

ES13B Weather Prediction and Storms

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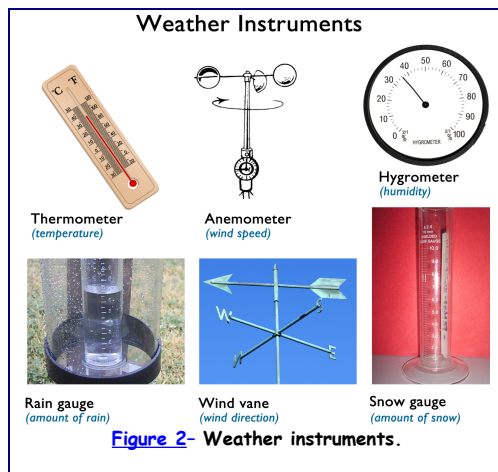
Date: ___ / ___ / ___ Period ___ Room ___

**Did you know?**

- 1 Weather is very difficult to predict. That's because it's very complex. Many factors are involved. Slight changes in the atmosphere can cause a big change in the weather.
- 2 Scientists who study and forecast the weather are called meteorologists.
- 3 A storm is any kind of severe weather like rain, snow or a thunderstorm. It is caused by a major disturbance in the atmosphere. (see [Figure 1](#)).

**Figure 1-** A thunderhead could bring a storm.**So, why is it important to me?**

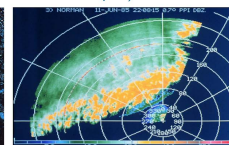
- 4 Weather is always changing. One day might be cold and cloudy. The next day might be warm and sunny. Even on the same day, the weather can change a lot. A beautiful morning might be followed by a stormy afternoon. Pilots certainly need to know a lot about the weather to fly a plane.

What are the big ideas I need to know?**Figure 2-** Weather instruments.

- 5 These are some of the most commonly used weather instruments(see [Figure 2](#)).
Thermometer: temperature, Anemometer: wind speed, Rain gauge: rain, Hygrometer: humidity, Wind vane: wind direction, Snow gauge: snow.

- 6 Weather stations contain many instruments for measuring

weather factors. Many weather satellites orbit Earth. They constantly collect and transmit weather data from high above the surface. A weather radar device sends out radio waves in all directions from a radar tower on Earth. The waves bounce off water in the atmosphere and return to the sender. Radar shows where precipitation is falling (see [Figure 3](#)).

How Weather Data Are Collected**Weather Station**
(The weather stations contains many instruments for measuring weather factors.)**Weather Balloon**
(This weather balloon will rise into the atmosphere until it bursts. As it rises, it will gather weather data and send them to the surface.)**Weather Satellite**
(Many weather satellites orbit Earth. They constantly collect and transmit weather data from high above the surface.)**Weather Radar**
(A radar device sends out radio waves in all directions. The waves bounce off water in the atmosphere and return to the sender. They show where precipitation is falling. It's raining in the orange-shaded area shown here.)**Figure 3-** Weather instruments.

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- 7 What do meteorologists do with all that weather data? They use it in weather models. The models analyze the data and predict the weather. The models require computers. That's because so many measurements and calculations are involved.
- 8 The weather map shown (see [Figure 4](#)) shows air pressure. The lines on the map connect places that have the same air pressure and they're called isobars. The map also shows low (L) and high (H) pressure centers and fronts. It might have lines connecting places with the same temperature. These lines are called isotherms.

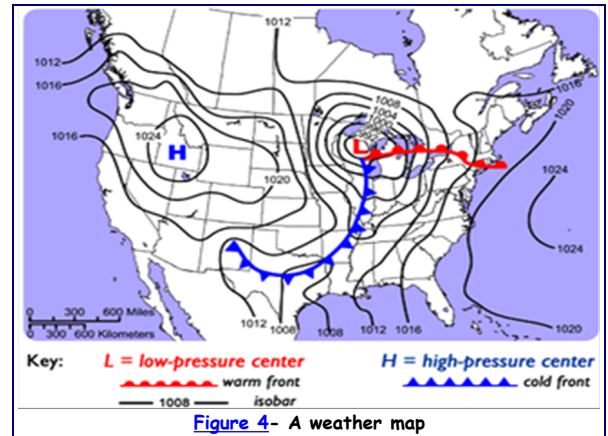


Figure 5- Lightning during a thunderstorm.



Figure 6- A tornado is very local.

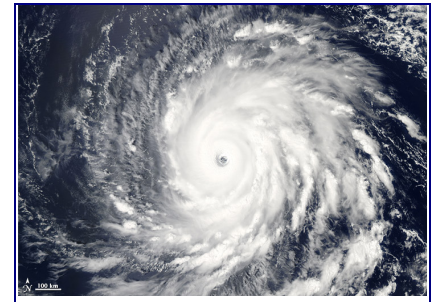


Figure 7- A massive hurricane from above.

- 9 During a thunderstorm, some parts of a thunderhead become negatively charged. Other parts become positively charged. The difference in charge creates lightning (see [Figure 5](#)). Lightning blasts the air with energy. The air heats and expands so quickly that it explodes. This creates the loud sound of thunder.
- 10 Severe thunderstorms have a lot of energy and strong winds. They often produce tornadoes. A tornado is a storm with a funnel-shaped cloud of whirling high winds (see [Figure 6](#)). The funnel reaches down to the ground causing massive destruction. Fortunately, tornadoes may be less than two football fields wide.
- 11 A hurricane is a large storm with high winds and heavy rains. It develops from a tropical cyclone. A hurricane may cover the entire Gulf of Mexico (see [Figure 7](#)). It may also travel across an ocean. Its wind speed may be twice as fast as you can go in an automobile! Hurricanes form over warm ocean water. The warm water gives them a lot of their energy. As long as a hurricane stays over the warm ocean, it keeps growing stronger. However, if it goes ashore, it starts to lose energy because there is no ocean to keep it going.

What about?

- 12 At the center of a hurricane is a small area where the air is calm and clear called the eye. The eye forms at the low-pressure center of the hurricane.
- 13 Because light travels faster than sound, you can count the seconds between seeing lightning and hearing thunder. You can estimate how far away the lightning was - a lapse of 5 seconds is equal to about a mile.
- 14 The [Fujita Scale](#) is used for measuring tornado intensity and the [Saffir - Simpson](#) Scale is used for hurricanes wind speeds and amount of destruction.