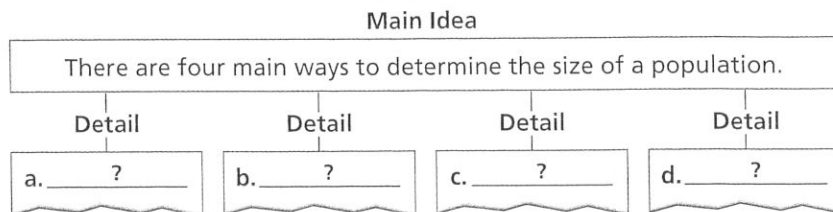


Organizing Information

Identifying Main Ideas Copy the graphic organizer about determining population size onto a separate sheet of paper. Then complete it and add a title. (For more on Identifying Main Ideas, see the Skills Handbook.)



Reviewing Key Terms

Choose the letter of the best answer.

- A prairie dog, a hawk, and a badger all are members of the same
 - niche.
 - community.
 - species.
 - population.
- All of the following are examples of limiting factors for populations *except*
 - space.
 - food.
 - time.
 - weather.
- In which type of interaction do both species benefit?
 - predation
 - mutualism
 - commensalism
 - parasitism
- Which of these relationships is an example of parasitism?
 - a bird building a nest on a tree branch
 - a bat pollinating a saguaro cactus
 - a flea living on a cat's blood
 - ants protecting a tree that produces the ants' only food
- The series of predictable changes that occur in a community over time is called
 - natural selection.
 - ecology.
 - commensalism.
 - succession.

If the statement is true, write *true*. If it is false, change the underlined word or words to make the statement true.

- Grass is an example of a biotic factor in a habitat.
- Immigration is the number of individuals in a specific area.
- An organism's specific role in its habitat is called its niche.
- The struggle between organisms for limited resources is called mutualism.
- A parasite lives on or inside its predator.

Writing in Science

Descriptive Paragraph Use what you have learned about predators and prey to write about an interaction between two organisms. For each organism, describe at least one adaptation that helps it either catch prey or fend off predators.



Populations and Communities

- Video Preview
- Video Field Trip
- ▶ Video Assessment

Review and Assessment

Checking Concepts

11. Name two biotic and two abiotic factors you might find in a forest ecosystem.
12. Explain how plants and algae use sunlight. How is this process important to other living things in an ecosystem?
13. Describe how ecologists use the technique of sampling to estimate population size.
14. Give an example showing how space can be a limiting factor for a population.
15. What are two adaptations that prey organisms have developed to protect themselves? Describe how each adaptation protects the organism.

Thinking Critically

16. **Making Generalizations** Explain why ecologists usually study a specific population of organisms rather than the entire species.
17. **Problem Solving** In a summer job working for an ecologist, you have been assigned to estimate the population of grasshoppers in a field. Propose a method and explain how you would carry out your plan.
18. **Relating Cause and Effect** Competition for resources in an area is usually more intense within a single species than between two different species. Suggest an explanation for this observation. (*Hint:* Consider how niches help organisms avoid competition.)
19. **Classifying** Lichens and mosses have just begun to grow on the rocky area shown below. Which type of succession is occurring? Explain.



Math Practice

20. **Inequalities** Review the two inequalities about population size on page 16. Then revise each inequality to include immigration and emigration in addition to birth rate and death rate.

Applying Skills

Use the data in the table below to answer Questions 21–24.

Ecologists monitoring a deer population collected data during a 30-year study.

Year	0	5	10	15	20	25	30
Population (thousands)	15	30	65	100	40	25	10

21. **Graphing** Make a line graph using the data in the table. Plot years on the horizontal axis and population on the vertical axis.
22. **Interpreting Data** In which year did the deer population reach its highest point? Its lowest point?
23. **Communicating** Write a few sentences describing how the deer population changed during the study.
24. **Developing Hypotheses** In Year 16 of the study, this region experienced a very severe winter. How might this have affected the deer population?

Lab zone Chapter Project

Performance Assessment Review your report and graph to be sure that they clearly state your conclusion about the effects of crowding on plant growth. With your group, decide how you will present your results. Do a practice run-through to make sure all group members feel comfortable with their parts. After your presentation, list some improvements you could have made in your experimental plan.

Review and Assessment

Checking Concepts

9. Name and describe each of the three energy roles organisms can play in an ecosystem.
10. How are food chains and food webs different?
11. What is the source of energy for most ecosystems? Explain.
12. Describe the role of nitrogen-fixing bacteria in the nitrogen cycle.
13. Explain how competition can affect the dispersal of species.
14. Why is the tropical rain forest able to support so many species?
15. In which biome would you find large herbivores such as elephants and zebras? Explain.
16. Which abiotic factors are important to aquatic ecosystems?

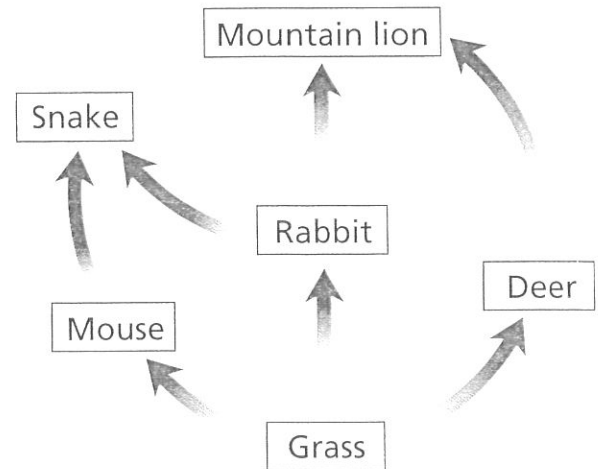
Thinking Critically

17. **Inferring** Polar bears are very well adapted to life around the Arctic Ocean. Their white fur camouflages them in the snow. They can withstand freezing temperatures for a long time. They can swim and hunt in very cold water. Is the distribution of polar bears limited by physical barriers, competition, or climate? Explain your answer.
18. **Comparing and Contrasting** How are the temperate rain forest and the tropical rain forest similar? How are they different?
19. **Predicting** A chemical spill has just killed off all the algae in a part of the surface zone in the open ocean. How will this accident affect the food webs in that part of the surface zone?
20. **Classifying** Which organisms in the illustration are producers? Consumers?



Applying Skills

Use the diagram of a food web below to answer Questions 21–24.



21. **Interpreting Diagrams** Which organism in this food web fills the role of producer?
22. **Classifying** Specify whether each consumer in this food web is a first-level, second-level, or third-level consumer.
23. **Inferring** Which level of the food web contains the greatest amount of available energy?
24. **Predicting** If a disease were to kill most of the rabbits in this area, predict how the snakes, deer, and mountain lions would be affected.

Lab zone Chapter Project

Performance Assessment Create a report, poster, or other product that clearly presents your data and conclusions from your decomposition experiment. In your notebook, compare your results to your predictions about the different waste materials in the compost mixture. Were you surprised by any of your results? Based on what you have learned from your project and those of your classmates, make a list of the ideal condition for decomposition.