Zoe Explores Ecosystems Around the World

Grade 6 science travel

Students will be able to analyze how organisms obtain resources, grow, and interact within ecosystems across different biomes.

Name: _____ Date: _____

1. Zoe lands in Costa Rica to study a rainforest ecosystem. She spots a toucan eating figs from a tree. Is the toucan a producer or a consumer? Circle one: PRODUCER / CONSUMER. Explain your choice in one sentence.

2. Zoe finds a rare find — a field notebook left by a scientist. It lists these organisms: fig tree, toucan, jaguar, fungi. Fill in the blank. The fig tree is the _____ in this food chain because it captures energy from the sun.

3. Zoe travels to the Serengeti in Africa. She observes that zebras eat grass, lions eat zebras, and bacteria break down dead lions. True or False: Bacteria are producers in this ecosystem. Explain why using the word 'decomposer.'

4. Zoe discovers a unique item — a hidden map showing two Serengeti zones. Zone A has 120 grass plants per square meter. Zone B has only 15. Zoe hypothesizes that Zone B will support fewer zebras than Zone A. What is one piece of evidence from the map that supports her hypothesis?

5. Zoe reaches a coral reef in Australia. She records this food web: algae → sea urchin → triggerfish → reef shark. A disease wipes out all triggerfish. Predict TWO effects this would have on other organisms in the food web. Use the words 'increase' and 'decrease.'

6. Zoe uncovers a hidden treasure — an old ecologist's journal from the Amazon. It states: producers in this rainforest capture 10,000 units of energy. Only 10% passes to each next level. Complete the energy pyramid. Level 1 (producers): 10,000 units. Level 2 (primary consumers): ___ units. Level 3 (secondary consumers): ___ units. Then explain why energy is lost between levels.

7. Zoe interviews a local ecologist in the Amazon. The ecologist says deforestation removed 40% of the tree cover in one region. Zoe observes that insect species dropped sharply afterward. Using your knowledge of ecosystems, explain the cause-and-effect chain that links tree loss to insect decline. Include the words 'habitat,' 'producer,' and 'food source.'

8. Zoe completes her world expedition and presents her biggest discovery. She found that every ecosystem she visited — rainforest, savanna, coral reef, Amazon — followed the same rule: removing one organism affected all others. This is called interdependence. Design a real conservation plan for ONE ecosystem Zoe visited. Name the ecosystem. Identify one organism at risk. Explain how losing it would affect two other organisms. Then state one action humans could take to protect it. Use evidence from Zoe's expedition notes.

Answer Key: Zoe Explores Ecosystems Around the World

GRADE 6 | TEACHER & PARENT USE ONLY

Before Q6, pause and ask students to predict which organism in Zoe's rainforest food web holds the most energy. Students can compare their predictions to what Q6 reveals about producer-to-consumer energy flow.

1. Zoe lands in Costa Rica to study a rainforest ecosystem. She spots a toucan eating figs from a tree. Is the toucan a producer or a consumer? Circle one: PRODUCER / CONSUMER. Explain your choice in one sentence.

Answer: Working: Producers make their own food using sunlight. Consumers eat other organisms for energy. The toucan eats figs — it does not make its own food. Answer: CONSUMER. Explanation example: The toucan is a consumer because it eats figs from the tree rather than making its own food.

2. Zoe finds a rare find — a field notebook left by a scientist. It lists these organisms: fig tree, toucan, jaguar, fungi. Fill in the blank. The fig tree is the _____ in this food chain because it captures energy from the sun.

Answer: Working: A producer captures sunlight and converts it to food energy. All other organisms listed consume other things. The fig tree performs photosynthesis. Answer: The fig tree is the PRODUCER in this food chain because it captures energy from the sun.

3. Zoe travels to the Serengeti in Africa. She observes that zebras eat grass, lions eat zebras, and bacteria break down dead lions. True or False: Bacteria are producers in this ecosystem. Explain why using the word 'decomposer.'

Answer: Working: Producers make food from sunlight. Decomposers break down dead organic matter and recycle nutrients back into the soil. Bacteria here break down dead lions — they do not produce food from sunlight. Answer: FALSE. Bacteria are decomposers, not producers, because they break down dead organisms to recycle nutrients.

