AIM 17 | How do clouds form?

You cannot see water vapor. But you can change water vapor into liquid water which you *can* see.

This is how to do it: Pour some water into a pitcher. Add ice. Let it stand. Soon the pitcher is covered with a thin layer of water (Figure B).

The water on the outside of the pitcher comes from the air. The cold pitcher cools the air around the pitcher. Now the air can hold less water vapor. In fact, it has more water vapor than it can hold.

The *extra* water vapor comes out of the air. It changes to liquid water and settles on the pitcher.

The change from a gas to a liquid is called *condensation* [kon den SAY shun].

The temperature at which condensation takes place is called the *dew point*.

NOW LET'S USE THESE FACTS TO LEARN HOW CLOUDS ARE FORMED.

A cloud starts out as moist air. Moist air is lighter than dry air. It rises into the sky.

As the air rises, it cools. When it cools enough, it reaches its dew point. Some of the water vapor in the air condenses. It changes to tiny *droplets* of water.

Droplets are very light. They are so light that other rising air keeps them from falling to earth.

As more humid air rises, more water vapor condenses. Little by little, billions and billions of droplets build up.

These countless numbers of droplets form what we call a *cloud*.

FINDING RELATIVE HUMIDITY

Each cube in Figures D–H stand for a part of the air. The temperatures are the same. Each ball stands for *one* part of water vapor.

Twenty parts of water vapor makes each cube saturated. Twenty parts of water vapor is all that the air can hold at this temperature. With twenty parts of water vapor, the air has 100% relative humidity.

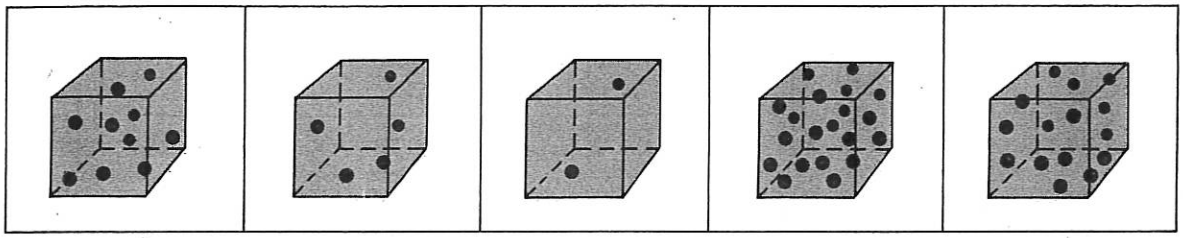

Figure D **Figure E** **Figure F** **Figure G** **Figure H**

Study each diagram. Then answer these questions. (Use Figure letters.)

1. **a)** Which cube of air is saturated? _____

b) What is the relative humidity of the air in this cube? _____

c) Can this air hold any more water vapor? _____

2. Which air has

a) 50% relative humidity? _____ **c)** 25% relative humidity? _____

b) 75% relative humidity? _____ **d)** 10% relative humidity? _____

3. Which air is the driest? _____

4. Which air is the dampest? _____

5. Which air can hold these many *more* parts of water vapor?

a) 18 _____ **c)** 10 _____

b) 5 _____ **d)** 15 _____

DO YOU REMEMBER?

Air has many other gases. When more and more water vapor is added, it makes the other gases spread out more.

This makes the *air pressure* _____ (higher, lower). If you don't remember, look back to Aim 5.

TRACING THE MAKING OF A CLOUD

Match the letters in the diagram with the descriptions. Write the proper *letters* on the blank lines. Some of these letters may be used more than once.

