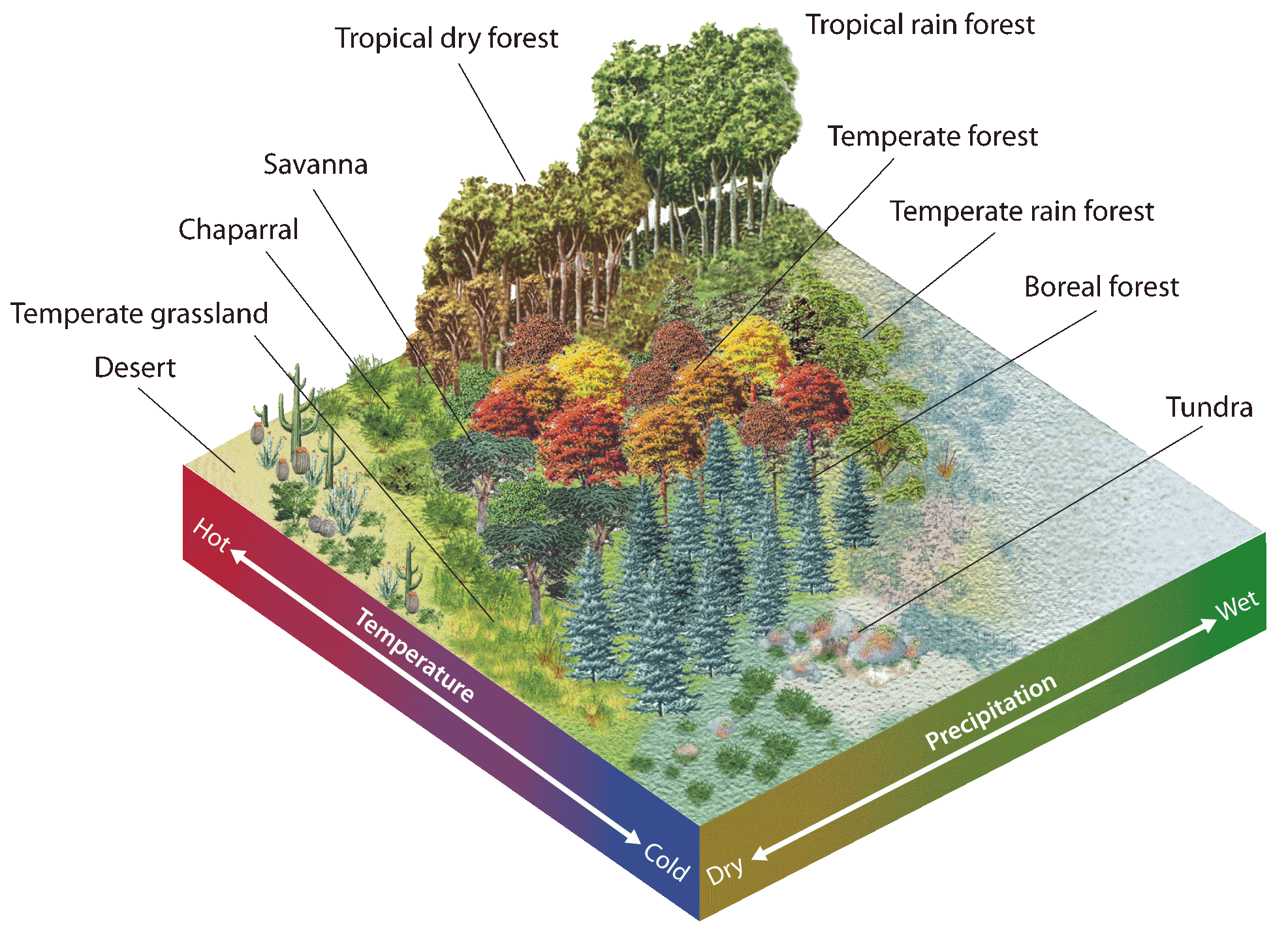
**Chapter 6 Biomes and Aquatic Ecosystems**

