



Battle Creek Area Mathematics and Science Center Summative Assessment - End of Unit Exam

Attached is the Summative Assessment for the Battle Creek Area Mathematics and Science Center Science Unit, *Energy in an Ecosystem*. This assessment includes a number of multiple-choice questions, two constructed response questions, and several items from the unit's Student Journal. Summative assessment of targeted concepts and skills provides feedback to the individual student and the teacher on conceptual understanding, demonstration of achievement of selected content, and determination of readiness for refinement and application of new knowledge and skills. The inclusion of the Student Journal items provides the opportunity to determine the level of understanding and ability of key knowledge and skills targeted in this unit. The Student Journal items evaluate individual student learning and the effectiveness of instruction. Rubrics are included in the Summative Assessment to ensure consistent scoring of the items. All components of this assessment provide multiple opportunities to assess student understanding of each science content expectation addressed in the unit.

The BCAMSC Summative Assessments are in draft form and may change based on student performance and teacher feedback. The BCAMSC Outreach Staff will use data collected from participating districts to make adjustments for the following school year.

If you have any questions or suggestions regarding the Summative Assessment, please direct your calls to Nancy Karre at (269) 965-9584 or email: nancy@bcamsc.org.



A S S E S S M E N T



Name: _____



Date: _____

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1. Which of the following relationships is parasitic?
 - a. A flea on a dog.
 - b. A fish cleaning worms from a shark.
 - c. Two buzzards fighting over a dead animal.
 - d. A ladybug eating the aphids (insects) on a plant.

2. Serena and Marie had fun spending the month of July at their grandfather's farm in Michigan. A family of red-tailed hawks lived in the nearby forest. Serena and Marie watched the hawks circle in the sky and then swoop down and catch mice and fly off to the forest with their prey in their talons. Grandfather said he was very happy the family of hawks lived close to his barn and fields. What do you think is the BEST reason that their grandfather is happy to see the hawks?
 - a. The hawks are good entertainment for Serena and Marie during their visit.
 - b. The hawks keep the mice and squirrel population in balance.
 - c. Grandfather belongs to the birdwatching organization.
 - d. The hawks help grandfather's crops to grow.

3. The red-tailed hawks and mice are part of the ecosystem in the forest near the grandfather's farm. What role do the hawks play in the ecosystem?
 - a. predator
 - b. prey
 - c. producer
 - d. decomposer

4. What might happen to the ecosystem if the hawks left?
 - a. The hawks would fly south for winter.
 - b. The hawks would starve.
 - c. The mice population would increase.
 - d. The mice would also leave the area.



Energy in an Ecosystem (cont.)

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5. Which of the following describes the relationship between the hawk and mouse?
 - a. parasitic
 - b. competitive
 - c. predator/prey
 - d. symbiotic

6. Which of the following provides organisms in an ecosystem with all their basic life requirements?
 - a. soil
 - b. habitat
 - c. air
 - d. consumers

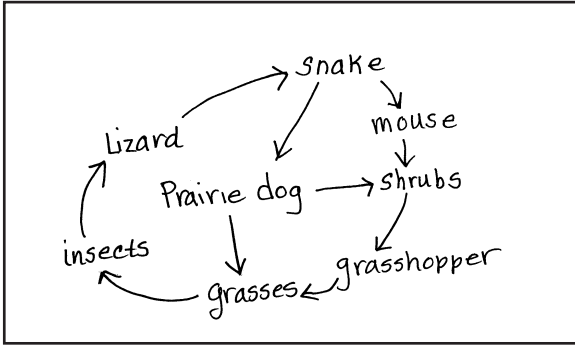
7. A prairie ecosystem consists mainly of prairie dogs, hawks, rabbits, mice, grass, owls, bushes, and snakes. Which organisms in the prairie ecosystem are producers?
 - a. grass, bushes
 - b. hawks, owls, snakes
 - c. prairie dogs, rabbits, and mice
 - d. All of the organisms are producers.

