How Do We Measure Weather?

NGSS Standard: SC.5.E.7.3 - Recognize how weather can be measured using instruments such as thermometers, barometers, anemometers, and rain gauges.

A. GRADE LEVEL: 5th Grade
B. SUBJECT: STEM/Earth Science
C. DATE: [Insert Date]
D. DURATION: 1 Hour

E. LESSON FOCUS:
Students will explore the instruments used to measure weather and understand their functions, while practicing observation and data collection techniques.

F. MATERIALS:
- Real or model weather instruments (thermometers, barometers, anemometers, and rain gauges)
- DIY materials: clear plastic cups, rulers, tape, and cardboard for rain gauge
- Weather data recording worksheet
- Chart paper and markers
- Pictures/videos of weather instruments in action

G. LESSON OBJECTIVES:
1. Identify and describe the function of common weather instruments.
2. Record weather data using models or simulated instruments.
3. Discuss the importance of weather measurement in daily life.

H. PROCEDURES

1. INTRODUCTION (10 Minutes):
- Begin with a question: *"Have you ever wondered how meteorologists know what the weather will be like tomorrow?"*
- Show images/videos of extreme weather conditions (e.g., storms, sunny days) and ask: *"Why is it important to measure weather?"*
- Introduce the instruments used to measure weather: thermometers (temperature), barometers (air pressure), anemometers (wind speed), and rain gauges (rainfall).

2. EXPERIMENT (25 Minutes):
Activity A: Observing Weather Instruments
- Show students how each weather instrument works.
  - **Thermometer**: Demonstrate reading the temperature in Celsius and Fahrenheit.
  - **Barometer**: Explain high/low pressure and how it relates to weather.
  - **Anemometer**: Show how wind speed is measured.
  - **Rain Gauge**: Demonstrate how rainfall is measured in inches or millimeters.

Activity B: DIY Rain Gauge (Optional)
- Guide students to create a simple rain gauge using a plastic cup, ruler, and tape.
- Teach them to mark increments on the cup to measure rainfall over time.

3. OBSERVATION (15 Minutes):

- If outside, have students use the instruments to record current weather data.
- If indoors, use weather simulation videos or describe a scenario where students "read" the data from pre-recorded conditions.
- Complete a weather observation worksheet, recording temperature, wind speed, air pressure, and rainfall.

4. GENERALIZATION (5 Minutes):

- Discuss: *"What would happen if we didn't measure weather?"*
- Emphasize how weather data helps in planning, farming, transportation, and disaster preparedness.

5. ASSESSMENT:

- Exit ticket: *"Name two weather instruments and explain what they measure."*
- Evaluate students' participation in discussions and accuracy of weather data recorded on worksheets.

Note 1: Safety

Safety is essential when conducting outdoor weather observations. Students should remain in a designated area, avoid extreme weather conditions, and handle weather instruments with care. If using thermometers, avoid mercury thermometers to prevent breakage and potential hazards. Encourage proper supervision to ensure safe participation.

Note 2: Accommodation

For English Language Learners (ELLs), provide visuals of weather instruments with labeled names and translations in their native language. Use sentence frames to guide discussions, such as *"A thermometer measures ____."* For Exceptional Student Education (ESE) learners, offer hands-on practice with instruments and one-on-one support during the activity. For advanced learners, challenge them to predict weather patterns using the collected data.