

# LESSON 14

## What makes air pressure change?

Where is air pressure greater—Mount Everest or Death Valley? Death Valley is below sea level. It has a greater air pressure.

However, air pressure changes even without going from mountains to valleys.

Two other things can change air pressure. They are temperature and the amount of water vapor in the air.

**TEMPERATURE** Heat makes air molecules move faster. As they move faster, the molecules spread farther apart. A container of warm air has fewer molecules in it than an equal container of cool air.

Fewer molecules mean less weight. And less weight means less pressure.

**WARM AIR WEIGHS LESS THAN COOL AIR.**

**WARM AIR HAS LESS PRESSURE THAN COOL AIR.**

**AMOUNT OF WATER VAPOR** Water vapor weighs less than most of the other gases of the air.

Each molecule of water vapor that goes into the air takes the place of some of the air molecules.

Usually, a heavier molecule is replaced. This makes the air lighter.

**MOIST AIR WEIGHS LESS THAN DRY AIR.**

**MOIST AIR HAS LESS PRESSURE THAN DRY AIR.**

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## LET US REVIEW

Review what you learned about air pressure in Lesson 13. Then look at Figure A and answer the questions. Write the correct letter in the spaces provided.

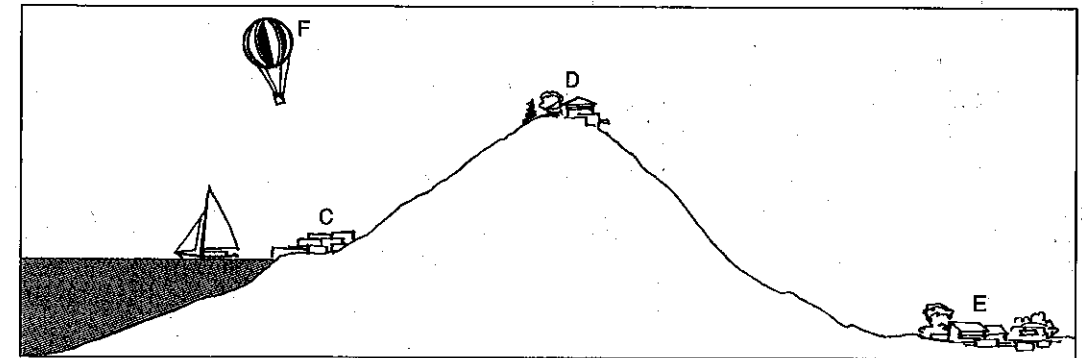


Figure A

1. Air molecules are closest together at \_\_\_\_\_.
2. Air molecules are farthest apart at \_\_\_\_\_.
3. Air pressure is greatest at \_\_\_\_\_.
4. Air pressure is lowest at \_\_\_\_\_.

## TEMPERATURE CHANGES AIR PRESSURE

Study Figures B and C. Then answer the questions by writing B or C in the spaces provided.

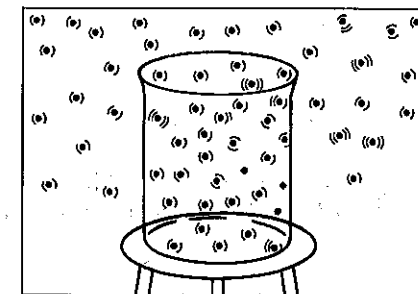


Figure B

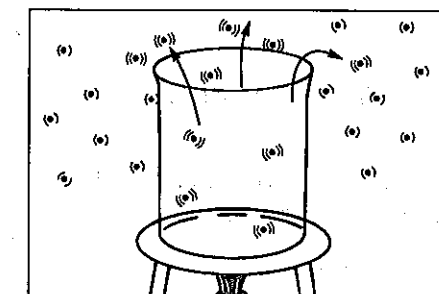


Figure C

1. Which beaker has the warmer air? \_\_\_\_\_
2. Which beaker has the cooler air? \_\_\_\_\_
3. Which beaker has more air molecules? \_\_\_\_\_
4. Which beaker has fewer air molecules? \_\_\_\_\_
5. Air is lighter in beaker \_\_\_\_\_.
6. Air is heavier in beaker \_\_\_\_\_.
7. Air pressure is greater in beaker \_\_\_\_\_.
8. Air pressure is lower in beaker \_\_\_\_\_.

