Focus on the New York State Learning Standards

Climate and Weather

2.2i Weather describes the conditions of the atmosphere at a given location for a short period of time.
2.2j Climate is the characteristic weather that prevails from season to season and year to year.
2.2k The uneven heating of Earth's surface is the cause of weather.
2.2l Air masses form when air remains nearly stationary over a large section of Earth's surface and takes on the conditions of temperature and humidity from that location.
2.2m Most local weather condition changes are caused by movement of air masses.
2.2n The movement of air masses is determined by prevailing winds and upper air currents.
2.2o Fronts are boundaries between air masses. Precipitation is likely to occur at these boundaries.
2.2p High-pressure systems generally bring fair weather. Low-pressure systems usually bring cloudy, unstable conditions.
2.2q Hazardous weather conditions include thunderstorms, tornadoes, hurricanes, ice storms, and blizzards.
2.3.2 Describe applications of information technology in mathematics, science, and other technologies that address needs and solve problems in the community.

You can understand the origins and changes of weather.

Weather is what happens in the atmosphere at a certain place and time.

The long-term pattern of weather in a region is called **climate**.

An **air mass** is a large body of air with similar properties of temperature and humidity to the land over which it formed.

Guided Instruction

DIRECTIONS Read the following information.

Guided Questions

What is **weather?**

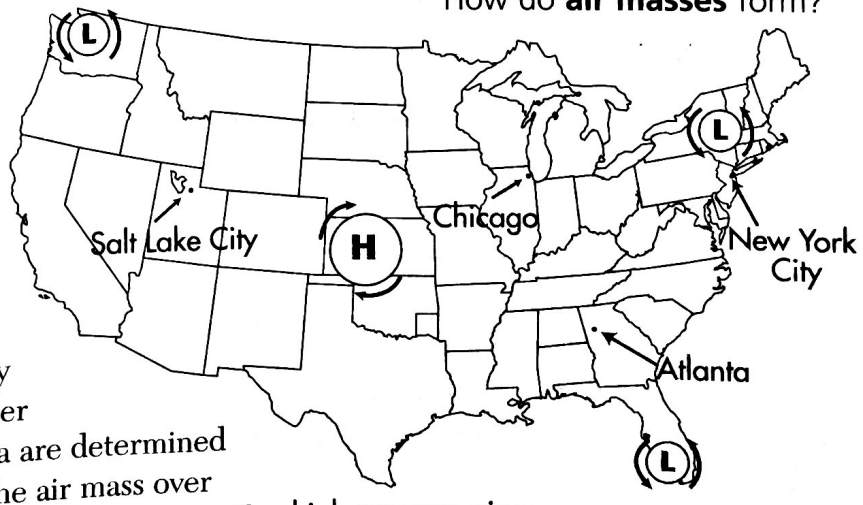
Weather describes what happens in the atmosphere in one area over a short period of time. Characteristics of weather include air temperature, air pressure, wind speed, humidity, and precipitation such as rain, snow, sleet, or hail. Weather is caused by the uneven heating of Earth's surface.

What is **climate?**

The long-term weather pattern of a region is its **climate**. For example, it is possible to predict that, as spring approaches, an area will become warmer and experience increased rainfall. These are seasonal changes that have been observed over many years.

How do **air masses** form?

All of the weather events you may have experienced are due to the movements of air masses. **Air masses** form when air remains stationary over an area and takes on the conditions of temperature and humidity from that location. Weather conditions for a given area are determined by the characteristics of the air mass over that location.



H = high-pressure air mass
L = low-pressure air mass

INFORMATION SYSTEMS
Scientists use computer models of the atmosphere to predict weather and changes in Earth's climate.

Accordingly, changes in weather are caused by the movement of air masses. Prevailing winds and currents of air high in the atmosphere move air masses from place to place. For example, air masses formed over the Arctic region may be blown south, bringing cold weather to the United States. Moving south, the cold air mass will run into other air masses over the United States. The boundaries between air masses are called fronts, and are usually where precipitation occurs.

While weather is complex and often difficult to predict, there are some general patterns that hold true. Air masses tend to move from west to east across the United States. High-pressure air masses usually bring fair, sunny weather, and low-pressure air masses usually bring cloudy, stormy weather. Predictions about the weather can give people time to prepare for such hazardous conditions as thunderstorms, tornadoes, hurricanes, ice storms, and blizzards.

Guided Questions
How do air masses change weather?

DIRECTIONS For each question, write your answer in the spaces provided.

1. Name three characteristics of weather.

2. How is climate related to weather?

3. What causes air masses to move and make changes in weather?

4. Describe two weather patterns that generally hold true.

5. Look at the weather map on page 217. What kind of weather is New York experiencing?

6. List five different types of hazardous weather conditions.

Apply the New York State Learning Standards to the State Test

Directions (7–11): For each question, write your answer in the spaces provided. Base your answers to questions 7 through 11 on the table below.

Severe weather	Description	Damage
thunderstorm	intense rainfall, possibly hail, thunder, lightning, winds up to 120 km per hour	flooding, crop damage, lightning
blizzard	intense snow storm, high, cold winds	roads covered, roofs may collapse
hurricane	System of severe thunderstorms, ocean heat causes winds over 120 km per hour, may be hundreds of km across, weakens over land	flooding, crops and buildings damaged, people and animals killed
tornado	extremely violent and narrow swirl of wind moving over land, funnel cloud with winds up to 500 km per hr	winds rip apart buildings, trees
ice storm	severe rainfall in freezing temperatures; ice forms on and clings to structures	power lines and trees fall under weight of ice

7 Which type of severe weather has the strongest winds?

8 How large is a hurricane?

9 A storm causes the roofs of several houses in a neighborhood to collapse. What type of storm probably occurred?

10 Which type of severe weather starts over the ocean and weakens over land?

11 Which type of severe weather seems the most dangerous? Explain.

Directions (12–18): Each question is followed by four choices. Decide which choice is the *best* answer. Circle the number of the answer you have chosen.

12 Which of the following describes a group of short-term conditions in the atmosphere over a certain area?

(1) climate
(2) weather
(3) temperature
(4) humidity

13 The cause of weather is

(1) gravity
(2) the Moon
(3) nitrogen in the atmosphere
(4) uneven heating of Earth's surface

14 Over the United States, air masses tend to move in which direction?

(1) east to west
(2) west to east
(3) north to south
(4) south to north

15 The boundaries between air masses are called

(1) fronts
(2) climates
(3) pressure zones
(4) weather regions

16 Fair weather is associated with

(1) upper air currents
(2) prevailing winds
(3) low pressure systems
(4) high pressure systems

17 Which of the following hazardous weather conditions has the strongest winds?

(1) thunderstorm
(2) tornado
(3) hurricane
(4) ice storm

18 Air masses that move north into the United States from the Gulf of Mexico tend to produce which type of weather?

(1) windy and cool
(2) dry and cold
(3) warm and moist
(4) dry and warm