



**FOLDABLES** **Brainstorm** other roles that biologists fulfill in addition to those discussed in Section 1.1. List these roles on the back of your Foldable and give examples.

## Vocabulary

## Key Concepts

### Section 1.1 Introduction to Biology

- adaptation (p. 10)
- biology (p. 4)
- development (p. 9)
- growth (p. 9)
- homeostasis (p. 10)
- organism (p. 6)
- organization (p. 8)
- reproduction (p. 9)
- response (p. 9)
- species (p. 9)
- stimulus (p. 9)

**MAIN Idea** All living things share the characteristics of life.

- Biology is the study of life.
- Biologists study the structure and function of living things, their history, their interactions with the environment, and many other aspects of life.
- All organisms have one or more cells, display organization, grow and develop, reproduce, respond to stimuli, use energy, maintain homeostasis, and have adaptations that evolve over time.

### Section 1.2 The Nature of Science

- ethics (p. 15)
- forensics (p. 15)
- metric system (p. 14)
- peer review (p. 14)
- science (p. 11)
- SI (p. 14)
- theory (p. 11)

**MAIN Idea** Science is a process based on inquiry that seeks to develop explanations.

- Science is the study of nature and is rooted in observation and experimentation.
- Pseudoscience is not based on standard scientific research; it does not deal with testable questions, welcome critical review, or change its ideas when new discoveries are made.
- Scientists worldwide use SI.
- Science and ethics affect issues in health, medicine, the environment, and technology.

### Section 1.3 Methods of Science

- control group (p. 19)
- constant (p. 19)
- data (p. 19)
- dependent variable (p. 19)
- experiment (p. 18)
- experimental group (p. 19)
- hypothesis (p. 18)
- independent variable (p. 19)
- inference (p. 16)
- observation (p. 16)
- safety symbol (p. 21)
- scientific method (p. 16)
- serendipity (p. 18)

**MAIN Idea** Biologists use specific methods when conducting research.

- Observations are an orderly way of gathering information.
- Inferences are based on prior experiences.
- Controlled experiments involve a control group and an experimental group.
- An independent variable is the condition being tested, and the dependent variable results from the change to the independent variable.



**FOLDABLES** **Summarize** the law of conservation of matter, and explain how it applies to the physical and chemical changes that take place in substances during natural cycles.

## Vocabulary

## Key Concepts

### Section 2.1 Organisms and Their Relationships

- abiotic factor (p. 35)
- biological community (p. 36)
- biome (p. 36)
- biosphere (p. 34)
- biotic factor (p. 35)
- commensalism (p. 40)
- ecology (p. 32)
- ecosystem (p. 36)
- habitat (p. 38)
- mutualism (p. 39)
- niche (p. 38)
- parasitism (p. 40)
- population (p. 36)
- predation (p. 38)
- symbiosis (p. 39)

- MAIN Idea** Biotic and abiotic factors interact in complex ways in communities and ecosystems.
- Ecology is the branch of biology in which interrelationships between organisms and their environments are studied.
  - Levels of organization in ecological studies include individual, population, biological community, ecosystem, biome, and biosphere.
  - Abiotic and biotic factors shape an ecosystem and determine the communities that will be successful in it.
  - Symbiosis is the close relationship that exists when two or more species live together.

### Section 2.2 Flow of Energy in an Ecosystem

- autotroph (p. 41)
- biomass (p. 44)
- carnivore (p. 41)
- detritivore (p. 42)
- food chain (p. 43)
- food web (p. 43)
- herbivore (p. 41)
- heterotroph (p. 41)
- omnivore (p. 42)
- trophic level (p. 42)

- MAIN Idea** Autotrophs capture energy, making it available for all members of a food web.
- Autotrophs capture energy from the Sun or use energy from certain chemical substances to make food.
  - Heterotrophs include herbivores, carnivores, omnivores, and detritivores.
  - A trophic level is a step in a food chain or food web.
  - Food chains, food webs, and ecological pyramids are models used to show how energy moves through ecosystems.

