

# Weather Basics



# Bell Activity

- What visual observations would you use to predict the weather?
- Where can you find weather forecasts?
- Based on today's weather, what do you think tomorrow's weather will be like? Why?

Meteorologists: forecast the weather a few days in advance

Engineers: analyze changing weather patterns in our atmosphere and design sensitive instruments to collect weather data

Do Meteorologists work together?



- Being able to predict weather and adjust is not only important for comfort but for survival as well!



# What is weather?

- Things taking place in Earth's atmosphere over the short term.
- Directed by the sun
  - Areas closer to the equator receive more energy from the sun compared to the poles.
  - Certain surfaces have different abilities to soak up the sun's rays giving different areas on Earth different temperatures.
    - Dense forests are harder for the sun rays to penetrate so lower temperatures
    - The ocean takes a lot longer to heat up and to cool down affecting temp on the shore
  - The tilt of our Earth affects the amount of direct sunlight a specific area receives.
    - The tilt provides us with the different seasons on Earth.

# Temperature

- Measured by a **thermometer**
- Temperature affects the air pressure around us
  - Heated air expands lowering the air pressure
  - Cooler air contracts increasing the air pressure
- Differences in air pressure cause all types of weather

# Air Pressure

Air moves from areas of high pressure to areas of low pressure causing **wind**.

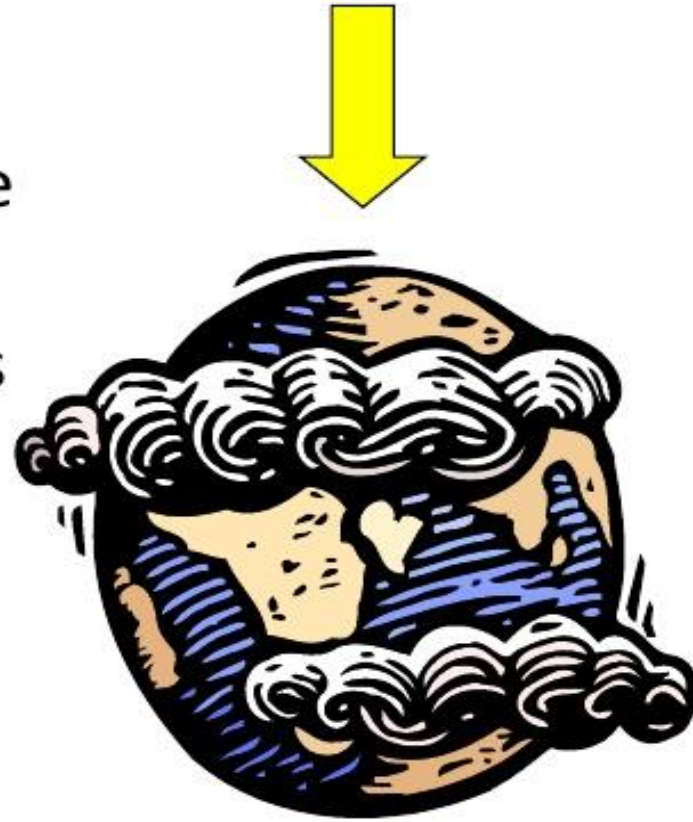
Moving air masses and air pressure are two factors that help determine what the weather is going to be like.

