Norfolk Public Schools
Science Learning in Place Plan: Environmental science Lessons

Week 10: May 18 – 22, 2020 (Waste)

Monday	Tuesday	Wednesday	Thursday	Friday
Waste Active Reading: • Read **"Solid Waste"** passage. • Use *Critical Reading Strategies* to make note of the key points in the passage.	**Waste** Active Reading: • Review the passage **"Solid Waste"**. • Complete the following sections of the worksheet: - *Identifying Main Ideas (1-2)* - *Vocabulary Development (3)*	**Waste** Active Reading: • Review the passage **"Solid Waste"** • Read and answer questions - *Recognizing Similarities and Differences (4-5)* - *Recognizing Cause and Effect (6-8)*	**Waste** Interpreting Data: • Analyze the data presented for each set of questions. • Complete the lesson review questions 1-6.	**Waste** Map Skills: Review the map of the San Francisco Bay area recycling centers to respond to questions 1-4 of the "Map Skills" worksheet.

Week 11: May 25 – 29, 2020 (The Environment and Human Health)

Monday	Tuesday	Wednesday	Thursday	Friday
The Environment and Human Health Main Idea: • Read **"Pollution from Human Activities"** passage. • Complete the lesson review questions 1-2.	**The Environment and Human Health** Active Reading: • Read the passage **"Pollution and Human Health"**. • Complete the following section of the worksheet: - *Identifying Main Ideas (1-3)*	**The Environment and Human Health** Active Reading: • Review the passage **"Pollution and Human Health"**. • Complete the following section of the worksheet: - *Vocabulary Development (4-6)* - *Recognizing Cause and Effect (7-9)*	**The Environment and Human Health** Main Idea: • Read the **"Water Challenges"** article. • Complete the lesson review questions 1-4.	**The Environment and Human Health** Maps in Action: • Analyze the map **"Lyme Disease Risk"** • Use the map to respond to questions 1-5.

Week 12: June 1 – 5, 2020 (Economics, Policy, and the Future)				
Monday	Tuesday	Wednesday	Thursday	Friday
Economics, Policy, and the Future Active Reading: • Read the passage **"Economics and International Cooperation"**. • Use *Critical Reading Strategies* to make note of the key points in the passage.	**Economics, Policy, and the Future** Active Reading: • Review the passage **"Economics and International Cooperation"**. • Complete the following section of the worksheet: - *Identifying Main Ideas (1-3)* - *Vocabulary Development (4-7)*	**Economics, Policy, and the Future** Active Reading: • Review the passage **"Economics and International Cooperation"**. • Complete the following sections of the worksheet: - *Recognizing Similarities and differences (8)* - *Recognizing Cause and Effect (9-10)*	**Economics, Policy, and the Future** Map Skills: • Review the **"National Parks"** map and respond to questions 1-5 of the "Map Skills" worksheet.	**Economics, Policy, and the Future** Supporting Opinions: • Read section 3 **"The Importance of the Individual"**. - Choose 3 individuals that you feel were most important to environmental history from figure 1.1. - *Summarize each contribution and explain why you feel this work to be most important.*

CRITICAL READING *strategies*

Marking the Text

\# → Number the paragraphs

→ Circle key terms

→ Underline essential info

(...based on the reading purpose)

→ Box new vocab words

(...and define them in the margins)

Additional Ways to Mark the Text

→ [Bracket] information

(when underlining has been used for another purpose)

→ Write labels in the margins

(double underline labels to stand out from other marks)

Name _____ Class _____ Date _____

Skills Worksheet

Active Reading

Section 1: Solid Waste

Read the passage below and answer the questions that follow.

Solid waste from manufacturing, mining, and agriculture make-up most of the rest of the total solid waste produced in the-United States. This waste includes items-such as scrap metal, plastics, paper, sludge, and ash. Consumers do not directly produce waste from manufacturing, but they indirectly create it by purchasing products that have been manufactured.

