

Explore Activity

How Can You Compare Weather?

Procedure

Communicate Think of the country in large regions—the Northeast, the Southwest, and the coasts. Write a report for the weather in each region based on the map you see here.


Drawing Conclusions

- 1 Infer** Which areas are having warm, rainy weather?
- 2 Infer** Where is the weather cool and dry?
- 3 Predict** How do you think weather in any part of the country may change, based on the data in this map? Give reasons for your answer. How would you check your predictions?
- 4 FURTHER INQUIRY Interpret Data** What will tomorrow's weather be like? Interpret the information on the weather map in the morning paper. Compare your interpretation to the actual weather during the day.

Materials

station
model key
newspaper
weather map
(optional)
pencil
crayons

W E
Lines are drawn to show wind direction, not speed. This is a wind coming from the east, going west—an east wind.



Read to Learn

Main Idea Weather changes often occur at fronts, where different air masses meet.

How Do Air Masses Affect Weather?

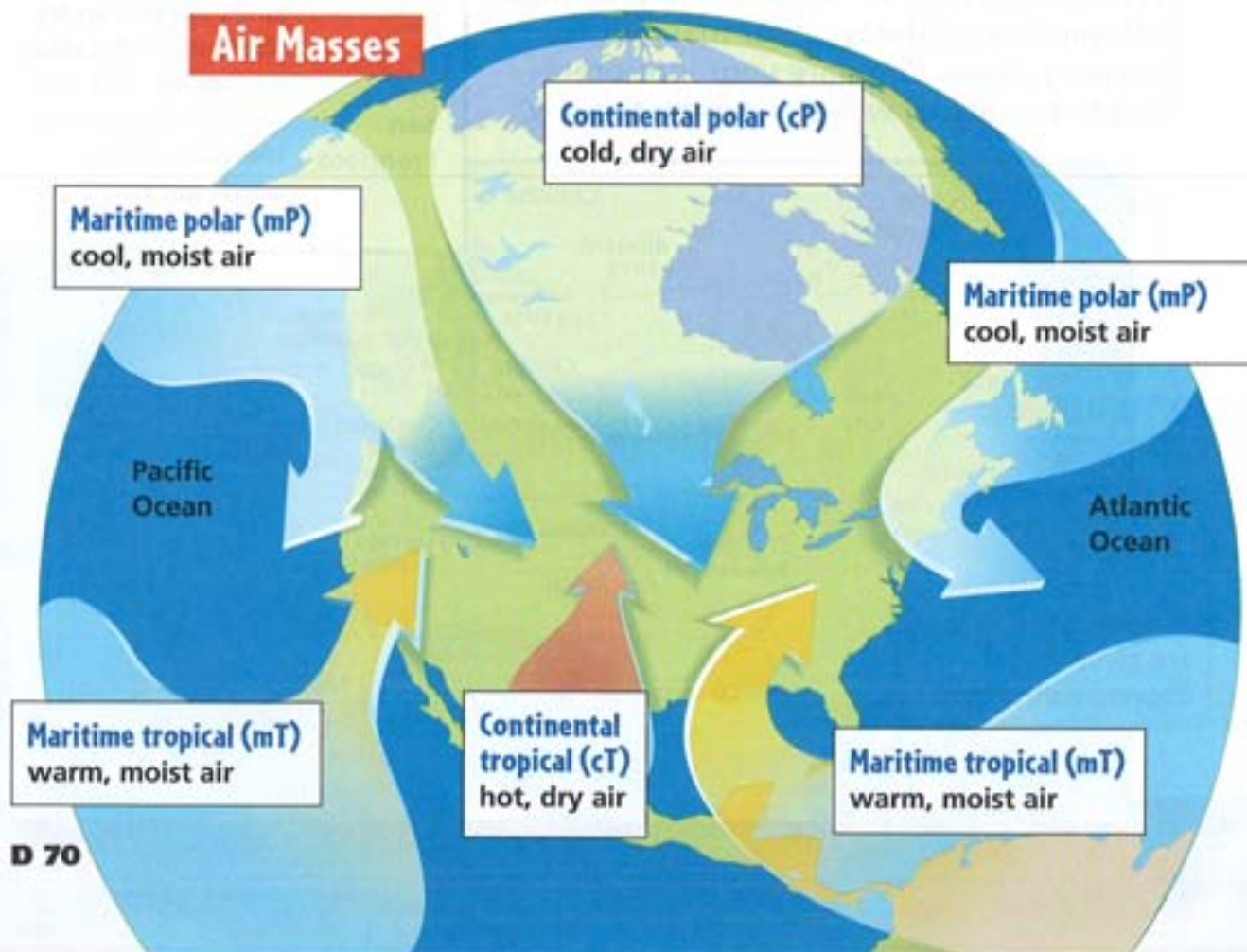
Weather maps show that cities across a large region can share the same weather. They also show how the weather in different areas can differ.