8. When the number of members in a species becomes very small, that species is said to be:
 - a. little
 - b. extinct
 - c. balanced
 - d. endangered

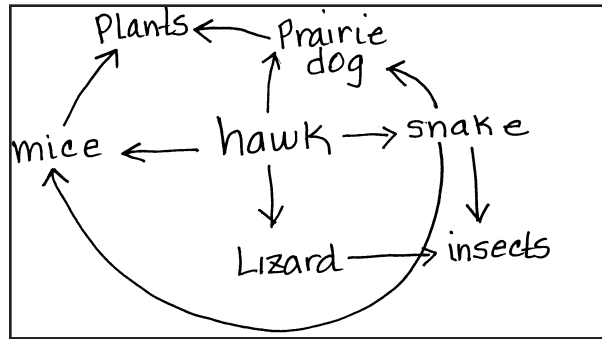


9. Choose the food web that shows the energy flow in a prairie ecosystem.

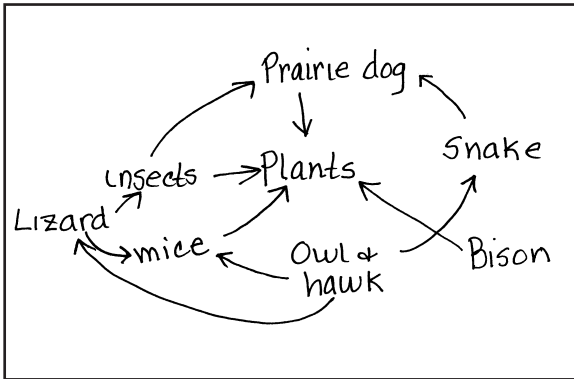
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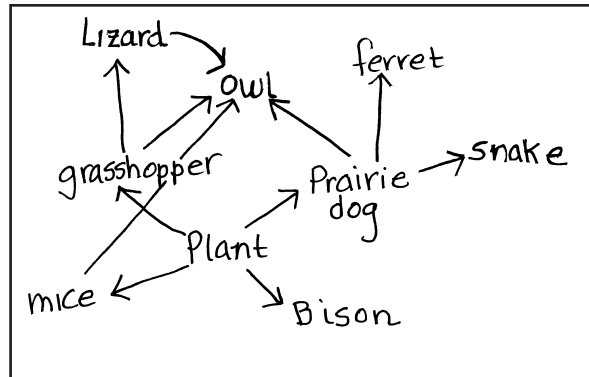
b.



c.



d.



10. A biologist studying birds made the following observations. She concluded that the birds would not compete for food because:

- a. insects are plentiful.
- b. the birds feed at different times.
- c. the birds lay eggs at different times.
- d. the birds feed in different parts of the tree.

| Bird | Food | When They Feed | Where They Feed |
|--------|---------|----------------|-----------------|
| Bird 1 | insects | dawn, dusk | trees, middle |
| Bird 2 | insects | dawn, dusk | trees, higher |
| Bird 3 | insects | dawn, dusk | trees, lower |



Energy in an Ecosystem (cont.)

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11. The Hines Emerald Dragonfly can be found in Michigan and was one of the first insect species to be listed as endangered under the Endangered Species Act. Female dragonflies deposit eggs in shallow water, near plants, or in soft mud. After the larvae hatch, they live underwater for two to four years. They consume large quantities of mosquito larvae, water insects, worms, and even small fish and tadpoles. Once larval growth is complete, they emerge from the water to begin a life in the air. They shed their final exoskeleton to reveal a bright green body with expanded wings. The adults feed on mosquitoes, flies, and other insects for four to seven weeks before returning to the water to mate and die.

Based on its feeding preferences, the dragonfly is best classified as a:

- a. predator
- b. decomposer
- c. herbivore
- d. producer

12. A large area of wetlands is being drained for development. The most likely effect of this change on the Hines Emerald Dragonfly population will be that the population of:

- a. dragonflies will increase, and mosquitoes will decrease.
- b. dragonflies will decrease, and mosquitoes will increase.
- c. dragonfly larvae will increase, but the adult population will decrease.
- d. dragonfly larvae will decrease, but the adult population will increase.

13. Michigan is one of the few states where the endangered Hines Emerald Dragonflies live. Choose the action most likely to have endangered the survival of the dragonflies.