Waste from mining consists of rock and minerals that are left over from excavation and processing. In the past, these mine tailings were left exposed in large heaps and runoff from them contaminated nearby water sources. Now, tailings are disposed of by refilling and landscaping abandoned mines. Agricultural waste includes crop wastes and manure, which are biodegradable and can be broken down and returned to the soil. However, the increasing use of fertilizers and pesticides may mean that if this waste is returned to the soil, it could harm plants and animals. It could also contaminate groundwater in the area.

IDENTIFYING MAIN IDEAS

One reading skill is the ability to identify the main idea of a passage. The main idea is the main focus or key idea. Frequently, a main idea is accompanied by supporting information that offers detailed facts about the main idea.

In the space provided, write the letter of the term or phrase that best completes each statement or best answers each question.

_____ 1. Solid waste from manufacturing includes
   a. crop wastes.
   b. rocks.
   c. minerals.
   d. plastics.

_____ 2. In the past, waste from mining
   a. was biodegradable.
   b. was sometimes dumped in oceans or rivers.
   c. included paper and plastics.
   d. was produced by consumers.

VOCABULARY DEVELOPMENT

Read the following question and write the answer in the space provided.

3. The verb *degrade* means "break down." The prefix bio- refers to living things. The suffix *–able* means "capable of." Use this information to define *biodegradable.*

_____

_____

RECOGNIZING SIMILARITIES AND DIFFERENCES

One reading skill is the ability to recognize similarities and differences between two phrases, ideas, or things. This is sometimes known as comparing and contrasting.

In the space provided, write the letter of the term or phrase that best completes each statement.

_____ 4. Agricultural waste may be easier to dispose of than other types of solid waste because agricultural waste
   a. can be broken down and returned to the soil.
   b. is often left exposed in large heaps.
   c. may be used to refill abandoned mines.
   d. makes up a small percentage of the total solid waste.

_____ 5. Manufacturing waste is different from mining waste in that manufacturing waste
   a. is processed and then purchased by consumers.
   b. is most difficult to dispose of.
   c. includes products created by human beings.
   d. is biodegradable.

RECOGNIZING CAUSE AND EFFECT

One reading skill is the ability to recognize cause and effect.

Read each question and write the answer in the space provided.

6. How do consumers indirectly create manufacturing waste?

_____

7. The increasing use of which products may cause agricultural waste to become difficult to dispose of?

_____

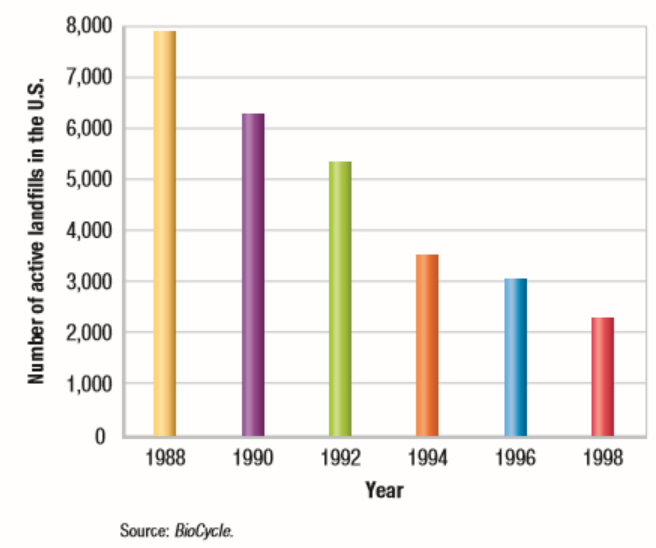
8. How does the use of these products make agricultural waste more difficult to dispose of?

_____

_____

Interpreting Graphics

Directions: The graph below shows the number of landfills in the United States from the year 1988 to the year 1998. Use the graph to answer questions 1-3.



1. Determine. Approximately how many landfills existed in 1988? in 1998?

2. Explain. During the span of 10 years, did the overall number of landfills increase or did the number decrease? What may have caused this change? Explain your answer.

