

## Wind over Water

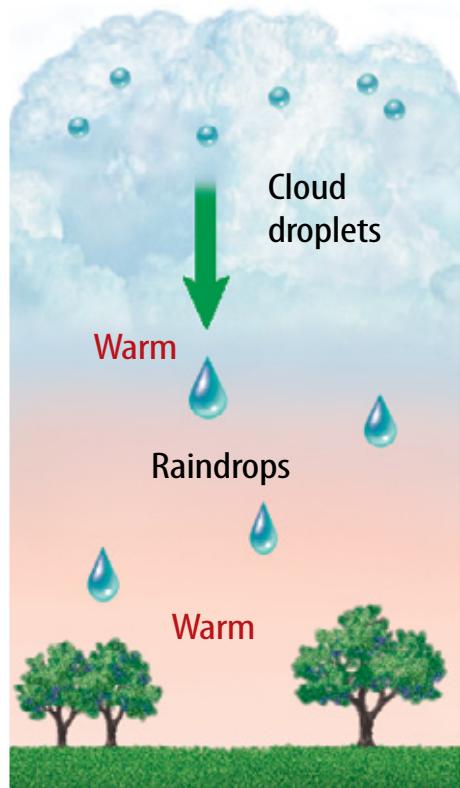
What do you get when you add a mast with a sail to a surfboard? You get a windsurf board! Windsurfers harness the power of wind to skim their boards across the water.

Windsurfers pay attention to many weather factors, not just the wind. They might choose to stay off the water during cold or rainy weather or when a storm is on its way.

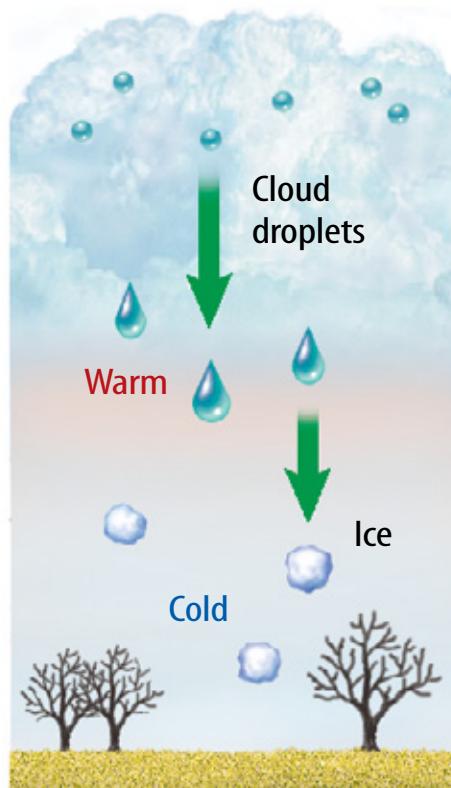
- ❶ Describe at least three weather factors that you observe in the photo.
- ❷ How would a storm make windsurfing dangerous?
- ❸ What is the weather like where you are? What sports would be appropriate today?