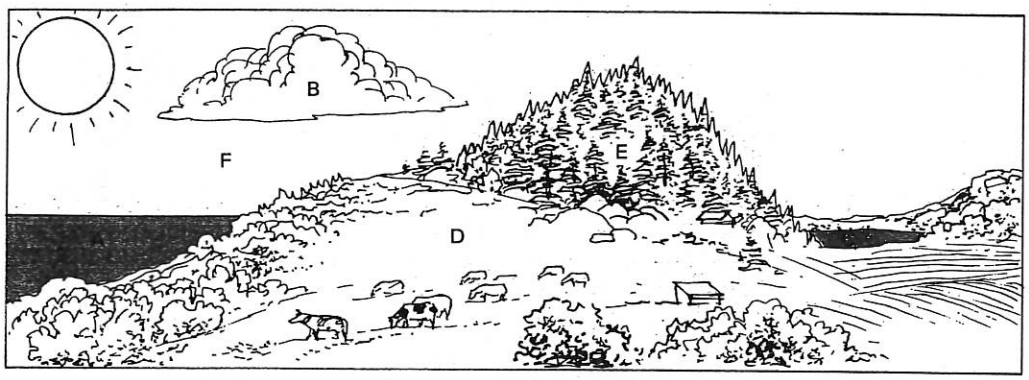

Figure C

1. Water evaporates from _____, _____, _____, and _____.
2. The air is cooling at _____.
3. Condensation has happened at _____.
4. Water is changing to a gas at _____, _____, _____, _____, and _____.
5. Water vapor is changing to liquid water at _____.

MATCHING

Match the two lists. Write the correct letter on the line next to each number.

1. _____ evaporation
2. _____ condensation
3. _____ dew point
4. _____ the higher you go
5. _____ cloud

a) the temperature at which a gas changes to a liquid

b) the colder it gets

c) the change from a liquid to a gas

d) made up of billions of water droplets

e) the change from a gas to a liquid

UNDERSTANDING CONDENSATION

Study Figures A and B. Then choose the correct term for each statement. Write your choice in the space.

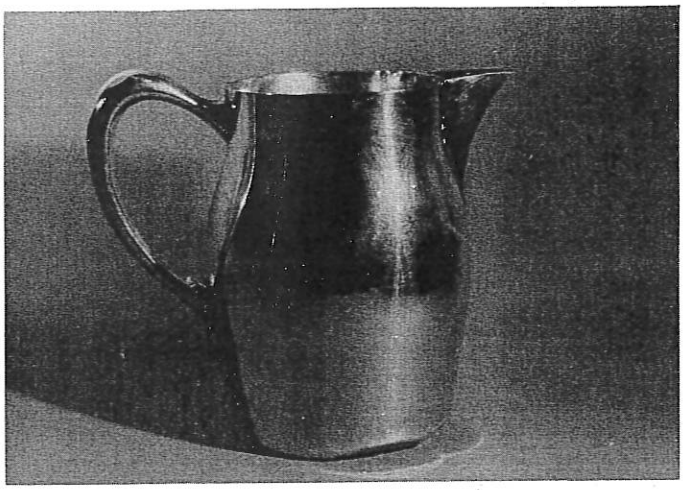

Figure A

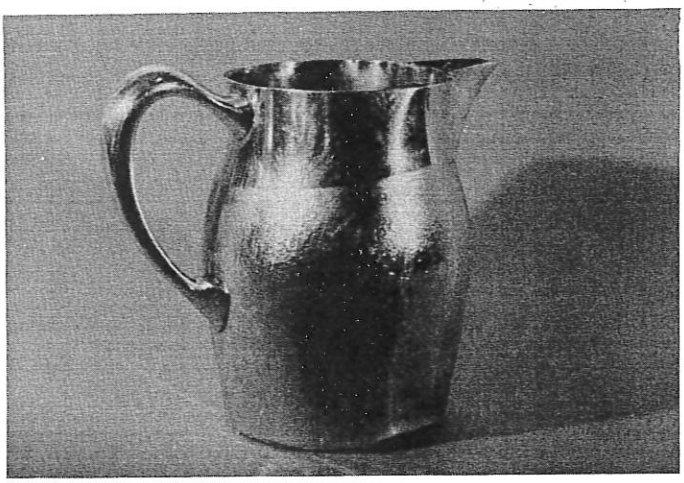

Figure B

Look at Figure B to answer the questions.