3. Predict. If this trend continues, what might the graph look like for the year 2028?

Analyzing Data

Directions: Use the table below to answer questions 4-6.

PAPER PRODUCTS IN MUNICIPAL SOLID WASTE

Product	Generation (tons)	Percentage recycled
Newspapers	13,620	56.4
Books	1,140	14.0
Magazines	2,260	20.8
Office papers	7,040	50.4

4. **Evaluating Data.** How many tons of paper products were generated according to the table?

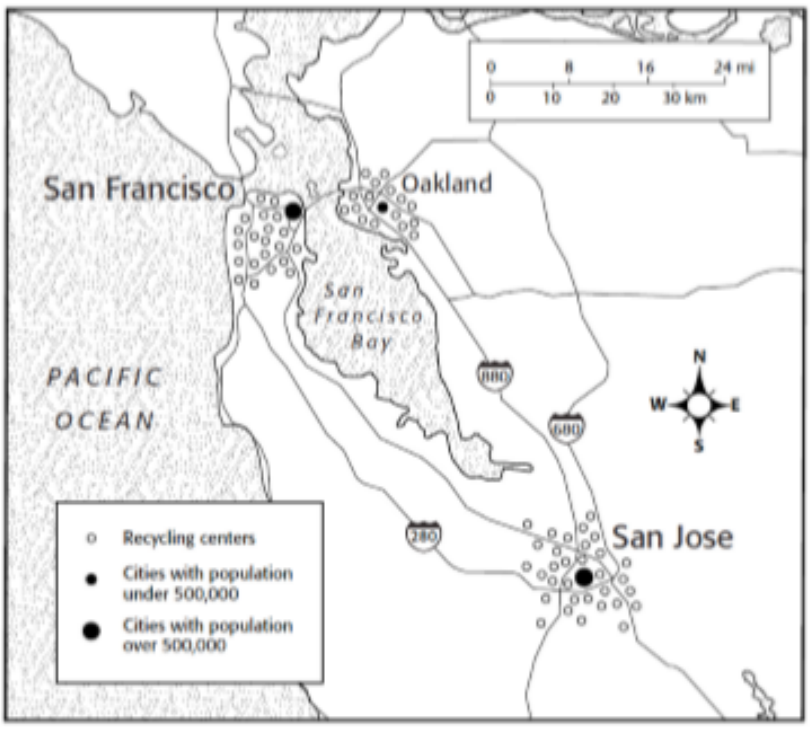
5. **Making Calculations**. How many tons of newspapers were recycled? How many tons of newspapers were not recycled?

6. **Making Calculations**. How many tons of office papers were recycled? How many tons of office papers were not recycled?

Name _____ Class _____ Date _____

Skills Worksheet **RECYCLING CENTERS**

Map Skills



This map of the San Francisco Bay area shows the location of many of its recycling centers. Although many of these centers collect common recyclables, such as glass, plastic, and metal, others recycle clothing or computer parts. The purpose of recycling centers is to collect materials of all kinds for reuse.

Use the map above to answer the questions below.

1. **Using a Key** How many recycling centers are shown in San Francisco?

_____

2. **Analyzing Data** If the population of San Francisco is approximately 750,000, how many people are served by each of its recycling centers?

_____

3. **Finding Locations** How might communities between major cities utilize urban recycling centers? What problems might arise with this solution?

_____

_____

4. **Inferring Relationships** What relationship can you infer between recycling centers and population?

_____

_____

Pollution from Human Activities

Human activities release thousands of types of chemicals into the environment, but we know surprisingly little about the health effects of most of them. Only about 10 percent of commercial chemicals have been tested for their toxicity, and about 1,000 new chemicals are introduced every year. **Figure 1.7** shows the introduction of pollutants into the environment by human activities.