*6.1 Defining Biomes*

**Objectives:**

* Explain how biomes are characterized
* Describe how net primary production varies among biomes

1. Earth’s major Biomes
   1. Groups of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ ecosystems that share \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ conditions
   2. 10 primary biomes: tropical rain forest, dry savanna, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, temperate rain forest, temperate forest, temperate grassland, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, boreal forest, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_



1. Question (Refer to Figure 1 pg. 165)
   1. What are some abiotic and biotic factors in the areas we live in?
   2. What biome do you think we live in?
   3. What biomes are near where we live?
   4. What patterns do you notice in the location of biomes?
2. Climate and Climatographs
   1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: average conditions, including temperature and precipitations, over long periods of time in a given area.
   2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: day to day conditions in Earth’s atmosphere
   3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: diagrams that summarize an area’s average monthly temperature and precipitation
   4. Each \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ has a set of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ adapted to its particular climate conditions
3. Question (refer to Figure 2 pg. 165)
   1. In Harare, Zimbabwe during what months is the rainy season?
   2. During what months is the dry season?
   3. What biome is Harare in (see pg. 163 for its location)?
4. Concept Check
   1. What factors are used to characterize biomes?
   2. What’s the difference between an ecosystem and a biome?
5. Biomes and Net Primary Production
   1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ primary production: the rate at which primary producers undergo \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
   2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ primary production: the amount of organic matter (biomass) that remains after primary producers use some to carry out \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
   3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ vary in their net primary productivity, the rate at which primary producers convert energy to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
   4. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ biomes generally have higher net primary productivity than cold, dry biomes.

*6.2 Biomes*

**Objectives:**

* Explain how organisms are adapted to the conditions of their biomes.

1. Tropical Rain Forest
   1. Temperature: year round \_\_\_\_\_\_\_\_\_ temperatures
   2. Precipitation: \_\_\_\_\_\_\_\_\_\_\_m per \_\_\_\_\_\_\_\_\_\_\_
   3. Soil : nutrient-\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   4. Plants:\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ leaves and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ roots.
   5. Animals \_\_\_\_\_\_\_\_\_\_ animal species of any biome and animals tend to be

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

1. Tropical Dry Forest
2. Temperature: \_\_\_\_\_\_\_\_\_\_\_\_ year round
3. Precipitation: highly \_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. Trees: Most are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, meaning they lose their \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

and cease \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ part of the year.

1. Plants/Animals: Exhibit adaptations such as \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_,

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ that allow then to survive

the \_\_\_\_\_\_\_\_\_\_\_ season.

1. Savanna
2. Precipitation: Less than \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ but more than \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Has a distinct \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

1. Landscape: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ interspersed with groups of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
2. Plants: Adapted to \_\_\_\_\_\_\_\_\_\_ conditions. Tend to be \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
3. Animals: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to find water, or burrow when water is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
4. Desert
5. Temperature: Varies widely from \_\_\_\_\_\_\_\_\_ to \_\_\_\_\_\_\_\_\_\_\_\_.
6. Precipitation: Less than \_\_\_\_\_\_\_\_\_\_\_\_\_\_ per year.
7. Plants: Have \_\_\_\_\_\_\_\_\_\_\_ leaves, store water in their \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, have

