

Delaware Science Coalition



Grade 1 Weather Unit Template



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Preface: This unit has been created as a model for teachers in their designing or redesigning of course curricula. It is by no means intended to be inclusive; rather it is meant to be a springboard for teacher thought and creativity. The information we have included represents one possibility for developing a unit based on the Delaware content standards and the Understanding by Design framework and philosophy.

Unit Summary

This unit focuses on different types of weather which can be observed and measured. Students learn to use instruments such as a thermometer, rain gauge, and wind flag to collect and record data. Along with their observations, students use the data to give a weather report for each day. They also use the data to determine weather patterns over time. Students come to recognize that weather affects their choice of clothing and activities.

Stage 1: Desired Results **Delaware Science Content Standards**

Delaware Science Content Standards

This course focuses on the Delaware Science Content Standards and Grade Level Expectations in Standards 1, 3, 5, and 8 found on the following web site: http://www.doe.k12.de.us/programs/ci/content_areas/science.shtml

Standard 1- Nature and Application of Science and Technology

Understanding and Abilities of Scientific Inquiry

Students should know and be able to:

1. Understand that: Scientific investigations, whether conducted by students or scientists, involve asking a question about the natural world.
 - Be able to: Generate questions and predictions using observations and exploration about the natural world.
3. Understand that: The purpose of accurate observations and data collection is to provide evidence. Scientists use tools to enhance their senses in order to obtain more evidence.
 - Be able to: Collect data using observations, simple tools and equipment. Record data in tables, charts, and bar graphs. Compare data with others to examine and question results.
4. Understand that: Scientists use observations from investigations and knowledge that is already known to develop an explanation.
 - Be able to: Construct a simple explanation by analyzing observational data. Revise the explanation when given new evidence or information gained from other resources or from further investigation.
5. Understand that: The purpose of communicating with others is to share evidence and conclusions. Scientists communicate the results of their investigations to others.

- Be able to: Share simple plans, data, and explanations with an audience and justify the results using the evidence from the investigation.
6. Understand that: The use of mathematics, reading, writing, and technology are important in conducting scientific inquiries.
 - Be able to: Use mathematics, reading, writing, and technology when conducting an investigation and communicating the results.

Science, Technology, and Society

Students should know that:

1. People have invented new technologies to solve problems.

Students should be able to:

- Observe that sunlight can be used to heat the inside of homes and other buildings by allowing the sunlight to pass through windows.
2. Tools are useful in science to help gather data for observations and measurements and provide a safe means of conducting an investigation.

Students should be able to:

- Select and use appropriate instruments such as wind scales, thermometers, cloud charts, and rain gauges to measure weather conditions.

History and Context of Science

1. People from all parts of the world practice science and make many important scientific contributions.
2. Much has been learned about the natural world but there is still much to understand.

Students should be able to:

- Identify a meteorologist as a scientist who uses technology to study, observe, and record information about the weather and who uses this information to forecast the weather. Use weather forecasts to make decisions such as choice of clothing or outdoor activities.

Standard 3: The Forms and Sources of Energy

Forms and Sources of Energy

Students should know that:

1. The Sun is a source of energy that lights and warms the Earth.

Students should be able to:

- Identify the Sun as the source of energy that warms and lights the Earth.

2. Objects that move (i.e., moving air, moving water) have energy because of their motion.

Students should be able to:

- Identify air and water as moving objects that have energy.

3. Heat energy is a form of energy that makes things warmer.

Students should be able to:

- Observe that heat energy makes things warmer.

Energy Interacting with Materials The transformation and Conservation of Energy

Students should know that:

1. When light hits an object, the light energy can become heat energy.

Students should be able to:

- Investigate what happens to the temperature of an object when it is placed in direct sunlight. Record data and conclude that the energy in the sunlight was changed into heat energy in the object.
- Compare what happens when sunlight strikes dark and light colored objects.

The Production, Consumption and Application of Energy

Students should know that:

1. Moving air, moving water, and sunlight contain energy that can be put to our use.

Students should be able to:

- Observe that sunlight can be used to heat the inside of homes and other buildings by allowing the sunlight to pass through windows.

Standard 4: Earth in space

Earth, Moon, Sun System

Students should know that:

1. The shape of the Earth is similar to a sphere.

2. From Earth many objects may be seen in the sky including the Sun, the Moon, stars, and man-made objects.

Students should be able to:

- List objects that can be observed in the sky in the daytime and objects that can be observed in the sky at nighttime.
Discuss which objects are on which lists (e.g., the Moon can be observed sometimes in the day and sometimes at night).