Recent Improvements

In the United States, regulations have helped reduce our exposure to pollutants. Most vehicles and factories now have pollution-control devices. As a result, people living in the United States contain lower levels of some toxic chemicals in their bodies, on average, than they did in the recent past. In 2001, 2003, and 2005, the U.S. Centers for Disease Control and Prevention (CDC) released studies on chemical residues in the U.S. population. Levels of nicotine (from smoking), mercury, and several other toxic chemicals were considerably lower in these peoples' tissues than they had been in 1991. Because we know so little about the effects of chemicals on our health, new health risks are discovered frequently. For example, scientists now think that chemical pollution may be at least part of the cause of Parkinson's disease and Alzheimer's disease.

Burning Fuels

Despite advances in public health resulting from pollution control, air pollution is still a major health problem. Burning fuels in vehicles, home furnaces, power plants, and factories introduces enormous amounts of pollutants into the air. These pollutants include the gas carbon monoxide and particulates. Gasoline and coal burning contribute to many premature deaths each year from asthma, heart disease, and lung disorders. A recent study found that long-term exposure to air contaminated with soot particles raises a person's risk of dying from lung and heart diseases.

Lesson Review

1. What measures have been taken in the United States to reduce exposure to pollutants?

2. Name three potential effects on human health from burning gasoline and coal.

Name_____ Class _____ Date _____

Skills Worksheet

Active Reading

Section 1: Pollution and Human Health

Read the passage below and answer the questions that follow.

We are exposed to small amounts of chemicals every day, in food, in the air we breathe, and sometimes in the water we drink. Almost any chemical can be harmful if taken in, or *ingested*, in large enough amounts. The question is whether the concentration of any particular chemical in the environment is high enough to be harmful.

To determine the effect of a pollutant on health, we need to know several things. We need to know how much of the pollutant is in the environment and how much gets into the body. Then we need to determine what concentration of the toxin damages the body. The amount of a harmful chemical to which a person is exposed is called the dose of that chemical. The damage to health that results is called the *response*.

Whether a chemical has a toxic effect depends in part on the dose. The response also depends on the number of times a person is exposed, the person's size, and how well the person's body breaks down the chemical.

IDENTIFYING MAIN IDEAS

One reading skill is the ability to identify the main idea of a passage. The main idea is the main focus or key idea. Frequently, a main idea is accompanied by supporting information that offers detailed facts about main ideas.

In the space provided, write the letter of the term or phrase that best completes each statement or best answers each question.

_____ 1. How are people exposed to chemicals on a daily basis?
- a. in the food they eat
- b. in the air they breathe
- c. in the water they drink
- d. all of the above

_____ 2. The amount of a harmful chemical to which a person is exposed is the
- a. dose.
- b. response.
- c. pollutant.
- d. toxin.

_____ 3. Almost any chemical can be harmful if
- a. it is present in the environment.
- b. a person is exposed to it repeatedly.
- c. it is ingested in large enough amounts.
- d. a person has never been exposed to it before.

VOCABULARY DEVELOPMENT

Read each question and write the answer in the space provided.

4. The verb *concentrate* means "gather" or "collect." The suffix *-ion*, used to form nouns, means "state" or "condition." Use this information to define the noun *concentration*.

_____

_____

5. *Pollute* means "to make impure." *Pollution* is "the act of polluting." If the suffix *-ant* means "something that performs an action," what is a *pollutant*?

_____

_____

6. A *response* is a "reply" or a "reaction." Use this information to explain why the health damage that results after exposure to a harmful chemical is called a *response*.

_____

_____

RECOGNIZING CAUSE AND EFFECT

One reading skill is the ability to recognize cause and effect.

In the space provided, write the letter of the phrase that best answers each question.

_____ 7. What information is *not* necessary for determining the effects of a pollutant on individual health?
- a. how much of the pollutant gets into the body
- b. how many people have been exposed to the pollutant
- c. what concentration of the pollutant damages the body
- d. how much of the pollutant is in the environment

_____ 8. Which factors determine whether exposure to a chemical will have a toxic effect?
- a. concentration and dose
- b. dose and exposure
- c. concentration and response
- d. exposure and response

Read the following question and write the answer in the space provided.

