Investigating Weather & Climate

Weather and Climate

BOCES 4 Science

Investigating Weather & Climate

Teacher's Guide

Published by BOCES 4 Science
Genesee Valley Educational Partnership
Monroe 1 BOCES
Monroe 2–Orleans BOCES
Wayne Finger Lakes BOCES

Written by teachers and administrators from public school districts within the borders of the NYS Midwest Joint Management Team in conjunction with the BOCES 4 Science Educators
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12/17

Foreword

BOCES 4 Science is a collaboration between four New York State BOCES (Board of Cooperative Educational Services) with in the Midwest Region. This collaborative of science educators came together to respond to the need for instructional resources based on the New York State pK-12 Science Learning Standards (NYSSLS). The research behind the Next Generation Science Standards (NGSS) and the National Research Council (NRC) publication, A Framework for K-12 Science Education is the basis for the NYSSLS and the BOCES 4 Science units.

We believe that the future health and well-being of our world depends on scientifically literate people making informed decisions. The development of scientific literacy begins at the earliest grades. Elementary children must have concrete experiences upon which to hook their understanding and new vocabulary – this is especially true in the discipline of science. We embrace the notion that students should experience phenomena and solve real problems to learn about the world. We strive to present lessons and materials that will make high quality science instruction available for all students through cost-effective resources for teachers.

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About this Unit

Overview

The *Investigating Weather & Climate* unit is designed for 3rd grade. The main topics included in this unit are investigating the phenomenon of weather, the water cycle, weather-related hazards, and climates in different regions of the world. The class collaborates to plan and conduct an investigation of the weather using weather tools. Students develop a presentation about the weather and climate at a specific global location.

Scheduling

This unit is scheduled to be in the classroom for 13 weeks. There are approximately 25 science instructional sessions in this unit, based on 30-40 minutes each. Adjust your schedule accordingly. Please return the unit promptly or to request an extension, call 585-352-1140.

Materials to Obtain Locally

Some lessons require materials that are NOT supplied in the kit. These materials can be easily obtained by the teacher or the students. Materials that will need to be provided are indicated with an asterisk in the lesson materials list and are also listed below:

- Books about Natural Hazards (L8)
- Chart paper (L1, L2, L6, L7, L11)
- Computer and Internet access (L13)
- Digital camera (optional) (L9, L15)
- Digital technology such as Green Screen, video, etc. (optional) (L13)
- Disaster Fact Sheets, teacher-selected from FEMA website (L8)
- Globe (optional) (L10, L12)
- Hair blow dryer (optional) (L9)
- Hammer (optional) (L6)
- Hot tap water (L7)
- Ice Cubes (L7)
- Live Radar (L1 and throughout)
- Local Weather Forecast (L1 and throughout)
- Marker (L1, L2)
- Milk cartons, paper student-size (optional) (L9)
- Scissors (L12)
- Supplies as needed for Travel Destination Reports (L14)
- Water (L3, L4, L7, L9)

Three Dimensions

Each of the BOCES 4 Science lessons includes at least one element from each of the three dimensions identified in the NYSSLS. The lesson page identifies the specific elements targeted; the NYSSLS topic page is included after the Features that Support 3-D Learning page.

Science and Engineering Practices (SEP) – These are the major practices that scientists employ as they investigate and build models of their understanding of the world. They also include key practices used by engineers as they design and build systems.

Disciplinary Core Ideas (DCI) – Selected to represent four major domains: the physical sciences; the life sciences; the earth and space sciences: and engineering technology, and the applications of sciences.

Crosscutting Concepts (CCC) – These big ideas have application across all domains of science and provide one way of linking across the domains of the DCI's. In addition, they link to ideas that are parts of other elementary subjects.

