Energy Flow In Ecosystems

Guided Reading WB pgs. 285-287, and 291-292

True or False?

Each organism has a role in the movement of energy through its ecosystem?

True!

Although each organisms role is different, all parts of the ecosystem are necessary for the ecosystem to work!

Energy Roles in an Ecosystem

An organism's energy role is determined by how it obtains energy and how it interacts with other organisms within the ecosystem.

The energy roles within an ecosystem are producer, consumer, and decomposer.

Producers

Organisms that make their own food by using the sun's energy to turn water and carbon dioxide into food through a process called photosynthesis.

Producers are the sources of ***all*** the food in an ecosystem!

Examples of Producers: *Plants, algae, and some bacteria*

True or False?

Energy enters ***all*** ecosystems as sunlight?

False!

Energy enters most ecosystems as sunlight, but the rest enters the ecosystem through producers!

True or False?

Producers are the source of all the food in an ecosystem?

True!

Consumer

An organism that obtains energy by feeding on other organisms.

Types of Consumers

Type of Consumer	Type of Food
Herbivore	Only plants
Carnivore	*Only animals*
Omnivore	Both plants and animals
Scavenger	Dead organisms

Decomposer

Organisms that breaks down waste and dead organisms.

The two major groups of decomposers are *bacteria* and *fungi.*

True or False?

Decomposers return raw materials to the environment.

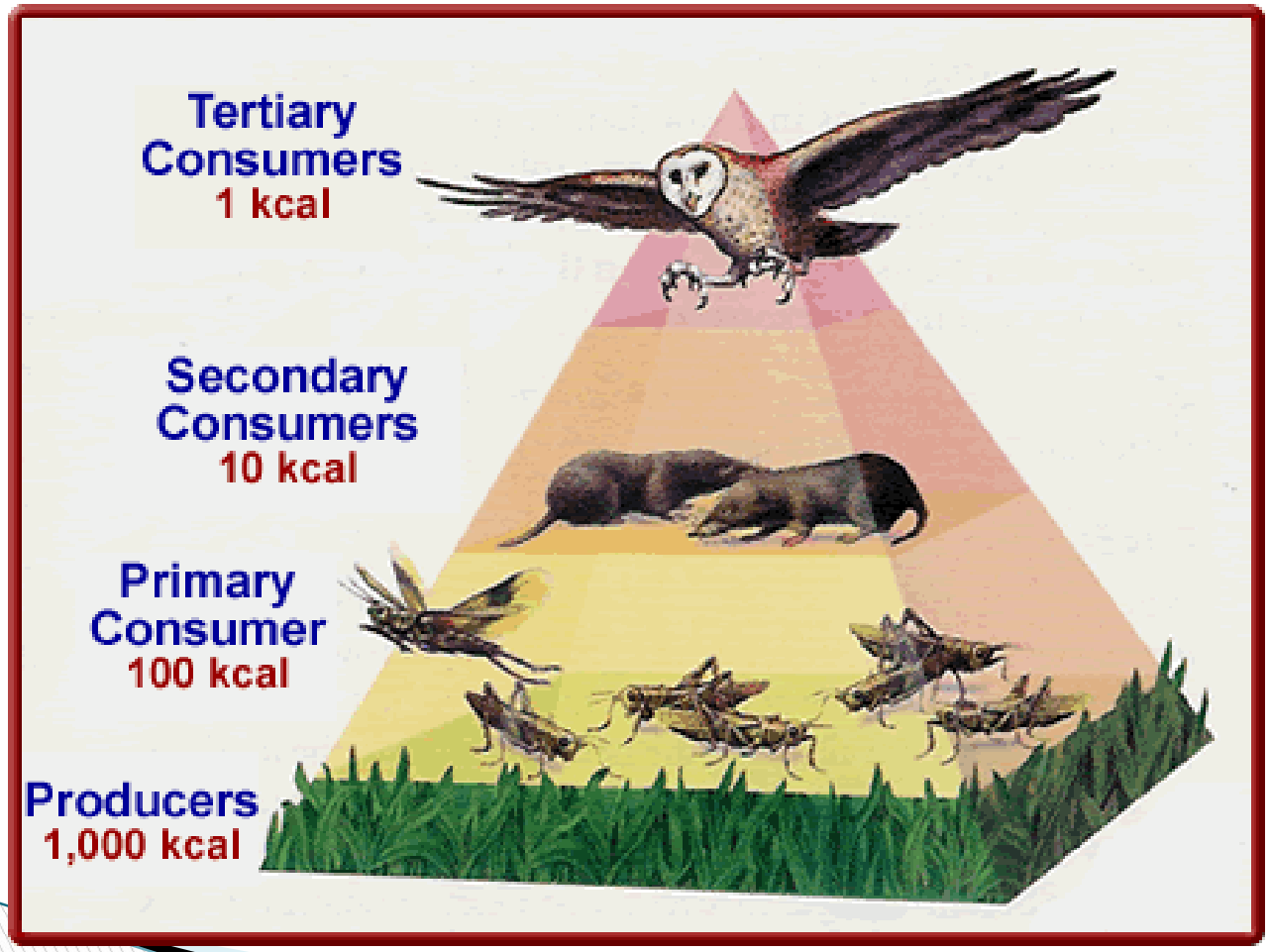
True!