Tool to measure air pressure – **Barometer**

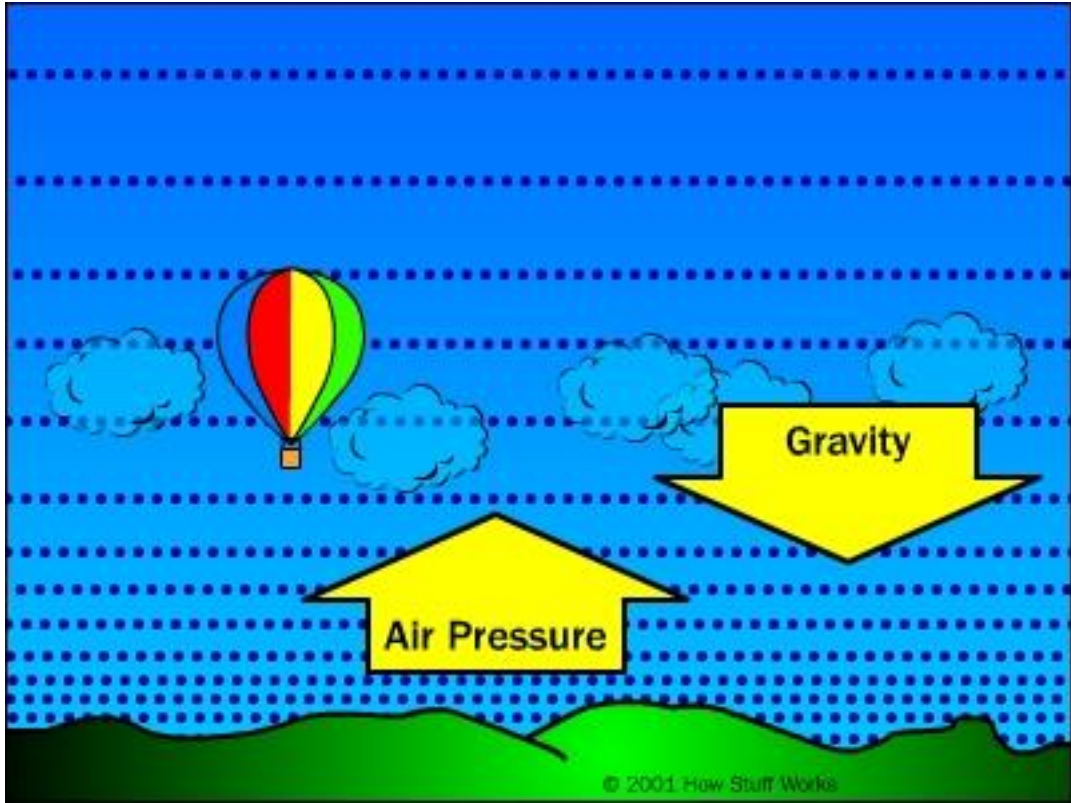
Tool to measure wind speed – **Anemometer**

# Air Pressure

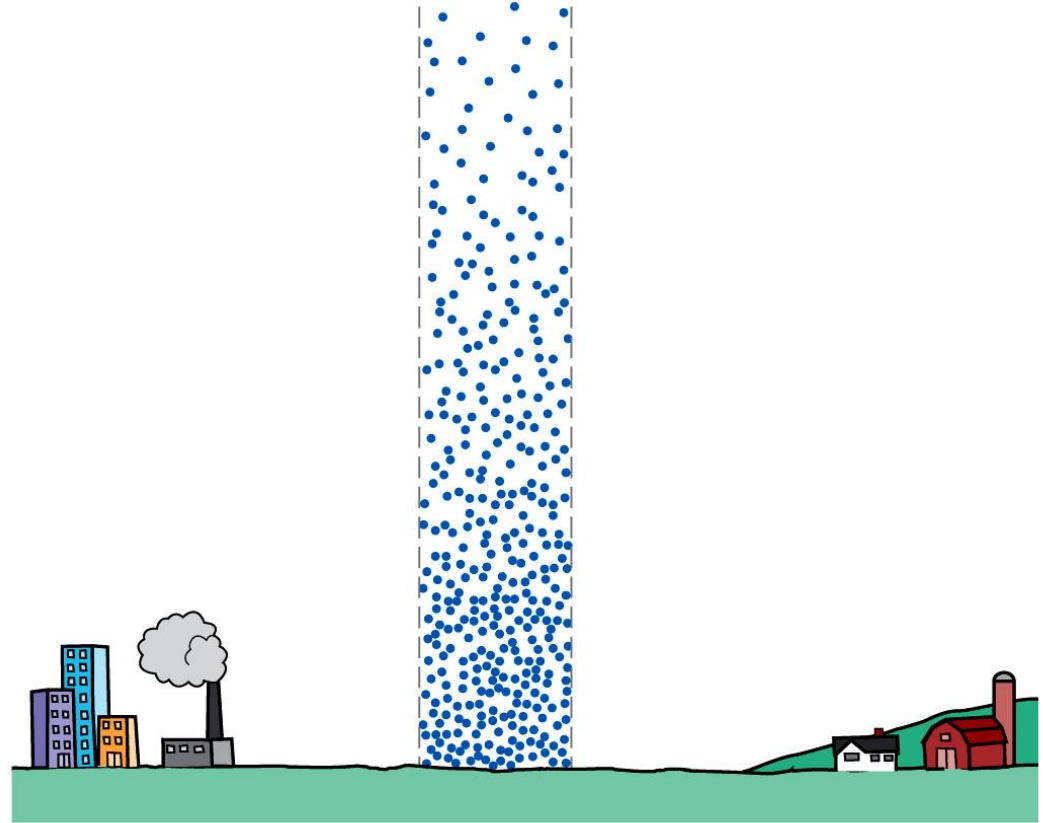
- **Air Pressure** is a measure of the force of the air pressing down on the earth's surface

