LAYNE KENNEDY

From left: cirrus, cumulonimbus, cumulus, mammatus with cumulus congestus in the foreground, cirrocumulus.

By Mary Hoff

Clues in the Clouds

Look up in the sky to learn what clouds can tell us.

CLOUDS come in many shapes and sizes. Puffy as cotton balls tossed into the air … low, slow, and growlingly gray … spun across the high sky in frail, feathery wisps.

Clouds appear in familiar phrases. "Head in the clouds" means someone is distracted. "On cloud nine" means someone seems to be floating with joy. "Every dark cloud has a silver lining" means that even bad things have a good side.

Clouds can inspire visions of animals or objects. They can be low to the ground or high in the sky. And they can tell us about what kind of weather might be on the way.

How do clouds form? And how can we read their clues? Let's turn our eyes to the skies.

Water on Wings

When you think of water, you probably think of a liquid. But water exists in other forms, too. When it gets cold, it turns into a solid—ice. And when it gets really warm, it turns into a gas—water vapor. Invisible water molecules are in the air all around us, in every breath we take.

When those warm water molecules cool enough, they can change again. With the help of tiny bits of dust or other particles, they can *condense,* or turn back into liquid. Suspended in the air, the tiny drops (or, if it's really cold, ice crystals) form floating objects we know as clouds.

What causes water molecules suspended in the air to cool down so they can condense into clouds? Earth's atmosphere is made up of layers. Most clouds are in the bottom layer. They move with the air masses that bring different types of weather. Sometimes they run into each other. When they do, one slides up and over the other one. The air mass closest to the ground is warm and moist. As the air rises it cools, and water vapor condenses and forms clouds that we can see.

Sometimes the water droplets that make up clouds stay suspended in the air. But when they get too crowded, or cool down enough, they can form larger clumps and fall to Earth in the form of rain, snow, or another form of precipitation.

Fun Fact

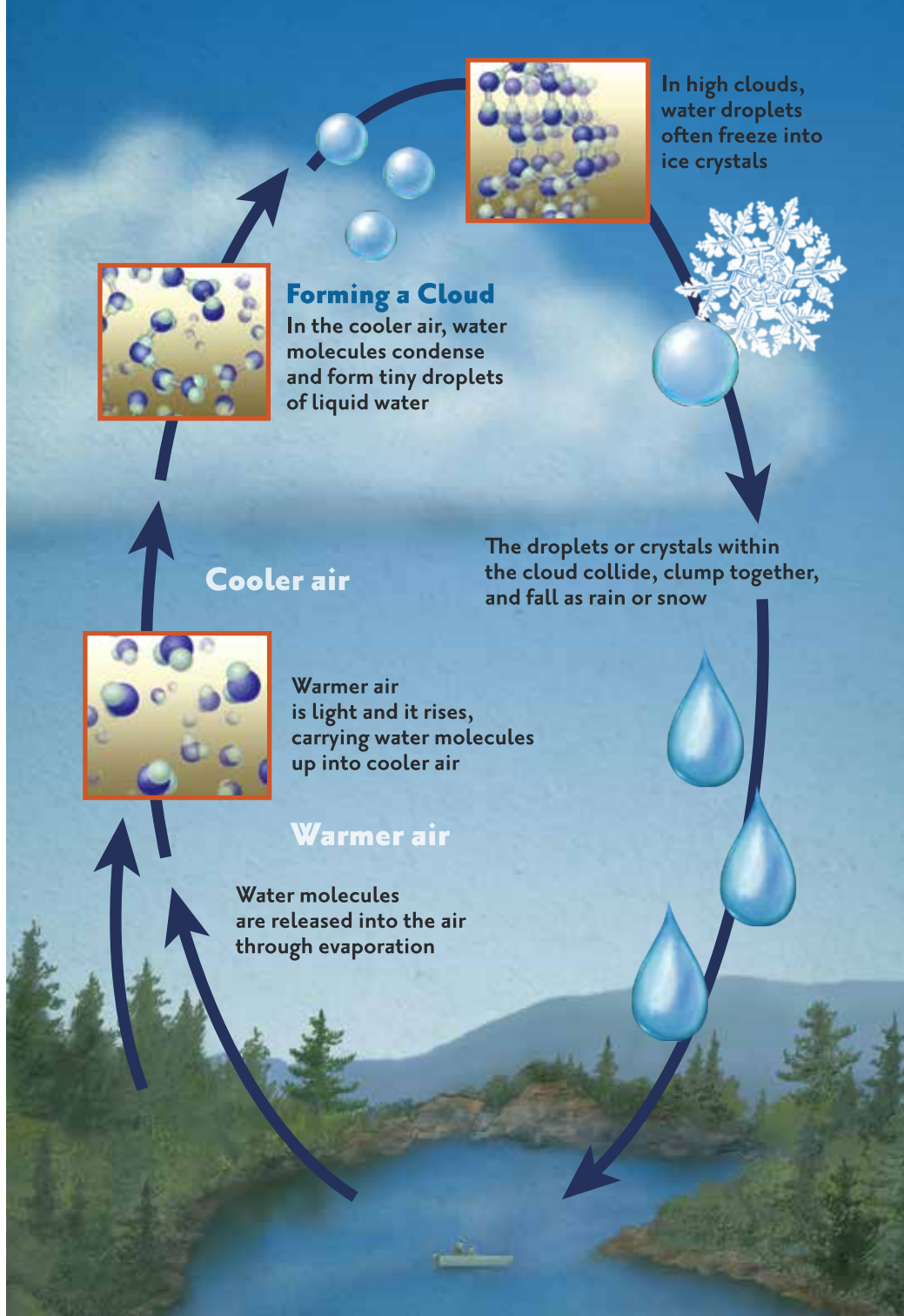
At any time, clouds cover about three-quarters of Earth's surface.

