

SCIENCE

ECOSYSTEMS

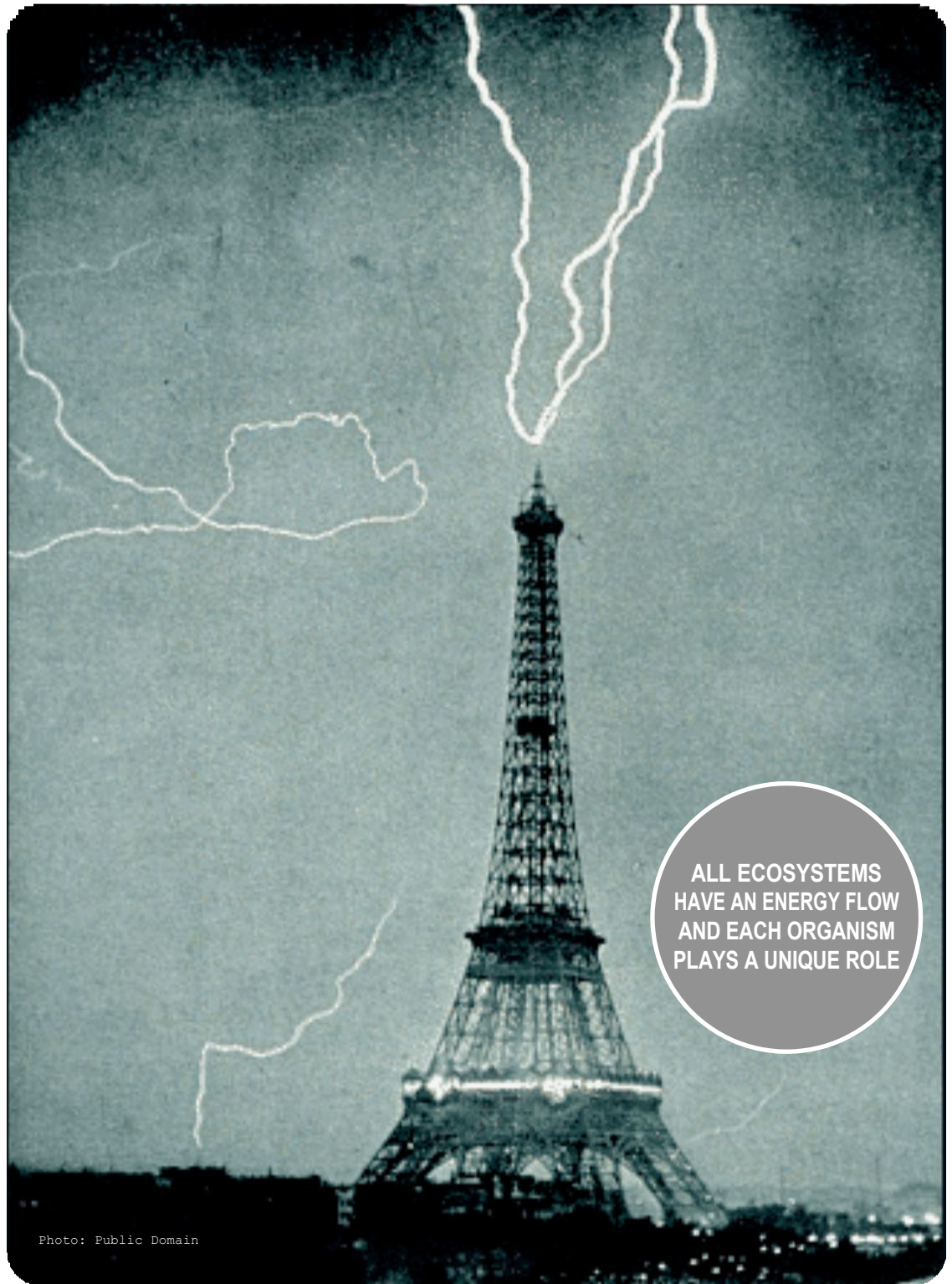


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ALL ECOSYSTEMS
HAVE AN ENERGY FLOW
AND EACH ORGANISM
PLAYS A UNIQUE ROLE

AS YOU READ:

THINK ABOUT...