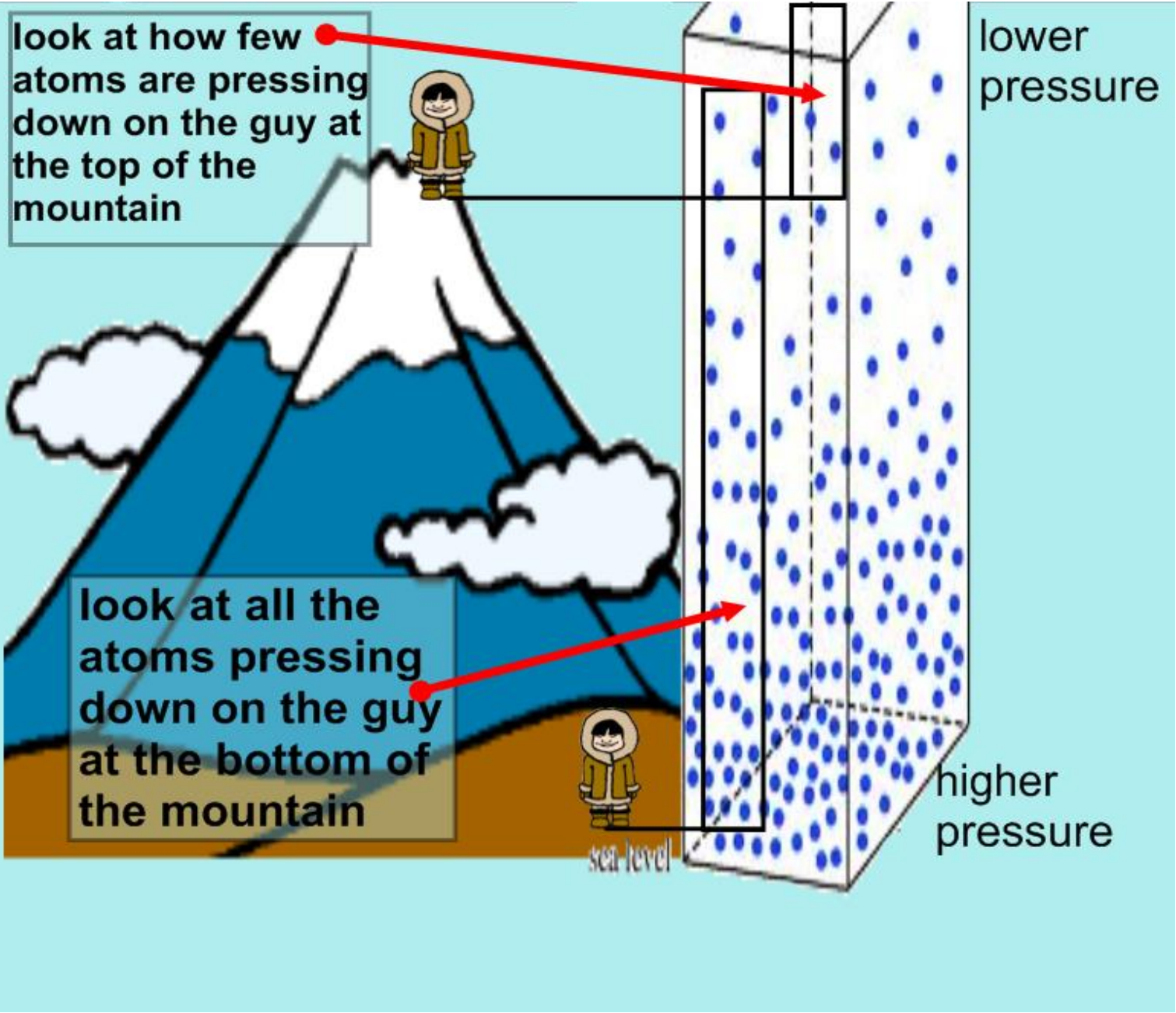






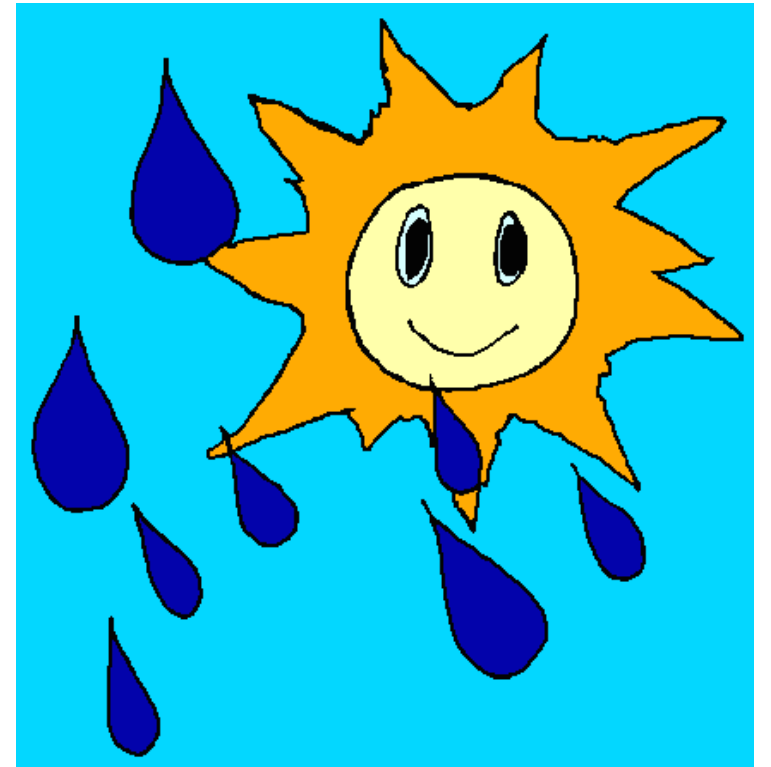