NYSSLS Shifts in Instruction

It is the intention of BOCES 4 Science that this unit provides lessons that demonstrate the following shifts in instruction:

- **Explaining Phenomena or Designing Solutions to Problems:** The unit focuses on supporting students to make sense of a phenomenon or design solutions to a problem.
- **Three Dimensions:** The unit helps students develop and use multiple grade-appropriate elements of the SEPs, CCCs, and DCIs which are deliberately selected to make sense of phenomena or design a solution to a problem.
- **Integrating the Three Dimensions for Instruction and Assessment:** The unit will elicit student artifacts that show direct, observable evidence of three dimensional learning.
- **Relevance and Authenticity:** By taking advantage of student questions and experiences in the context of their homes, neighborhood and community, the lessons in this unit will motivate student sense-making or problem-solving.
- **Student Ideas:** This unit provides opportunities for students to express, clarify, justify, interpret or represent their ideas and to respond to peer and teacher feedback.
- **Building on Students' Prior Knowledge:** Since student understanding grows over time, this unit identifies and builds on students' prior learning in three dimensions in such a way as it is explicit to both students and teachers.

Assessment:

Providing opportunities for assessment of learning and feedback to students is an important step in the educational process. This unit includes formative assessments and summative assessments. The teacher is encouraged to use a variety of informal or anecdotal assessment strategies.

Additional Features of this Unit

The *Investigating Weather & Climate* unit also includes a Student Science Journal. A digital version of the Student Science Journal is available online at the BOCES 4 Science website. (A web address and password are located on a color insert in the Teacher's Guide.)

Additional resources for the teacher, such as reading pages, directions to assemble materials, ELA supports, and direct links to videos or websites mentioned in the teacher's guide, etc. can also be found on the BOCES 4 Science website.

Features that Support 3-D Learning

Look for these features in the Teacher's Guide:

NYS pK – 12 Science Learning Standards within each lesson provide the teacher with specific information about the Performance Expectation and the 3-Dimensions that are targeted by the instruction in this lesson.

Performance Expectations:

K-2-ETS1-2 – Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.

Science and Engineering Practices

Developing and Using Models

Develop a simple model based on evidence to represent a proposed object or tool.

Disciplinary Core Ideas

ETS1.B: Developing Possible Solutions

- Designs can be conveyed through sketches, drawings, or physical models, These representations are useful in communicating ideas for a problem's solutions to other people.

Crosscutting Concepts

Structure and Function

- The shape and stability of structures of natural and designed objects are related to their function(s).

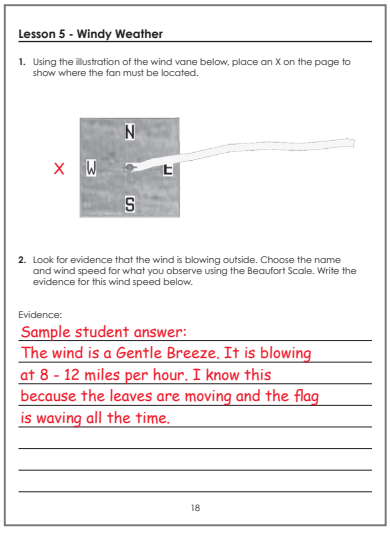
ELA/Math/Social Studies Connections:

ELA: 2R1

Math: NY-2.MD

Social Studies:

Throughout the Teacher's Guide, the 3-Dimensional Domains are color coded within the text so that teachers know to emphasize or explicitly point out to students this connection to either the **Science and Engineering Practices (SEPs)** and the **Crosscutting Concepts (CCCs)**. In addition, small boxes on the right hand side of the Procedure pages (see box in the blue column to the right) serve as a visual reminder, as well.



Lesson 5 - Windy Weather

1. Using the illustration of the wind vane below, place an X on the page to show where the fan must be located.

2. Look for evidence that the wind is blowing outside. Choose the name and wind speed for what you observe using the Beaufort Scale. Write the evidence for this wind speed below.

Evidence:

Sample student answer:
The wind is a Gentle Breeze. It is blowing at 8 - 12 miles per hour. I know this because the leaves are moving and the flag is waving all the time.