3. The Sun and Moon appear to move slowly across the sky.

Students should be able to:

- Safely observe the location of the Sun at the same time in the morning, noon, and afternoon over several days. Describe the Sun's movement across the sky over the course of the day.

4. The pattern of day and night repeats every 24 hours. The Sun can only be seen in the daytime.

Students should be able to:

- Use simple models to demonstrate how Earth's rotation causes day and night.

5. The Moon can be observed sometimes at night and sometimes during the day.

Students should be able to:

- Observe the Moon in the day sky over several months. Draw a sequence of pictures that shows the repeating cyclic pattern of the Moon.

6. The appearance of the Moon changes in a cycle that takes about a month.

- Observe the Moon in the day sky over several months. Draw a sequence of pictures that shows the repeating cyclic pattern of the Moon.

Technology and Applications

Students should know that:

1. Binoculars allow people to observe objects in the sky from Earth.

Standard 5: Earth's Dynamic Systems

Components of Earth

Students should know that:

1. Water can exist as a solid, liquid or gas and in different forms such as rain, snow and ice.

Students should be able to:

- Identify the earth materials (i.e., rocks, soil, water, air) found in aquatic and terrestrial environments.

Interactions throughout Earth's Systems

Students should know that:

1. Weather influences plants, animals and human activity.

Students should be able to:

- Keep daily records of weather conditions (wind speed, type and amount of precipitation, cloud cover and type, temperature) and use these records to identify patterns over short and long periods of time.

2. People who work or play outdoors often dress and base their activities on the speed of the wind and the temperature of the air.

Students should be able to:

- Demonstrate that there is air all around and that the wind is moving air. Use instruments to qualitatively measure wind speed and describe this by using a simplified Beaufort scale.
- Use a thermometer to measure temperature in degrees Fahrenheit. Describe how hot or cold an object or weather event feels by using a thermometer.
- Use a rain gauge to measure precipitation and describe how this measurement would change when frozen precipitation such as snow or ice melts.
- Organize weather data on graphs and on long-term data collection charts and use this data to describe typical seasonal

weather patterns.

- Describe different weather conditions and discuss how these conditions affect plants, animals, and human activity.

3. Clouds are shaped by winds and are made of small water droplets or ice crystals. Cloud shapes can be used to help forecast weather.

Students should be able to:

- Identify three basic cloud types (cirrus, cumulus, and stratus) all of which are made of water and/or ice. Conclude that wind moves clouds in the sky.

Technology and Applications

Students should know that:

1. Weather can be observed, measured and described through the use of simple tools such as a thermometer, rain gauge and wind vane.

Students should be able to:

- Select and use appropriate instruments such as wind scales, thermometers, cloud charts, and rain gauges to measure weather conditions.
- Identify a meteorologist as a scientist who uses technology to study, observe, and record information about the weather and who uses this information to forecast the weather.
- Use weather forecasts to make decisions such as choice of clothing or outdoor activities.

Standard 8: Ecology

Interactions within the Environment

Students should know that:

1. An interconnectedness exists among the living and nonliving parts of an environment. This interconnectedness can be observed by the changes made by plants and animals in their environment.

Students should be able to:

- Describe the impact of weather conditions (e.g. sun, fog, rain, snow) on plant and animal activities.

Big Ideas

Weather patterns can be detected from collected wind, temperature, and rain data.

Observation of weather conditions provides evidence to make decisions about clothing and activities.

Investigate the effects of heat energy with water and color.

Interactions of people and animals with different kinds of weather.

Unit Enduring Understandings

Students will understand that...

Senses can be used to observe, describe, gather data and communicate changes in weather features (cloud cover, temperature, precipitation, wind).

There are tools to measure changes in weather features (wind scales, thermometers, rain gauges), and these tools help meteorologists to make weather forecasts.

The weather changes from day to day, week to week, and seasonally.

The weather affects decisions that people make about clothing to wear and their outside activities.

Scientists, called meteorologists, use tools to collect data to report current weather conditions and predict future weather.

Unit Essential Question(s)

How does weather affect all living things?

How do weather instruments help to observe and describe weather features?

How do the senses help provide information about the weather?

