Name _____ Date _____

NGSS-Designed Lesson Assessment: Resources in Living Systems

Main Ideas

Read each item. Then select the letter next to the best answer.

1. Lola lives on a small island in Lake Erie. She loves watching the local squirrels chase each other and eat berries. She decides to plant 100 berry bushes on the island. How might the larger population of berry bushes affect the squirrel population that eats the berries?

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    A. The squirrels will stop eating berries because there are too many.
    B. The larger population of berries will have no effect on the squirrel population on the island.
    C. The larger population of berries will cause an increase in the squirrel population on the island.
    D. The larger population of berries will cause a decrease in the squirrel population on the island.

2. The corn plants on the left side of the image below are larger and their leaves are greener than the plants on the right side. They are growing in the same soil and with the same amount of light and water. What might explain the differences between the two groups of plants?

    A. Both parts of the corn field lack important resources, resulting in limited growth.
    B. Both parts of the corn field have equal amounts of resources, resulting in healthy corn.
    C. The corn on the right has more resources than the corn on the left, resulting in more abundant growth.
    D. The corn on the left has more resources than the corn on the right, resulting in more abundant growth.

3. It has been a particularly dry year in Nevada, so there is very little grass growing. Carlos knows that grasshoppers need fresh vegetation, like grass, to eat. What might Carlos predict about grasshopper populations this year?

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   A. Grasshopper populations will increase in a dry year.
   B. Grasshopper populations will decrease in a wet year.
   C. Grasshopper populations will decrease in a dry year.
   D. Grasshopper populations will be the same, whether the year is dry or wet.

4. Carolina is working on a science fair project. She is doing a survey of the diversity of dragonflies in a pond in her local park. In the spring, she counts an average of 25 blue winged dragonflies and 12 orange headed dragonflies each day. At a different park, on the other side of town, she counts an average of 12 blue winged dragonflies and 30 orange headed dragonflies each day.

   What might explain this pattern?

   A. Blue winged dragonflies are more common than orange headed dragonflies.
   B. Blue winged dragonflies are better at competing for a limited resource under any set of conditions.
   C. Orange headed dragonflies are better at competing for a limited resource under any set of conditions.
   D. Blue winged dragonflies are better at competing for a limited resource at the pond in the local park than are orange headed dragonflies.

5. Grassland ecosystems around the world have limited amounts of rainfall. As a result, few or no trees grow in those ecosystems because trees require more rainfall. What pattern would you expect if amounts of rainfall increased in a grassland ecosystem?

   A. No trees would grow in grassland ecosystems with more rainfall.
   B. More trees would grow in the grassland ecosystem with limited rainfall.
   C. More trees would grow in the grassland ecosystem with more rainfall.
   D. The growth of trees in the grassland ecosystem is not affected by rainfall.

6. These zebras and wildebeest are grazing together on an African savanna. Populations of different species are competing for the same food resource: grass. How might two species competing for the same resource continue to co-exist?

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   A. Zebras will eat more grass, causing a decline in the wildebeest population.
   B. Zebras will eat more grass, causing an increase in the wildebeest population.
   C. Wildebeest will eat grass in the same way as zebras do, increasing competition with zebras.
   D. Zebras will eat grass in slightly different ways, reducing competition between their populations.

Think Like a Scientist

Read about each scientific investigation. Then answer the questions that follow the investigation by selecting the letter next to the best answer.

Investigation

Khalid is interested in how plants respond to limited resources. He decides to study how plant growth is affected by the amount of sunlight, a resource that all green plants need to survive and reproduce. He plants seeds under different light conditions, varying from plants exposed to no shade during the day to plants that are shaded for 80% of every day.

He then measured the response of the plants to these conditions by measuring their total mass after a period of growth.

Khalid's results are show in the table below.

The impact of shade on plant mass.

Amount of shade	Plant Mass (g)
No shade	54
40% shade	42
60% shade	41
80% shade	25

7. Which pattern best fits the data collected by Khalid?

    A. Plants that grow with more shade grow larger.
    B. Plants that grow with more sunshine grow larger.
    C. Plants that grow with more sunshine end up being smaller.
    D. Plants that grow with intermediate amounts of sunshine grow larger.

8. Khalid has been put in charge of designing a test garden in his school. How might he use the information from his experiment to help design a garden that grows the largest plants?

    A. Khalid should make sure that the garden is shaded to reduce sunlight.
    B. Khalid should make sure that the garden has lots of exposure to sunlight.
    C. Khalid should make sure that the garden has intermediate amounts of sunlight.
    D. These data do not provide information that will help Khalid design the test garden.

9. In this experiment, sunlight is not a limited resource, but nutrients are a limited resource. How might the results change if all of the plants were grown under the same amount of sunlight, but with another limited resource, such as limited nutrients?

   A. The plants would all grow larger.
   B. The mass of all of the plants would be larger.
   C. The mass of all of the plants would be smaller.
   D. Limited resources would have no impact on the plants.

Expressing Science Practices, Concepts, and Ideas

Read the directions for each item carefully and use the space provided to respond.

10. Khalid is exploring different ways that limited resources affect how plants grow and reproduce. In addition to collecting data on how amount of sunlight affects plant mass, he has collected data on how amount of sunlight affects the number of flowers. Predict how more sunlight affects number of flowers by filling in the table.

    Indicate the range of values that are possible in the table below by filling in the grid.

The impact of shade on plant flowering.	
Amount of shade	**Number of flowers**
No shade	
40% shade	6.3
60% shade	
80% shade	2.6

11. You have gotten a summer internship at a local natural history museum. You have been asked to help develop a museum display that shows an organism in its ecosystem, biome, and in the biosphere.

    Choose a favorite wild organism – which could be a plant or an animal or even a single celled organism. Then draw that organism in its hierarchy. Use a nested set of circles and be sure to include the following levels of organization:
    • organism
    • population
    • species
    • ecosystem
    • biome
    • biosphere

12. Rosy snails have been accidentally transported by people to an area where white-lined snails are found. The two snail species compete for the same kinds of resources.

Use the evidence provided in the table below to write a one paragraph essay that includes:
• a claim about which species is the better competitor.
• evidence and reasoning to support your claim.

Snail population sizes over time

Year	Rosy snail population size	White-lined snail population size
1	5,223	3,514
2	8,542	1,815
3	12,544	178

13. You are preparing for your school's Science Night. You have decided to give a presentation on how food resources impact populations. You found the photograph below to illustrate how a population of lions might be impacted by one of their food resources, a population of zebras. Write a script for what you plan to say in your presentation using the picture. Use all the words from the word bank.

WORD BANK
population
resource
scarce
abundant
increase
decrease