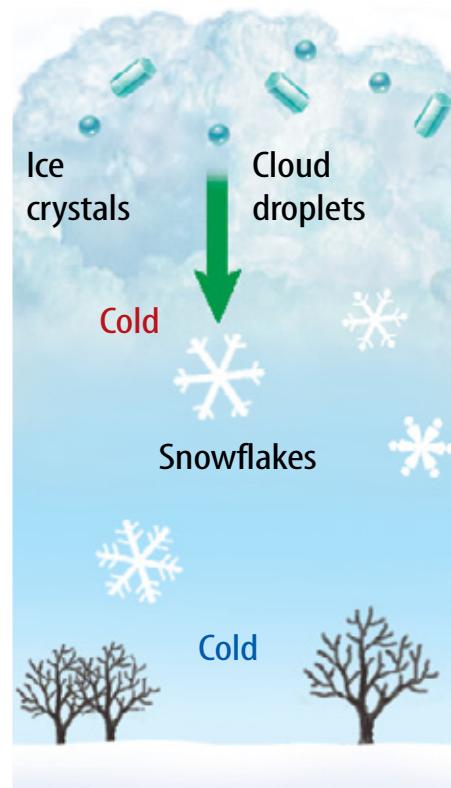
## Types of Precipitation



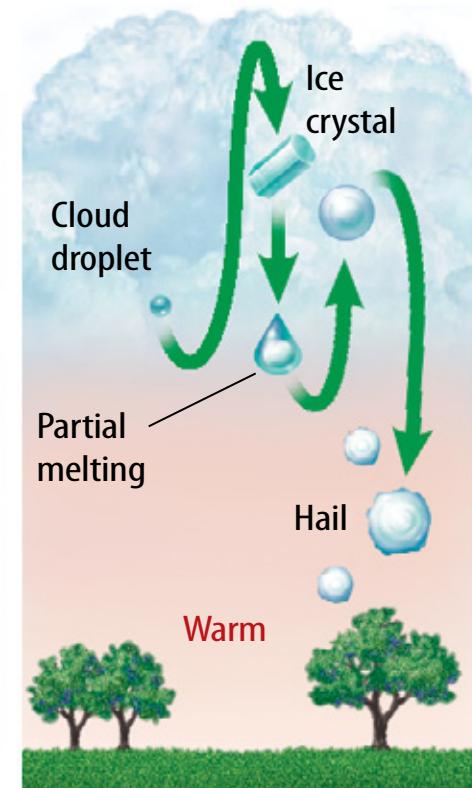
Rain



Sleet



Snow



Hail

## It's a Twister!

A tornado is a storm with violent, swirling winds.

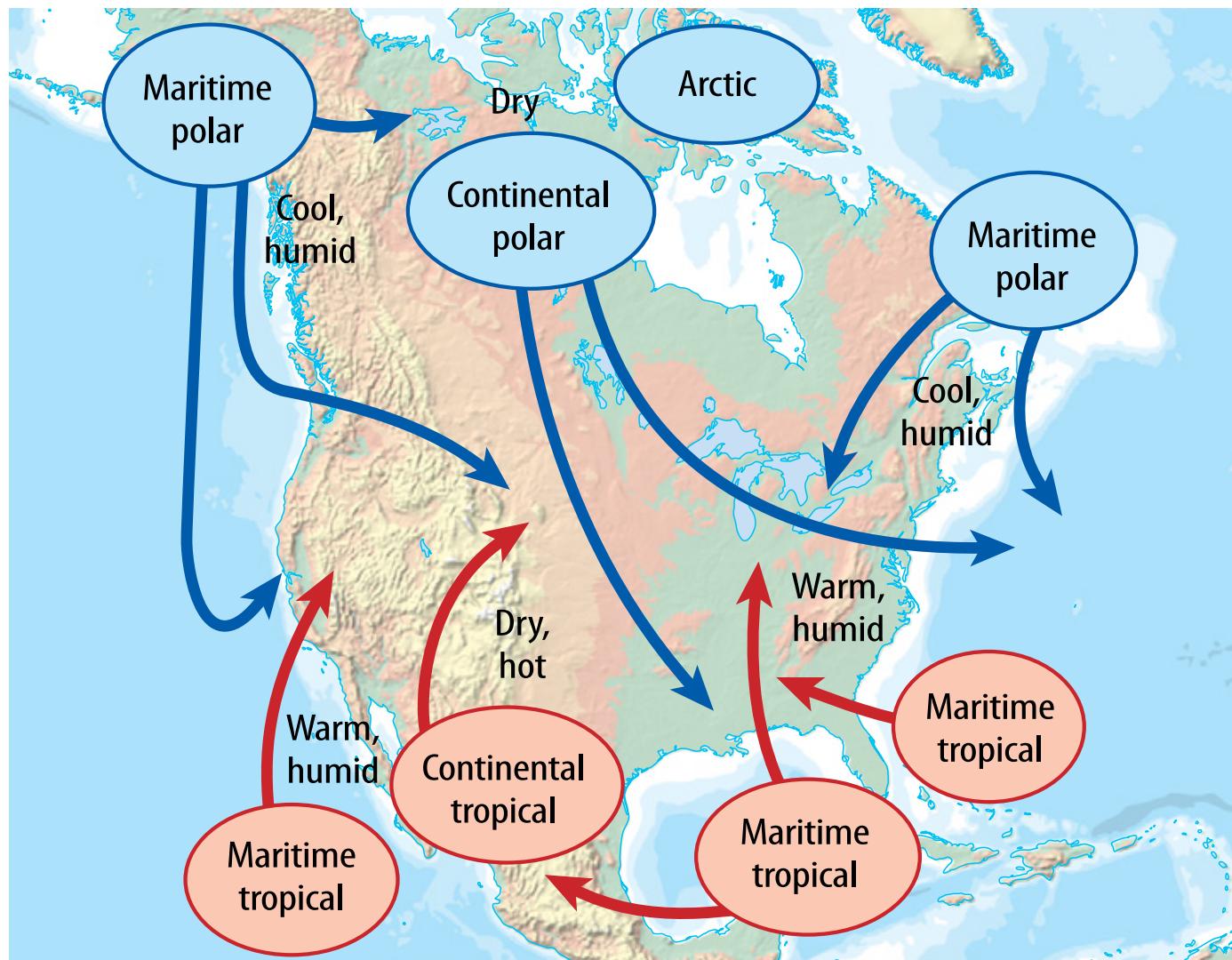
Tornadoes can uproot trees, blow out windows, and even lift cars and houses.