Parade of Clouds

Clouds can be big or small, thin or thick, high or low. Different clouds form under different conditions, and those conditions affect what they look like.

Puffy clouds form when the sun hits objects on the surface of the earth, heating them up. The heated air rises into the sky until it gets to a zone cool enough for droplets to form from the moisture it holds.

Stringy clouds form when wind, rather than warmth, carries air skyward. The direction of the strands that make up the cloud can tell us something about the wind that was blowing when the cloud formed.



TAINA LITWAK

10 Kinds of Clouds

Scientists group clouds into 10 main categories. Which category a cloud is in depends on how high in the sky it is, the shape it takes, and whether it produces rain, snow, or other precipitation. The types of clouds you see in the sky can provide valuable clues about what kind of weather might be ahead.

Low Clouds

PETER BOULAY, DNR

Nimbostratus clouds cover the sky, block the sun, and create rain or snow. They are often dark gray. Think "gloomy day," and you are probably picturing nimbostratus clouds.

Weather Clue: If the air is filled with nimbostratus clouds, there's a good chance it's raining or snowing—or will be before too long.

PETER BOULAY, DNR

Stratocumulus clouds form rounded sheets and layers low in the sky. They are puffy rather than stringy and cover most or all of the sky.

Weather Clue: Stratocumulus clouds tell us that we may see rain soon, but the weather will quickly clear up.

In a Fog

Have you ever wondered what it's like inside a cloud? If you've ever walked around in a fog, you already know! Fog is simply a cloud that is so low it actually touches the ground.

PHOTOGRAPH BY RICHARD HAMILTON SMITH

Cumulus clouds are the puffy, "cotton ball" clouds people like to imagine as puppies, faces, turtles, and other shapes. They are made up of liquid water rather than ice. Cumulus clouds tend to be lighter-colored at the top than at the bottom.

Weather Clue: Cumulus clouds generally signal good weather—but beware if they turn into cumulonimbus clouds!

PETER BOULAY, DNR

Cumulonimbus clouds are thick, dense, and tall. They form when warm air near the ground is swept upward and cools down. They are usually flat and spread out at the top.

Weather Clue: Cumulonimbus clouds often bring thunderstorms, hail, and even tornadoes.

BILL MARCHEL

Stratus clouds are low and gray and may produce rain or snow. When you say "cloudy day" you are probably talking about stratus clouds covering the sky.

Weather Clue: Stratus clouds signal the potential for light snow or rain ahead, with possible clearing overnight.

PETER BOULAY, DNR

Medium-Height Clouds

PETER BOULAY, DNR

Altostratus clouds cover the sky on a "gray day." The sun may peek through, but it doesn't show a halo as it does for cirrostratus clouds (see page 40). Altostratus clouds may contain both ice and water droplets.

Weather Clue: Altostratus clouds tell us that rain or snow is likely on the way.

Fun Fact

In summer, cumulus clouds are more common. In winter, stratus clouds are more common.

PETER BOULAY, DNR

Altocumulus clouds are the most common medium-height clouds. They contain water rather than ice and are small and puffy—like popcorn or cotton balls in the sky. If they are thick, they may look gray. Altocumulus clouds are often found with other kinds of clouds.

Weather Clue: Prepare for thunderstorms later in the day; after that, good weather is on its way.

Fun Fact

In winter, nighttime clouds help keep daytime warmth close to Earth. If there are no clouds, the warmth can escape skyward, resulting in cold, crisp nights.

High Clouds

Fun Fact

Cities tend to have more clouds than rural areas.

Cirrus clouds are thin and wispy and sometimes resemble feathers. High in the sky where temperatures are low, they usually are made up of ice crystals rather than liquid water. As light interacts with the ice crystals, you may see a "halo" effect around the sun or moon.

Weather Clue: Cirrus clouds tell us that the weather is changing. Often, pleasant weather is ahead.

LAYNE KENNEDY

Mouth Clouds

Can a person make a cloud? If you live in Minnesota, chances are you already have! When you talk or breathe outdoors in cold weather, the water vapor in the warm, moist air from inside your body hits the cold, dry outdoor air and condenses, forming miniature clouds in front of your eyes.

PHOTOGRAPH BY LAYNE KENNEDY

COURTESY OF CARA FOSTER

Cirrostratus clouds are also high in the sky. They tend to be smoother and cover the sky more completely than cirrus clouds. They may create a halo effect around the sun or moon.

Weather Clue: If you see cirrostratus clouds in the sky, it's likely to rain or snow within 24 hours.

Fun Fact

In Minnesota, November and December are the cloudiest months. The least cloudy months are June, July, and August.

PETER BOULAY, DNR

Cirrocumulus clouds are high clouds with lumps or wrinkles. They are relatively uncommon. Often they are cirrus or cirrostratus clouds grown old.

Weather Clue: Cirrocumulus clouds tell us the weather will likely be cold, but there will be no snow anytime soon.

Teachers Resources. Find a Teachers Guide and other resources for this and other Young Naturalists stories at *mndnr.gov/young_naturalists*.

Name These Clouds

Test your new knowledge about the categories of clouds by identifying the types shown in these photos.

ERIK FREMSTAD

1.

LAYNE KENNEDY

2.

WALT HUSS

3.

LAYNE KENNEDY

4.

COURTESY OF SUSAN PHELPS

5.

BILL MARCHEL

6.

Answers: 1. altocumulus. 2. cirrus. 3. mammatus. 4. cirrocumulus. 5. cumulus. 6. cumulonimbus.