Knowledge & Skills

Knowledge:

- How to conduct simple experiments
- How to collect, record, and analyze weather data using simple tools (thermometer, wind gauge, rain gauge)
- The senses can be used to observe weather conditions (wind speed, precipitation, temperature, and cloud cover)
- The weather changes over time and that patterns can be observed
- Meteorologists study weather data and make forecasts. (weather predictions)
- Weather affects the clothing you wear, and outside activities

Skills:

- Generate questions and predictions using observations and exploration about the natural world.
- Generate and follow simple plans using systematic observations to explore questions and predictions.
- Collect data using observations, simple tools and equipment. Record data in tables, charts, and bar graphs. Compare data with others to examine and question results.
- Construct a simple explanation by analyzing observational data. Revise the explanation when given new evidence or information gained from other resources or from further investigation.
- Share simple plans, data, and explanations with an audience and justify the results using the evidence from the investigation.
- Use mathematics, reading, writing, and technology when conducting an investigation and communicating the results.
- Identify the Sun as the source of energy that warms and lights the Earth.
- Identify air and water as moving objects that have energy.
- Observe that heat energy makes things warmer.
- Observe the evidence of the force of air pushing on objects and materials such as pinwheels and kites. Compare how the direction and speed (fast, slow) of the moving air affects the motion of the objects.
- Observe and measure the temperature of hot and cold water. Investigate what happens when hot and cold water are mixed. Record data on a graph and use the data to summarize the results.
- Investigate what happens to the temperature of an object when it is placed in direct sunlight. Record data and conclude that the energy in the sunlight was changed into heat energy in the object.
- Compare what happens when sunlight strikes dark and light colored objects.
- Draw conclusions that dark colored objects feel warmer and increase more in temperature in sunlight than do light colored objects.
- List objects that can be observed in the sky in the daytime and objects that can be observed in the sky at nighttime. Discuss which objects are on which lists (e.g., the Moon can be observed sometimes in the day and sometimes at night).
- Safely observe the location of the Sun at the same time in the morning, noon, and afternoon over several days. Describe the Sun's movement across the sky over the course of the day.
- Observe the Moon in the day sky over several months. Draw a sequence of pictures that shows the repeating cyclic pattern of the Moon.
- Use simple models to demonstrate how Earth's rotation causes day and night.
- Keep daily records of weather conditions (wind speed, type and amount of precipitation, cloud cover and type, temperature) and use these records to identify patterns over short and long periods of time.
- Demonstrate that there is air all around and that the wind is moving air. Use instruments to qualitatively measure wind speed and describe this by using a simplified Beaufort scale.
- Keep daily records of weather conditions (wind speed, type and amount of precipitation, cloud cover and type, temperature) and use these records to identify patterns over short and long periods of time.

- Demonstrate that there is air all around and that the wind is moving air. Use instruments to qualitatively measure wind speed and describe this by using a simplified Beaufort scale.
- Use a thermometer to measure temperature in degrees Fahrenheit. Describe how hot or cold an object or weather event feels by using a thermometer.
- Identify three basic cloud types (cirrus, cumulus, and stratus) all of which are made of water and/or ice. Conclude that wind moves clouds in the sky.
- Use a rain gauge to measure precipitation and describe how this measurement would change when frozen precipitation such as snow or ice melts.
- Organize weather data on graphs and on long-term data collection charts and use this data to describe typical seasonal weather patterns.
- Describe different weather conditions and discuss how these conditions affect plants, animals, and human activity.
- Select and use appropriate instruments such as wind scales, thermometers, cloud charts, and rain gauges to measure weather conditions.
- Identify a meteorologist as a scientist who uses technology to study, observe, and record information about the weather and who uses this information to forecast the weather. Use weather forecasts to make decisions such as choice of clothing or outdoor activities. Select and use appropriate instruments such as wind scales, thermometers, cloud charts, and rain gauges to measure weather conditions.
- Identify a meteorologist as a scientist who uses technology to study, observe, and record information about the weather and who uses this information to forecast the weather. Use weather forecasts to make decisions such as choice of clothing or outdoor activities.

Stage 2: Assessment Evidence (Design Assessments To Guide Instruction)

Suggested Performance Task(s)

Weather assessment for Grade One can be found at:

http://www.doe.k12.de.us/programs/sci_assess/default.shtml

Transfer Key Ideas:

- Weather conditions influence living things.
- Weather conditions create patterns.
- Weather conditions (wind, precipitation, cloud cover, and temperature) can be measured and observed using scientific

- tools (i.e., thermometer, wind gauge, rain gauge).
- Weather data is summarized on graphs and charts.

