How Is Weather Forecasted?

Can you imagine waking up and not knowing the day's expected weather? You might check outside for the current weather, but you would have to guess whether the temperature would warm up or cool down later. You would also have to guess if a storm is on its way. Thanks to experts called *meteorologists*, you don't have to guess. Meteorologists work at weather stations around the world. They study weather patterns and conditions in Earth's **atmosphere**. They use what they find to make forecasts of upcoming weather events. People can use these weather forecasts to prepare for likely weather.

Meteorologists look for patterns in the way air moves to help them create forecasts. They study large bodies of air called *air masses*. All the air in an air mass has relatively the same temperature, **air pressure**, and **humidity**. Sometimes, one air mass meets another air mass that has a different temperature or humidity. When two air masses meet, a front forms at their boundaries. Fronts move across Earth and can change the weather. For example, a cold front brings a cool air mass that lowers temperatures and may cause rain. A warm front brings a warm air mass that raises temperatures. Meteorologists look at how air masses, air pressure, and fronts interact. Each interaction gives them more data to make weather predictions.

A variety of tools help meteorologists track current weather conditions. Radar systems use energy waves to detect storms or clouds and see how fast they are moving. Weather **satellites** take pictures of Earth's atmosphere from space. Meteorologists examine these pictures and track severe weather events, such as hurricanes. Meteorologists also send weather balloons up into the atmosphere. These balloons have tools called *radiosondes* tied to them. They collect data on wind, pressure, and temperature.

All these different tools send weather data to computers at weather stations. Meteorologists work with special programs that use mathematics to combine all the data. This combined data creates models of weather patterns that meteorologists can study. Then, they can see causes and effects of certain patterns. Depending on the type of model that was created, meteorologists can create detailed forecasts for up to 7–10 days.

Have you ever gotten caught in the rain on a forecasted sunny day? Or, have you experienced clear skies on a predicted snow day? That's because a weather forecast is not a guarantee. A forecast provides information on what is likely to happen next. It predicts the future using data collected from current and past events. It is not possible to have a perfectly predicted forecast because the factors that affect weather change constantly.

Thanks to technology, creating weather forecasts is easier than ever. Meteorologists not only help us know how to dress for the day, but they can also save lives. They can warn people when extreme storms, such as hurricanes or **tornadoes**, are likely to strike. Forecasting the weather may never be perfect, but since technology is always advancing, meteorologists will become better and better at it.

—Pamela Dorsey

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DEFINE

- **air pressure**—the force exerted by the weight of the air around us

- **atmosphere**—the layer of gases surrounding Earth

- **humidity**—the amount of water vapor in the air or atmosphere

- **satellites**—human-made objects that orbit Earth

- **tornadoes**—violent rotating winds accompanied by funnel-shaped clouds that move in narrow paths over land

DAILY REPORT

DISCUSS

1. How do air masses interact with each other?
2. What difficulties might people in the past have faced without weather forecasts?
3. Why are weather forecasts not guarantees?
4. In what ways does the weather affect your life?

WRITE

What does the perfect weather look and feel like to you? Descriptively write about how you would spend a day in this type of weather and what activities you would do. Then, write about your least favorite type of weather and how you feel when you experience it.

CREATE

In a small group, choose one of the following weather conditions: blizzard, thunderstorm, heat wave, or fog advisory. Pretend you are weather forecasters who need to warn the public. Then, prepare a script for a mock weather forecast, and present it to the whole group.