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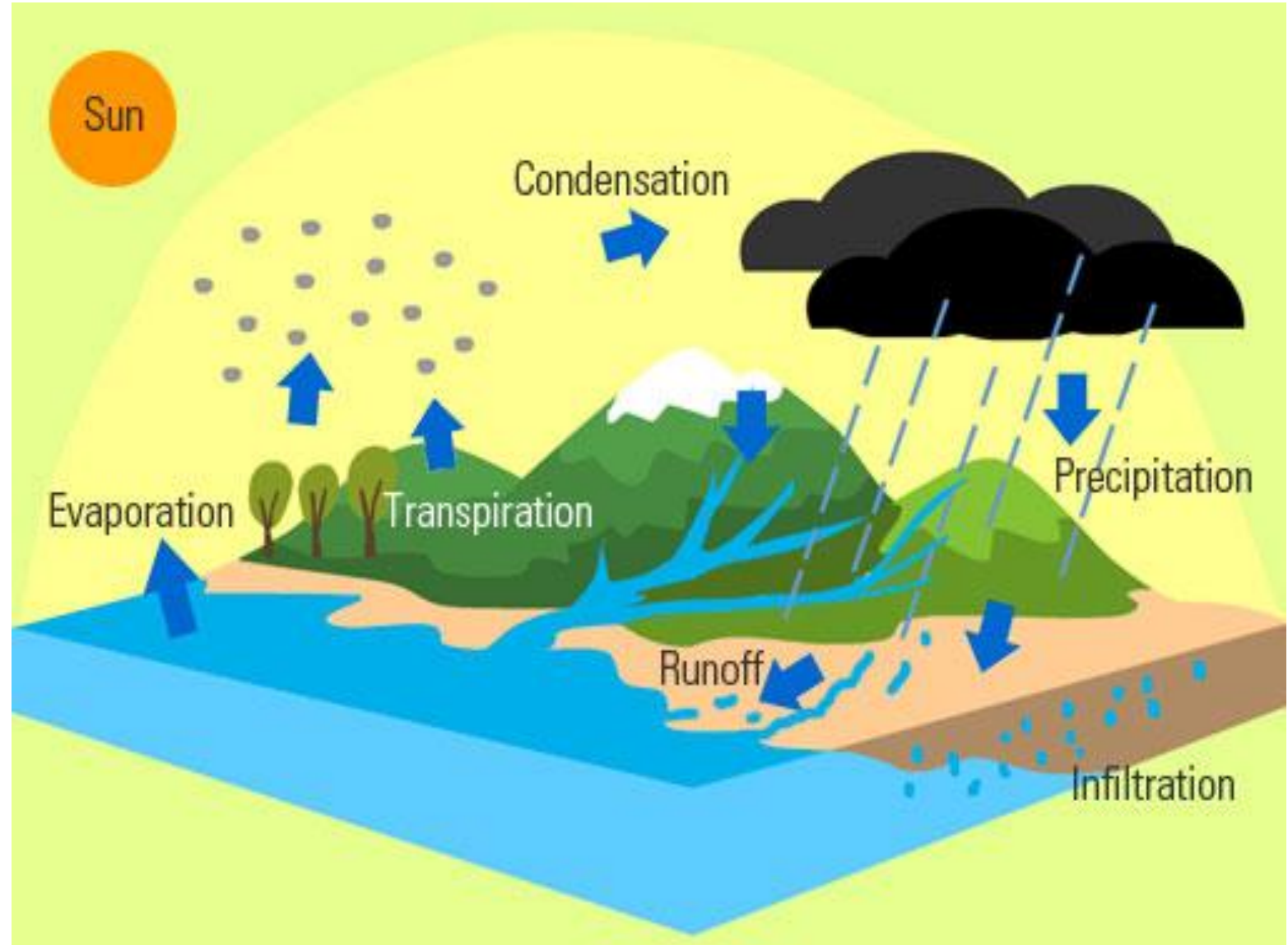