- a. An increase in rainfall and flooding of the dragonfly habitat.
- b. The introduction of a new invasive predator in the dragonfly habitat.
- c. The destruction of the dragonfly habitat by filling in and building on wetlands.
- d. A shortened spring and summer for the larvae to develop into adults.



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Mrs. Conway's sixth grade classroom built a woodland ecosystem for observation of the relationship between the organisms and their surroundings. They decided that the classroom ecosystem should have a balance that includes consumers, producers, and decomposers. They determined that they would need living and nonliving things in the ecosystem in order for there to be a balance and for all living things to survive.

14. Choose the list below that identifies possible decomposers that would survive in the classroom habitat.
- a. ferns, moss mat, and grasses
 - b. land snails, millipedes, and mushrooms
 - c. lizards, flies, and crickets
 - d. leaf matter, sticks, and soil
15. Choose the role of the decomposer in the ecosystem.
- a. Decomposers eat other plants and animals and break down their food into chemicals and materials that help them grow.
 - b. Decomposers use energy from the sun to make and store their own food in a process called photosynthesis.
 - c. Decomposers feed on and break down dead organisms or their products and provide nutrients to other plants and animals.
 - d. Decomposers are scavengers that eat dead, decaying animals in the forest and along the side of the road.
16. What abiotic factors will be necessary in the classroom ecosystem?
- a. air, water, sunlight, and soil
 - b. plants, soil, and sunlight
 - c. heat, rocks, branches, and leaves
 - d. moisture, heat, nutrients, and plants



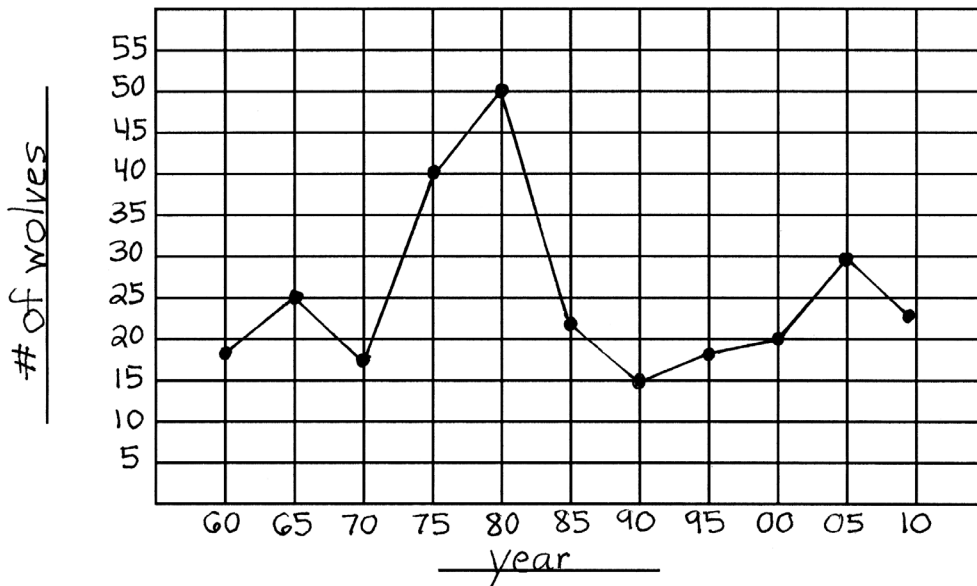
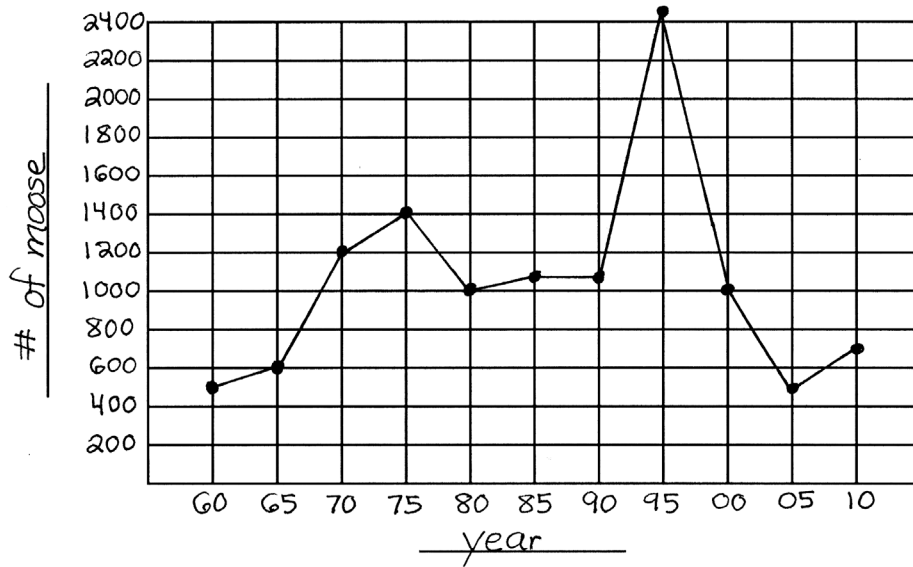
Energy in an Ecosystem (cont.)