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In addition, a small picture of the page(s) of the Student Science Journal (with answers) that students are using for each lesson has been included on the appropriate pages in the Teacher's Guide (see box to the right). This keeps the teacher from needing to go back and forth between various documents pertaining to a particular lesson.

CCC: Crosscutting Concept(s):

Cause and Effect:

Events have causes that generate observable patterns.

New York State P-12 Science Learning Standards

Weather and Climate

Students who demonstrate understanding can:

3-ESS2-1. Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season. [Clarification Statement: Examples of data could include average temperature, precipitation, and wind direction.] [Assessment Boundary: Assessment of graphical displays is limited to pictographs and bar graphs. Assessment does not include climate change.]

3-ESS2-2. Obtain and combine information to describe climates in different regions of the world. [Clarification Statement: Emphasis should be on various climates in different regions rather than on localized weather conditions.]

3-ESS3-1. Make a claim about the merit of a design solution that reduces the impacts of a weather-related hazard.* [Clarification Statement: Examples of design solutions to weather-related hazards could include barriers to prevent flooding, wind-resistant roofs, and lightning rods.]

3-ESS2-3. Plan and conduct an investigation to determine the connections between weather and water processes in Earth systems. [Clarification Statement: Emphasis should be on the processes that connect the water cycle and weather patterns.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education:*

Science and Engineering Practices

Planning and Carrying Out Investigations

Planning and carrying out investigations to answer questions or test solutions to problems in 3–5 builds on K–2 experiences and progresses to include investigations that control variables and provide evidence to support explanations or design solutions.

- Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence, using fair tests in which variables are controlled and the number of trials considered. (3-ESS2-3)
- Make observations and/or measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon or test a design solution. (3-ESS2-3)

Analyzing and Interpreting Data

Analyzing data in 3–5 builds on K–2 experiences and progresses to introducing quantitative approaches to collecting data and conducting multiple trials of qualitative observations. When possible and feasible, digital tools should be used.

- Represent data in tables and various graphical displays (bar graphs and pictographs) to reveal patterns that indicate relationships. (3-ESS2-1)

Engaging in Argument from Evidence

Engaging in argument from evidence in 3–5 builds on K–2 experiences and progresses to critiquing

Disciplinary Core Ideas

ESS2.D: Weather and Climate

- Scientists record patterns of the weather across different times and areas so that they can make predictions about what kind of weather might happen next. (3-ESS2-1)
- Climate describes a range of an area's typical weather conditions and the extent to which those conditions vary over years. (3-ESS2-2)
- (NYSED) Earth's processes continuously cycle water, contributing to weather and climate. (3-ESS2-3)

ESS3.B: Natural Hazards

- A variety of natural hazards result from natural processes. Humans cannot eliminate natural hazards but can take steps to

Crosscutting Concepts

Patterns

- Patterns of change can be used to make predictions. (3-ESS2-1),(3-ESS2-2)

Cause and Effect

- Cause and effect relationships are routinely identified, tested, and used to explain change. (3-ESS2-3),(3-ESS3-1)

Connections to Engineering, Technology, and Applications of Science

Influence of Engineering, Technology, and Science on Society and the Natural World

- (NYSED) Engineers improve existing technologies or develop new ones to increase their benefits (e.g., improved Doppler radar), decrease known risks (e.g., severe

New York State P-12 Science Learning Standards

the scientific explanations or solutions proposed by peers by citing relevant evidence about the natural and designed world(s).

- Make a claim about the merit of a solution to a problem by citing relevant evidence about how it meets the criteria and constraints of the problem. (3-ESS3-1)

Obtaining, Evaluating, and Communicating Information

Obtaining, evaluating, and communicating information in 3–5 builds on K–2 experiences and progresses to evaluating the merit and accuracy of ideas and methods.

