Encyclopedic Entry

precipitation

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Precipitation is any type of water that forms in the Earth's atmosphere and then drops onto the surface of the Earth.

Water vapor, droplets of water suspended in the air, builds up in the Earth's atmosphere. Water vapor in the atmosphere is visible as clouds and fog. Water vapor collects with other materials, such as dust, in clouds.

Precipitation condenses, or forms, around these tiny pieces of material, called cloud condensation nuclei (CCN).

Clouds eventually get too full of water vapor, and the precipitation turns into a liquid (rain) or a solid (snow).

Precipitation is part of the water cycle. Precipitation falls to the ground as snow and rain. It eventually evaporates and rises back into the atmosphere as a gas. In clouds, it turns back into liquid or solid water, and it falls to Earth again. People rely on precipitation for fresh water to drink, bathe, and irrigate crops for food.

The most common types of precipitation are rain, hail, and snow.

Rain

Rain is precipitation that falls to the surface of the Earth as water droplets. Raindrops form around microscopic cloud condensation nuclei, such as a particle of dust or a molecule of pollution.

Rain that falls from clouds but freezes before it reaches the ground is called sleet or ice pellets.

Even though cartoon pictures of raindrops look like tears, real raindrops are actually spherical.

Hail

Hail forms in cold storm clouds. It forms when very cold water droplets freeze, or turn solid, as soon as they touch things like dust or dirt. The storm blows the hailstones into the upper part of the cloud. More frozen water droplets are added to the hailstone before it falls.

Unlike sleet, which is liquid when it forms and freezes as it falls to Earth, hail falls as a stone of solid ice.

Hailstones are usually the size of small rocks, but they can get as large as 15 centimeters (6 inches) across and weigh more than a pound.

Snow

Snow is precipitation that falls in the form of ice crystals. Hail is also ice, but hailstones are just collections of frozen water droplets. Snow has a complex structure. The ice crystals are formed individually in clouds, but when they fall, they stick together in clusters of snowflakes.

Snowfall happens when many individual snowflakes fall from the clouds. Unlike a hail storm, snowfall is usually calm. Hailstones are hard, while snowflakes are soft.

Snowflakes develop different patterns, depending on the temperature and humidity of the air.

When snow falls in the form of a ball instead of soft flakes, it is called graupel. This happens when snow is melted and precipitation forms around the snow crystal.

Snow requires temperatures at the ground to be near or below freezing—less than 0 degrees Celsius (32-degrees Fahrenheit). Snow that falls on warmer ground melts on contact.

Other Types of Precipitation

Sometimes, different types of precipitation fall at the same time. During harsh winter storms, for instance, it is not unusual for sleet and rain to fall at the same time.

Other times, precipitation doesn't fall at all. Virga is a type of precipitation that begins to fall from a cloud, but evaporates before it reaches the surface of the Earth.

Human activity can create precipitation. Urban heat islands, which are areas around major cities that are much warmer than their surroundings, lead to increased and more intense rainfall near cities.

Global warming also causes changes in global precipitation. When the planet is hotter, more ice evaporates in the atmosphere. That eventually leads to more rainy precipitation. It usually means wetter weather in parts of North America, for example, and drier conditions in tropical areas that are usually humid.

VOCABULARY

Term	Part of Speech	Definition
atmosphere	*noun*	layers of gases surrounding a planet or other celestial body.
city	*noun*	large settlement with a high population density.
cloud	*noun*	visible mass of tiny water droplets or ice crystals in Earth's atmosphere.
cloud condensation nuclei (CCN)	*plural noun*	microscopic bits of clay, salt, or solid pollutant around which water vapor condenses in clouds to form raindrops.
condense	*verb*	to turn from gas to liquid.
crop	*noun*	agricultural produce.
crystal	*noun*	type of mineral that is clear and, when viewed under a microscope, has a repeating pattern of atoms and molecules.
dust	*noun*	tiny, dry particles of material solid enough for wind to carry.
evaporate	*verb*	to change from a liquid to a gas or vapor.
fog	*noun*	clouds at ground level.

gas	*noun*	state of matter with no fixed shape that will fill any container uniformly. Gas molecules are in constant, random motion.
global warming	*noun*	increase in the average temperature of the Earth's air and oceans.
graupel	*noun*	precipitation that falls as ice collected around a snow particle. Also called snow pellets.
hail	*noun*	precipitation that falls as ice.
hailstone	*noun*	individual chunk of ice that falls as precipitation.
humidity	*noun*	amount of water vapor in the air.
ice	*noun*	water in its solid form.
ice pellet	*noun*	rain that freezes as it falls to Earth. Also called sleet.
irrigate	*verb*	to water.
microscopic	*adjective*	very small.
molecule	*noun*	smallest physical unit of a substance, consisting of two or more atoms linked together.
pollution	*noun*	introduction of harmful materials into the environment.
precipitation	*noun*	all forms in which water falls to Earth from the atmosphere.
rain	*noun*	liquid precipitation.
rainfall	*noun*	amount of precipitation that falls in a specific area during a specific time.
sleet	*noun*	rain that freezes as it falls to Earth. Also called ice pellets.
snow	*noun*	precipitation made of ice crystals.
snowflake	*noun*	precipitation that falls as an ice crystal.
spherical	*adjective*	rounded and three-dimensional.
storm	*noun*	severe weather indicating a disturbed state of the atmosphere resulting from uplifted air.
temperature	*noun*	degree of hotness or coldness measured by a thermometer with a numerical scale.
tropical	*adjective*	existing in the tropics, the latitudes between the Tropic of Cancer in the north and the Tropic of Capricorn in the south.
urban heat island	*noun*	city area that is always warmer than the surrounding area.
vapor	*noun*	visible liquid suspended in the air, such as fog.
virga	*noun*	precipitation that evaporates before hitting the ground.
water	*noun*	chemical compound that is necessary for all forms of life.
water cycle	*noun*	movement of water between atmosphere, land, and ocean.

For Further Exploration

Articles & Profiles

- National Geographic News: Humans Changing Rainfall Patterns, Study Says

- USGS: The Water Cycle and Precipitation

Maps

- National Weather Service: Fronts/Precipitation Maps
- National Weather Service: Advanced Hydrologic Prediction Service

Websites

- USGS: Water Science for Schools—The Water Cycle