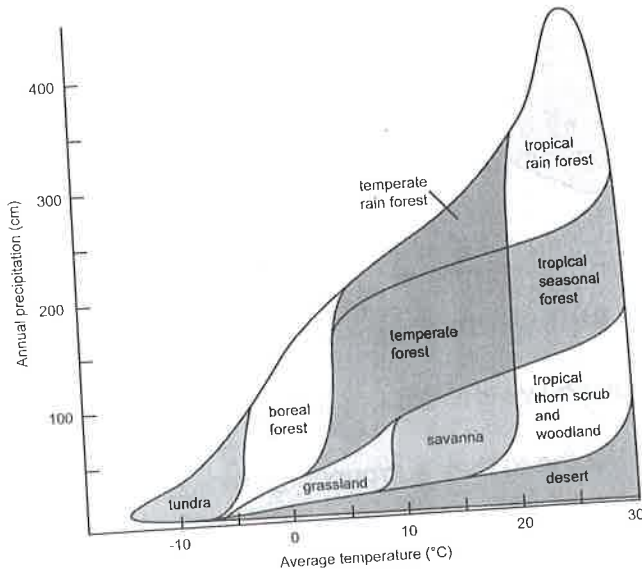


① Read and track your thinking!

### 33. Earth's Biomes

A <sup>1</sup>Climates vary throughout the world. <sup>2</sup>**Climate** is the average weather conditions of a region, which is described by the average yearly precipitation and temperature. <sup>3</sup>Climate affects the **abiotic factors** (nonliving things) in the environment, such as water, air, sunlight, and soil. <sup>4</sup>**Biotic factors** (living things) depend on abiotic factors for survival. <sup>5</sup>The earth is divided into large land regions, called **biomes**, which have similar plants, animals, and climate. <sup>6</sup>Notice in the graph below how each biome is effectively characterized by the temperature and amount of precipitation.



B <sup>7</sup>Observe the extremely low temperatures of the **tundra** biomes. <sup>8</sup>This severe climate causes a layer of soil to remain permanently frozen. <sup>9</sup>This **permafrost** layer prevents roots from growing deep in the ground; therefore, trees are quite sparse. <sup>10</sup>Some plants that are able to grow in the tundra's nutrient-poor soil during the short growing season are wildflowers, grasses, mosses, and dwarf shrubs. <sup>11</sup>Even though the precipitation is also very low, the tundra still has snowy grounds and many swamps and bogs due to the exceptionally low rate of evaporation. <sup>12</sup>A few of the animals that are able to live in the tundra, even with these abiotic factors, are caribou, owls, foxes, and rabbits. <sup>13</sup>Many of these animals have adapted to this environment by camouflaging with white coats. <sup>14</sup>The arctic tundra includes large areas of northern Canada and Russia.

C <sup>15</sup>You can determine from the graph that the **tropical rain forest** has the opposite climate of the tundra. <sup>16</sup>This is mainly due to their location. The tropical rain forests are found in close proximity to the equator. <sup>17</sup>Unlike the tundra, the tropical rain forest has a very high rainfall and very hot temperatures, which is why it is home to two-thirds of all animals and plant species on the earth.

D <sup>18</sup>The **desert** biome is characterized by a very dry climate. <sup>19</sup>Unlike the tundra, the desert can lose more moisture than it receives. <sup>20</sup>Temperatures can be extreme due to this low moisture, changing from a daytime temperature of 50 degrees Celsius (122 degrees Fahrenheit) to a nighttime temperature of zero degrees Celsius (32 degrees Fahrenheit). <sup>21</sup>There are also some deserts that are cold most of the time. <sup>22</sup>Deserts occupy about one-third of our planet's land surface and are found on every continent. <sup>23</sup>The soils in most deserts have a low amount of organic materials and are usually very sandy or rocky. <sup>24</sup>Any organism that lives in the deserts has been able to adapt to the arid conditions. <sup>25</sup>To avoid moisture loss, many of the desert animals rest during the daylight hours and are awake at night, which is called being **nocturnal**. <sup>26</sup>Some desert animals are snakes, lizards, rodents, a few insects, and birds. <sup>27</sup>The sparse plant life may include shrubs, cacti, and grass that grows in bunches.