- Obtain and combine information from books and other reliable media to explain phenomena. (3-ESS2-2)

reduce their impacts. (3-ESS3-1) (Note: This Disciplinary Core Idea is also addressed by 4-ESS3-2.)

weather alerts), and meet societal demands (e.g., cell phone applications). (3-ESS3-1)

Connections to Nature of Science

Science is a Human Endeavor

- Science affects everyday life. (3-ESS3-1)

Connections to other DCIs in third grade: N/A

Articulation of DCIs across grade-levels: **K.ESS2.D** (3-ESS2-1); **K.ESS3.B** (3-ESS3-1); **K.ETS1.A** (3-ESS3-1); **4.ESS2.A** (3-ESS2-1); **4.ESS3.B** (3-ESS3-1); **4.ETS1.A** (3-ESS3-1); **5.ESS2.A** (3-ESS2-1); **MS.ESS2.C** (3-ESS2-1),(3-ESS2-2); **MS.ESS2.D** (3-ESS2-1),(3-ESS2-2); **MS.ESS3.B** (3-ESS3-1)

Common Core State Standards Connections:

ELA/Literacy –

RI.3.1	Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers. (3-ESS2-2)
RI.3.9	Compare and contrast the most important points and key details presented in two texts on the same topic. (3-ESS2-2)
W.3.1	Write opinion pieces on topics or texts, supporting a point of view with reasons. (3-ESS3-1)
W.3.7	Conduct short research projects that build knowledge about a topic. (3-ESS2-3),(3-ESS3-1)
W.3.8	Recall information from experiences or gather information from print and digital sources; take brief notes on sources and sort evidence into provided categories. (3 ESS2-2)

Mathematics –

MP.2	Reason abstractly and quantitatively. (3-ESS2-1),(3-ESS2-2),(3-ESS3-1)
MP.4	Model with mathematics. (3-ESS2-1),(3-ESS2-2), (3-ESS3-1)
MP.5	Use appropriate tools strategically. (3-ESS2-1), (3-ESS2-3)
3.MD.A.2	Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l). Add, subtract, multiply, or divide to solve one-step word problems involving masses or volumes that are given in the same units, e.g., by using drawings (such as a beaker with a measurement scale) to represent the problem. (3-ESS2-1),(3-ESS2-3)
3.MD.B.3	Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step "how many more" and "how many less" problems using information presented in bar graphs. (3-ESS2-1)

*The performance expectations marked with an asterisk integrate traditional science content with engineering through a Practice or Disciplinary Core Idea. The text in the "Disciplinary Core Ideas" section is reproduced verbatim from A Framework for K-12 Science Education: Practices, Cross-Cutting Concepts, and Core Ideas unless it is preceded by (NYSED).

Data from Different Seasons

Focus Question:
How do we measure air temperature? What can patterns in data tell us about different seasons?

Vocabulary:
Celsius
data
decrease
Fahrenheit
increase
pattern
temperature
thermometer

Lesson Synopsis

Learning Target(s):
I can use a thermometer to measure the temperature of air and water.
I can use patterns in data to learn about different seasons.

Lesson Description:
As weather investigators, students use tools and data to draw conclusions about typical weather conditions during different seasons. The students will use thermometers, precipitation data and temperature data as clues to solving a problem. (This is a two part lesson.)

Management

Materials

For Part A: (For the class)
1 "How to Use a Thermometer" poster
Thermometer image (BOCES 4 Science website)
Water*

For each pair:
1 thermometer
1 plastic cup containing cold water
1 plastic cup containing warm water
1 white tray for distribution of materials

For each student:
Student Science Journal

For Part B: (For the class)
Photographs representing the four seasons (BOCES 4 Science website)
Video: "About the Seasons" from PBS Learning Media (BOCES 4 Science website)

For each student:
Student Science Journal

*provided by teacher/student

Safety:
Remind students that if the glass tube of the thermometer breaks or becomes detached they are to notify the teacher immediately.