17. Mistletoe is a plant that taps its roots into the trunk or branches of a tree. The mistletoe receives its nutrients and water from the host tree. Mistletoe is classified as:
- a. an evergreen plant
 - b. a parasitic plant
 - c. a competitor plant
 - d. a predator plant
18. Michigan's Isle Royale is an island located in the northwest portion of Lake Superior. It is the site of a 50-year-old study of the relationship between the moose and the wolf and their surroundings. The number of wolves on the island is called a:
- a. community
 - b. niche
 - c. population
 - d. ecosystem
19. The interaction of the plants and animals on Isle Royale is called a:
- a. food chain
 - b. community
 - c. population
 - d. competition



Energy in an Ecosystem
Answer Key





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Rubric for Energy in an Ecosystem Summative Assessment

(Total Possible Points - 37)

Question #1: Which of the following relationships is parasitic? (L.EC.06.1)

Answer: a (1 point)

Question #2: What do you think is the BEST reason that their grandfather is happy to see the hawks?
(L.EC.06.23, L.EC.06.32)

Answer: b (1 point)

Question #3: What role do the hawks play in an ecosystem? (L.EC.06.21)

Answer: a (1 point)

Question #4: What might happen to the ecosystem if the hawks left? (L.EC.06.23, L.EC.06.32)

Answer: c (1 point)

Question #5: Which of the following describes the relationship between the hawk and mouse?
(L.EC.06.21)

Answer: c (1 point)

Question #6: Which of the following provides organisms in an ecosystem with all their basic life requirements? (L.EC.06.31)

Answer: b (1 point)

Question #7: A prairie ecosystem consists mainly of prairie dogs, hawks, rabbits, mice, grass, owls, bushes, and snakes. Which organisms in the prairie ecosystem are producers? (L.OL.06.51)

Answer: a (1 point)

Question #8: When the number of members in a species becomes very small, that species is said to be: (L.EC.06.42)

Answer: d (1 point)

Question #9: Choose the food web that shows the energy flow in a prairie ecosystem. (L.OL.06.51)

Answer: d (1 point)



**Energy in an Ecosystem
Answer Key (cont.)**

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Question #10: A biologist studying birds made the following observations. She concluded that the birds would not compete for food because: (L.EC.06.21, S.IP.06.16, S.IA.06.11)

Answer: d (1 point)

Question #11: Based on its feeding preferences, the dragonfly is best classified as a: (L.EC.06.21, L.OL.06.51)

Answer: a (1 point)

Question #12: The most likely effects of this change on the Hines Emerald Dragonfly population will be that the population of: (L.EC.06.32, L.EC.06.42)

Answer: b (1 point)

Question #13: Michigan is one of the few states where the endangered Hines Emerald Dragonflies live. Choose the action most likely to have endangered the survival of the dragonflies. (L.EC.06.41)

Answer: c (1 point)

Question #14: Choose the list below that identifies possible decomposers that would survive in the classroom habitat. (L.OL.06.51)

Answer: b (1 point)

Question #15: Choose the role of the decomposer in the ecosystem. (L.OL.06.51, L.OL.06.52)

Answer: c (1 point)

Question #16: What abiotic factors will be necessary in the classroom ecosystem? (L.EC.06.31)

Answer: a (1 point)

Question #17: The mistletoe receives its nutrients and water from the host tree. Mistletoe is classified as: (L.EC.06.21)

