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TEACHER GUIDE

WEATHER VS. CLIMATE GRADES 3-5

COMMON MISCONCEPTIONS

- **The temperature of air is the same everywhere on earth.**
The temperature of air depends on the location where it is recorded. Air temperature can even vary locally depending upon whether it was taken in the sun or the shade.
- **The reason for the pattern of temperature changes over a day or over a year is because the amount of clouds blocking the sun is changing.**
Temperature might drop slightly when a cloud covers the sun, but overall temperature changes have to do with time of day and time of year, as well as the geographical location where the temperature is being recorded.

WEATHER AND CLIMATE

In the elementary grades, it is important for students to develop a solid understanding of weather and climate to serve as a foundation for advanced understanding in later grades. At this level, focus is on what weather and climate are, and how they differ when they can seem like the same thing. It is key that students understand that weather is the day-by-day variation in the atmosphere that affects conditions locally, while climate is the variation of weather conditions over time. One way to remember this is that weather influences what you will wear today, but climate explains why you have all the clothes in your closet. If you live in a warm and sunny climate you may only own shorts and t-shirts, but if you live in a climate that typically experiences hot summers and cold, snowy winters, you may also own a winter coat and snow pants.

Many students will have heard about changing climate and may want to discuss it. At this level, it is critically important for students to grasp the difference between weather and climate before they try to understand changing climate. Climate change is introduced through NGSS standards at the Middle School level.

WEATHER FORECASTING TOOLS AND DATA

Weather forecasts are based on data, not on guesses. Scientists, called Meteorologists, learn how to analyze the data collected to predict what will happen over the next few days. Weather forecasts become less accurate the further out they are predicted. This is why you usually only see a few days or a week's worth of weather predicted in a forecast. Forecasts can change as conditions do and therefore weather data changes. At this level, students can comprehend some of the factors that impact the weather better than others. Air temperature, wind direction, and precipitation are easy to observe and measure using thermometers, anemometers (or a wind vane for direction), and rain gauges, respectively. Air pressure, measured using a barometer, is important for weather forecasting, but is more abstract and may be harder for students to understand. Wind speed is also best kept at a qualitative level for some students - the wind is calm vs. blowing hard - instead of using abstract speeds in mph. You may want to introduce the Beaufort scale to give students a visual graph to better understand the concept of how wind speed is measured.