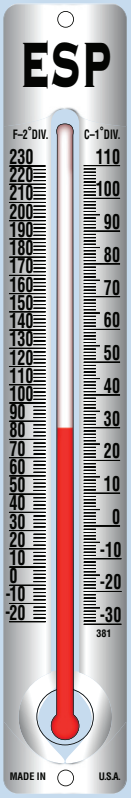
Preparation:
For Part A

Hang the "How to Use a Thermometer" poster in the classroom.

Set up the trays but add the warm and cold water right before distributing so that there is a significant temperature difference between them.

For Part B

Preview the following video: "About the Seasons" PBS Learning Media from the BOCES 4 Science website.



Teacher Background:

Meteorologists often use different types of data to find out about the weather. In this lesson, students review how to use a thermometer and then solve a problem with mixed up temperature and precipitation data. They are being asked to determine the name of the season when given data about typical temperatures and precipitation during that season. (The students are not provided with the month of the year.)

The thermometers that are provided in this unit are long, thin tubes filled with a red mixture of oil and alcohol. (They do not contain mercury.) The liquid in the thermometers rises when the air around it gets warmer and expands. When the air gets colder (contracts), the liquid falls in the tube. Fahrenheit and Celsius are two different scales used for measuring temperature. On the Fahrenheit scale, the freezing point of water is 32 degrees F and the boiling point is 212 degrees F. On the Celsius scale, 0 degrees C is the freezing point of water, and 100 degrees C is the boiling point.

In the United States, meteorologists use the Fahrenheit scale when reporting air temperature in weather reports. In this unit, we will use the Fahrenheit scale to collect data; however, it is important to introduce students to both temperature scales due to the Celsius scale being the metric measurement of temperature, and a great number of countries outside the U.S. use the Celsius scale to measure temperature. When measuring temperature using the Fahrenheit scale, each line on the scale is equal to 2 degrees. So when students are reading the Fahrenheit thermometer they are counting by twos. When measuring temperature using the Celsius scale, each line on the thermometer is equal to one degree.

Thermometers should be held on the side or the top rather than on the bulb and exposed to the air (or water) for two full minutes in order to get an accurate temperature.

Throughout this unit, students will learn about differences in air temperature in various global locations. This unit will simplify reasons for climatic differences by focusing on the geographic location of a site in terms of distance from the equator, and the amount of sunlight and precipitation received over time. The greatest environmental factors that determine differences in air temperature during the day, during seasons of the year, as well as in various locations around the world are the amount of sunlight reaching the surface of the earth and the angle of the incoming solar radiation.

Standards

Performance Expectations:

3-ESS2-1 – Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season. (Clarification statement: Examples of data could include average temperature, precipitation, and wind direction.) (Assessment Boundary: Assessment of graphical displays is limited to pictographs and bar graphs. Assessment does not include climate change.)

Science and Engineering Practices

Planning and Carrying Out Investigations

- Make observations and/or measurements to produce data to serve as the basis for evidence

Analyzing and Interpreting Data

- Analyze and interpret data to make sense of phenomena, using logical reasoning, mathematics, and/or computation.

Engaging in Argument from Evidence

- Construct and/or support an argument with evidence, data, and/or a model.

Disciplinary Core Ideas

ESS2-D: Weather and Climate

- Scientists record patterns of the weather across different times and areas so they can make predictions about what kind of weather might happen next.

Crosscutting Concepts

Patterns

- Similarities and differences in patterns can be used to sort and classify natural phenomena.
- Patterns of change can be used to make predictions

Cause and effect

- Cause and effect relationships are routinely identified and used to explain change.

Scale, Proportion, and Quantity

- Standard units are used to measure and describe physical quantities such as weight, time, temperature and volume.

Connections to Nature of Science

Science is a Human Endeavor

- Science affects everyday life.