1. The pitcher in Figure B is _____ than the air.
   warmer, cooler

2. The pitcher in Figure B _____ the air close to it.
   cools, warms

3. The air next to the pitcher now can hold _____ water vapor.
   more, less

4. Some water vapor in the air touching the pitcher _____.
   evaporates, condenses

5. Condensation changes _____.
   a liquid to a gas, a gas to a liquid

6. What do we call the temperature at which condensation takes place?

_____

REACHING OUT

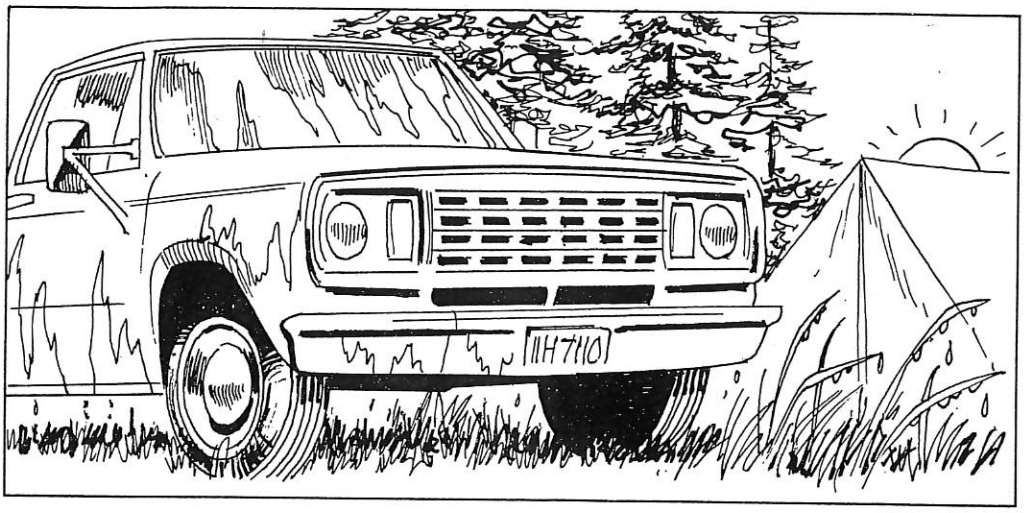

Figure D

Everyone has seen *dew*. We see it on the morning grass. We have seen it cover automobiles.

The sentences below tell how dew is formed. *But* the sentences are not in the proper order.

Re-write these sentences in proper order on the blank lines below.

1. After the sun goes down, the air and earth cool off.
2. Some water vapor condenses. It changes to drops of dew.
3. During the daytime, the sun evaporates water.
4. The air reaches its dew point.
5. The air becomes moist.

COMPLETING SENTENCES

Complete the sentences with the choices below.

saturated	cloud	more
evaporation	condensation	liquid water
dew point	water vapor	invisible
droplet		

1. Water in the gas form is called _____.
2. The change from liquid water to water vapor is called _____.
3. Water vapor is _____.
4. Warm air can hold _____ water vapor than cool air can.
5. Air that holds all the water vapor that it can is said to be _____.
6. When saturated air cools, extra water vapor changes to _____.
7. The change from water vapor to liquid water is called _____.
8. The temperature at which condensation takes place is called the _____.
9. A very tiny drop is called a _____.
10. Many, many billions of droplets make up a _____.

TRUE OR FALSE

Write T on the line next to the number if the sentence is true. Write F if the sentence is false.

1. _____ You can always see water.
2. _____ Water vapor is invisible.
3. _____ A vapor is a gas.
4. _____ Evaporation is the change from a gas to a liquid.
5. _____ Saturated air cannot hold any more water vapor.
6. _____ Cold air can hold less water vapor than warm air.
7. _____ Evaporation happens at the dew point.
8. _____ When warm air rises, it cools off.
9. _____ Condensation happens when air cools.
10. _____ A cloud is made up of water vapor.