. I would make a law to stop people from putting chemicals in the water.

Human Activities and Water (AP 2.1) (page 129)

1. Answers may include various activities such as washing clothes, taking a shower, brushing teeth, fishing, swimming, and cooking.

2–4. Answers will vary based on student choices.

Cleaning Water (AP 2.2) (page 130)

1. Answers should note that the coffee filter trapped all the sand and that the water was less colored compared with the sieve. However, water took longer to pass through the filter.

2. Answers should note that the coffee filter trapped all the soil and that the water was less colored

compared with the sieve but that the sieve also trapped some material. Water took longer to pass through the filter.

3. Answers should note that the coffee filter is better at filtering water but is slower than the sieve.

4. Answers will vary. Students should include the concept of a balance between the time taken to filter the water and the effectiveness of the filter.

Lesson 2 Check (AP 2.3) (page 131)

1. Answers will vary. Accept the following: When germs, waste, chemicals, or other substances enter water, they can harm people and wildlife.

2. Answers will vary. Accept the following: to remove large objects from the wastewater

3. Answers will vary. Accept the following: to kill bacteria or other bugs or germs in the water that could make people sick

4. The chemicals stick to the gills of fish. The fish are less able to get oxygen from water.

5. water quality testing

6. use less phosphate

7. Phosphate causes the algae to grow out of control.

8. As the algae grow out of control, they decompose. The bacteria that decompose the algae use up oxygen in the water. Fish and other animals need oxygen. As their oxygen is used up, they cannot survive.

Water Pollution Sources (AP 3.1) (page 132)

1. Answers may include one or more of the following: farming, gardening, road or building construction, landfill, trash, boating, fishing, logging, runoff from parking lots

2. Answers will vary. Students should observe that some pollution sources have common origins. For example, plastics from a landfill may pollute rivers and end up as a garbage patch in the ocean.

3–5. Answers will vary based on student choices.

Lesson 3 Check (AP 3.2) (page 133)

1. Answers will vary. Accept the following: Every living thing needs water to survive. Plants and animals live in water, drink water, and use water to make food. No living thing can survive without water.
2. Answers will vary. Accept the following: on Earth's surface in lakes and rivers and underground in aquifers
3. Answers will vary. Accept the following: to ensure that fresh water is not used faster than it is replaced
4. Answers will vary. Accept any reasonable answer, such as: Dave is wrong because people use chemicals that benefit plants. The chemicals can keep weeds from growing among crops. Other chemicals stop insects from damaging crops. However, these chemicals can be harmful if they enter lakes and rivers.
5. Answers will vary. Accept the following: Oil is difficult to remove from water, and it kills plankton, fish, birds, and other sea life.
6. Answers will vary. Accept two or more of the following: soaked up, use chemicals or bacteria, skim off the surface, burned off
7. Answers will vary. Accept the following: an area of ocean where pieces of plastic collect or an area of ocean where the density of plastic is high

Z-Chart (AP 4.1) (page 134)

1. Answers will vary based on student choices. Look for sources appropriately related to the task.
2. Answers will vary based on region and available source information.
3. Answers will vary based on student choices. Look for grade-appropriate organization of information from the source.

How Pollution Spreads (AP 4.2) (page 135)

1. Answers will vary. However, answers should include the following elements: The water represents a water body, such as a lake or ocean. The food coloring represents a point source of pollution. The pebble represents land.

2. Answers will vary. However, answers should include that the ice cubes created water currents that caused the food coloring to move.
3. Answers will vary. Accept any reasonable answer, such as: An oil spill is an example of point-source pollution. When the oil is spilled, water currents can move the oil to other places in the water.
4. Answers will vary. Accept any reasonable answer, such as: An oil spill first harms wildlife in the water near the spill. When the oil spreads to other areas, it will harm even more wildlife. If people eat fish affected by the oil spill, they could become sick.
5. Answers will vary. Accept any reasonable answer, such as: Preventing oil spills is one way to protect water resources. Oil spills can be prevented by ensuring that oil companies transport oil safely. Cleaning up quickly after an oil spill is another way to protect water resources. One way to clean up oil spills is to use bacteria that eat oil.

