

## SECTION 15-3

## SECTION SUMMARY

## Air Pressure

Guide for  
Reading

- ◆ What are some of the properties of air?
- ◆ What instruments are used to measure air pressure?
- ◆ How does increasing altitude affect air pressure and density?

Air consists of atoms and molecules that have mass. Therefore, air has mass. Because air has mass, it also has other properties, including density and pressure. The amount of mass per unit volume of a substance is called the density of the substance. The force per unit area is called pressure. Air pressure is the result of the weight of a column of air pushing down on an area. The molecules in air push in all directions. This is why air pressure doesn't crush objects.

Falling air pressure usually indicates that a storm is approaching. Rising air pressure usually means that the weather is clearing. A barometer is an instrument that measures changes in air pressure. There are two kinds of barometers: mercury barometers and aneroid barometers. A mercury barometer consists of a glass tube open at the bottom end and partially filled with mercury. The open end of the tube rests in a dish of mercury, and the space above the mercury in the tube contains no air. The air pressure pushing down on the surface of the mercury in the dish is equal to the weight of the column of mercury in the tube. At sea level, the mercury column is about 76 centimeters high, on average. An aneroid barometer has an airtight metal chamber that is sensitive to changes in air pressure. The thin walls of the chamber flex in and out as air pressure changes, and the movements are recorded on a dial.

In weather reports, air pressure usually is given in inches of mercury. National Weather Service maps indicate air pressure in millibars. One inch of mercury equals 33.87 millibars.

Altitude, or elevation, is the distance above sea level. Air pressure decreases as altitude increases. As air pressure decreases, so does density. Sea-level air has the weight of the whole atmosphere pressing on it, so air pressure is highest at sea level. Air pressure is much lower at the tops of mountains. There the low density of air can make it hard to breathe because there is less oxygen in each cubic meter of air.

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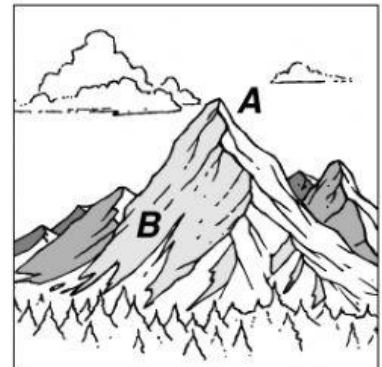
## REVIEW AND REINFORCE

# Air Pressure

### ◆ Understanding Main Ideas

*Study the figure below, and then complete the following statements*

1. Altitude is greater at point \_\_\_\_\_.
2. Air pressure is greater at point \_\_\_\_\_.
3. Density of the air is greater at point \_\_\_\_\_.
4. A cubic meter of air has less mass at point \_\_\_\_\_.
5. The percentage of oxygen in the air at point A is \_\_\_\_\_ percent.



*Answer the following questions on a separate sheet of paper.*

6. State three properties of air.
7. Why doesn't air pressure crush objects such as your desk?
8. What two units of air pressure are used in weather reports?

### ◆ Building Vocabulary

*Match each term with its definition by writing the letter of the correct definition on the line beside the term.*

- |                             |                                                                            |
|-----------------------------|----------------------------------------------------------------------------|
| _____ 9. air pressure       | a. the amount of mass in a unit volume of a substance                      |
| _____ 10. altitude          | b. force per unit area                                                     |
| _____ 11. aneroid barometer | c. the result of the weight of a column of air pushing down on an area     |
| _____ 12. barometer         | d. any instrument that measures changes in air pressure                    |
| _____ 13. density           | e. instrument that measures changes in air pressure using liquid mercury   |
| _____ 14. mercury barometer | f. the distance above sea level                                            |
| _____ 15. pressure          | g. instrument that measures changes in air pressure without using a liquid |