E <sup>28</sup>The **temperate forests** are located between the polar zones and the tropical zones (near the equator). <sup>29</sup>The climate in the temperate zones on Earth is subtler, with warm and cool weather changing with the seasons. <sup>30</sup>Biomes that lie within the temperate zones are coniferous forests, deciduous forests, and grasslands. <sup>31</sup>A wide range of plants and animals live within these temperate areas, including the majority of the human population.

Read these directions Carefully.

1. For each statement, circle T for true and F for false. If the statement is false, replace the **bold word(s)** to make the statement true. Then write the number of the sentence(s) that best supports your answer.

a. T F There **are not many** deserts on Earth. \_\_\_\_\_  
\_\_\_\_\_

b. T F **Not many trees** grow in the tundra. \_\_\_\_\_  
\_\_\_\_\_

c. T F **Not many trees** grow in the temperate forests. \_\_\_\_\_, \_\_\_\_\_  
\_\_\_\_\_

d. T F The desert biome daytime temperature is **similar to** the nighttime temperature. \_\_\_\_\_  
\_\_\_\_\_

2. In paragraph D, the word **arid** most likely means:  
a. very dry  
b. moist  
c. rainy  
d. sunny

3. In paragraph E, an antonym for the word **subtle** is most likely:  
a. slight  
b. moist  
c. calm  
d. obvious

4. How have desert animals adapted to the dry climate?  
\_\_\_\_\_  
\_\_\_\_\_

Write the number of the sentence that best supports your answer. \_\_\_\_\_

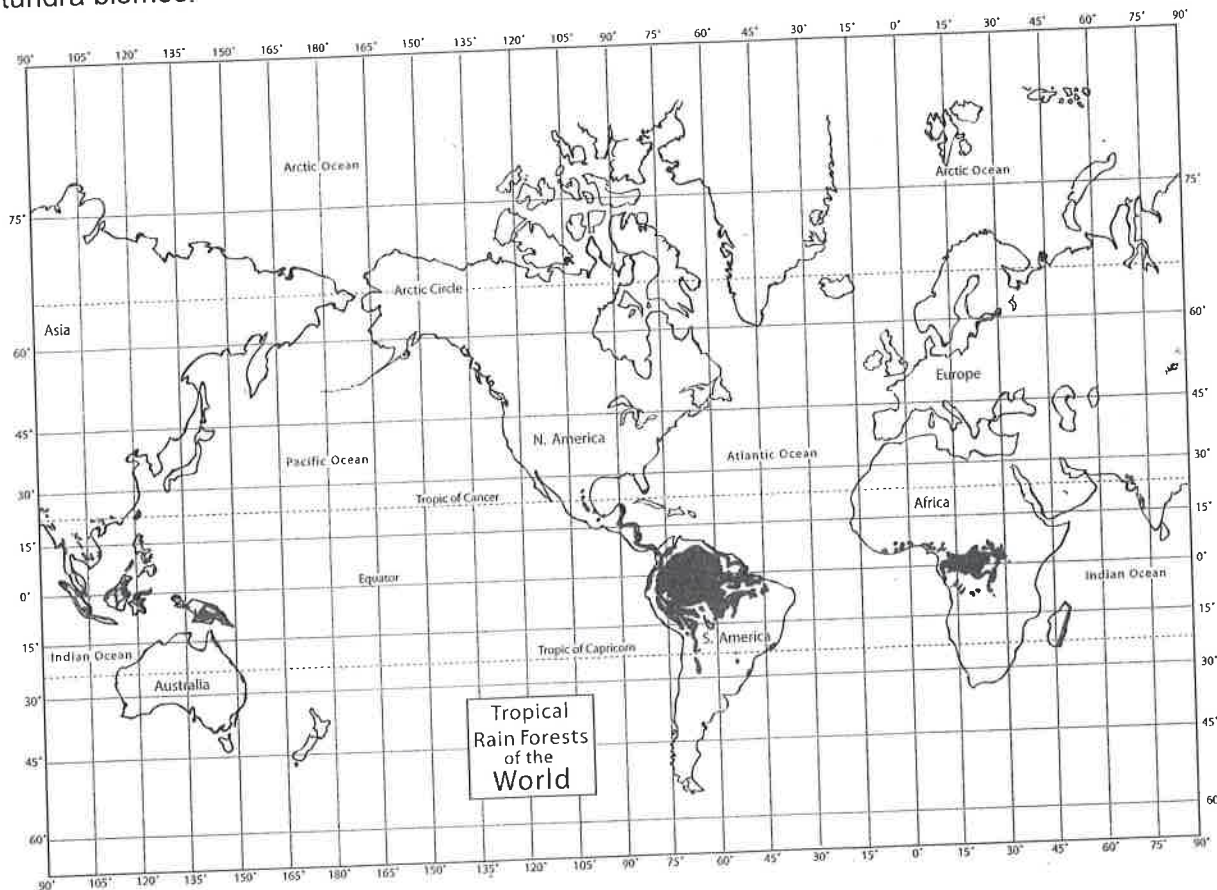
5. Using the graph, list the three biomes that have average temperatures that reach below zero degrees Celsius.  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