ELA/Math/Social Studies Connections:

ELA: 3R1, 3R3, 3W1

Math: NY-3.MD.4

Vocabulary:

- **Celsius** - A scale used by many countries around the world to measure temperature
- **data** - Information collected and recorded as a means to make decisions
- **decrease** - to lessen or reduce (with thermometers – "go down")
- **Fahrenheit** - A scale used by the United States to measure temperature
- **increase** - to make or get larger (with thermometers – "go up")
- **pattern** - A feature or characteristic that may repeat
- **temperature** - A measurement of heat; The degree of hotness or coldness
- **thermometer** - A tool used to measure temperature

SEP: Science and Engineering Practice(s):

Planning and Carrying Out Investigations:

Make observations &/ or measurements to produce data

CCC: Crosscutting Concept(s):

Cause and Effect:

Cause and effect relationships are routinely identified and used to explain change.

Procedure

Part A

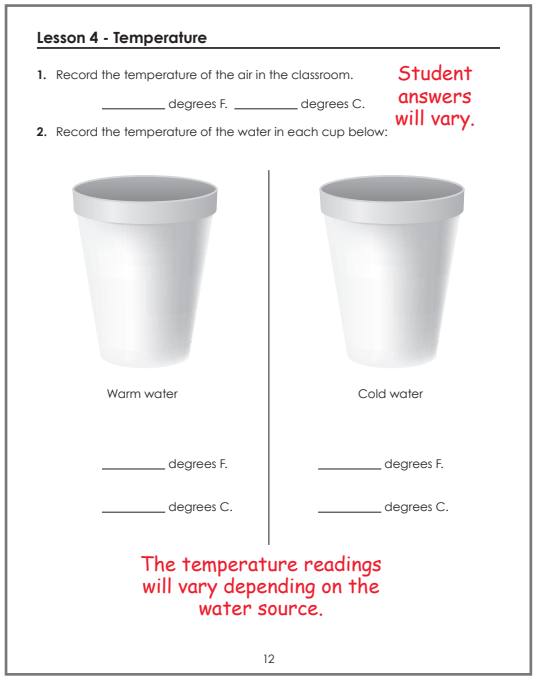
Phenomenon: How a thermometer changes with conditions.

1. Provide each pair of students with a **thermometer** and two plastic cups of water – one warm tap water and one cold tap water.
2. Direct the students to use the thermometer to **make observations** and find out about the **temperature** of the water. (Students should try to figure out how to read a thermometer. They should place the thermometer in one of the cups of water and then in the other and notice that the red liquid changes position in the glass tube.)

   Discussion Questions: Students should discuss this question in pairs and then as a whole class.

   - What **observations** did you make? (The red liquid inside the glass tube changed position – went up when the water was warm and went down when the water was cold.)
   - What are the **cause and the effect** of the change to the red line in the glass tube? (When the temperature was warm, the red line was higher and next to higher numbers. When the temperature was cold, the red line was lower and next to lower numbers.)
   - How do we use a thermometer? (Students may suggest that you "read" a thermometer by finding the top of the red liquid in the tube and noting the numbers beside the tube.)

3. Bring the students' attention to the "How to Use a Thermometer" poster and have them compare the procedure they followed to the procedure on the poster.
4. Have the students work with a partner to complete pages 12 and 13 of the Student Science Journal.



Lesson 4 - Temperature

1. Record the temperature of the air in the classroom.

_____ degrees F. _____ degrees C.

Student answers will vary.