Tornadoes are most common during the late summer on open plains, especially in the central United States. They have, however, occurred during all seasons and in all 50 states.

- ❶ What factors affect the amount of damage caused by a tornado?
- ❷ What other types of severe storms are you aware of?
- ❸ How should people in a car respond when a tornado is approaching?



## Air Masses

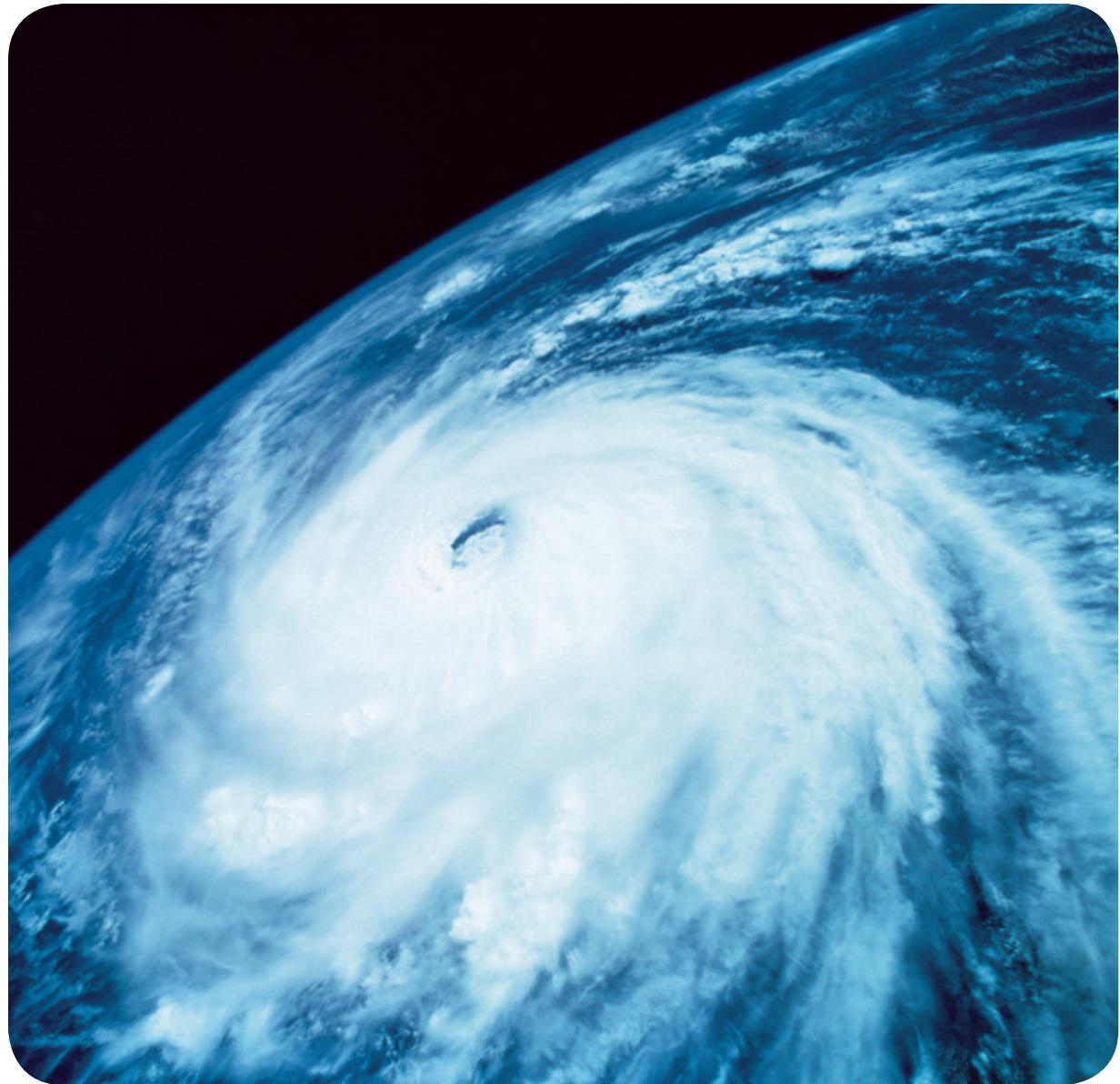


## A View from Above

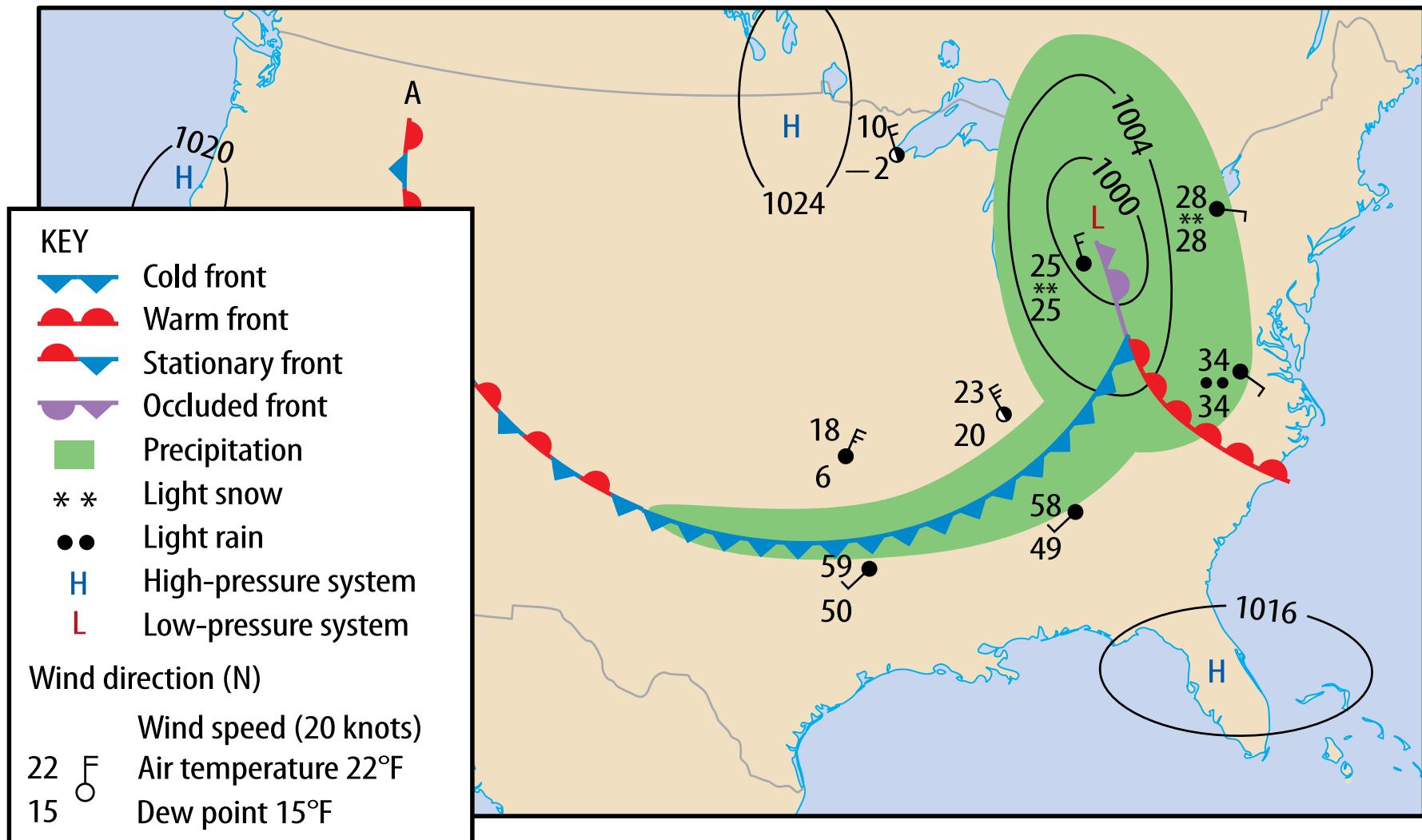
Long ago, people could only imagine what Earth's weather looked like from space. Today, cameras on satellites are constantly taking pictures of Earth's atmosphere.