Lesson 4 Check (AP 4.3) (pages 136–137)

1. Correct order: B, E, A, C, D
2. Answers will vary. Accept the following: A point source of pollution may cause worse initial damage than a nonpoint source. A point source of pollution may be quicker to clean up than a nonpoint source.
3. Correct selection: A, C
4. Answers will vary. Accept any reasonable answer, such as: When people clean up an oil spill from water, the cleaner water resource benefits wildlife and people.
5. Answers will vary. Accept any reasonable answer, such as: A water treatment plant uses technology to filter and disinfect water so that the water is safe for people and the environment.

Water Resources Action Plan (AP 5.1) (page 138)

1. Answers will vary by classroom and community.
2. Evaluate students based on reasonable grade-appropriate use of topical information.

Lesson 5 Check (AP 5.2) (page 139)

1. Answers will vary. Accept any reasonable answer, such as the following: We need to protect our local water resources because access to clean, reliable sources of fresh water is essential to society and human health and necessary for a healthy environment.

2. Answers will vary. Accept any reasonable answer, such as the following: to address a specific water resources problem with solutions and recommendations to achieve a specific goal or desired outcome

3. Answers will vary. Accept any reasonable answer that includes five or more of the following: title, summary, background or introduction, problem statement or question, recommendations, evidence such as maps or diagrams, specific goals to be accomplished, budget and schedule, references

4. Answers will vary. Accept any reasonable answer, such as the following: Use observations and surveys to collect data. Make predictions about potential issues or concerns. Test solutions and methods to address water resources problems.

Testing Air Quality (AP 6.1) (page 140)

3. Answers will vary based on location of school, but students may mention putting the card near where cars or buses drive since air pollution is produced when fuel is burned.

4. Results should prompt students to draw a representation of tiny collected particles.

Air Quality Index (AP 7.1) (page 141)

1–3. Answers will vary based on location. Check for accurate interpretation of available data.

4. breathing problems, itchy eyes

5. planting trees and plants, reducing use of fuel, using clean energy, putting scrubbers on smokestacks

6. Yes, wind can move air pollution from one place to another, so it is possible for a place to suffer from poor air quality even though it did not contribute to the problem.

Indoor and Outdoor Pollution (AP 8.1) (page 142)

1–2. Answers will vary based on location. Check for accurate interpretation of available data.

3. If a city is more crowded with cars or has more factories, it can have a higher AQI.

4. The smoke blew toward some students but not others.

5. Evaluate responses based on grade-appropriate use of information. Sample answers:

Indoor air pollution:

comes mostly from textiles and cleaning supplies

Both:

presents health hazards

Outdoor air pollution:

comes mostly from vehicles and industry

Researching Air Pollution (AP 8.2) (page 143)

Volcanic eruption:

outdoor air; natural; no

Smoking/vaping:

indoor air; human-caused; yes

Emissions from vehicles:

outdoor air; human-caused; yes

Forest fire:

outdoor air; both; yes

Smoke/chemicals from factories or power plants:

both; human-caused; yes

Smoke from cooking food:

indoor air; human-caused; yes

Smog:

outdoor air; human-caused; yes

How Can a Cyclone Clean Air? (AP 9.1) (page 144)

1. It stuck to the sides of the cup.

2. in a factory before the smoke is released, in an exhaust chimney, or on the tailpipe of a car or truck to keep pollutants from entering air

Air Quality Action Plan (AP 9.2) (page 145)

1. Answers will vary by classroom and community.
2. Evaluate students based on reasonable grade-appropriate use of topical information.

Making a Waste-Free Lunch (AP 10.1) (page 146)

- Drawings will vary but should show only items that are 100% consumable or reusable.
- Some disadvantages are that it takes more time to plan and may cost money to buy the reusable items and take time to wash them every day. Some advantages are that there is less waste that needs to be recycled or put in landfills. This keeps land from being contaminated and saves energy and cost from transporting and recycling the materials.

Examining Contaminated Land (AP 10.2) (page 147)

1. Accept all reasonable responses.
2. Students should note deterioration in biodegradable material and no change in nonbiodegradable material.
3. It reduces land contamination because the material eventually is broken down completely.

Ways Humans Contaminate Land (AP 11.1) (page 148)

Building on Land:

positive effects: can stabilize areas, provides living environments for humans

negative effects: destabilizes ecosystems, takes away living environments for existing organisms

Farming:

positive effects: can replenish soil, adds ecosystems to an area

negative effects: introduces chemicals to the environment that can be harmful, reduces living areas for wildlife

Mining:

positive effects: provides resources for humans, provides jobs

negative effects: can damage ecosystems, long-term effects due to chemicals used

Green Space:

positive effects: provides living areas for wildlife, helps return oxygen to the air

negative effects: reduces land available for human uses, destination green spaces can increase traffic in an area

Modeling Strip Mining (AP 11.2) (page 149)

1. **Sand:** land/soil; **Stone:** materials removed during mining; **Chopsticks:** bulldozer/drill
2. It moved.
3. It removes material and makes it sink.
4. It is not able to be used for animals to live in or plants to grow in.