Expectations of Students:

- Observe and record the weather (cloud cover, precipitation, and wind speed) by circling the appropriate picture.
- Read and record a rain gauge to the nearest unit.
- Read and record temperature accurately.
- Infer a season based on several pieces of data.
- Select clothing appropriate for the weather.
- Infer an outside temperature based on clothing and weather conditions and mark a thermometer appropriately.
- Associate weather conditions with temperature descriptions.
- Relate weather conditions to human activity.
- Interpret a weather data graph.
- Tally graphic information.
- Use data to decide on a appropriate activity given weather conditions.

Rubrics/checklists for Performance Tasks

Weather assessment rubrics for Grade One can be found at:

http://www.doe.k12.de.us/programs/sci_assess/default.shtml

Other Evidence

Formative Assessment #1 Wind Speed (use after lesson 5)

- This assessment measures the student's ability to measure wind speed.

Directions:

Teacher takes students outside and asks them to determine wind speed by using the flag or trees. Students hold up 0, 1, or 2 fingers to represent wind speed (0 = no wind, 1 = some wind, 2 = strong wind)

Scoring Guide:

Teacher observes and records on a checklist whether students are able to hold up the correct number of fingers for wind speed.

Formative Assessment #2 Using a Thermometer (use after lesson 7)

- This assessment measures the student's ability to record a temperature on a thermometer.

Directions:

The teacher gives a temperature and students use their student made thermometer to show the temperature in degrees Fahrenheit. Students hold up their thermometer for the teacher to see. Students must be within 3 degrees of the given temperature.

Scoring Guide:

Teacher observes and records on a checklist whether students are able to measure within 3 degrees of accuracy.

Formative Assessment # 3 Using a Thermometer (use after lesson 7)

- This assessment measures the student's ability to record and interpret the temperature.

Directions:

The teacher tells the student to record the temperature of 20° F. The student colors the thermometer up to 20°F. Students answer the question, "Is this a hot or cold temperature?" Have students draw a picture of how to dress for this temperature.

(See attached thermometer recording sheet.)

Scoring Guide: Rubric

- 2 Student colors to the 20° F mark, writes the temperature is cold and draws a picture
Showing appropriate dress (e.g. hat, coat gloves, long pants)
- 1 Student responds accurately to 2 of the 3 questions
- 0 Student answers only 1 or none of the questions accurately

Formative Assessment # 4 Rainfall Graph (use after lesson 11)

- This assessment measures the student's ability to read a graph and analyze the data.

Directions:

The teacher passes out the graph worksheet. The students answer the questions to complete the worksheet.

(See attached rainfall graph recording sheet.)

Scoring Guide: Rubric

- 2 Student accurately answers all 4 questions. 1) 12 days; 2) 1 day; 3) Tuesday; 4) 3 cubes
- 1 Student accurately answers 2 or 3 questions
- 0 Student answers 1 or none of the questions

Formative Assessment # 5 Weather Report (ongoing)

- This assessment measures the student’s ability to interpret the weather based on collected weather data and observations (thermometer, wind flag, weather stamps)

Directions:

After the daily data is collected and recorded on the yellow post-its on the calendar, have one student each day orally summarize the data for the class in a “weather report”.

Scoring Guide: Rubric

- 2 Student accurately states the day’s temperature, wind speed, precipitation, cloud cover and date.
- 1 Student accurately states 2 of the 4 weather features and date.
- 0 Student is unable to state at least two weather features and the date.

Student Self-Assessment and Reflection

Stage 3: Learning Plan

(Design Learning Activities To Align with Goals and Assessments)

Key learning events needed to achieve unit goals

Resource: STC *Weather and Me*, National Science Resource Center, Washington DC

Weather and Me

Lesson 1- Pre-Unit Assessment (KWL)

This lesson allows the teacher to activate student prior knowledge about weather.

Lesson 2- Observing the Weather

Students use their senses to observe weather conditions.

Lesson 3- Recording the Weather

Students record data on a calendar using weather stamps (cloud cover, precipitation, and wind)

Lesson 4- Estimating Wind Speed

Students use a wind scale to estimate wind speed.

Lesson 5- Reading a Thermometer

Students learn to use and read a thermometer.

Lesson 6- Making a Model Thermometer

Students learn to read model and real thermometers recording data on a temperature graph. Students also learn about the Fahrenheit scale.

Lesson 7- Comparing Inside and Outside Temperatures

Students practice using their thermometer taking the inside room temperature and comparing it to the outside temperature.