9. What factors determine the response to a chemical?

_____

_____

_____

Water Challenges

In the United States and other developed countries it is easy to get clean water. These countries have systems to deliver water to distant places. They also have effective laws and management to preserve the water supply and have good waste collection and treatment systems. In much of the world, this is not the case. Access to clean water is one of the world's biggest health challenges. For example, in many African countries, there is not enough water. In places where there is plenty of water, it often is contaminated with human wastes or pollutants. Thousands of people die every day from diarrhea caused by drinking unsafe water.

Making a Difference

For the last several decades, many organizations have been cooperating to bring clean water to people around the world. One of these programs is the Global Water for Sustainability Program (GLOWS). GLOWS is a team of organizations, led by Florida International University, funded by the United States Agency for International Development. By working with governments of developing countries and local communities, they increase social, economic, and environmental benefits of clean water. They do this by helping countries develop management plans for water use and creating infrastructure to deliver and purify water. This ensures that there is enough clean water available and that people don't have to travel too far to get water. GLOWS trains members of local communities in waste and water management to maintain water resources into the future. Although there is still much to do, international programs including GLOWS have improved water access and sanitation for more than a billion people already.

Water in a Changing World

The challenges of ensuring adequate water resources for people are complicated by environmental changes. Drought, sea level rise, floods, and other factors associated with climate change threaten water supplies. Drought and salt water moving into freshwater supplies can reduce the amount of water available to people. Floods can make waters unsafe to drink if pollutants enter the water supply. Understanding the impacts of climate change and natural disasters is a critical part of GLOW's work.

Safe water is a basic human necessity for cleaning, cooking, and drinking. At least one in eight people worldwide do not have access to a safe and reliable water supply.