Researching Community Land Use (AP 12.1) (page 150)

Answers will vary based on location. Evaluate for grade-appropriate use of relevant information.

Land Use Action Plan (AP 13.2) (page 152)

1. Answers will vary by classroom and community.
2. Evaluate students based on reasonable grade-appropriate use of topical information.

Interacting Spheres (AP 14.1) (page 153)

Sample answers:

Atmosphere: I breathed the air. I saw through the atmosphere to find things.

Biosphere: I ate plants. I played with my dog. I listened to the birds. I wore cotton socks.

Geosphere: I walked on the ground. I put salt on my potato. I drank from a glass.

Hydrosphere: I drank water. I ran through the rain. I used water to brush my teeth.

Positive and Negative (AP 14.2) (page 154)

Positive Relationships:

monitor changes and well-being of plants and animals

recycle and reuse resources

efficiently use resources such as water or energy in heating, lighting, or traveling

make rules to protect endangered animals and plants

find ways to dispose of waste materials safely

Negative Relationships:

litter

use disposable cups, bottles, dishes

waste resources by leaving on lights, leaving windows open when heating a building, letting the water run

use chemicals that harm wildlife

destroy animal habitats

Positive and Negative Impacts (AP 15.1) (page 155)

1. deforestation, global warming, hunting, mining, pollution
2. recycling, renewable energy, replanting, wildlife protection
3. **Negative Impact:** deforestation, global warming, hunting, mining, pollution
4. **Is Addressed By (Positive Activity):** replanting, renewable energy, wildlife protection, recycling, recycling

Researching Environmental Protection (AP 15.2) (page 156)

Answers will vary based on location. Evaluate for grade-appropriate use of relevant information.

Lesson 15 Check (AP 15.3) (pages 157–158)

1. Answers will vary. Accept any reasonable answer, such as: A reliable source is from a well-known news website that is not biased. A scientific article or paper is a reliable source. An unreliable source does not use evidence or scientific reasoning.
2. Answers will vary. Accept an answer that cites an example of a positive relationship with living resources, such as: Replanting forests is a human activity with a positive impact on the ecosystem's trees.
3. Answers will vary. Accept an answer that cites an example of a positive relationship with nonliving resources, such as: Limiting use of fossil fuels for transport is a human activity with a positive impact on the ecosystem's air.

4. Answers will vary. Accept an answer that cites an example of a negative relationship with living resources, such as: Hunting animals is a human activity with a negative impact on the ecosystem's wildlife.
5. Answers will vary. Accept an answer that cites an example of a negative relationship with nonliving resources, such as: Mining is a human activity that generates waste with a negative impact on the ecosystem's soil.
6. Answers will vary. Accept any reasonable answer that cites an example of an ecosystem threat and describes how it harms the environment, such as: Deforestation causes trees to be removed, loss of soil, and loss of habitat for wildlife. The ecosystem is harmed because these impacts reduce its capacity to support life.
7. Answers will vary. Accept any reasonable answer that cites an example of how people have used scientific ideas and technology to protect Earth's ecosystems, such as: Scientists use satellite images to monitor deforestation and replanting.

Lesson Reflection (AP UC.3) (page 161)

1. Answers will vary. Accept any reasonable answer, such as the following: We need to protect our local ecosystems because healthy ecosystems are essential for society, human health, and maintaining the food supply. Healthy ecosystems provide food, clothing, medicines, energy, and clean air and water.
2. Answers will vary. Accept any reasonable answer, such as the following: to address a specific ecosystem's problem with solutions and recommendations to achieve a specific goal or desired outcome
3. Answers will vary. Accept any reasonable answer that includes five or more of the following: title, summary, background or introduction, problem statement or question, recommendations, evidence such as maps or diagrams, specific goals to be accomplished, budget and schedule, references
4. Answers will vary. Accept any reasonable answer, such as the following: Use observations and surveys to collect data. Make predictions about potential threats, issues, or concerns. Test solutions and methods to address ecosystem problems.