Answer: b (1 point)

Question #18: The number of wolves on the island is called a: (L.EC.06.11)

Answer: c (1 point)



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Question #19: The interaction of the plants and animals on Isle Royale is called a: (L.EC.06.11)

Answer: b (1 point)

Question #20: Describe how Mr. Ferguson's actions were harmful to the ecosystem in the area. (L.EC.06.11, L.EC.06.41)

Elements

- a. The construction of the dam changed the availability of water for plants and animals downstream.
- b. The construction of the dam created a wetland or flooding, making it not suitable for some plants.
- c. Fish, toads, turtles, and other animals downstream of the dam lost their water and populations decreased.
- d. Fish, toads, turtles, and other animals had an increase in water and populations increased.

Scoring (4 points)

- 4 - Response includes all four elements
- 3 - Response includes three elements
- 2 - Response includes two elements
- 1 - Response includes one element
- 0 - No response, no elements, can't read the answer

Question #21: Choose an ecosystem that exists in Michigan (example: woodland, lake, pond, river, dunes, meadow, etc.). Describe the biotic and abiotic elements and give examples of populations and communities that live there. (L.EC.06.11)

Elements

- a. Student includes description of biotic factors.
- b. Student includes description of abiotic factors.
- c. Student includes examples of members within the community.

Scoring (3 points)

- 3 - Response includes all three elements
- 2 - Response includes two elements
- 1 - Response includes one element
- 0 - No response, no elements, can't read the answer



Summative Assessment: Student Journal

Question #22 - Activity #1, Journal Entry: Write a scientific explanation that describes the change in the moose population on Isle Royale after the wolves arrived on the island. Include a clear and concise claim, evidence from your data chart and graphs, and reasoning in your scientific explanation. (L.EC.06.11, S.IP.06.16, S.IA.06.11)

Elements

- a. Claim is clear and concise that reflects the lack of patterns or trends in the population of moose and wolves.
- b. Evidence is cited from the graph and chart.
- c. Reasoning reflects additional factors in the population numbers besides the predator/prey relationship.

Scoring (3 points)

- 3 - Response includes all three elements
- 2 - Response includes two elements
- 1 - Response includes one element
- 0 - No response, no elements, can't read the answer

Question #23 - Activity #4, Journal Entry Question #2: Describe the role of the consumer and decomposer in the ecosystem. Describe how the consumer and decomposer obtain food (energy). (L.0L.06.52)

Elements

- a. Consumers eat plants and other animals to obtain food (energy).
- b. Consumers help to provide a balance in the population of animals in an ecosystem.
- c. Decomposers break down the remains of dead plants and/or animals to obtain food (energy) and return nutrients to the soil.
- d. Decomposers provide nutrients to the soil through their waste products.
- e. Decomposers help reduce the amount of waste and decomposing material in an ecosystem.

Scoring (5 points)

- 5 - Response includes all five elements
- 4 - Response includes four elements
- 3 - Response includes three elements
- 2 - Response includes two elements
- 1 - Response includes one element
- 0 - No response, no elements, can't read the answer



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Question #24 - Activity #8, Journal Entry Question #2: Describe what would happen if one of the populations of organisms in the food web became overpopulated. (L.EC.06.23)

Elements

- a. If one population of organisms became overpopulated, the food supply for that population would decrease and gradually be unable to support that population.
- b. If one population of organisms became overpopulated, there would be competition for food, space, and water within the population.
- c. If one population of organisms became overpopulated, the food supply would eventually run out and the population would die off or move to a new location.

Scoring (2 points)

- 2 - Response includes at least two elements
- 1 - Response includes one element
- 0 - No response, no elements, can't read the answer

Question #25 - Activity #8, Journal Entry Question #3: Describe what might cause a population of organisms to become overcrowded. (L.EC.06.32)

Elements

- a. Populations of organisms become overcrowded when the food source is plentiful.
- b. Populations of organisms become overcrowded when weather conditions are favorable for food getting.
- c. Populations of organisms become overcrowded when a predator in the ecosystem moves or dies out.

Scoring (1 point)

- 1 - Response includes at least one element
- 0 - No response, no elements, can't read the answer