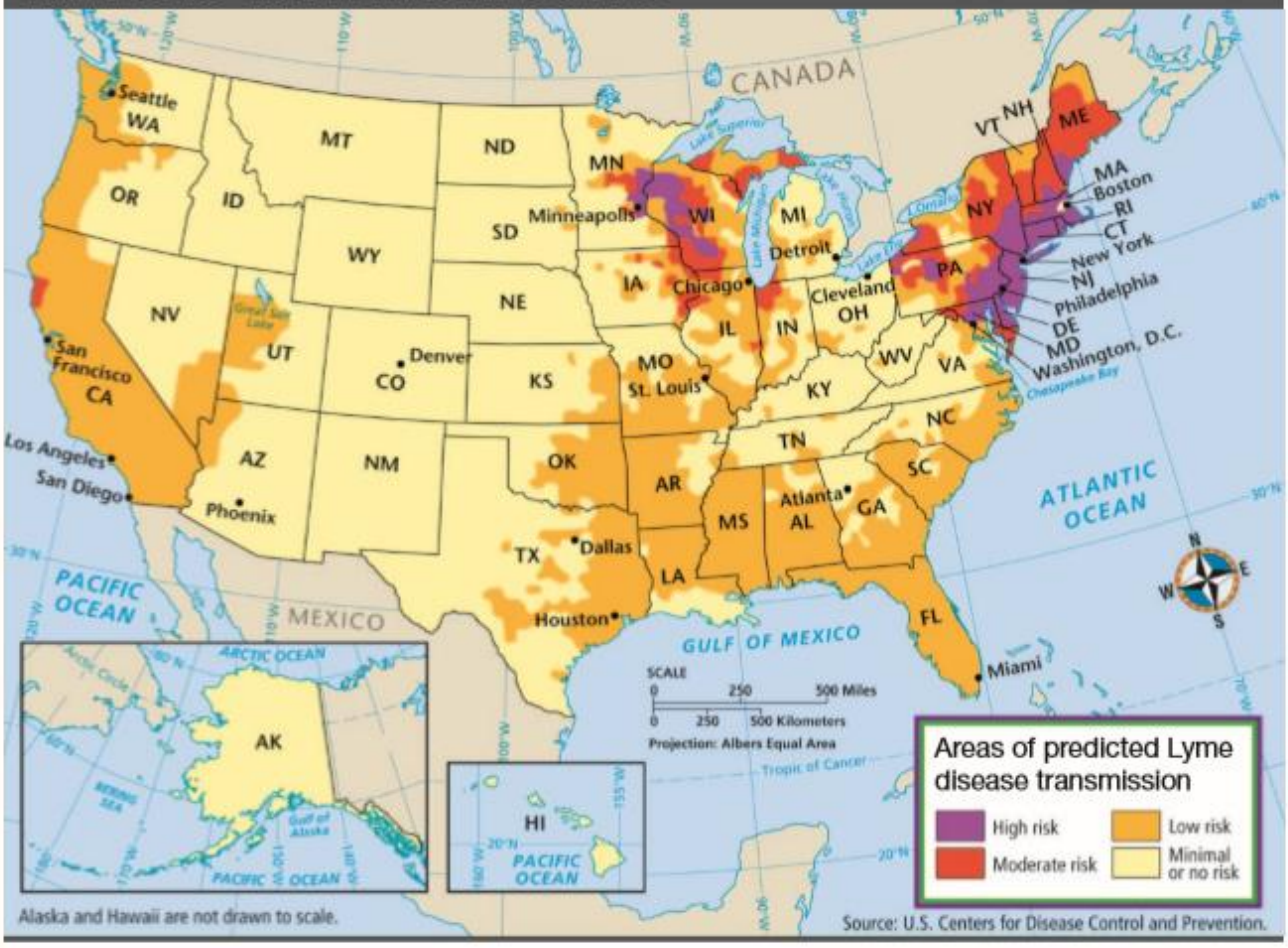
Lesson Review Questions

1. What factors in developed countries make it easier to obtain clean water?
2. What is the one of the world's biggest health challenges?
3. What is the goal of the program *GLOWS*?
4. What environmental factors can threaten water supplies?

Maps in Action

Lyme Disease Risk

LYME DISEASE RISK IN THE UNITED STATES



Map Skills

Use the Lyme disease risk map for the United States to answer the questions below.

1. **Interpreting Graphics** Using the map above, determine the risk of contracting Lyme disease in your city or town.
2. **Interpreting Graphics** In what general region of the United States is the risk of contracting Lyme disease greatest?
3. **Recognize Relationships** Can you determine the relationship between the risk of contracting Lyme disease and the concentration of ticks that act as vectors for the disease? Explain your answer.
4. **Analyzing Data** What is the difference between the risk of contracting Lyme disease in rural Massachussetts and the risk of contracting Lyme disease in rural Nevada?
5. **Inferring Conclusions** What factors might account for the relatively high risk of contracting Lyme disease in the Northeast?

Name _____ Class_____ Date _____

Skills Worksheet

Active Reading

Section 1: Economics and International Cooperation

Read the passage below and answer the questions that follow.

Businesses and private organizations also play roles in addressing environmental problems. Many businesses have found that recycling their wastes can save money and improve their public image. Saving energy makes business sense and also helps reduce emissions of greenhouse gases that contribute to climate change.

Private organizations often cooperate with each other and with governments. Such cooperation may include conducting research or creating plans for environmental management.

The Nature Conservancy is a nonprofit organization that uses a simple economic strategy to preserve ecosystems. This organization collects donations of money and land. If the donated land is not targeted for preservation, the organization trades or sells the land. Large preserves are put together by a combination of donations, exchanges, and purchases of land. The organization has created preserves in all 50 states and in 30 other countries.

IDENTIFYING MAIN IDEAS

One reading skill is the ability to identify the main idea of a passage. The main idea is the main focus or key idea. Frequently, a main idea is accompanied by supporting information that offers detailed facts about the main idea.

In the space provided, write the letter of the term or phrase that best completes each statement or best answers each question.