Why are weather conditions in one part of a country different from those in another part? Look back at the map on page D69. Some of the cities are having clear, cool weather. The air throughout this region is cool and dry. Other cities are having warmer, cloudy

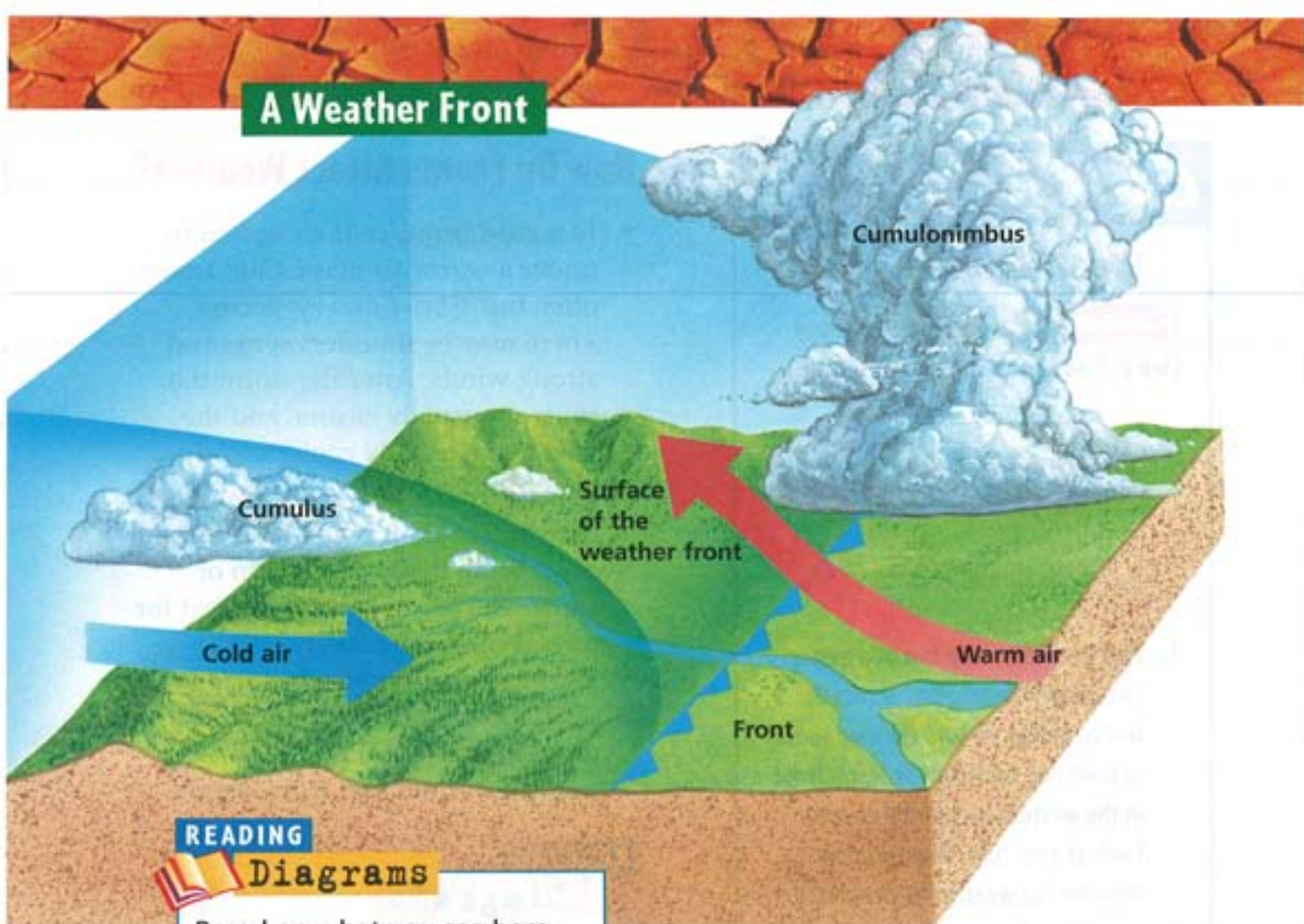
weather. The air throughout this region is warm and moist. A large region of the atmosphere where the air has similar properties throughout is called an **air mass**.

An air mass gets its properties from the region where it forms. Air over the Gulf of Mexico is above very warm water. The water warms the air, and evaporation from the Gulf adds water vapor. The air becomes warm and moist. Air masses are named for the region they come from.

As air masses move, they bring these conditions with them. What happens if a cool, moist air mass moves over an area that has warm, dry weather? The warm, dry weather will change.



