Name _____ Date _____ Class _____

Enrich

MS-ESS 3-2

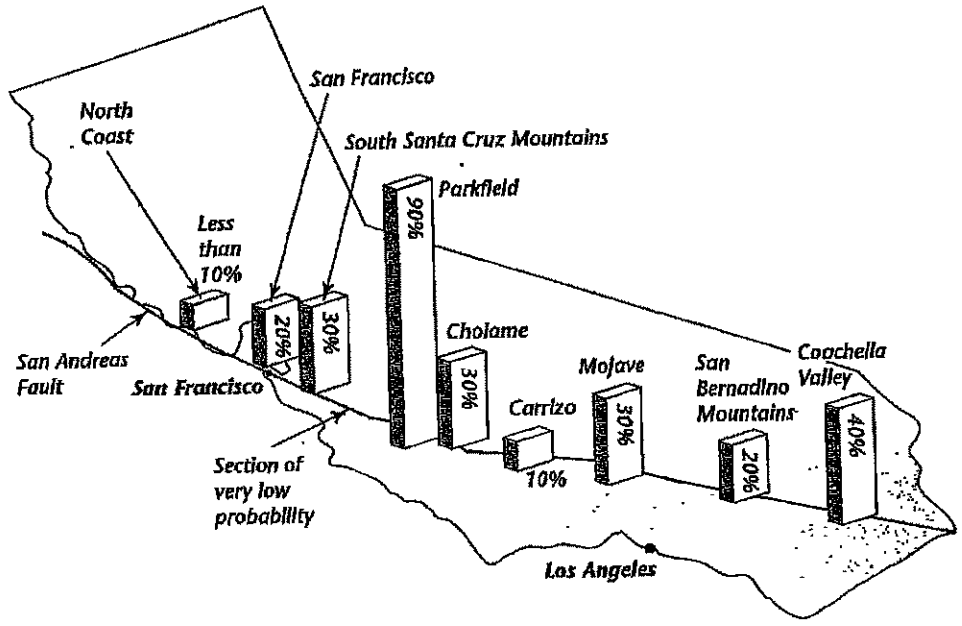
Monitoring Earthquakes

Read the passage and look at the diagram. Then use a separate sheet of paper to answer the questions that follow the diagram.

Earthquake Probability

This combined map and bar graph shows the probability of earthquakes in different areas along the San Andreas fault. Probability is a measure of how likely it is that some event will happen in a given time. A probability near 100 percent means that an event in very likely to happen. A probability near zero percent means that an event is very unlikely to happen.

Earthquake Probability Along the San Andreas Fault



1. Which area has the highest probability of an earthquake?
2. What is the probability of an earthquake in the North Coast area?
3. The fault section between the Santa Cruz Mountains and Parkfield has a very low probability. Geologists know that this area has experienced very little damaging seismic activity in the past. They also found that the blocks of rock in this section move slowly and continually. Why would slow, continual movement lead geologists to give the section a low probability?
4. What can you infer about why the probability of an earthquake is so high in the Parkfield area?

Name _____ Date _____ Class _____

MS-ESS3-3

Key Concept Summaries

Waste Disposal and Recycling

What Are Three Solid Waste Disposal Methods?

The wastes produced in homes, businesses, schools, and in the community—such as paper, food scraps, empty packaging, construction debris, agricultural wastes, and industrial wastes—are called **municipal solid waste. Three methods of handling solid waste are burning, burying, and recycling.** The burning of solid waste is called **incineration.** Any substance that causes pollution is a **pollutant.** Until a few decades ago, people buried waste in open dumps. Some of this waste polluted the environment. Rainwater falling on a dump dissolved chemicals from the wastes, forming a liquid called **leachate** that could pollute rivers, streams, and groundwater. Now much solid waste is buried safely in landfills. A **sanitary landfill** is specially designed to safely hold municipal solid waste, construction debris, and some types of agricultural and industrial waste.

We can all decrease the amount of waste we produce by following the "three R's"—reduce, reuse, and recycle. We can reduce by using less and creating less waste in the first place. We reuse objects and materials when we find another use instead of discarding them. **Recycling** is the process of reclaiming raw materials and reusing them to create new products.

What Are the Major Categories of Recycling?

Recycling reduces the volume of solid waste by reusing materials. Materials that can be broken down by bacteria and other decomposers are **biodegradable. Most recycling focuses on four major categories of products: metal, glass, paper, and plastic.** Recycling conserves resources and saves energy, yet it does not solve the solid waste problem.

How Are Hazardous Wastes Safely Disposed Of?

Any material that can be harmful to human health or the environment if it is not properly disposed of is a **hazardous waste.** Hazardous wastes include those that are toxic, explosive, flammable, corrosive, and radioactive. **Hazardous wastes that are not disposed of in carefully designed landfills may be incinerated or broken down by organisms. Liquid wastes may be stored in deep rock layers.**

On a separate sheet of paper, explain how people can use the "three R's" to decrease the amount of waste we produce.

Place the outside corner, the corner away from the dotted line, in the corner

Name _____ Date _____ Class _____

MS-ESS 3-4

Enrich

Introduction to Natural Resources

Read the passage below. Then use a separate sheet of paper to answer the questions that follow the passage.

Keeping Water Clean

Clean water is an essential natural resource. Prior to 1987, the Clean Water Act was the primary government tool for controlling water pollution from point sources of pollution. The government defines a point source as "any discernable, confined and discrete source of pollution." Point sources include factories and waste-treatment facilities. Businesses like these are monitored by the government. If a business is found to be releasing more than an acceptable level of pollution, the company must pay fines. In some cases, company executives have to serve jail sentences.

