Desert Connections

Model how a desert wash fits into larger ecological systems.

BIO.6 "Develop and use models to illustrate interactions between ecological hierarchy levels, including biosphere, biome, ecosystem, community, population, and organism."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Number one example of each ecological level in the passage, from 1 for organism to 6 for biosphere. Underline two statements that show how a change at one level can affect another.

Life in a Desert Wash

1. At the edge of an Arizona desert wash, a Gila woodpecker pecks a nest cavity into one saguaro cactus. That single cactus is an organism. All the saguaros living in the wash form a saguaro population, while all the Gila woodpeckers there form another population. The populations of saguaros, woodpeckers, bees, and other living species together make up the wash community. When bees carry pollen between cactus flowers, they help the saguaros produce fruit. Woodpeckers eat the fruit and may scatter its seeds. A change affecting one organism can therefore reach other populations in this community.

2. The wash ecosystem includes its community plus nonliving parts, such as sandy soil, sunlight, and rainwater. After a storm, water collects briefly in low ground. Some seeds then germinate, giving insects more plants to feed on; more insects can support woodpeckers. In a long dry spell, fewer seedlings survive, so the community may change even though the soil and sunlight remain. This wash is one ecosystem within the Sonoran Desert biome. A biome is a large region with characteristic climate and living things. Other Sonoran Desert ecosystems include rocky slopes, which hold different communities.

3. All Earth's biomes together are part of the biosphere, the regions of Earth where life exists. The Sonoran Desert is only one piece of this largest level. Levels help us model both a place and changes within it: an organism belongs to a population, populations interact in a community, and a community interacts with nonliving features in an ecosystem. The biome groups ecosystems shaped by a regional climate, while the biosphere includes life across biomes. If unusually little rain falls across the biome for years, many wash ecosystems could dry out, changing populations in more than one community.

2 ANSWER WITH EVIDENCE

Use the passage

1. Make a smallest-to-largest chain using the cactus, all saguaros in the wash, the wash community, the wash ecosystem, the Sonoran Desert biome, and the biosphere. Label each ecological level.

2. Trace how a storm could affect woodpeckers through two other kinds of living things. Which level includes the rainwater, and which level includes the interacting populations?

3. Place the desert wash and a rocky slope in a model of the Sonoran Desert. What level does each place represent, and what larger level contains both?

4. Suppose little rain falls across the Sonoran Desert for years. Trace how this biome-wide condition could change more than one community.

3 YOUR TURN

Your own words

In the box, sketch a nested model of a place other than the desert wash. Label an example at each of the six levels, include a nonliving part of the ecosystem, and add two arrows with short notes: one from a nonliving part to a living level and one between living levels.

Desert Connections

PART 1 · READ AND MARK

Number one example of each ecological level in the passage, from 1 for organism to 6 for biosphere. Underline two statements that show how a change at one level can affect another. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	Make a smallest-to-largest chain using the cactus, all saguaros in the wash, the wash community, the wash ecosystem, the Sonoran Desert biome, and the biosphere. Label each ecological level.	**One cactus, organism → all saguaros in the wash, population → wash community, community → wash ecosystem, ecosystem → Sonoran Desert, biome → biosphere.**
2	Trace how a storm could affect woodpeckers through two other kinds of living things. Which level includes the rainwater, and which level includes the interacting populations?	**Rainwater can help seeds germinate. More plants can feed more insects, which can support more woodpeckers. Rainwater is part of the ecosystem; the interacting populations make up the community.**
3	Place the desert wash and a rocky slope in a model of the Sonoran Desert. What level does each place represent, and what larger level contains both?	**The wash and rocky slope are different ecosystems with different communities. Both are within the Sonoran Desert biome.**
4	Suppose little rain falls across the Sonoran Desert for years. Trace how this biome-wide condition could change more than one community.	**Less rain across the biome could dry out many wash ecosystems. Fewer seedlings might survive in each wash, changing populations and their interactions in multiple communities.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

Nested labels, smallest to largest: one oak tree, organism; local oak trees, population; oak, squirrel, and fungus populations, community; forest patch with soil and rain, ecosystem; temperate deciduous forest, biome; Earth's biosphere. Arrow from rain to the oak population: water supports oak growth. Arrow from the oak population to squirrels: acorns provide food.

Accept other accurate chains and effects supported by the passage. For the open task, check that the six levels are nested correctly and that both arrows explain plausible interactions.