Food Chains and Food Webs

A series of events in which one organism eats another and obtains raw energy is called a *food chain.*

The many overlapping food chains in an ecosystem make up a *food web.*

Energy Pyramids



As you move up the energy pyramid, each level has less energy available than the level below.

Energy Pyramids

Show…

The amount of energy that moves from one feeding level to another in a food web.

Food Webs

Producers form the base of the food web.

First-level consumers feed on the producers, and the movement of energy is from the producers to the first-level consumers.

Second-level consumers feed on the first-level consumers, and the movement of energy is from the first-level to the second-level consumers; they *may be carnivores or omnivores.*

Note: *An organism may play more than one role in a food web.*

Food web example:

Grass is a _____.

A mouse is a _____ consumer.

A kestrel is a _____ consumer.

If the kestrel died, and a buzzard was eating the kestrel, then the buzzard would be a _____.

True or False?

Most food webs only have three or four feeding levels.

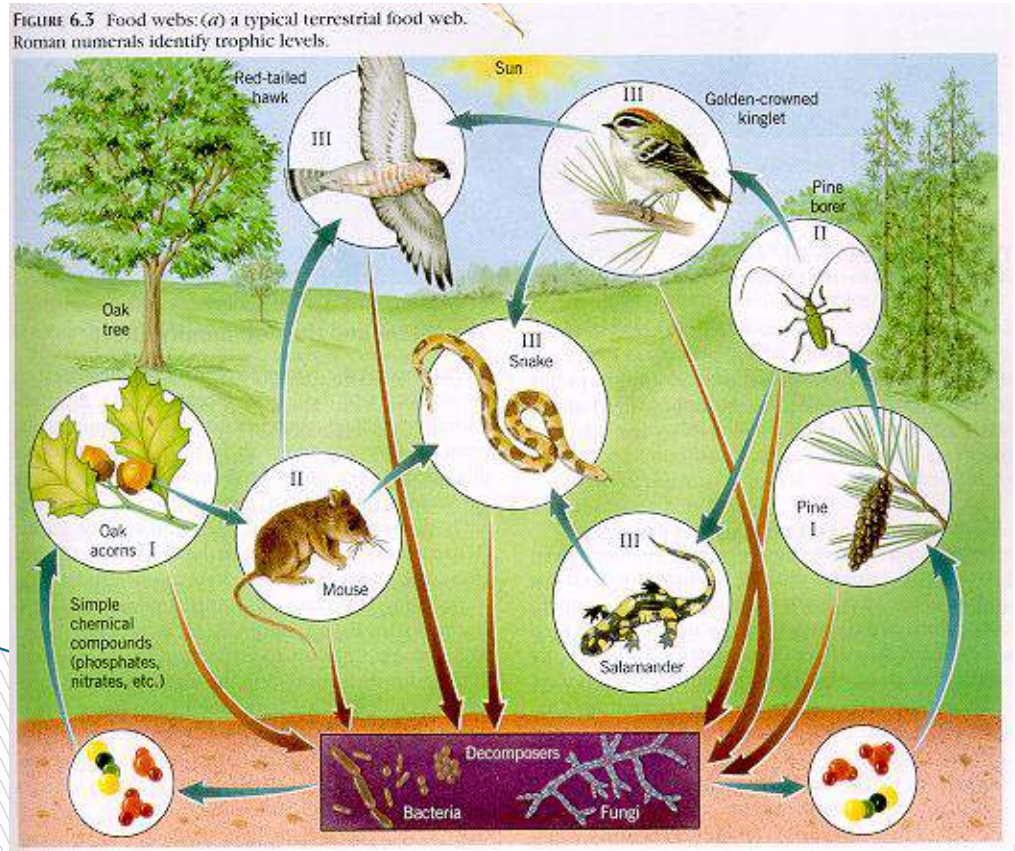


FIGURE 6.3 Food webs: (*a*) a typical terrestrial food web. Roman numerals identify trophic levels.

True!

Why are there usually few organisms at the top of a food web?

…because there is a limited amount of energy available at that level of a food web.

Biogeography

The study of where organisms live is called *biogeography.*

Note: In addition to studying *where* species live, biogeographers also try to understand *what* led to the worldwide distribution of species that exist today.

Continental Drift

One factor that has affected how species are distributed is the motion of Earth's continents.

Continental Drift is…

The very slow movement of the continents on a layer of solid rock called plates.

True or False?

All of today's continents were part of one large land mass about 225 million years ago.

True!

What do you think?

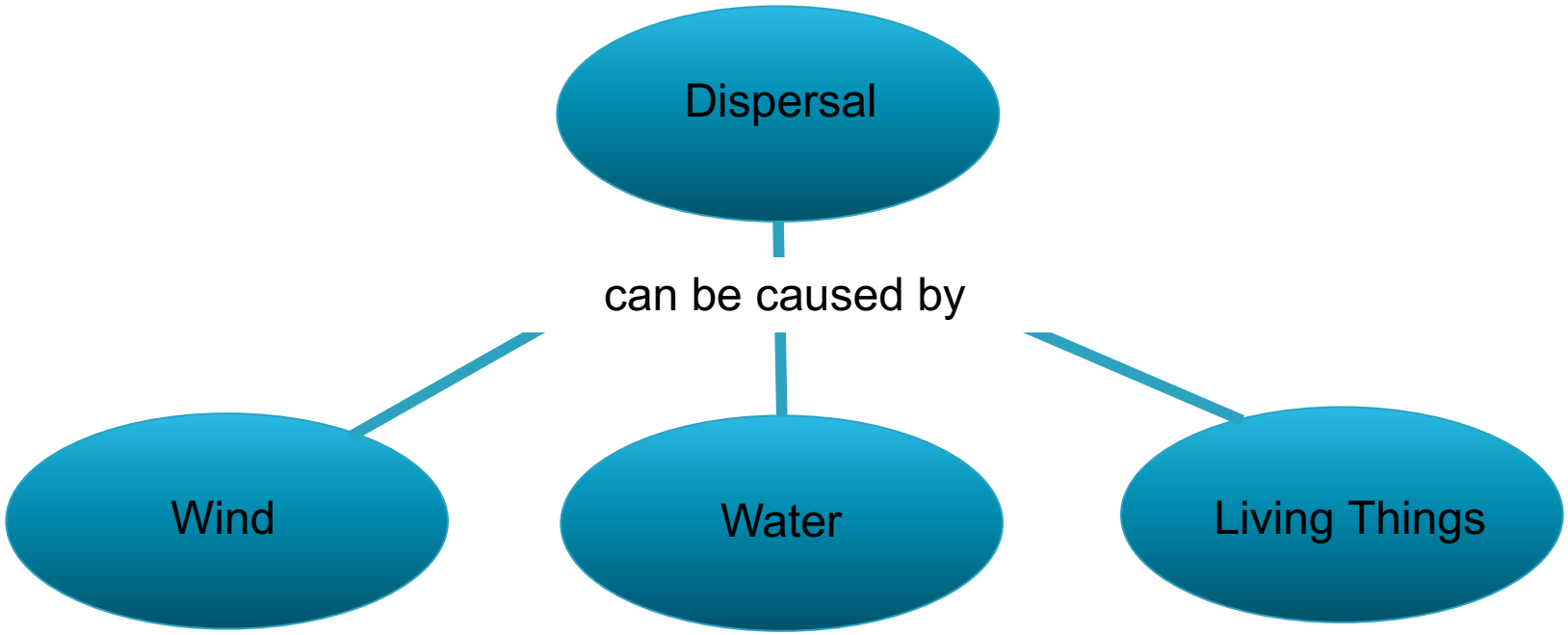
The movement of the continents has had little impact on the distribution of species.

