Name _____ Class _____ Date _____

Climate, Environment, and Resources

Section 1

MAIN IDEAS

1. While weather is short term, climate is a region's average weather over a long period.
2. The amount of sun at a given location is affected by Earth's tilt, movement, and shape.
3. Wind and water move heat around Earth, affecting how warm or wet a place is.
4. Mountains influence temperature and precipitation.

Key Terms and Places

weather the short-term changes in the air for a given place and time
climate a region's average weather conditions over a long period
prevailing winds winds that blow in the same direction over large areas of Earth
ocean currents large streams of surface seawater
front a place where two air masses of different temperature or moisture content meet

Section Summary

UNDERSTANDING WEATHER AND CLIMATE

Weather is the condition of the atmosphere at a certain time and place. **Climate** is a region's average weather over a long time. Climate is affected mostly by two factors: sun and latitude. Energy from the sun falls more directly on the equator, so the hottest temperatures are near the equator. In general it gets colder as you move away from the equator to a higher latitude.

What are two important forces that affect climate?

_____

_____

SUN AND LOCATION

Heat from the sun moves around the Earth, partly through winds. Wind is caused by the rising and sinking of air. Cold air sinks, and warm air rises. At different latitudes winds tend to blow in the same direction. These **prevailing winds** can be from the west or east. Near the poles and in the subtropics, prevailing winds are easterlies. In the middle latitudes are the westerlies. Prevailing winds control an area's climate.

What causes wind?

_____

_____

WIND AND WATER

Winds pick up moisture over oceans and dry out passing over land. At about 30° North and South latitude, dry winds cause many of the world's deserts.

Ocean currents—large streams of surface water—also move heat around. The Gulf Stream is a warm current that flows from the Gulf of Mexico across the Atlantic Ocean to western Europe.

Water heats and cools more slowly than land. Therefore, water helps to moderate the temperature of nearby land, keeping it from getting very hot or very cold.

Which heats and cools more slowly–land or water?

_____

A **front** is a place where two different air masses meet. In the United States and other regions, warm and cold air masses meet often, causing severe weather. These can include thunderstorms, blizzards, and tornadoes. Tornadoes are twisting funnels of air that touch the ground. Hurricanes are large tropical storms that form over water. They bring destructive high winds and heavy rain.

Which occurs in the tropics–tornadoes or hurricanes?

_____

MOUNTAINS

Mountains also affect climate. Warm air blowing against a mountainside rises and cools. Clouds form, and precipitation falls on the side facing the wind. However, the air is dry by the time it goes over the mountain. This effect creates a rain shadow, a dry area on the side of the mountain facing land.

CHALLENGE ACTIVITY

Critical Thinking: Sequencing Write a short description of the process leading up to the formation of a rain shadow. Draw and label a picture to go with your description.

Name _____ Class _____ Date _____

Climate, Environment, and Resources

Section 2

MAIN IDEAS

1. Geographers use temperature, precipitation, and plant life to identify climate zones.
2. Tropical climates are wet and warm, while dry climates receive little or no rain.
3. Temperate climates have the most seasonal change.
4. Polar climates are cold and dry, while highland climates change with elevation.

Key Terms and Places

monsoon winds that shift direction with the seasons and create wet and dry periods
savanna an area of tall grasses and scattered trees and shrubs
steppe a semi-dry grassland or prairie
permafrost permanently frozen layers of soil

Section Summary

MAJOR CLIMATE ZONES

We can divide Earth into five climate zones: tropical, temperate, polar, dry, and highland. Tropical climates appear near the equator, temperate climates are found in the middle latitudes, and polar climates occur near the poles. Dry and highland climates can appear at different latitudes.

Underline the names of the five climate zones.

TROPICAL AND DRY CLIMATES

Humid tropical climates occur near the equator. Some are warm and rainy throughout the year. Others have **monsoons**—winds that shift directions and create wet and dry seasons. Rain forests need a humid climate to thrive and support thousands of species.

Moving away from the equator, we find tropical savanna climates. A **savanna** is an area of tall grasses and scattered trees and shrubs. A long, hot dry season is followed by short periods of rain.

What happens when monsoon winds change direction?

_____

_____

Deserts are hot and dry. At night, the dry air cools quickly; desert nights can be cold. Only a few living things survive in a desert. Sometimes **steppes**—dry grasslands—are found near deserts.

TEMPERATE CLIMATES

Away from the ocean in the middle latitudes are humid continental climates. Most have four distinct seasons, with hot summers and cold winters. In this climate, weather often changes quickly when cold and warm air masses meet.

Underline the name of the climate that can have four distinct seasons.

A Mediterranean climate has hot, sunny summers and mild, wet winters. They occur near the ocean, and the climate is mostly pleasant. People like to vacation in these climates. Only small, scattered trees survive in these areas.

What do people typically like to do in Mediterranean climates?

_____

East coasts near the tropics have humid subtropical climates, because of winds bringing in moisture from the ocean. They have hot, wet summers and mild winters. Marine west coast climates occur farther north and also get moisture from prevailing winds coming in from the ocean.

POLAR AND HIGHLAND CLIMATES

Subarctic climate occurs south of the Arctic Ocean. Winters are long and cold, and summers are cool. There is enough precipitation to support forests. At the same latitude near the coasts, tundra climate is also cold, but too dry for trees to survive. In parts of the tundra, soil is frozen as **permafrost**.

Can there be forests in subarctic climates?

_____

Ice cap climates are the coldest on Earth. There is little precipitation and little vegetation.

