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# A GUIDE TO THE CLOUDS

MEET 12 TYPES FLOATING YOUR WAY.

**ON A LAZY** summer day, may we suggest looking up? Clouds are perfect things to watch: They're constantly drifting through the sky and changing shape in fascinating, unpredictable ways. All that shape-shifting is useful, too. Clouds can reveal what weather might be heading your way, and they play a big role in trapping heat, which makes the planet warmer, and reflecting sunlight, which makes it cooler. Although humans have been staring at clouds for millennia, they are still tricky to study, because they're so unpredictable, says Katja Friedrich, a cloud scientist at the University of Colorado, Boulder. "Climate models have

a hard time accurately predicting the amount of clouds we'll have in a changing climate," she says. That means that in the future, cloud-watching will be more important than ever. So in a summer without lockdowns or quarantine, when it's time to celebrate going out into the world and to admire what you find there, take some time with those fluffy floaters. It's not hard to master the basics: Scientists categorize clouds into 10 major types, which are named based on how high they are in the sky, their shape and if they produce precipitation (like rain or snow). We've also included fog and contrails. Let's begin! *Chelsea Leu*

## MEET THE CLOUDS

**CUMULUS** These classic fluffy white clouds are identifiable by their tops, which look like cauliflower. (*Cumulus* means "heap" or "pile" in Latin.) One way they form is when some parts of the ground heat up more than other parts — a parking lot, for instance, will get hotter on a sunny day than a grassy field — and the pockets of air above them rise to form cumulus. Seeing cumulus clouds alone in the sky can serve as a good indicator of fair weather!

**STRATUS** If the sky is gray and overcast and you can't really see any indi-

vidual clouds, you're actually looking at a stratus cloud. These clouds hang low in the sky in a layer (*stratus* means "spread out" in Latin) and don't usually produce rain. They can form when warm air drifts over cooler land or water. Layers of these clouds higher up in the sky are called **ALTOSTRATUS** (*alto* is Latin for "high").

**STRATOCUMULUS** As their name suggests, stratocumulus look like a cross between stratus and cumulus clouds. They form a lumpy or patchy gray layer, kind of like a bunch of cumulus clouds stuck together. Similar puffy, rippled clouds higher up in the sky are

called **ALTOCUMULUS**. One way to tell the difference is to point your hand toward the cloud: *Alto*cumulus is about 1 to 3 fingers wide, and *strato*cumulus is anything bigger than that.

**FOG** You've probably experienced fog before — it feels very chilly and wet, and it's hard to see too far in front of you. Congratulations: You've been inside a stratus cloud! Fog is what we call stratus clouds that touch the ground, and it often forms at night, when the land cools off and makes the air above it colder. It also forms on coasts when warm, moist air flows over the cold ocean.

**NIMBOSTRATUS** If it's a rainy, gloomy day outside, you're probably under a nimbostratus cloud. These mid-level clouds are dark gray and usually cover the sky thickly enough to blot out the sun, and they're most recognizable for producing constant rain or snow ("nimbus" or "nimbo" in the cloud name means that it produces precipitation).

**CUMULONIMBUS** These massive clouds, which produce thunderstorms, often extend about 40,000 feet into the sky. They form when warm, wet air rises very quickly: They start out as ordinary cumulus clouds, but they keep growing taller and taller until rain and

ice begin to form inside (which gives them their ominous dark gray color) and finally fall. *Cumulonimbus* are so dense and complex that they can create thunder, lightning, strong winds, heavy rain, hail and even tornadoes.

**CIRRUS** These clouds, the highest in the sky, are thin, wispy and made entirely of tiny ice crystals. Their hairlike texture is formed by high winds that blow the ice crystals into strands (the name *cirrus* comes from the Latin word for "curl"). Other high clouds include **CIRROSTRATUS**, a thin layer that can cause the sun to have a halo, and **CIRROCUMULUS**, small puffy clouds

way up in the sky. Cirrus clouds often appear on sunny days, but they can also indicate that a change in weather, like rain or snow, is on the way.

**CONTRAILS** These long, streaky trails in the sky are formed by airplanes, and they count as cirrus clouds, too. When planes fly, they release a lot of warm water vapor, which turns into liquid in the colder air of the sky and then freezes, forming clouds made of ice. You can use contrails to tell the moisture of the sky at high altitudes: If the contrail from a plane disappears immediately, then the air is dry; if it lingers, then the air is humid.

## HOW CLOUDS FORM

Clouds may look fluffy and soft, but they're actually made up of countless teeny-tiny water droplets floating in the sky. They form when air containing water vapor (the gaseous form of water) rises higher into the atmosphere. Here's how it works: **1.** A pocket of air is pushed up into the sky. That can happen in several ways: Either that pocket of air is warmer than the surrounding air, and so it rises, or mountains push it up higher into the atmosphere. **2.** The atmosphere becomes cooler at higher altitudes. So when the water va-

por in that rising pocket of air gets cold enough, it will start to condense (turn back into liquid water) by sticking onto floating particles like dust, pollen, bacteria or salt crystals from the ocean. (See the not-to-scale diagram on the right to follow along!) **3.** This process forms droplets about 20 micrometers wide, or roughly the width of the thinnest human hairs. Tons of these droplets, hanging in the sky together, form a cloud! **4.** This is also the process that creates rain and snow: If enough droplets combine, they'll get heavy enough to fall out of the sky as a raindrop — or, if it's cold enough, a snowflake. ♦