6. Using the graph, describe the climate in the savanna.  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

7. View the world map on the following page as you complete the following questions.  
a. Describe the location of the tropical rain forests of the world.  
\_\_\_\_\_

b. How does the location affect the climate of the rain forests?  
\_\_\_\_\_

8. On the world map, label the approximate locations of the temperate forest biomes and the tundra biomes.



### Written Response Questions

For the following two questions, apply all of the information you've learned when answering.

9. Explain how the soil in the tundra and desert are similar. How does this type of soil affect these biomes? (3-4 sentences)

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10. Describe the type of biome where you live. Describe the climate and how it affects the abiotic factors. Then give details on how the biotic factors depend on the abiotic factors. (3-4 sentences)

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## ① Read and track your thinking! 34. Ecosystems

**A** <sup>1</sup>Earth has a huge variety of ecosystems.

<sup>2</sup>Water ecosystems can be found in rivers, lakes, ponds, marshes, coral reefs, the deep sea, and elsewhere. <sup>3</sup>Land ecosystems are in forests, grasslands, deserts, and numerous other places.

<sup>4</sup>Each ecosystem depends on the balance and interaction of the abiotic and biotic factors.

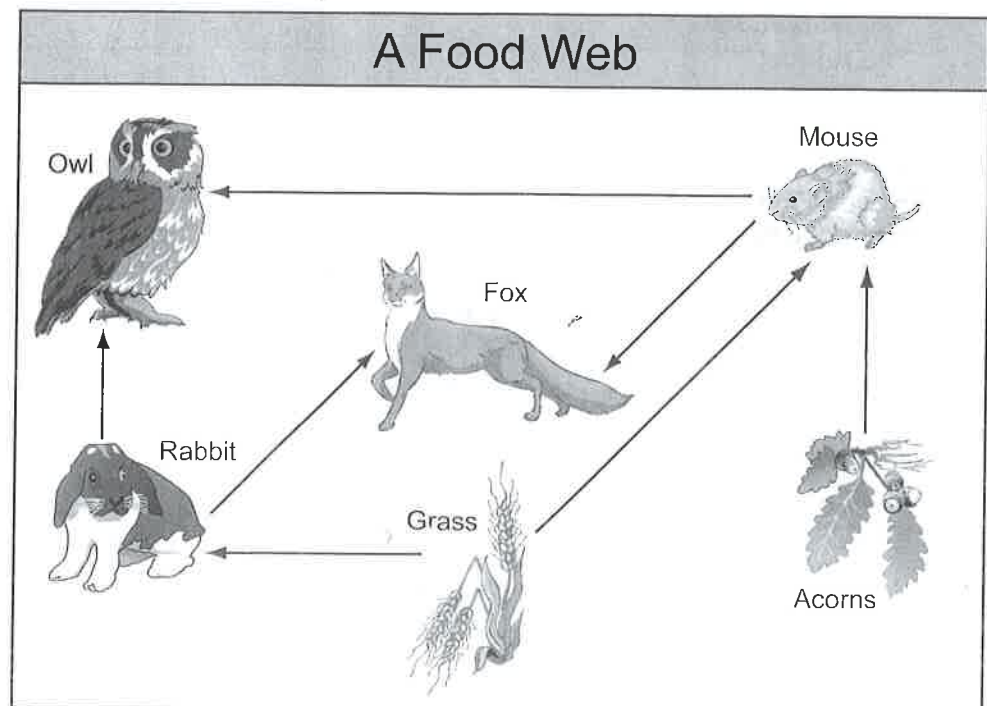
**B** <sup>5</sup>If you sat quietly beside a lake, what do you suppose you would observe? <sup>6</sup>Perhaps you'd see fish jumping in the water, ducks swimming by, and the breeze causing ripples in the water.