2. Record the temperature of the water in each cup below:

Warm water

_____ degrees F.

_____ degrees C.

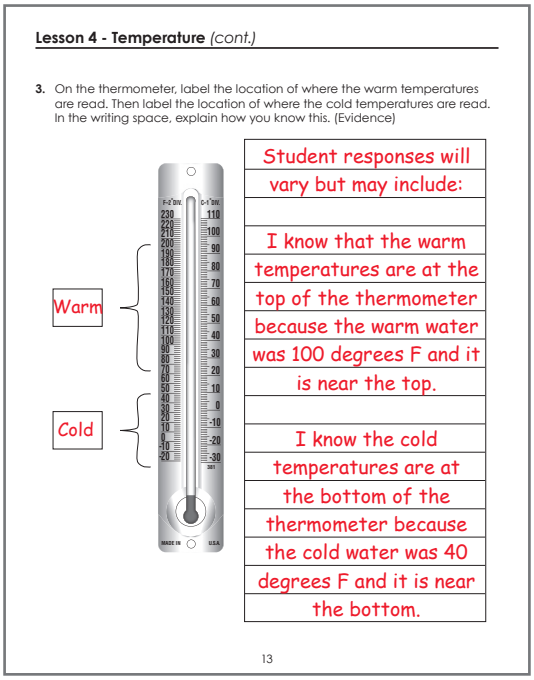
Cold water

_____ degrees F.

_____ degrees C.

The temperature readings will vary depending on the water source.

12



Lesson 4 - Temperature *(cont.)*

3. On the thermometer, label the location of where the warm temperatures are read. Then label the location of where the cold temperatures are read. In the writing space, explain how you know this. (Evidence)

Warm

Cold

Student responses will vary but may include:
I know that the warm temperatures are at the top of the thermometer because the warm water was 100 degrees F and it is near the top.
I know the cold temperatures are at the bottom of the thermometer because the cold water was 40 degrees F and it is near the bottom.

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Discussion questions:

- What type of **evidence** did you use to support where the warm or cold temperatures are read on a thermometer? (Evidence may include that the student used the temperatures of the warm and cold water.)
- What word(s) could you use to say the temperature went up? (increase)
- What word(s) could you use to say the temperature went down? (decrease)
- If the temperature **increases**, what is happening? (It is getting hotter.)
- If the temperature **decreases**, what is happening? (It is getting colder.)

Part B

Phenomenon: Typical weather conditions expected during certain seasons.

5. Show the students the Student Science Journal pages 14-17. Explain that our **data** is not labeled with the correct name of the season. Their challenge is to use what they know about temperature from pages 12 and 13 of their Student Science Journal to match the name of the season with the data. Have the students discuss the symbols in the precipitation spaces on each page to be sure they understand what each symbol represents. Point out that the Student Science Journal data is only **Fahrenheit** units.
6. Use a classroom digital projector to show the students the two pages of photos of the seasons from the Teacher Resources page on the BOCES 4 Science website. As a whole class, discuss the typical temperature **patterns** (hot, warm, cool, cold) and precipitation (rain, snow) during each of the seasons pictured.

   The three minute video: "About the Seasons" from PBS Learning Media provides a brief review of seasonal temperatures and activities, including showing a thermometer for each season.

   Discussion Questions:

   - How could you use the thermometer that you labeled warm or cold (on page 13 of Student Science Journal) to help you solve this problem? (Students could compare the high temperatures on each of the season pages to the thermometer to see if the temperatures for that page would be considered warm or cold.)
   - What else do you need to know? (Answers vary, how to find the Fahrenheit side of the thermometer, what temperatures are normal during each season)

CCC: Crosscutting Concept(s):

Patterns:

Patterns of change can be used to make predictions.

SEP: Science and Engineering Practice(s):

Scale, Proportion and Quantity:

Standard units are used to measure and describe physical quantities such as weight, time, temperature and volume.

SUMMER

FALL

WINTER

SPRING

7. Have the students work in pairs to discuss and label the data for the proper season for each of the Science Journal pages 14-17.

Discussion Questions:

- What **evidence** did you have for your answers to each of the names of the seasons? (Students should note the temperatures and whether they are warm or cold, etc.)

SEP: Science and Engineering Practice(s):

Engaging in Argument from Evidence:

Construct an argument with evidence, data, and/or a model.

SEP: Science and Engineering Practice(s):

Analyzing and Interpreting Data:

Analyze and interpret data to make sense of phenomena, using logical reasoning, mathematics and/or computation.

