Name _____ **Date** _____

What's the Weather?

Key Words		
absorbed	air mass	atmosphere
cold front	energy	front
high pressure system	low pressure system	pattern
radiation	reflect	warm front
water vapor	weather	wind

The **atmosphere** is a layer of air that totally surrounds the Earth. It protects the Earth from some of the sun's harmful rays. The two main gases found in the atmosphere are nitrogen and oxygen. These gases along with carbon dioxide and water vapor are important for the life processes of many organisms. Dust, ice, and liquid water, can also be found in the Earth's atmosphere. The mixture of gases in the atmosphere support life on the Earth.

Weather is the condition of the atmosphere at any given time. What the weather is like is very important to us. There are many factors that affect what the weather is and if it will change anytime soon: the amount of **water vapor** in the air, the temperature of the air, etc. The most important factor in the development of weather **pattern**s on the Earth's surface, however, is the **sun**.

One reason that the sun is important to the development of weather is that the sun warms the Earth. Without the sun, the Earth would be a frozen rock, but too much energy from the sun would turn the Earth into a mass of boiling liquid. The layers of the atmosphere protect us from the sun's damaging rays. The sun is the source of all **energy** in the atmosphere. The energy from the sun that reaches the Earth is called **radiation** (the movement of energy through space as waves). Three different events take place when radiation from the sun reaches the Earth's surface. Some of the energy is **reflect**ed back into space. Some of the energy is **absorbed** by the atmosphere. Finally, some of the energy reaches the surface of the Earth. The way these three events balance affects our weather.

The radiant energy from the sun warms the Earth. Air near the Earth's surface gets warm. Warm air is less dense than cold air. The warm air rises. As the warm air rises, cold air moves in to replace the warm air. This movement of air is called **wind**. Wind moves weather patterns all around the world.

The movement of air masses is what causes the weather to change from day to day and month to month. An **air mass** is a large pocket of air with about the same temperature and humidity (amount of moisture). An air mass can be hot or cold or wet or dry. Its features are like the land over which it forms. Air masses that form over the North Pole often bring very cold air to the United States. Air masses that form over lakes or oceans tend to be wet. These air masses bring rain or snow to nearby land. A **front** means the place where two air masses of different temperatures meet. An incoming front always means a change in weather.

A **cold front** occurs when a cold air mass moves into area covered with a warm air mass. When the colder air mass meets the warmer one, it slides under the warm air mass and forces it upward. The higher the warm air goes and the cooler it gets, the less able it is to hold the water vapor it contains. When this happens, there may be a heavy rain or storms. Because cold fronts often move quickly, the weather conditions they bring are often brief.

Another type of front is a **warm front**. A warm front occurs when a mass of warm air catches up with a mass of cold air. The warm air pushes behind the cold air mass and at the same time, rises up above the cold air. The warm air cools, and clouds form as the air's water vapor condenses. These clouds usually mean that there will be long-lasting precipitation and warmer weather.

Weather maps often show the movement of fronts and pressure systems. **High pressure systems** are associated with warm fronts and usually bring sunny, bright days. In the Northern Hemisphere air tends to flow in a clockwise direction in a high pressure system. **Low pressure systems** are often associated with cold fronts and usually bring rain and sometimes big storms. In the Northern Hemisphere, the air in a low pressure system flows in a counterclockwise direction.

1. A cold front forms when—

A a cold air mass stops moving

B a cold air mass moves into an area of warm air

C warm air moves into an area of cold air

D warm air moves quickly to bring rain

2. Which of the following is a way that the sun affects weather patterns on the Earth?

A The sun is the source of all energy in the atmosphere.

B The energy from the sun that reaches the Earth is called radiation.

C The sun is made mainly of helium and hydrogen.

D Some of the sun's energy is reflected back into space.

3. Which of the following is likely to produce large amounts of rain?

A An air mass

B Very strong winds

C A high pressure system

D A low pressure system

4. Why does warm air rise when it meets cooler air? Warm air—

A is easily moved by wind

B is less dense than cooler air

C tries to avoid cooler air

D is more dense than cooler air

5. Which of the following gases in the Earth's atmosphere is NOT a part of the life processes of many organisms?

A Carbon dioxide

B Oxygen

C Helium

D Water vapor

6. Which of the following forms of energy powers the water cycle, winds, and weather?

A Solar energy

B Heat energy

C Chemical energy

D Electrical energy

7. In which of the following areas is a hot, dry air mass most likely to form?

A A tropical rain forest

B The South Pole

C The Pacific Ocean

D The Sahara Desert

B. A **meteorologist** predicts the **weather**. It is winter in the **Northern Hemisphere** right now.

The words above in **bold type** are nouns. A noun is a word that names a person, place, or thing. A **meteorologist** is a person; **weather** is a thing; and the **Northern Hemisphere** is a place. Look at the nouns listed below. Then read the sentences. Write the noun that best completes the sentence.

air mass	cold front	warm front
atmosphere	wind	weather

8. _____ is created by the uneven heating of the Earth's atmosphere by the sun.

9. The _____ is the layer of air that totally surrounds the Earth.

10. A _____ is the leading edge of a large mass of cold air.

11. _____ Is the condition of the air outside at any given time.

12. A _____ is the leading edge of a mass of warm air.

13. An _____ is a large pocket of air with the same temperature and the same humidity.

14. Use the space below to write a summary of paragraph number three.

absorbed	air mass
atmosphere	cold front
energy	front
high pressure system	low pressure system
pattern	radiation
reflect	warm front
water vapor	weather
wind	