A Weather Front



READING

Diagrams

Based on what you see here, how would you define front in your own words?

Once an air mass is formed, it is moved by global winds. In the United States, global winds tend to move air masses from west to east.

Air masses with different conditions can “meet.” That is, one runs into another. What happens when air masses with different temperatures meet? They don’t mix together. Instead, a narrow boundary forms between them. This boundary is called a **front**. It marks the leading edge, or front, of

A front forms along the boundary between a warm air mass and a cold air mass.

an air mass that is moving into an area where another air mass is moving out. Weather changes rapidly at fronts. That’s because you pass from one kind of air mass into another. Fronts often cause rainy, unsettled weather.

READING Sequence of Events

What happens when a cold air mass meets with a warm air mass?

QUICK LAB



Weather Prediction

FOLDABLES Make a Four-Door Book. (See p. R 44.) Label the tabs as shown.



1. Find a weather map in a newspaper that shows the weather across the United States. Be sure the map shows at least one cold front or warm front in the western part of the country. Look at your map. Use the book to describe the weather in your state.
2. Use your book to describe the weather in each region of the country—northwest, southwest, southeast, northeast.
3. **Infer** Weather patterns move from west to east across the United States. How do you think the weather just east of the front will change in the next day or so? Explain under the tabs of your Four-Door Book.

▶ **What kind of weather does a cold front usually produce?**

How Do Fronts Affect Weather?

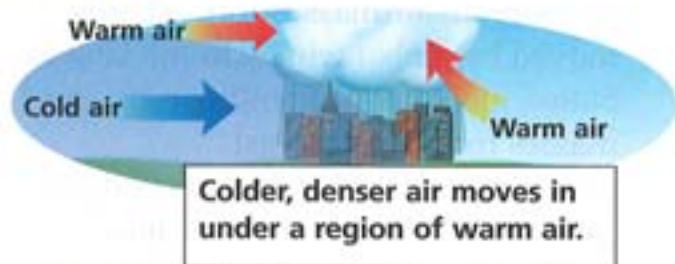
- In a **cold front**, cold air moves in under a warm air mass. Cold fronts often bring brief, heavy storms. There may be thunderstorms and strong winds. After the storm the skies are usually clearer, and the weather is usually cooler and drier.
- In a **warm front**, warm air moves in over a cold air mass. Warm fronts often bring light, steady rain or snow. The precipitation may last for days. Winds are usually light. Warm fronts may also bring fog—stratus clouds that form near the ground. Afterward the weather is usually warmer and more humid.

READING

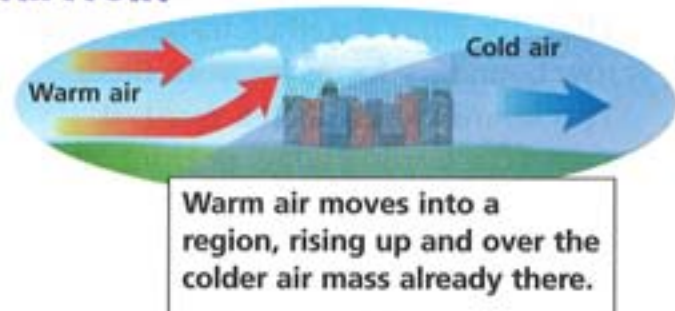
Diagrams

Write a paragraph comparing a warm front with a cold front.

Cold Front



Warm Front



Why It Matters

Weather forecasting is hard. Knowing how the atmosphere is moving lets you predict the weather. The problem is that the atmosphere is huge and complex. A weather forecaster might predict clear weather for tomorrow. However, another air mass might move in. Everything can change.

Computers do high-speed calculations to predict the atmosphere's motion. Predictions are compared with forecasts to account for any differences. Two-day forecasts are calculated every 12 hours. A five-day forecast is calculated daily.

eJournal Visit our Web site www.science.mmhschool.com to do a research project on weather forecasting.

Think and Write

1. What are four different kinds of air masses? How are they different?
2. What kind of weather is produced by a cold front?
3. What kind of weather is produced by a warm front?
4. How can you use weather maps to predict weather?
5. **Critical Thinking** How can you tell the kind of front passing by just observing the weather?

WRITING LINK

Expository Writing Write an interview for the local TV news. Explain how changes in the weather affected the way three people spent their day.



MATH LINK

Graph weather data. Research local newspapers to learn what kinds of fronts have moved through your area and the kind of weather each front brought. Do this for a month. Graph your data. Report what you found.

TECHNOLOGY LINK



Science Newsroom CD-ROM
Choose *It's Up in the Air* to learn more about how air masses affect weather conditions.



Visit www.science.mmhschool.com for more links.