WHAT IS AN ECOSYSTEM?

CONSIDER....

WHAT ENERGY ROLES DO ORGANISMS PLAY IN A ECOSYSTEM?

DETERMINE...

WHAT ABIOTIC AND BIOTIC FACTORS ARE AND HOW THEY ARE IMPORTANT IN ECOSYSTEMS.

ENERGY FLOW

IN ECOSYSTEMS

AFTER READING,
LOOK AT THIS
PICTURE AGAIN. CAN
YOU NAME THE BIOTIC
FACTOR(S)? THE
ABIOTIC?



THE COMPONENTS OF AN ECOSYSTEM ARE...

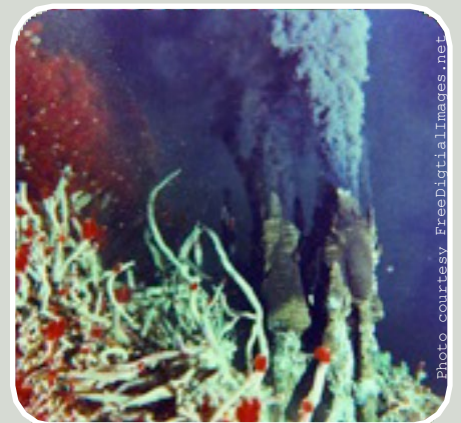
ALL THE LIVING AND NONLIVING THINGS THAT INTERACT IN A PARTICULAR AREA.

The organisms in an ecosystem are called **BIOTIC FACTORS**. They interact with the nonliving things, or **ABIOTIC FACTORS**, such as sunlight, water, weather, and oxygen.

Each organism lives in a specific **HABITAT** that provides the things the organism needs. Each **SPECIES** - a group of similar organisms that can mate with one another and produce fertile offspring - has a role or **NICHE** in an ecosystem in which it lives. An organism's niche includes the physical conditions that it needs to survive and reproduce.

An organism's energy role is determined by how it obtains energy and how it interacts with the other living things in its ecosystem. **AN ORGANISM'S ENERGY ROLE IN AN ECOSYSTEM MAY BE THAT OF A PRODUCER, CONSUMER, OR DECOMPOSER.**

Plants, algae, and some microorganisms can carry out photosynthesis. In this process, the organism uses the radiant energy of the sun to turn carbon dioxide and water into chemical energy in the form of glucose (simple sugar).



NICHE


Some organisms fill unusual niches (or roles) in an ecosystem. These tube worms thrive in the extremely hot water found near geothermal vents by cooperating with the bacteria found there.

OTHER ORGANISMS DEPEND ON

producers for food and energy. An organism that obtains energy by feeding on other organisms is called a **CONSUMER**.

Consumers that eat only plants are called **HERBIVORES**. Consumers that eat only other animals are called **CARNIVORES**. A consumer that eats both plants and animals is called an **OMNIVORE**. A **SCAVENGER** is a carnivore that feeds on the bodies of dead organisms. Organisms that break down dead organisms and return the nutrients to the soil are called **DECOMPOSERS**. As decomposers obtain energy for their own needs, they return simple molecules to the environment to be used again by other organisms.

The flow of energy through an ecosystem can be shown in diagrams called food chains and food webs. A **FOOD CHAIN** is a series of events in which one organism eats another and obtains energy. This energy flow is pictured by showing an arrow indicating the flow of energy from one organism to another. For example if a rabbit is eaten by a fox, a food chain would show the arrow pointing from the rabbit to the fox indicating that the fox obtained energy from the rabbit. The first organism in any food chain is always a producer. No food chain can exist without producers. Since we know that producers must obtain energy from the sun to perform photosynthesis, we therefore know that the original energy source of all food chains is the radiant energy from the sun.