## MOISTURE CHANGES AIR PRESSURE

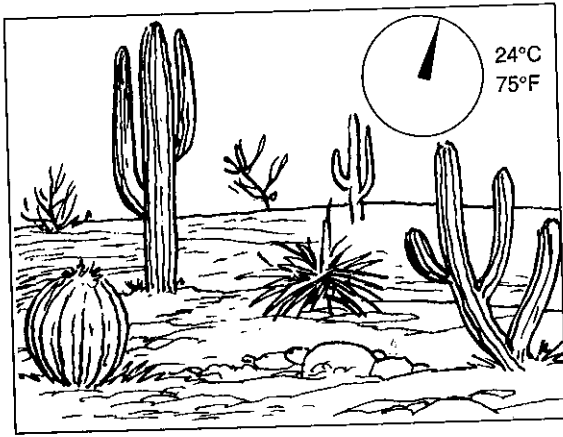


Figure D Desert



Figure E Rain forest

The two places shown in Figures D and E are both at sea level.

1. The air in Figure \_\_\_\_\_ has a lot of water vapor.
2. The air in Figure \_\_\_\_\_ has very little water vapor.
3. Which air is heavier? \_\_\_\_\_.
4. Which air is lighter? \_\_\_\_\_.
5. Air pressure is greater in \_\_\_\_\_.
6. Air pressure is weaker in \_\_\_\_\_.

## ABOUT BAROMETERS

Air pressure can be measured with a **barometer** [buh-ROM-uh-ter]. One kind of barometer is a mercury barometer. It is made of a glass tube filled with mercury.

How does it work?

- The tube is open at one end.
- The open end is placed in a container of mercury.
- Air pressure pushes down on the surface of the mercury in the container.
- The mercury is pushed up the tube.
- At sea level, air pressure can support, or hold up, a column of mercury 760 mm (about 30 inches) high.
- When air pressure increases, the mercury in the tube rises a little.
- When air pressure decreases, the mercury in the tube falls.

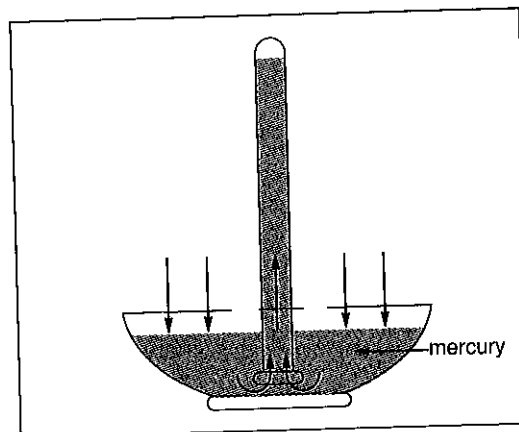


Figure F

## MOISTURE CHANGES AIR PRESSURE

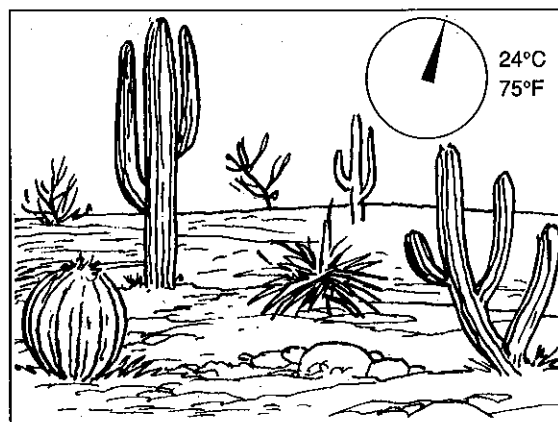


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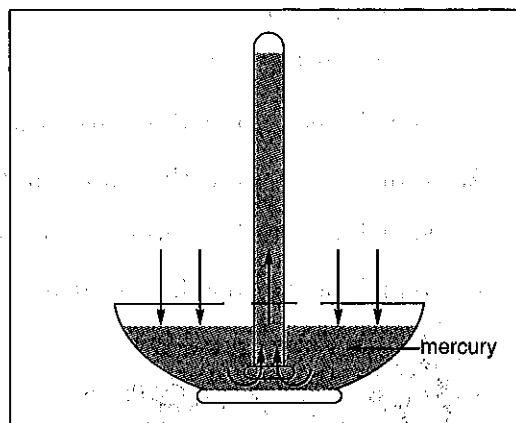


Figure F

Another barometer is the aneroid [AN-uh-royd] barometer. This is the barometer that is commonly used to measure air pressure.