_____ 1. What is the Nature Conservancy?
- a. a business that recycles its waste
- b. a nonprofit organization that preserves ecosystems
- c. a government organization that oversees preserves
- d. a private company that targets land for preservation

_____ 2. The Nature Conservancy forms large preserves by
- a. combining donations, exchanges, and purchases of land.
- b. working with the government to target land for preservation.
- c. persuading businesses to donate land for parks.
- d. conducting research to determine what land is suitable for preservation.

Read the following question and write the answer in the space provided.

3. What does the Nature Conservancy do with donated land that is not targeted for preservation?

_____

_____

VOCABULARY DEVELOPMENT

Read the question and write the answer in the space provided.

_____ 4. A private organization working with a government to create a plan for environmental management is an example of
- a. preservation
- b. economic strategy
- c. cooperation
- d. exchange

In the space provided, write the letter of the description that best matches the term or phrase.

_____ 5. preserve
_____ 6. recycling
_____ 7. environmental management

a. a plan for taking care of the environment
b. reuse of waste material
c. land whose ecosystems are protected

RECOGNIZING SIMILARITIES AND DIFFERENCES

One reading skill is the ability to recognize similarities and differences between two phrases, ideas, or things. This is sometimes known as comparing and contrasting.

Read the question and write the answer in the space provided.

8. Businesses and private organizations both play roles in addressing environmental problems. How are their roles different?

_____

_____

RECOGNIZING CAUSE AND EFFECT

One reading skill is the ability to recognize cause and effect.

Read each question and write the answer in the space provided.

9. How do businesses benefit from recycling waste?

_____

_____

10. How do private organizations cooperate with each other and with governments?

_____

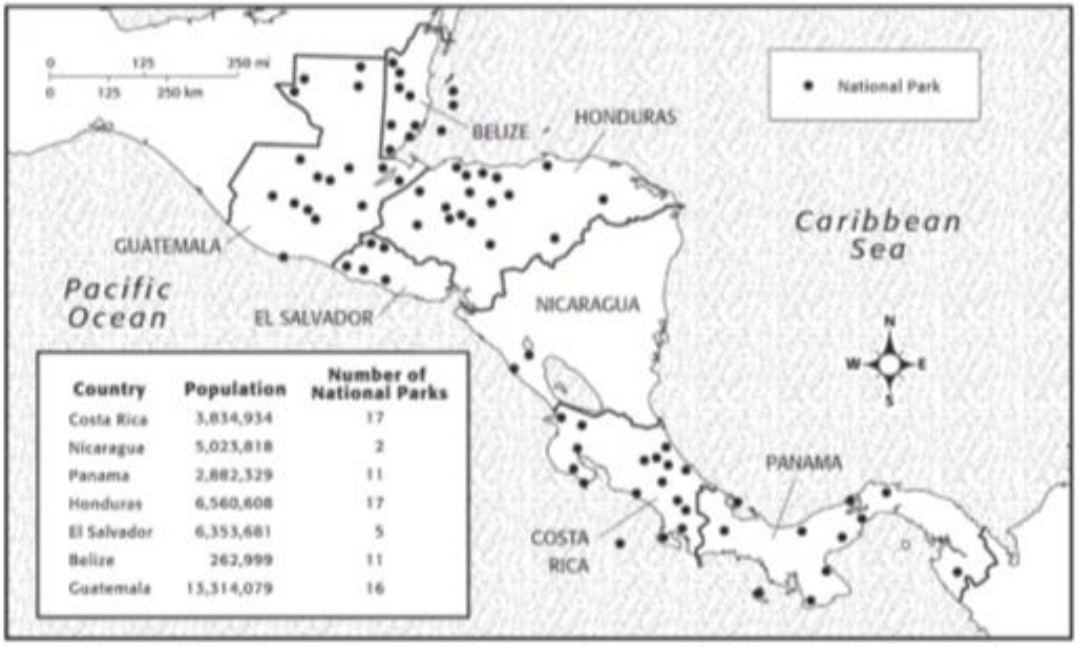
_____

_____

Name _____ Class _____ Date _____

Skills Worksheet **NATIONAL PARKS**

Map Skills



Country	Population	Number of National Parks
Costa Rica	3,834,934	17
Nicaragua	5,023,818	2
Panama	2,882,329	11
Honduras	6,560,608	17
El Salvador	6,353,681	5
Belize	262,999	11
Guatemala	13,314,079	16