# Humidity

- Humidity is the amount of water vapor in the air.
- Humidity is an indicator of precipitation (rain, dew, snow, fog)
- Humidity is also powered by the sun because the sun powers the Earth's water cycle.
- Humidity is measured by a **hygrometer**.



# Water Cycle



# Ever-Changing Weather

- Weather is constantly changing
- Human activity can impact weather through agriculture, industry and everyday use of cars and electricity.
  - These affects can lead to extreme weather such as drought, floods and storms.
- Engineers work to develop technologies to manage floods, increase precipitation and reduce hail.

**Civil Engineers:** Analyze weather data to help design houses, bridges and other structures that are appropriate for the weather and climate in an area.

**Environmental Engineers:** study weather data to determine where to place energy technologies such as wind or solar farms.

**Materials Engineers:** Work with the way different materials are affected by weather. They even design clothes for different climates.

**Computer Engineers:** develop software that helps put all of the weather measurements together in a way that makes sense for meteorologists and communities.

# Assessment Questions

1. What controls most of the Earth's weather? Why?
2. Does human activity impact the weather? How?
3. List several technologies or processes designed by engineers.

- <http://forecast.weather.gov/MapClick.php?lat=43.6067&lon=-116.2261#.WHcA9Vcleb8>



# Homework

Compare and contrast the weather in 2 different cities in the United States. Write a paragraph explaining the difference in temperature using concepts such as elevation, proximity to the ocean, distance from the equator etc.