No!

Consider Australia for example, Australia drifted away from the other landmasses. Organisms from other parts of the world could not reach the isolated island. Kangaroos, koalas, and other unique species flourished in this isolation.

Dispersal

The movement of organisms from one place to another is called *dispersal*.



Wind and Water

Wind can disperse *seeds, the spores of fungi, tiny spiders, and other small, lightweight organisms.*

Water can disperse things that float such as coconuts and leaves.

Other living things

Some organisms may be dispersed by other living things.

For example:
A bird may eat seeds and deposit them in its waste in another location.

A duck may carry algae or fish eggs on its feet from pond to pond.

A dog may carry sticky plant seeds on its fur.

True or False?

Humans are not important to the dispersal of other species.

False!

As people move around the world, they take organisms with them. Sometimes it is intentional and other times unintentional.

Exotic Species

Species that have been carried into a new locale by people are called *exotic species.*

Example: Kudzu is not a native species to Georgia, but was brought here from China to help control erosion; however, it covers other living things blocking them from the sunlight and water, eventually killing the organism.

Limits to Dispersal

Three factors that limit dispersal of a species are *physical barriers*, *competition*, *and climate.*

Physical Barriers

Physical barriers limit the movement of organisms.

Examples of these barriers are *water, mountains, and deserts*.

Competition

When an organism enters a new area, it must compete for resources with the species already there.

So, how can competition act as a barrier to dispersal?

If species already in the area are thriving, they may outcompete a new species and act as a barrier to its dispersal.

Climate

The typical weather pattern in an area over a long period of time is the area's *climate.*

Climate *can* limit dispersal.

For example: Conditions at the top of the mountain are different than those at the bottom. Shrubs and cactus can not grow at the top in the freezing cold weather.

Climate

Places with similar climates tend to have species that occupy similar niches.

For example: Most continents have a large area of flat, grassy plains. So these continents have organisms that occupy the niche of "large, grazing animals".

Populations

- A population is all of the members of one species in a particular area.

- A species is a group of organisms that are physically similar and can mate with each other and produce fertile offspring that can also mate and reproduce.

Limiting Factors

- Limiting factors are anything that restricts the number of individuals living in a population such as
  - Carrying capacity
  - Changes in the distribution of species
  - Environmental issues
- Examples of limiting factors are:
  - Food
  - Water
  - Space
  - Weather conditions

Environmental Issues

- Three Main Issues
  - *Resource Use*
  - *Population Growth*
  - *Pollution*

- How do these factors act as a limiting factors to populations?

Carrying capacity

- Carrying capacity is the largest population that an area can support. If there aren't enough biotic or abiotic factors the species are not able to survive in the ecosystem and changes occur

Results of Changes to Ecosystems

- Threatened Species – species that could become endangered in the near future
- Endangered species – species in danger of becoming extinct in the near future
- Extinction – the disappearance of all members of a species from Earth