shallow \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

1. Animals: Get most of their water from \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and tend to

be \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

1. Temperate Rain Forest
2. Temperature: Year round \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ temperatures.
3. Precipitation: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ rainfall
4. Location: \_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of the U.S.
5. Plants: Don’t lose leaves \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (conifers), forest floor covered in \_\_\_\_\_\_\_\_\_\_\_\_\_\_.
6. Animals: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ thrive here.
7. Temperate Forest
8. Temperature: \_\_\_\_\_\_\_\_\_\_\_ winters, \_\_\_\_\_\_\_\_\_\_\_\_\_ summers
9. Precipitation: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ spread throughout the year.
10. Soil: Nutrient \_\_\_\_\_\_\_\_\_\_\_\_ from annual \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
11. Plants: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ leaved and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
12. Animals: Migrate, hibernate, or store food to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
13. Temperate Grassland (Prairie)
14. Temperature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ seasonal temperatures.
15. Precipitation: Moderate \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ precipitation
16. Soil: Nutrient \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
17. Plants: No \_\_\_\_\_\_\_\_\_\_ only \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ because of lack of precipitation.
18. Animals: Adapted to deal with lack of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
19. Chaparral
20. Temperature: Highly \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ conditions.
21. Precipitation: Wet \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ summers.
22. Plants: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ resistant, thick waxy \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, thick

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, and deep \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

1. Animals: Many animals burrow or are nocturnal to avoid \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
2. Boreal Forest (Taiga)
3. Temperature: long cold \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and short cool \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. Soil: nutrient \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
5. Plants: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ trees adapted to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ conditions.
6. Animals: low \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. Some stay only during warm season. Those that stay

year round have \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

1. Tundra
2. Temperature: Cold, dark \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and sunny, cool \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. Location: High \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. Soil: Permafrost which is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ soil that is frozen year round.
5. Plants: No tall \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ common.
6. Animals: Most \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_to tundra during summer. Few live here

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

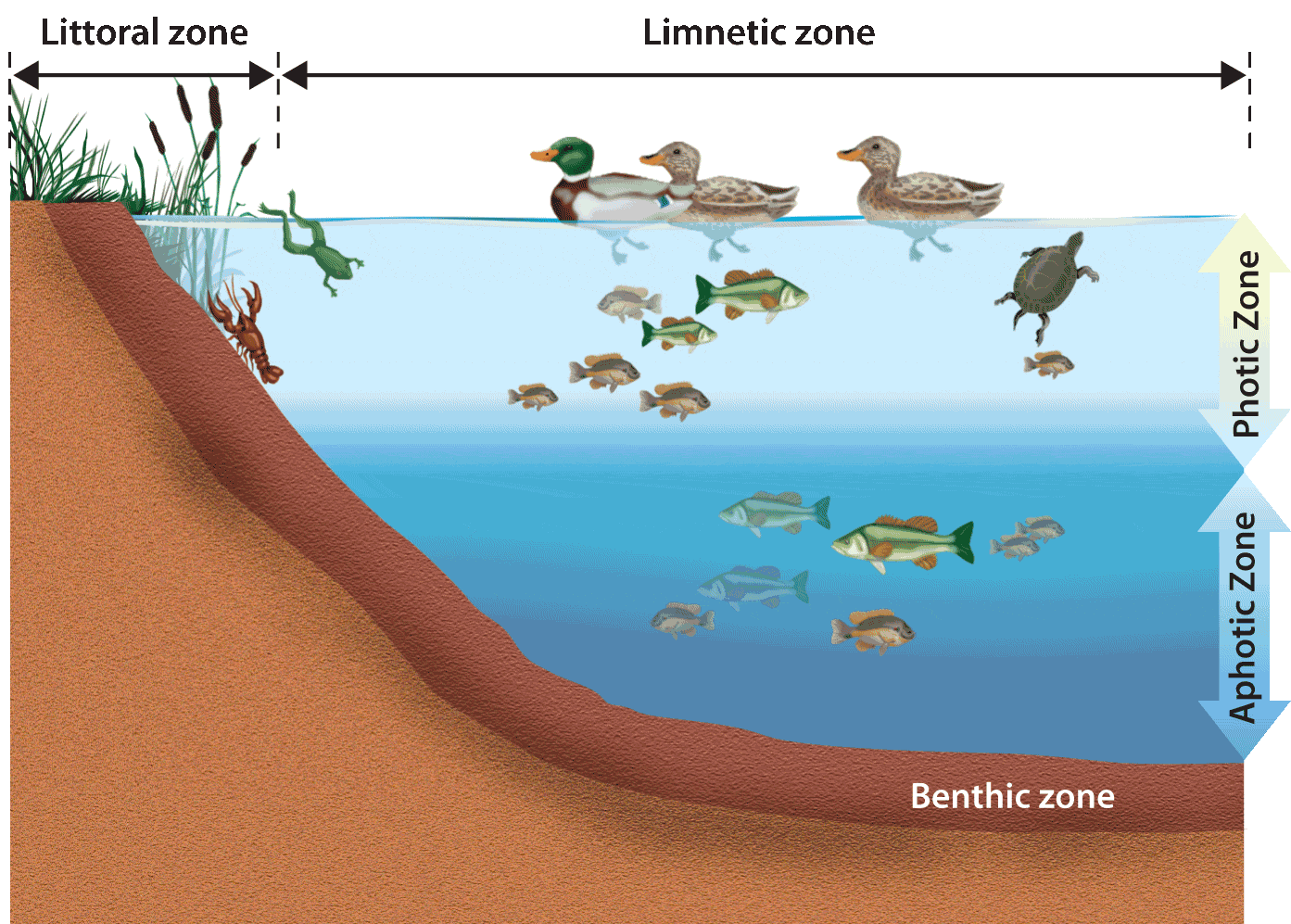
* YOUR riddle about a biome:
* A classmates riddle about biomes:

*Section 6.3 Aquatic Ecosystems*

**Objectives:**

* Describe the criteria ecologists use to classify aquatic ecosystems.
* List the major categories of freshwater ecosystems.
* Explain the ecological importance of estuaries.
* List the 3 major zones of the ocean.

1. \_\_\_\_\_\_\_\_% of Earth’s surface is covered by water.
2. Describing Aquatic Ecosystems:
   1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: the amount of dissolved salt present in water. Ecosystems are classified as \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, or \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ depending on salinity.
   2. Photosynthesis tends to be limited by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ availability, which is a function of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and water \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
   3. Aquatic ecosystems are either \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ or \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
   4. Aquatic ecosystem zones; \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
3. Freshwater Ecosystems: Ponds, lakes, Inland Seas
   1. Salinity is less than \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ ppt (parts per thousand)
   2. Ponds and lakes are similar, except in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, but inland seas contain organisms adapted for \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ water.
   3. Ponds and lakes are divided horizontally into zones: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

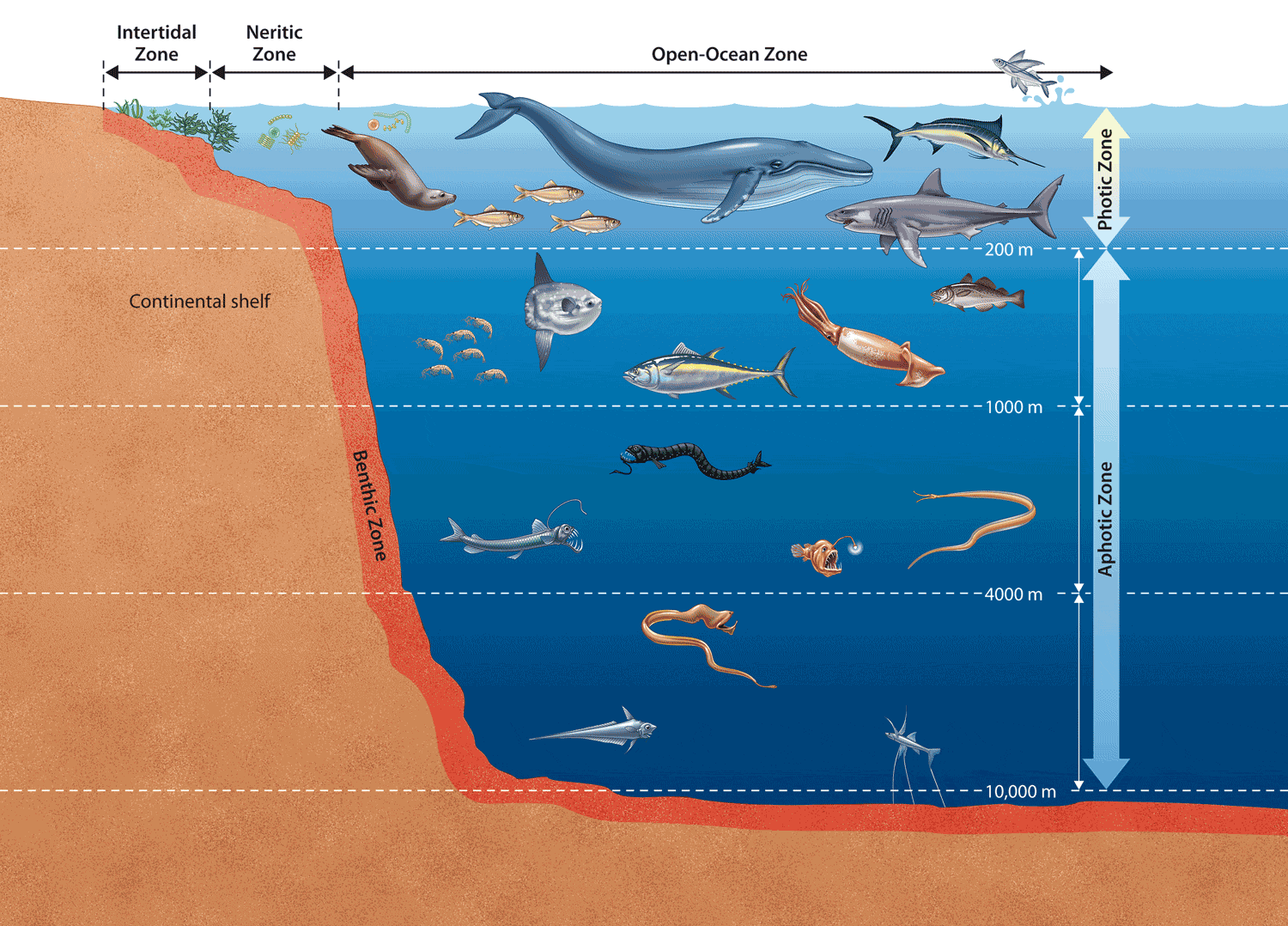


1. Freshwater Ecosystems: Wetlands
   1. Areas of land \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ with water at least part of the year.
   2. Include freshwater \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, swamps, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, and fens
   3. Wetlands prevent \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, recharge \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, filter \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, and provide \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
2. Freshwater Ecosystems: Rivers and Streams
