

2nd Grade Lesson

NC State Science Standards:

- 2.E.1.2 Summarize weather conditions using qualitative and quantitative measures to describe: temperature, wind direction, wind speed, precipitation
- 2.E.1.4 Recognize the tools that scientists use for observing, recording, and predicting weather changes from day to day and during the seasons.

Essential Questions:

- What are some manual and electrical instruments we use to record weather over time?
- How does recording characteristics of weather over time help meteorologists make weather predictions?

Brief Lesson Description:

Students will explore weather, weather observations, and weather predictions through a station lab and weather data collection over a period of time. Students will use this information to discuss how meteorologists measure characteristics of weather in order to look for patterns and make predictions in weather forecasts.

Performance Expectation(s) and Specific Learning Outcomes:

- Students will be able to describe the weather using qualitative observations.
- Students will be able to describe the weather by measuring characteristics such as temperature, wind, and precipitation and collecting quantitative data.
- Students will be able to explain how meteorologists predict the weather.

Prior Student Knowledge:

- The Earth is warmed by the Sun.
- Temperatures change daily and seasonally.
- Weather is the daily temperature, precipitation, and wind in a given area

Possible Preconceptions/Misconceptions:

- Clouds and rain are independent.
- Weather is controlled by Mother Nature.
- Weather forecasts are always accurate.

Materials:

Printouts from the supplemental materials

Clear tape

Red pipe cleaners (1 per group)

Clear drinking straws (1 per group)

Student thermometers (1 per group)

Cups to hold water (6)

Hot water

Cool water

Ice

Rulers (1 per group)

Clear jars (1 per group)
 Funnels (1 per group)
 3oz Paper Cups (5 per group)
 Straws (any color) (2 per group)
 Pencils with erasers (1 per group)
 Pushpins (1 per group)
 Cardstock for printing wind vane arrow
 Straws (any color) (1 per group)
 Straight pins (1 per group)
 Paper plates (2 per group)
 Modeling clay or play-doh (small clump per group)
 Pencils with erasers (1 per group)
 Student compasses (1 per group)

LESSON PLAN - 5-E Model

ENGAGE: Opening Activity - Access Prior Learning / Stimulate Interest / Generate Questions:

Time: 45 minutes

Can you measure and make a prediction about the weather where you live?

1. Ask students, have they ever wondered where the weather comes from?
 - a. Allow students to respond. This may lead to other questions like how do we know to bring an umbrella with us or to wear a coat?
 - b. Student answers can be placed on the board or on an anchor chart.
2. Read a fiction book about the weather such as *Cloudy with a Chance of Meatballs* by Judi Barrett. Tell students to listen for similarities in what they already know about the weather or words they recognize about the weather.
 - a. Have students work in pairs to fill out their *Weather Compare/Contrast Chart*.
 - b. Discuss what they put on their charts. Have students identify words they heard that they recognized.
3. Tell students this makes you think of another question: how do we know what kind of weather we are going to have for the day?
 - a. Students should suggest watching a weather forecast, apps that give the weather, meteorologists, etc.
 - b. Place these ideas on the board or anchor chart, as well.
4. Explain to students in order to explore these questions they are going to be meteorologists this week and measure the weather!

EXPLORE: Lesson Description - Materials Needed / Probing or Clarifying Questions:

Time: 60 minutes

1. Explain the *Measuring the Weather Station Lab* to students. Facilitate moving through the different stations with students. *This can be done as a whole class or as groups of 2 to 3 students moving around the stations independently depending on class size and student independence level.*
 - a. Station 1: Measuring Temperature with a Thermometer
 - b. Station 2: Measuring Precipitation with a Rain Gauge
 - c. Station 3: Measuring Wind Speed and Direction with an Anemometer and Wind Vane
2. Once students have completed each station. Have students summarize their findings and what they learned.
3. As a whole class, allow students to share their summaries and compare what they learned.

EXPLAIN: Concepts Explained and Vocabulary Defined:

Time: 45 minutes

1. Explain to students they will learn a little bit more about the weather instruments they just used, and how we predict the weather with their help. Read *What Is Weather* by Robin Johnson.
 - a. Have students use the *What I Know About Weather Graphic Organizer* to help them while reading the book aloud.
2. Facilitate students filling in the *Weather Instruments Foldable*.
3. Discuss with students any further questions they may have about what they have learned about weather and how we measure it. You may wish to revisit the anchor chart here.

Vocabulary: weather, thermometer, rain gauge, wind vane, anemometer, precipitation, wind, temperature, speed, direction, meteorologist

ELABORATE: Applications and Extensions:

Time: 2 weeks

Part A:

1. Explain to students they will now use their instruments to measure the weather outside for a week. Students use a rain gauge, wind vane and anemometer, and thermometer to measure weather over a period of a week.
 - a. Have students use their instruments to take measurements every day at the same time for a week or more depending on available time.
 - b. Have students fill out their weather data sheet every day while collecting their data.
2. Once students have collected all their data, ask them if they can notice anything interesting about their weather measurements. Discuss these observations with students. *Students may notice the temperature did or did not change very much, that the temperature was warmer the day before it rained, or any other various trends/observations.*

Part B:

1. Explain to students that they are going to get to talk to a real weather scientist or meteorologist. Invite a NC State Climate Office scientist to the classroom to talk about meteorology and weather predictions.

- a. Meet with the NCSCO scientist ahead of time to ask them to challenge students to make predictions about the weather by observing patterns in their previous observations at the end of their talk.
 - b. If an NCSCO scientist is unavailable, you may try *Skype A Scientist*:
<https://www.skypeascientist.com/> or there are various videos that can be shown in place of a scientist such as:
 - i. Chief Meteorologist, Career Video: <https://www.youtube.com/watch?v=Oq2tKLdF-g>
 - ii. Weather 101 for kids - with Meteorologist JD Rudd:
<https://www.youtube.com/watch?v=qWWx3reC9qA>
2. Now challenge students to make predictions about the weather just like a meteorologist does!

Part C:

1. Have students take new observations for a week, but this time they will make a prediction about the next day's weather before they measure it. Have students think about the patterns they saw in their initial weather observations from Part A and the new observations from the previous day.
 - a. Each new day, discuss if their predictions were accurate.
 - b. Based on their predictions, discuss what further things they might need to know to be more accurate. Discuss meteorologists use satellites and other much more precise instruments to measure the weather than what the students used. To explain these instruments show the GOES-R weather satellite video: https://www.youtube.com/watch?v=JZp7t_DPhWI&t=172s
2. Discuss any questions or observations the students make about predicting the weather. You may wish to revisit the anchor chart here to discuss any remaining questions.

EVALUATE:

Time: Throughout Lesson

Formative Monitoring (Questioning / Discussion):

Formative assessment can be conducted throughout the lesson.

Summative Assessment (Quiz / Project / Report):

Summative assessment can be conducted during the investigation, elaborate, and extension activity.

Elaborate Further / Reflect: Enrichment:

Time: 60 minutes

1. Have students create a story about the weather data they collected.
 - a. Explain that their story can be fictional like *Cloudy with a Chance of Meatballs* or more informational like *What Is Weather*, but they must include terms they learned and their own data they collected over the week-long period, including a future prediction.
 - b. This can be done individually or in pairs.
2. Have students share their stories, if time allows.