

191
bob
909

Investigation 7 precipitation

name _____
class _____ date _____
team _____ seat _____

How do raindrops form?

The clouds that drift majestically across the sky are composed of billions upon billions of tiny water droplets and ice crystals. Yet though a single cloud may contain several tons of moisture, many of them pass by without producing so much as a shower. Only when conditions are right does some of that moisture fall to earth as liquid rain.

The myriads of water droplets in the clouds form because, as warm, moist

air rises, it eventually becomes so cold that the water vapor condenses. Collecting around bits of dust and other microscopic particles known as condensation nuclei, the droplets at first are so minute that they literally float on air. But as they ride the air currents, the droplets collide and coalesce, gradually forming larger and larger droplets. In time they may become big and heavy enough to fall as rain.

Other raindrops have a more complicated history. They begin as snow

or ice crystals in the frigid upper reaches of a cloud, then melt as they pass through warmer air below and land on earth as rain. At least half of all rain probably begins as snow.

The smallest raindrops, classed as drizzle, drift so lazily to earth that they seem to float. The largest, nearly $\frac{1}{4}$ inch in diameter, pelt down at 25 feet per second. But whatever their size, none are teardrop-shaped. Although the largest drops are flattened on the bottom, most are round.

16-17

pg

readers digest - ABC's of nature

What causes snow?

When temperatures in a cloud are low enough, its moisture content may be released, not as rain, but as feather-light snowflakes. This happens because the water in clouds behaves in strange ways. At very low temperatures cloud droplets become supercooled, which means that they remain liquid even though their temperature

is below freezing. Under certain conditions the supercooled droplets evaporate and the vapor then freezes directly into minute ice crystals. As more vapor freezes on the first tiny crystals, they grow into snowflakes.

Developing flakes take on different shapes, depending on the temperature and the amount of moisture in the air. Because of their crystalline structure,

most snowflakes are about 90 percent air, a fact that makes them excellent insulators and mufflers of sound. But it also means that the water in 10 inches of snowfall equals only 1 inch of rain. Even so, snow is an important source of fresh water in many regions. Arid areas in the American West depend heavily on the spring runoff from snow in the Rocky Mountains.

Are sleet and hail similar?

Freezing temperatures and turbulent winds can play many tricks on a raindrop. The falling drops may pass through a layer of very cold air and freeze into solid pellets, or sleet, that actually bounce when they hit the ground. Or the drops may become so cold that they freeze on impact and coat everything they touch with a glassy armor of ice.

Hailstones, in contrast, are born high up in turbulent thunderclouds. Caught alternately in updrafts and downdrafts, pellets of ice enlarge as they are coated with additional layers of ice. Their final size depends on how long they are buffeted about in the cloud. Most are the size of grapes when they finally fall to earth, but many grow as big as walnuts and a few are as large as tennis balls. One of the

biggest on record was $5\frac{1}{2}$ inches in diameter and weighed $1\frac{1}{2}$ pounds.

The damage from hailstones can be catastrophic. They sometimes dent the roofs of cars and batter buildings, but their worst damage is to agriculture. Since they usually fall in summer, when thunderstorms are most common, they sometimes ruin entire fields of wheat and other crops.

Why is there dust in our rain water?

How does rain form?

bob
164

precipitation



How does snow form?

Some Snow Is Star-shaped

Although all snow crystals are constructed on a six-sided pattern, they are noted for the infinite variety of their forms. The most beautiful are the delicately symmetrical starlike flakes, like those shown above. Others may take the form of flat, hexagonal plates, needles, columns, cups, spools, or even irregular masses.

How is hail different from sleet?

What is the biggest hail stone ever found?