

Interactions Among Organisms: Mastery Check

Learning target: I can classify interactions with plus, minus and zero codes, read and predict predator-prey patterns, predict ripple effects in an ecosystem I have not studied, and tell a criterion from a constraint.

Retrieval and mastery check

About 40 min

Individual

MS-LS2-2 · assesses

MS-ETS1-1 · practice

independent practice

writing

Name _____

Date _____

Period _____

Directions

Answer every item on your own without notes. For multiple-choice items, circle one letter. For numeric items, show your calculation. For the drawing item, label every arrow. Finish with the synthesis paragraph in Part B. There are 12 items and 30 points; the points for each item are shown in brackets.

You will need: This worksheet, Pencil, Calculator (optional)

Part A: Retrieval and application (items 1-11)

1. [2] A gray fox eats mice, insects and bird eggs in spring, and mostly berries and manzanita fruit in late summer and fall. Which word fits it best, in the way this lesson uses the words? 2 pts
☐ A. Carnivore, because it hunts mice
☐ B. Herbivore, because most of its fall food is fruit
☐ C. Omnivore, because it regularly eats both plants and animals
☐ D. Not a predator, because eating fruit does not count
2. [2] A leech attaches to a western pond turtle's leg, drinks a little blood for several hours, then drops off. The turtle swims away, weakened slightly but alive. Which interaction best describes this? 2 pts
☐ A. Predation, because the leech eats part of another living animal
☐ B. Parasitism, because the leech feeds on a living host a little at a time without killing it
☐ C. Commensalism, because the turtle survives
☐ D. Competition, because both animals need food
3. [2] True or false: 'In competition, the species that wins most of the resource gets a +.' Circle your answer and explain. 2 pts
☐ True ☐ False Explain your thinking:

4. [2] A biologist counts barn owls and the meadow voles they mainly eat every year for twenty years. 2 pts
If the two populations are linked mainly by predation, which pattern should she expect?
- ☐ A. Owl peaks and vole peaks in exactly the same years
 - ☐ B. Owl peaks that come a year or so after vole peaks, in a pattern that repeats but not on an exact schedule
 - ☐ C. Owl peaks that come before vole peaks
 - ☐ D. Owls rising steadily every year while voles fall to zero

5. [3] Teaching numbers for an island: winter 1 had 1,250 moose and 25 wolves; winter 4 had 800 moose and 20 wolves. (a) Calculate the percent change in moose from winter 1 to winter 4. (b) Calculate the moose per wolf in each winter. (c) What do your results predict about the wolf population over the next few winters, and why? 3 pts

6. [3] Draw three boxes labeled sea otters, purple sea urchins and giant kelp. Draw an arrow for each interaction between them and label it with the interaction's name and its two codes. Then write ↑ or ↓ next to each box to show what happens to that population if the otters disappear. 3 pts

7. [3] A teaching scenario from a coral reef: groupers eat parrotfish; parrotfish scrape algae off rock and dead coral; algae compete with young corals for places to settle. Fishing boats remove most of the groupers. Predict what happens to the parrotfish, the algae and the young corals, and label each change as direct or indirect. 3 pts

8. [2] A team is designing a shield that protects a frog-call recorder from highway noise. Which statement is a **constraint** rather than a criterion? 2 pts
- ☐ A. The shield must cut highway noise at the recorder by at least 8 dB.
 - ☐ B. The software must detect at least 70 of 100 test frog calls.
 - ☐ C. The shield must cost no more than \$100 and use no plastic netting that could trap snakes.
 - ☐ D. Frog calls from the pond side must lose no more than 2 dB.

9. [2] A ranger writes this criterion for a new wildlife camera: 'It should work well at night.' Rewrite it so it can be tested, and add one constraint that protects the animals being filmed. 2 pts

10. [3] In one desert valley, yucca moths are the only insects that pollinate the yuccas, and yucca moth caterpillars eat only yucca seeds. Pesticide drifting from nearby farms kills most of the moths. Using the interaction's code, predict what happens to the yucca population over the next twenty years, and explain why the change might be slow to show up in a count of adult yuccas. 3 pts

11. [2] A cleaner fish eats algae and small parasites off a sea turtle's shell. Barnacles ride on a gray whale. One pair is a mutualism and the other is a commensalism. Identify each, and explain how the effect on the turtle and on the whale decides the label. 2 pts

Part B: Synthesis (item 12)

Remember the bullhorn acacia from the start of the lesson. The tree grows hollow thorns that ant colonies live in, and it feeds the ants with sugary nectar and small food packets. The ants sting insects and grazing animals that touch the tree and chew away vines and seedlings that crowd it. Trees whose ants were removed were chewed, overgrown by vines and grew far less than trees that kept their ants.

12. [4] Write one paragraph that does all four of these things. (1) Names the interaction between the acacia and its ants, rates each partner with +, – or Ø, and says what each partner gets. (2) Predicts what would happen to the acacia population, and to the ants, if a disease killed most ant colonies, and explains why some of the change could show up only after a delay. (3) Names an interaction with the same code from a different ecosystem and explains why the same pattern appears even though the species are completely different. (4) Names one thing that a first explanation of the acacia often gets wrong (for example, about why the tree 'pays' the ants) and corrects it. If you wrote a first explanation in Worksheet 1, use your own. 4 pts

Two rules to remember

Rule 1: rate each partner separately, helped (+), harmed (–) or no measurable effect (Ø), then read the pair: + + mutualism, + Ø commensalism, – – competition, + – predation (the gainer eats all or part of the other) or parasitism (the gainer lives on or inside a living host and takes a little at a time). Rule 2: populations linked by an interaction push on each other in both directions, and every change takes time, because populations grow through births and young growing up. When you are unsure about an item, ask which rule it is testing.

Write the thirteenth item

Write one new multiple-choice item for this quiz that tests the difference between predation and parasitism using organisms from a California ecosystem. Give four options, mark the correct one, and write one sentence for each wrong option explaining why a student might choose it. Then explain how your item would change if the parasite you chose sometimes kills its host.