This photo shows the swirling clouds of a hurricane. With the help of satellites, computers, and weather stations, scientists can accurately predict the weather and chart the course of severe storms.

- ❶ Why is weather forecasting important?
- ❷ Why are satellite photos of hurricanes useful?
- ❸ Why is it necessary to use many different tools to study the weather?



## Weather Map



# Teacher Guide

## Weather

### Lesson 1 Bellringer

Photodisc/Punchstock

#### Wind over Water

- Before the era of modern science, people used myths to explain changes in the weather. Ancient Greeks believed that the god Zeus made rain and that lightning was his weapon.
- Remind students that the weather cannot be described with a single adjective. Weather is characterized by many factors, including air temperature, precipitation, wind speed, and humidity. Different adjectives apply to each of these factors.

#### Answers to Questions

- The weather appears to be warm, sunny, and moderately windy (the wind is filling the sail, but the water appears calm).
- A storm could bring strong winds, heavy rain, and lightning. A windsurfer could be knocked off the surfboard. Lightning could strike the mast.
- Answers will vary. Students might suggest football, baseball, swimming, etc.

### Lesson 1 Focus on Content

#### Types of Precipitation

- Ask students to compare and contrast the four forms of precipitation shown here. All begin as water droplets or ice crystals that gather in clouds and then fall to the surface. They differ due to differences in temperature and, in the case of hail, in wind conditions.
- Hail is an unusual form of precipitation because it involves ice particles both rising and falling through the air. The stronger the upward-blowing wind, the longer the hailstones stay in the air and the larger they become. In 1996, hail the size of softballs fell in Lake Wales, Florida. This was the largest hail ever recorded in the state.

### Lesson 2 Bellringer

Royalty-Free/CORBIS

#### It's a Twister!

- The funnel cloud of a tornado can form in a variety of shapes and sizes. The photo shows a narrow funnel with a distinct boundary. Others are wider and less distinct.
- Students might wonder how this photograph was taken. Explain that "storm chasers" are professionals who drive into the heart of a storm to study and to photograph it. Their job is very dangerous, and their safety depends on excellent judgment.

#### Answers to Questions

- Answers include the location where the tornado strikes, the severity and duration of the storm, and how well people are prepared for the tornado.
- Answers include hurricanes, thunderstorms, and blizzards.

- In this situation, experts advise seeking shelter immediately in a low place, such as the ditch of the highway if there is no rain. Do not try to outrun an approaching tornado.

### Lesson 2 Focus on Content

#### Air Masses

- For each air mass, have students identify its characteristic temperature and moisture content. Then work with the class to design four icons to represent hot temperatures, cold temperatures, wet air, and dry air. Add the icons to the transparency to illustrate the type of weather that air masses bring.

### Lesson 3 Bellringer

Stockbyte/PunchStock

#### A View from Above

- Have students locate the eye of the hurricane in the photo. It is the button-like circle of clouds in the middle of the storm. Explain that the weather is quite calm inside the eye of the storm, in contrast to the extreme winds and rainfall outside it.

#### Answers to Questions

- Weather affects all sorts of human activities, including agriculture, transportation, and recreation. Forecasting also helps people prepare for and survive a severe storm.
- Satellite photos can show the entire storm and the swirling pattern of the clouds. They help scientists measure the size and strength of a hurricane and predict its path.
- Weather depends on many factors, including air temperature, air pressure, humidity, and precipitation. Different tools measure each of these factors. Computers and other technology help forecasters analyze data and make models of weather systems.

### Lesson 3 Focus on Content

#### Weather Map

- Challenge students to suggest ways that the weather shown on the map could change. Remind students that many factors affect the weather. As forecasters attempt to predict weather conditions for specific dates farther into the future, their forecasts become less accurate.