   1. Bodies of surface water that \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ downhill, eventually reaching an \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ or inland sea.
   2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: the area of land drained by a river and its tributaries.
   3. Characteristics, such as dissolved oxygen, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, water speed, organisms, and others, change from \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
3. Estuaries
   1. Occur where a \_\_\_\_\_\_\_\_\_\_\_\_\_ flows into the ocean or an \_\_\_\_\_\_\_\_\_\_\_ sea.
   2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ estuaries are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ ecosystems; organisms must tolerate wide salinity and temperature ranges.
   3. Coastal estuaries are home to saltwater \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and mangrove forests.
   4. Like \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, estuaries help prevent \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and soil \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ as well as provide habitats.
4. Oceans (salt water ecosystem)
5. Currents are driven by water temperature and density differences,

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, and \_\_\_\_\_\_\_\_\_\_\_\_\_.

1. Surface winds and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ generate vertical currents that transport \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
2. Horizontal ocean zones: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. Vertical ocean zones: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. Ocean Ecosystems
5. Intertidal: Highly \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, extreme range of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, moisture and salinity.
6. Neritic: Productive \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ forests and coral reefs provide

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and help protect \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ from erosion.

1. Open ocean:\_\_\_\_\_\_\_\_\_\_\_\_ productivity due to low \_\_\_\_\_\_\_\_\_\_\_\_ penetration; \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ base of food chain; deep sea organisms and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ vent communities.