Most humans are omnivores, meaning they eat both meat and plants

A **FOOD WEB** consists of the many overlapping food chains in an ecosystem.

When an organism makes its own food or eats other organisms, it obtains energy. The organism uses most of this energy for its own life processes. Only some of the energy will be available to the next organism in the food web. A diagram called an **ENERGY PYRAMID** shows the amount of energy that moves from one **TROPHIC LEVEL** (feeding level) to the next in a food web. In fact 90% of all available energy is lost as we advance from one trophic level to the next. For example, 100% of energy is available at the base of the energy pyramid, 10% at the next level 1% at the next and so on. The most energy is available at the producer level, (or base) of the energy pyramid, and the least energy is at the apex (or top) of the pyramid where top predators can be found.

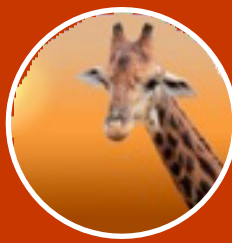
PRODUCERS

Can make their own food by using the sun's radiant energy



CONSUMERS

Gets energy from eating other organisms (plants or animals)



DECOMPOSERS

Break down dead things and return nutrients to the earth



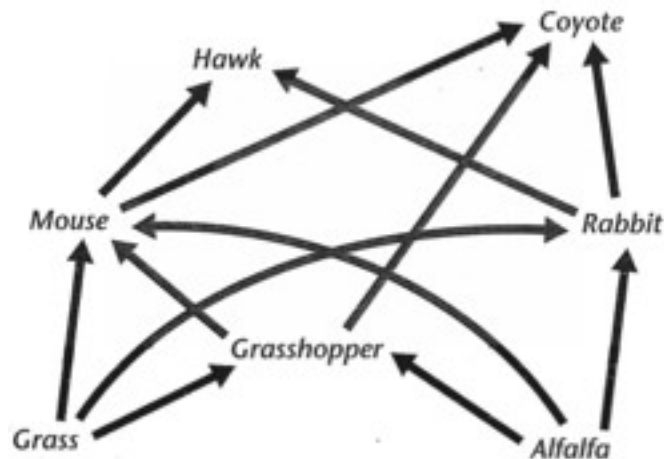
Photos: Courtesy of freedigitalimages.net

Name: _____ Class: _____

WHAT'S THE BIG IDEA? - ENERGY FLOW IN ECOSYSTEMS

LET'S REVIEW AND REINFORCE THE MAIN IDEAS

CHECK OUT THE FOOD WEB BELOW. USE THE INFORMATION IT PROVIDES TO ANSWER QUESTIONS 1-3



1. Which organism in the food web above is sometimes a first-level consumer (feeding only on producers) and sometimes a second-level consumer (a predator feeding on other organisms that feed on producers)? Please explain your answer.
2. Choose one food chain in the web. Name all the organisms in the chain. Start with the producer(s) and end with the top-level consumer.
3. Draw an energy pyramid for the food chain you chose in question number two. Explain how the amount of available energy differs from level to level.

Name: _____ Class: _____

WHAT'S THE BIG IDEA? - ENERGY FLOW IN ECOSYSTEMS

LET'S BUILD SOME VOCAB

FILL IN THE BLANKS WITH THE APPROPRIATE VOCAB WORD. REVISIT THE READING IF YOU ARE UNSURE.

4. Organisms that make their own food are called _____.
5. Organisms that obtain energy by feeding on other organisms are called _____.
6. Organisms that break down wastes and dead organisms and return the raw materials to the environment _____.
7. Consumers that eat only animals _____.
8. Consumers that eat only plants _____.
9. Consumers that eat both plants and animals _____.
10. Consumers that feed on the bodies of dead organisms _____.