Lesson 8-Measuring Water Temperature

Students continue to practice using the thermometer recording water temperatures. (ex., hot, cold, mixed waters)

Lesson 9- Experimenting with Color and Temperature

Students compare thermometer readings taken from the thermometer inside a white and a black bag. They draw conclusions about the affects of sunlight, color, and temperature.

Lesson 10- Making a Rain Gauge

Students construct a rain gauge and practice measuring rainfall.

Lesson 11- Exploring Puddles

Students explore what happens to the rain that falls into a puddle. (beginning introduction to the idea of evaporation).

Lesson 12- Testing Rainy Day Fabrics

Students conduct an investigation to determine appropriateness of a material for a raincoat.

Lesson 13- Observing Clouds**Lesson 14- Classifying Clouds**

Students observe clouds noticing attributes (shapes, sizes, other characteristics) and use a set of pictures to categorize clouds into types. (stratus, cumulus, and cirrus)

Lesson 15- Comparing Forecasts to Today's Weather

Students use the weather forecast (e.g., newspaper, computer, TV) and compare it to the data that they collect.

Lesson 16-Summarizing Our Weather Observations

Students tally and total weather data from the calendar according to the type (cloud cover, precipitation, wind). They use the data to look for patterns.

Resources & Teaching Tips**Stories included in the Weather and Me Teacher's Guide**

Observing the Weather with a Meteorologist (lesson 2)

Inventing Umbrellas (lesson 11)

A Coat to Keep You Dry (lesson 12)

Literature Connections

The Wind Blew by Pat Hutchins (lesson 4)

Gilberto and the Wind by Marie Hall Ets (lesson 4)

Rainy Day Puddle by Ei Nakabayashi (lesson 11)

Bringing the Rain to Kapiti Plain by Verna Aardema (lesson 12)

It Looked Like Spilt Milk by Charles Shaw (lesson 13)

Cloudy With a Chance of Meatballs by Judi Barrett (lesson 13)

The Cloud Book by Tommie De Paola (lesson 14)

The Cloud Book by Eric Carle (lesson 14)

Additional activities provided in the extension sections of each lesson.

Lesson 1:

- Make transparency of poem “It’s Hot” and use for choral reading
- Make transparency of pictures in figure 1-3. Show pictures one at a time and ask “What season? Why do you think so?”

Lesson 2:

- Make transparency of poem “Who Has Seen the Wind?” and use for choral reading.

Lesson 3:

- Enlarge pictures in figure 3-1. Cut off labels. Put at center for students to play a matching game.
- Make transparency of pictures in figure 3-1 and use to introduce weather stamps. Do with clouds one day and precipitation the next day and wind on the third day. Scramble them and play the identification game (show picture and ask what it represents or show picture and say thumbs up if this is the foggy stamp. Thumbs down if it is not.

Lesson 4:

- Make a poster of the wind scale (figure 4-4) and post in classroom.

Lesson 5:

- Collect different thermometers and spread out for students to observe. Tell them that they all belong in this group. Who can tell why they all belong together? (they tell temperature or how hot or cold something is)
- Use a transparency of pictures in “Thermometers in Our World” to talk about places thermometers are used. Say: “Can you think of someplace where a thermometer is used?” If they name a place you have, show the picture. If they can’t name a place, describe your pictures and then show the picture.

Lesson 8:

- When you go outside with the black and white bags, teacher takes post its and a pencil. Have a short story to read. Place the bags in similar places and read the story. When finished have students retrieve their bags and have students read their thermometer temperature. You can record the number on the post it and they can put it on their bag. Students can observe the weather and clouds while teacher is recording. Then students can write the temperature on the chart in the classroom.

Lesson 10:

- Use four different colored unifix cubes snapped together as a measure. Sit the cubes next to the plastic cups to determine rain amounts.

Lesson 11:

- Students can “paint” with water on the sidewalks. Use paintbrushes and water to make pictures and discuss what happens to them.

- Find a puddle and draw a chalk line around it. Come back and observe it later. It will be a smaller puddle or maybe have disappeared. Discuss what happened.

Lesson 12:

- Test the fabrics yourself before using in this lesson. The wool often is very thick and the water doesn't go through. Kids think that wet wool makes a good rainy day fabric.

Lesson 14:

- Mix up the cloud photographs and see if students can put them with the correct cloud on the cloud classification chart (figure 14-1).

Accommodation/Differentiation ideas and tips