As such point sources of pollution began to be controlled, water quality improved. But it became clear that factories, waste-treatment facilities, and other industries were not the only sources of water pollution. In 1987, Congress recognized the need to control additional kinds of pollution. More rules were added to the Clean Water Act for the purpose of controlling nonpoint sources of pollution.

Nonpoint sources of pollution cannot be traced to a specific source. They are detected in bodies of water, but it is impossible to tell exactly how they got there. Pollutants in storm water runoff are considered nonpoint sources. Household activities that contribute to pollution include dumping used motor oil or pet waste into a storm drain. Fertilizers and pesticides used on lawns become nonpoint sources of pollution when storm runoff carries these chemicals into bodies of water.

Since nonpoint sources cannot be identified, the government has to rely on voluntary cooperation by citizens, rather than the fines that industries face. The government educates citizens about the importance of reducing pollution. Guidelines for use of fertilizers and pesticides have been developed. Many communities have passed laws prohibiting the release of pet waste and oil into the environment. Efforts by individuals have contributed significantly to the improvement of water quality.

1. If you dump the oil you removed from your lawnmower down a storm drain, the oil entered the water from a specific point. Why is this not considered point source pollution?
2. Why is 1987 such an important year in pollution control?
3. The pollution from an average household is much less than that released by a factory. Why is it important to control the pollution released by an individual household?

Place the outside corner, the corner away from the dotted line, in the corner of your copy machine to copy onto letter-size paper.

Name _____ Date _____ Class _____

Review and Reinforce

MS- LS2-2

Populations

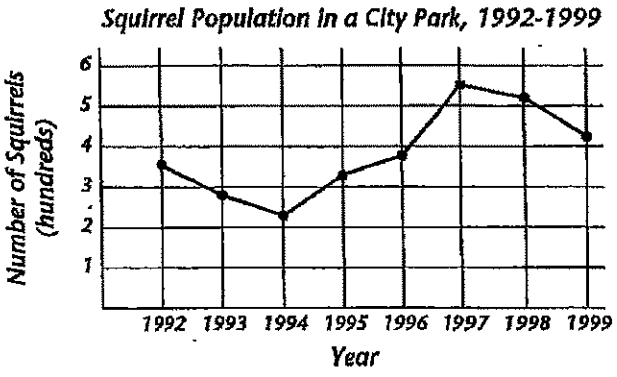
Understanding Main Ideas

Answer the following questions on a separate sheet of paper.

1. A vegetable garden is 12 meters long by 7 meters wide. It is home to 168 mice. What is the population density of the mice?
2. What are two ways that the size of a population can increase? What are two ways that the size of a population can decrease?
3. Identify three limiting factors that can prevent a population from increasing. Explain how each factor limits a population's size.

The line graph below shows how the size of the squirrel population in a city park changed over time. Use the line graph to answer questions 4–6.

4. Over which time period(s) did the squirrel population increase?
5. Over which time period(s) did the squirrel population decrease?
6. In which year did the population reach its lowest point? What was the size of the population that year?



Building Vocabulary

Fill in the blank to complete each statement.

7. Moving into a population is called _____.
8. Moving out of a population is called _____.
9. The largest _____ an area can support is called the carrying capacity.
10. The number of individuals that die in a population in a certain time period is the _____.

Place the outside corner, the corner away from the dotted line, in the corner of your copy machine to copy onto letter-size paper.

Name _____ Date _____ Class _____

MS-LS2-5

Key Concept Summaries

Biodiversity

What Is Biodiversity's Value?

The number of different species in an area is called the area's **biodiversity.** One reason to preserve biodiversity is that wild organisms and ecosystems are a source of beauty and recreation. **In addition, biodiversity has both economic value and ecological value within an ecosystem.** Many plants, animals and other organisms are economically valuable to humans. Also, all the species in an ecosystem are connected to one another. A **keystone species** is a species that influences the survival of many other species in an ecosystem.

What Factors Affect Biodiversity?

Factors that affect biodiversity in an ecosystem include climate, area, and diversity of niches. Tropical rain forests are the most diverse ecosystems in the world. Many scientists hypothesize that the reason for the great biodiversity in the tropics has to do with climate. Coral reefs are the second most diverse ecosystems. A coral reef supports many different niches.

Species need genetic diversity. Organisms in a healthy population have diverse traits such as color and size. **Genes** are located within cells and carry the hereditary information that determines an organism's traits. Species that lack a diverse gene pool are less able to adapt and survive changes in the environment.

The disappearance of all members of a species from Earth is called **extinction.** Species in danger of becoming extinct in the near future are called **endangered species.** Species that could become endangered in the near future are called **threatened species.**

How Do Humans Affect Biodiversity?

Biodiversity can be negatively or positively affected by the actions of humans. The major cause of extinction is **habitat destruction,** the loss of a natural habitat. Breaking larger habitats into smaller, isolated pieces is called **habitat fragmentation.** The illegal killing or removal of wildlife from their habitats is called **poaching.**

Three methods of protecting biodiversity are captive breeding, laws and treaties, and habitat preservation. **Captive breeding** is the mating of animals in zoos or wildlife preserves.

On a separate sheet of paper, explain the value of biodiversity and tell how humans can positively or negatively affect it.