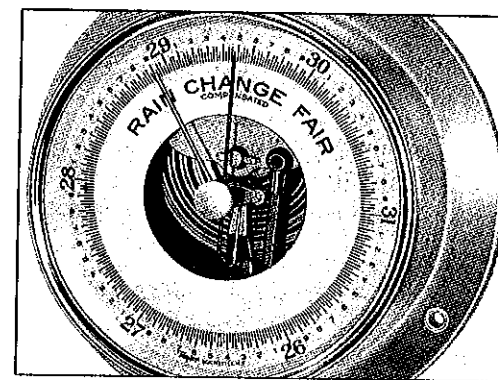


Figure G

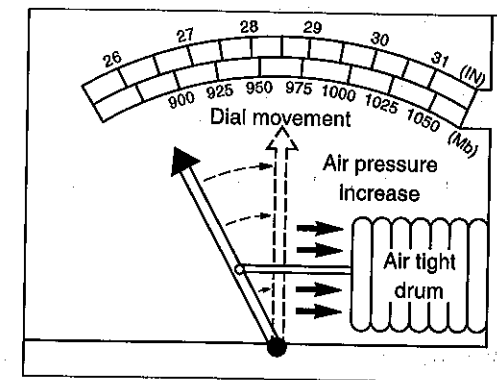


Figure H

The aneroid barometer has a small drum with almost no air in it. A needle is connected to the drum. The drum is "squeezed" when air pressure increases. This moves the needle to a greater number.

## FILL IN THE BLANK

Complete each statement using a term or terms from the list below. Write your answers in the spaces provided. Some words may be used more than once.

- |             |                                  |          |
|-------------|----------------------------------|----------|
| molecules   | height above sea level           | presses  |
| less        | atoms                            | weight   |
| temperature | barometer                        | pressure |
| gases       | amount of water vapor in the air | higher   |

1. The atmosphere is a mixture of \_\_\_\_\_.
2. Gases are made up of \_\_\_\_\_ and \_\_\_\_\_.
3. Atoms and molecules have \_\_\_\_\_.
4. Anything that has weight also \_\_\_\_\_ against things.
5. Three things that can change air pressure are: \_\_\_\_\_, \_\_\_\_\_, and \_\_\_\_\_.
6. Air pressure becomes weaker the \_\_\_\_\_ up you go.
7. Warm air has less \_\_\_\_\_ than cool air.
8. Moist air weighs \_\_\_\_\_ than dry air.
9. Air with a lot of water vapor has less \_\_\_\_\_ than dry air.
10. An instrument that measures air pressure is called a \_\_\_\_\_.

## COMPLETING SENTENCES

Choose the correct word or term for each statement. Write your choice in the spaces provided.

1. Molecules move faster in \_\_\_\_\_ air.  
warm, cool
2. Air that is warm takes up \_\_\_\_\_ space than cool air.  
more, less
3. Warm air weighs \_\_\_\_\_ than cool air.  
more, less
4. Warm air has \_\_\_\_\_ pressure than cool air.  
more, less
5. Water vapor is a \_\_\_\_\_.  
liquid, gas
6. Water vapor molecules weigh \_\_\_\_\_ than most of the other gases in the air.  
more, less
7. Moist air is \_\_\_\_\_ than dry air.  
heavier, lighter
8. Moist air has \_\_\_\_\_ pressure than dry air.  
more, less
9. The higher you go, the \_\_\_\_\_ air there is.  
more, less
10. Air pressure is \_\_\_\_\_ on a mountain than at sea level.  
greater, less

## REACHING OUT

1. Why do mountain climbers have trouble breathing on high mountains?

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2. Mountain A and Mountain B are the same height. At their tops the temperatures are the same. But Mountain B is covered by very moist air. Which mountain has the greater air pressure? Why?

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