4. Zoe discovers a unique item — a hidden map showing two Serengeti zones. Zone A has 120 grass plants per square meter. Zone B has only 15. Zoe hypothesizes that Zone B will support fewer zebras than Zone A. What is one piece of evidence from the map that supports her hypothesis?

Answer: Working: Food availability limits consumer populations. Zone A has 120 grass plants per square meter. Zone B has only 15 grass plants per square meter. Fewer producers means less food energy available for primary consumers like zebras. Answer: Zone B has far fewer grass plants (15 vs. 120 per square meter), so there is less food to support a large zebra population, supporting Zoe's hypothesis.

5. Zoe reaches a coral reef in Australia. She records this food web: algae → sea urchin → triggerfish → reef shark. A disease wipes out all triggerfish. Predict TWO effects this would have on other organisms in the food web. Use the words 'increase' and 'decrease.'

Answer: Working: Removing triggerfish breaks the energy transfer between sea urchins and reef sharks. Sea urchins are no longer eaten by triggerfish — their population will increase. Reef sharks lose a food source — their population will decrease. Answer: (1) Sea urchin populations will increase because triggerfish no longer eat them. (2) Reef shark populations will decrease because they lose triggerfish as a food source.

6. Zoe uncovers a hidden treasure — an old ecologist's journal from the Amazon. It states: producers in this rainforest capture 10,000 units of energy. Only 10% passes to each next level. Complete the energy pyramid.

Level 1 (producers): 10,000 units. Level 2 (primary consumers): ___ units. Level 3 (secondary consumers): ___ units. Then explain why energy is lost between levels.

Answer: Working: 10% rule — multiply each level by 0.10 to find the next level. Level 1: 10,000 units. Level 2: 10,000 × 0.10 = 1,000 units. Level 3: 1,000 × 0.10 = 100 units. Answer: Level 2 = 1,000 units. Level 3 = 100 units. Explanation: Energy is lost between levels because organisms use most energy for life processes like movement and heat, so only about 10% transfers to the next consumer level.

7. Zoe interviews a local ecologist in the Amazon. The ecologist says deforestation removed 40% of the tree cover in one region. Zoe observes that insect species dropped sharply afterward. Using your knowledge of ecosystems, explain the cause-and-effect chain that links tree loss to insect decline. Include the words 'habitat,' 'producer,' and 'food source.'

Answer: Working: Trees are producers and provide habitat. Step 1 — Trees (producers) are removed by deforestation. Step 2 — Habitat for insects is destroyed; insects lose shelter and nesting sites. Step 3 — Insects also lose their food source because many feed on leaves, bark, and fruit from trees. Step 4 — With less habitat and less food, insect populations decline. Answer: Deforestation destroys the habitat insects depend on. Trees are producers that serve as a food source for many insects. With fewer trees, insects lose both shelter and food, causing their populations to drop sharply.

8. Zoe completes her world expedition and presents her biggest discovery. She found that every ecosystem she visited — rainforest, savanna, coral reef, Amazon — followed the same rule: removing one organism affected all others. This is called interdependence. Design a real conservation plan for ONE ecosystem Zoe visited. Name the ecosystem. Identify one organism at risk. Explain how losing it would affect two other organisms. Then state one action humans could take to protect it. Use evidence from Zoe's expedition notes.

Answer: Working: Step 1 — Choose an ecosystem from the expedition (rainforest, savanna, reef, or Amazon). Step 2 — Identify one at-risk organism and trace its role in the food web. Step 3 — Apply cause-and-effect reasoning to two other organisms. Step 4 — Propose a human action grounded in reducing a specific threat. Example full answer: Ecosystem: Coral reef (Australia). Organism at risk: Triggerfish (from Q5). Effect 1 — Sea urchin populations explode without triggerfish to control them. Effect 2 — Reef sharks decline because they lose a key food source. Human action: Establish a marine protected area around the reef to ban fishing of triggerfish, allowing their population to recover and restoring balance to the food web. Conclusion: Zoe's expedition proved that every ecosystem depends on all its parts — protecting one organism protects the whole system.