Every Central American country has created national parks in order to save the remaining rain forest ecosystems. There are 411 protected areas in the region, and 391 more are being planned. Of the areas already protected, 124 are officially national parks.

Use the map above to answer the questions below.

1. **Analyzing Data** Which country or countries in Central America have the most national parks? the fewest?

2. **Analyzing Data** How have countries distributed their parks among interior and coastal areas?

3. **Inferring Relationships** What is the relationship, if any, between the size of a country and the number of national parks?

4. **Making Conclusions** What factors do you think affect the creation of national parks?

5. **Making a Hypothesis** How might a significant population increase in Guatemala affect the national parks system?

SECTION 3

Objectives

- Give examples of individuals who have influenced environmental history.
- Identify ways in which the choices that you make as an individual may affect the environment.

The Importance of the Individual

It is easy to feel that one person does not make much difference to the environment, but we all affect the environment with our daily actions. By learning about environmental problems and solutions, we are able to make responsible decisions and help others make similar choices. History has shown that one individual can have an influence on many others.

FIGURE 1.1

PEOPLE WHO HAVE INFLUENCED ENVIRONMENTAL THINKING

Henry David Thoreau (1817–1862) was a conservationist and writer who is best known for his essays about his stay in a cabin at Walden Pond in Massachusetts.	David Attenborough (1926–) is a British broadcaster and naturalist most well-known for his ground-breaking documentary series "Planet Earth."
John Muir (1838–1914) was a Scottish-born naturalist and writer who founded the Sierra Club, explored the American West, and was an advocate for preserving western lands as wilderness.	Marion Stoddart (1928–) led efforts to save the Nashua River in Massachusetts from pollution and development. *A River Ran Wild* is a book about her efforts. She is still active in protecting the Nashua River.
Theodore "Teddy" Roosevelt (1858–1919) was the first American president to strongly support conservation. He founded the Forest Service and created the first National Monuments.	Paul Ehrlich (1932–) is a Stanford ecologist who warned of the dangers of rapid population growth with his 1968 book, *The Population Bomb*.
Alice Hamilton (1869–1970) was the first American expert on diseases caused by working with chemicals. In the early 1900s, she warned workers about exposure hazards and opposed the addition of lead to gasoline.	Jane Goodall (1934–) studied chimpanzees in Tanzania's Gombe Stream National Park. Her books raised awareness of the plight of several endangered species and prompted new thinking about primate behavior.
Aldo Leopold (1887–1948) was an ecologist and forester who wrote about the land ethic in his book *A Sand County Almanac,* published in 1949.	Sylvia Earl (1935–) is an American oceanographer. She is an explorer-in-residence with the National Geographic Society. A winner of the 2009 TED Prize, she is an advocate for the establishment of marine protected areas around the world.
Rachel Carson (1907–1964) was a biologist with the U.S. Fish & Wildlife Service, who raised awareness of toxic pesticides with her 1962 book, *Silent Spring*.	Wangari Maathai (1940–2011) was the founder of the Green Belt Movement, a grassroots environmental nonprofit based in Kenya. She won the 2004 Nobel Peace Prize "for her contribution to sustainable development, democracy, and peace."
Garrett Hardin (1915–2003) was a distinguishing professor of human ecology who is best known for his 1968 essay "The Tragedy of the Commons."	John Cronin (1950–) is known internationally for his work as an advocate for New York's Hudson River. He was named a "Hero for the Planet" by *Time* magazine.