### Section 2.3 Cycling of Matter

- biogeochemical cycle (p. 45)
- denitrification (p. 48)
- matter (p. 45)
- nitrogen fixation (p. 48)
- nutrient (p. 45)

- MAIN Idea** Essential nutrients are cycled through biogeochemical processes.
- Biogeochemical cycles include the exchange of important elements between the abiotic and biotic parts of an ecosystem.
  - The carbon and oxygen cycles are closely intertwined.
  - Nitrogen gas is limited in its ability to enter biotic portions of the environment.
  - Phosphorus and carbon have short-term and long-term cycles.



**FOLDABLES** **Research** a natural disaster that occurred twenty or more years ago. Determine what the community looked like before the disaster and what the area looks like today. Draw a “then and now” picture.

### Vocabulary

### Key Concepts

#### Section 3.1 Community Ecology

- climax community (p. 63)
- community (p. 60)
- ecological succession (p. 62)
- limiting factor (p. 61)
- primary succession (p. 62)
- secondary succession (p. 63)
- tolerance (p. 61)

- MAIN Idea** All living organisms are limited by factors in the environment.
- Limiting factors restrict the growth of a population within a community.
  - Organisms have a range of tolerance for each limiting factor that they encounter.
  - Primary succession occurs on areas of exposed rock or bare sand (no soil).
  - Communities progress until there is little change in the composition of species.
  - Secondary succession occurs as a result of a disturbance in a mature community.

#### Section 3.2 Terrestrial Biomes

- boreal forest (p. 68)
- climate (p. 66)
- desert (p. 70)
- grassland (p. 70)
- latitude (p. 65)
- temperate forest (p. 69)
- tropical rain forest (p. 72)
- tropical savanna (p. 71)
- tropical seasonal forest (p. 71)
- tundra (p. 68)
- weather (p. 65)
- woodland (p. 69)

- MAIN Idea** Ecosystems on land are grouped into biomes primarily based on the plant communities within them.
- Latitude affects terrestrial biomes according to the angle at which sunlight strikes Earth.
  - Latitude, elevation, ocean currents, and other abiotic factors determine climate.
  - Two major abiotic factors define terrestrial biomes.
  - Terrestrial biomes include tundra, boreal forests, temperate forests, temperate woodlands and shrublands, temperate grasslands, deserts, tropical savannas, tropical seasonal forests, and tropical rain forests.

#### Section 3.3 Aquatic Ecosystems

- abyssal zone (p. 81)
- aphotic zone (p. 80)
- benthic zone (p. 80)
- estuary (p. 78)
- intertidal zone (p. 79)
- limnetic zone (p. 77)
- littoral zone (p. 76)
- photic zone (p. 80)
- plankton (p. 77)
- profundal zone (p. 77)
- sediment (p. 75)
- wetlands (p. 78)

- MAIN Idea** Aquatic ecosystems are grouped based on abiotic factors such as water flow, depth, distance from shore, salinity, and latitude.
- Freshwater ecosystems include ponds, lakes, streams, rivers, and wetlands.
  - Wetlands and estuaries are transitional aquatic ecosystems.
  - Marine ecosystems are divided into zones that are classified according to abiotic factors.
  - Estuaries and coral reefs are among the most diverse of all ecosystems.



**FOLDABLES** **Research** Find the population density of the countries of a continent. Make a color-coded map that shows the population density of each country.

### Vocabulary

#### Section 4.1 Population Dynamics

- carrying capacity (p. 98)
- density-dependent factor (p. 95)
- density-independent factor (p. 94)
- dispersion (p. 92)
- emigration (p. 97)
- immigration (p. 97)
- population density (p. 92)
- population growth rate (p. 97)

### Key Concepts

**MAIN Idea** Populations of species are described by density, spatial distribution, and growth rate.

- There are population characteristics that are common to all populations of organisms, including plants, animals, and bacteria.
- Populations tend to be distributed randomly, uniformly, or in clumps.
- Populations tend to stabilize near the carrying capacity of their environment.
- Population limiting factors are either density-independent or density-dependent.

