

Storms in Motion

Trace how moving air can build severe weather.

S6E4.d "Construct an explanation of the relationship between air pressure, weather fronts, and air masses and meteorological events such as tornados and thunderstorms."

NAME _____

DATE _____

1 READ AND MARK _____ Read it twice

YOUR JOB Underline each cause-and-effect link about air masses, fronts, or air pressure, then number the steps that can lead from meeting air masses to a thunderstorm or tornado.

When Air Masses Meet

- ① An air mass is a huge body of air with similar temperature and moisture. A cold, dry air mass and a warm, humid air mass can meet over the plains. Their boundary is a weather front. Because the two air masses have different densities, they do not quickly blend. At a cold front, denser cold air pushes beneath warm air. The warm air rises, cools, and water vapor condenses into clouds. This lifting can begin a thunderstorm.
- ② Air pressure is the force of air pressing on a surface. Rising warm air often leaves lower pressure near the ground, while sinking cooler air is linked to higher pressure. A low-pressure area does not automatically make severe weather, but it can help air flow inward and rise. Near a front, this upward motion may build tall storm clouds. Inside some clouds, strong updrafts and downdrafts separate electric charges. A sudden discharge between charges produces lightning, and thunder follows.
- ③ Some thunderstorms become severe when warm, moist air near the ground meets cooler air above and winds change speed or direction with height. This wind change can make rising air rotate. A powerful rotating updraft is called a mesocyclone. If rotation tightens and extends from the storm cloud toward the ground, a tornado may form. Tornadoes are most likely with certain severe thunderstorms, often near fronts where air masses meet. However, most thunderstorms do not produce tornadoes, and a front does not guarantee one.

2 ANSWER WITH EVIDENCE _____ Use the passage

1 How can a cold front start a thunderstorm?

2 What is the relationship between lower air pressure and rising air near a front?

3 Why does a weather front not guarantee that a tornado will form?

4 What conditions can make a thunderstorm severe and possibly tornadic, according to the passage?

3 YOUR TURN _____ Your own words

Create three labeled panels that explain one possible path from meeting air masses to a tornado. Show the front and air masses in Panel 1, rising air and lower pressure with a thunderstorm in Panel 2, and changing winds with rotating air and a possible tornado in Panel 3. Write one sentence under each panel explaining the change.

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PART 1 • READ AND MARK

Underline each cause-and-effect link about air masses, fronts, or air pressure, then number the steps that can lead from meeting air masses to a thunderstorm or tornado. Accept any marking that follows this job and points at the right text.

PART 2 • ANSWERS

#	QUESTION	ANSWER
1	How can a cold front start a thunderstorm?	Denser cold air pushes beneath warm air at a cold front. The warm air rises, cools, and condenses into clouds, which can begin a thunderstorm.
2	What is the relationship between lower air pressure and rising air near a front?	Rising warm air often leaves lower pressure near the ground. Lower pressure can help air flow inward and rise, which may build tall storm clouds near a front.
3	Why does a weather front not guarantee that a tornado will form?	A front can help create thunderstorms, but tornadoes need certain severe thunderstorms. Warm, moist air near the ground, cooler air above, and winds that change speed or direction with height can help create the needed rotation.
4	What conditions can make a thunderstorm severe and possibly tornadic, according to the passage?	Warm, moist air near the ground must meet cooler air above, and winds must change speed or direction with height. The changing winds can make rising air rotate, and tightening rotation that extends toward the ground may form a tornado.

PART 3 • YOUR TURN (SAMPLE ANSWER)

Panel 1: A cold, dry air mass pushes under a warm, humid air mass at a cold front. The denser cold air forces the warm air to rise.
Panel 2: Rising warm air leaves lower pressure near the ground and forms a tall thunderstorm cloud. Air can flow inward and rise near the low-pressure area. Panel 3: Winds changing with height make the rising air rotate in the severe storm. If the rotation tightens and reaches toward the ground, a tornado may form.

Accept explanations that correctly connect contrasting air masses, a front, lifting air, and thunderstorm development. For tornado explanations, students should include changing winds and rotating rising air, while recognizing that not every front or thunderstorm produces a tornado.