<sup>7</sup>All of these features are part of this freshwater ecosystem. <sup>8</sup>An **ecosystem** is the interlinking of all living (biotic) and nonliving (abiotic) things in an area. <sup>9</sup>The abiotic factors of a lake ecosystem would be rocks, the lake water, rain, wind, the sunshine, the ground soil surrounding the lake, the muddy lakebed, and all other nonliving things that make up the physical surroundings. <sup>10</sup>The biotic things are organisms such as animals, plants, bacteria, etc.

**C** <sup>11</sup>A group of organisms of one species living in the same area is called a **population**. <sup>12</sup>A group of ducks, a group of bass, or millions of microscopic bacteria each make up a separate population. <sup>13</sup>All of the populations of organisms in an area are called a **community**. <sup>14</sup>Each organism has an important function within the ecosystem. <sup>15</sup>A **niche** is the role each species has in an ecosystem. <sup>16</sup>This role takes into account what an animal eats, who eats it, where it lives, and more. <sup>17</sup>The dragonfly's niche in a freshwater ecosystem is to fly over the surface of the water, to eat flies and mosquitoes, and to be eaten by predators, such as frogs and birds. <sup>18</sup>Each species has its own unique role, meaning it cannot have exactly the same niche as another species.

**D** <sup>19</sup>The feeding relationships between organisms in an ecosystem are known as both **food chains** and **food webs**. <sup>20</sup>The first link in the food chain is a **producer**, which is a plant, protist, or other organism that make its own food through the process of photosynthesis. <sup>21</sup>The second link is considered the primary **consumer**, which cannot make its own food, so it eats the producer for its energy. <sup>22</sup>This consumer could be an **herbivore** (plant eater) or an **omnivore** (plant and animal eater). <sup>23</sup>All consumers depend on other living things for survival. <sup>24</sup>The next link in the chain is the secondary consumer, which is a **carnivore** (animal eater). <sup>25</sup>An example food chain is shown within the food web diagram below. <sup>26</sup>It begins with the grass getting energy from the sun. <sup>27</sup>Next, the rabbit eats the grass for energy, and then the fox eats the rabbit for energy.

**E** <sup>28</sup>Notice how the food web diagram is a more complex networking of producers and consumers than a food chain. <sup>29</sup>A food web is more realistic, since most animals consume several different types of food for survival. <sup>30</sup>For example, the mouse will eat acorns, grasses, seeds, and other types of food from plants when they are available, which depends on the season. <sup>31</sup>The owl will hunt for and consume insects, small mammals, and even other birds.



SCIENCE DETECTIVE® A1

Read these directions carefully

1. For each statement, circle T for true and F for false. If the statement is false, replace the **bold word(s)** to make the statement true. Then write the number of the sentence(s) that best supports your answer.

a. T F **All consumers** rely solely on producers for food. \_\_\_\_\_

b. T F One population of frogs lives in **many ponds**. \_\_\_\_\_

c. T F The owl in the food web diagram is a **secondary consumer**. \_\_\_\_\_

d. T F The rabbit in the food web diagram is **an omnivore**. \_\_\_\_\_

2. In paragraph B, the word **interlinking** most likely means:

- a. consuming
- b. connecting
- c. separating
- d. dividing

3. In paragraph E, an antonym for the word **complex** is:

- a. complicated
- b. narrow
- c. simple
- d. difficult

4. Describe the niche of an animal not mentioned in this lesson.

Animal: \_\_\_\_\_

Niche: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

5. Why couldn't a food web consist of only producers?

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Write the numbers of the two sentences that best support your answer. \_\_\_\_\_, \_\_\_\_\_

6. List several biotic factors in a forest.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

7. Add a picture of the sun to the food web diagram. Draw arrows to the two links that use the sun's energy to make food.

8. People are said to be "at the top of the food chain." Draw a diagram of a food chain. Begin with the sun and end with a human as a secondary consumer. Label all parts in detail.

#8 Diagram