Highland, or mountain, climate changes with elevation. As you go up a mountain, the climate may go from tropical to polar.

CHALLENGE ACTIVITY

Critical Thinking: Comparing and Contrasting Create a table showing the differences and similarities between any two types of climate.

Name _____ Class _____ Date _____

Climate, Environment, and Resources

Section 3

MAIN IDEAS

1. The environment and life are interconnected and exist in a fragile balance.
2. Soils play an important role in the environment.

Key Terms and Places

environment a plant or animal's surroundings

ecosystem any place where plants and animals depend upon each other and their environment for survival.

habitat the place where a plant or animal lives

extinct to die out completely

humus decayed plant or animal matter

desertification the slow process of losing soil fertility and plant life

Section Summary

THE ENVIRONMENT AND LIFE

Plants and animals cannot live just anywhere. They must have the right surroundings, or **environment.** Climate, land features, and water are all part of a living thing's environment. If an area has everything a living thing needs, it can be a **habitat** for that species.

Many plants and animals usually share a habitat. Small animals eat plants, and then large animals eat the small animals. Species are connected in many ways. A community of connected species is called an **ecosystem.** Ecosystems can be as small as a pond or as large as the entire Earth.

How large can an ecosystem be?

_____

Geographers study how changes in environments affect living things. Natural events and human actions change environments. Natural events include forest fires, disease, and climate changes. Human actions include clearing land and polluting.

Underline the human actions that can cause changes in an environment.

If a change to the environment is extreme, a species might become **extinct**, or die out completely.

What does it mean to become extinct?

_____

_____

SOILS AND THE ENVIRONMENT

Without soil, much of our food would not exist. Soil forms in layers over hundreds or thousands of years. The most fertile layer, the topsoil, has the most humus. **Humus** is decayed plant or animal matter.

Which has more humus–topsoil or subsoil?

_____

The next layer, the subsoil, has less humus and more material from rocks. Soil gets minerals from these rocks. Below the subsoil is mostly rock.

An environment's soil affects which plants can grow there. Fertile soils have lots of humus and minerals. Fertile soils also need to contain water and small air spaces.

Underline two things found in fertile soil.

Soils can lose fertility from erosion by wind or water. Soil can also lose fertility from planting the same crops repeatedly. If soil becomes worn out and can no longer support plants, **desertification** can occur.

CHALLENGE ACTIVITY

Critical Thinking: Drawing Inferences Consider the interconnections in your environment. As you go through a normal day, keep a list of the sources you rely on for energy, food, and water.

Name _____ Class _____ Date _____

Climate, Environment, and Resources

Section 4

MAIN IDEAS

1. Earth provides valuable resources for our use.
2. Energy resources provide fuel, heat, and electricity.
3. Mineral resources include metals, rocks, and salt.
4. Resources shape people's lives and countries' wealth.

Key Terms and Places

natural resource any material in nature that people use and value

renewable resources resources that can be replaced naturally

nonrenewable resources resources that cannot be replaced

deforestation the loss of forestland

reforestation planting trees to replace lost forestland

fossil fuels nonrenewable resources formed from the remains of ancient plants and animals

hydroelectric power the production of electricity by moving water

Section Summary

EARTH'S VALUABLE RESOURCES

Anything in nature that people use and value is a **natural resource**. These include such ordinary things as air, water, and soil. Resources such as trees are called **renewable resources** because Earth replaces them naturally. Those that cannot be replaced, such as oil, are called **nonrenewable resources**.

Air and water are renewable resources, but pollution can damage both. Some people get their water from underground wells, which can run out if too many people use them.

Soil is needed for all plant growth, including trees in forests. We get lumber, medicine, nuts, and rubber from forests. Soil and trees are renewable, but must be protected. The loss of forests is called **deforestation**. When we plant trees to replace lost forests, we call it **reforestation**.

Are air and water renewable or nonrenewable resources?

_____

Underline the resources we can get from a forest.

ENERGY RESOURCES

Most of our energy comes from **fossil fuels**, which are formed from the remains of ancient living things. These include coal, oil, and natural gas.

We use coal mostly for electricity, but it causes air pollution. An advantage of coal is that Earth still has a large supply. Another fossil fuel is petroleum, or oil. It is used to make gasoline and heating oil. Oil can be turned into plastics and other products. Oil also causes pollution, but we depend on it for much of our energy. The cleanest fossil fuel is natural gas, which is used mainly for cooking and heating.

Where does gasoline come from?

_____

What is the cleanest-burning fossil fuel?

_____

Renewable energy resources include **hydroelectric power**—the creation of electricity by moving water. This is accomplished mainly by building dams on rivers. Other renewable energy sources are wind, solar, and nuclear energy. Nuclear energy produces dangerous waste material that must be stored for thousands of years.

MINERAL RESOURCES

Minerals are solid substances in the Earth's crust formed from nonliving matter. Like fossil fuels, minerals are nonrenewable. Types of minerals include metals, rocks and gemstones, and salt. Mineral uses include making steel from iron, making window glass from quartz, and using stone as a building material. We also use minerals to make jewelry, coins, and many other common objects.

Name two uses of minerals.

_____

_____

RESOURCES AND PEOPLE

Some places are rich in natural resources. Resources such as fertile farmland, forests, and oil have helped the United States become a powerful country with a strong economy.

CHALLENGE ACTIVITY

Critical Thinking: Drawing Inferences Write a short essay explaining why we still use coal, even though it causes pollution.