Lesson #4 Seasonal Data A

Name of Season

Precipitation for a typical week

Sun	Mon	Tues	Wed	Thurs	Friday	Sat

Daily high temperatures for a typical week (° F)

Sun	Mon	Tues	Wed	Thurs	Friday	Sat
39	41	45	49	55	47	43

Evidence for this season _____

Page 14 (A) = Spring or could accept Fall

Lesson #4 Seasonal Data B

Name of Season

Precipitation for a typical week

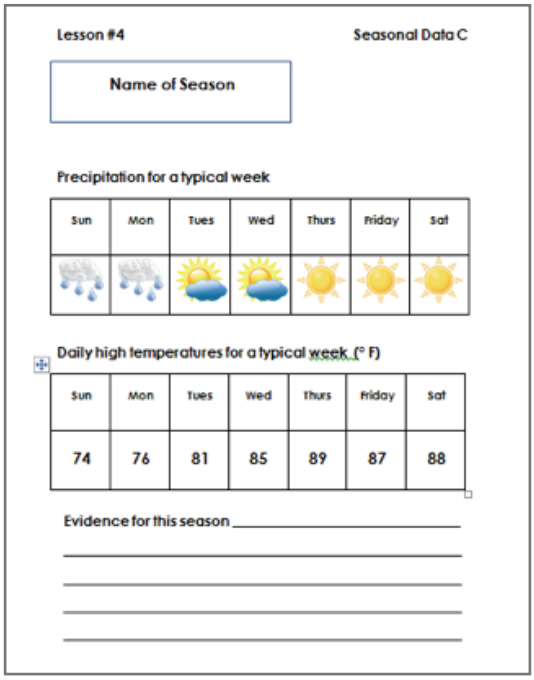
Sun	Mon	Tues	Wed	Thurs	Friday	Sat

Daily high temperatures for a typical week (° F)

Sun	Mon	Tues	Wed	Thurs	Friday	Sat
17	18	20	23	15	17	30

Evidence for this season _____

Page 15 (B) = Winter



Lesson #4 Seasonal Data C

Name of Season

Precipitation for a typical week

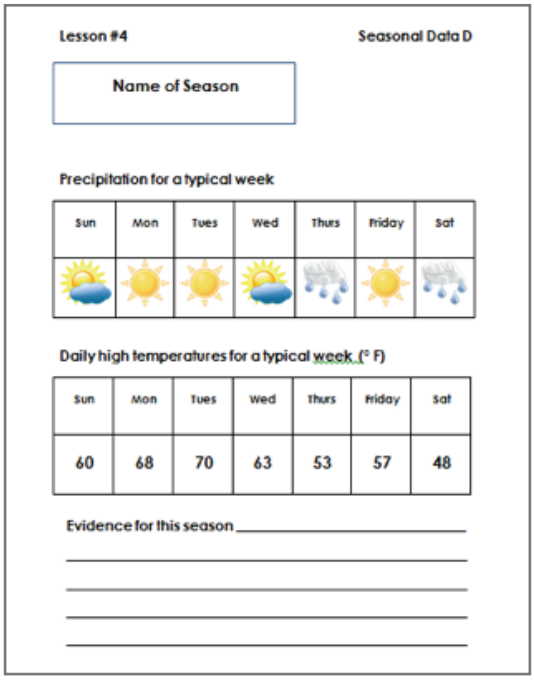
Sun	Mon	Tues	Wed	Thurs	Friday	Sat

Daily high temperatures for a typical week (° F)

Sun	Mon	Tues	Wed	Thurs	Friday	Sat
74	76	81	85	89	87	88

Evidence for this season _____

Page 16 (C) = Summer



Lesson #4 Seasonal Data D

Name of Season

Precipitation for a typical week

Sun	Mon	Tues	Wed	Thurs	Friday	Sat

Daily high temperatures for a typical week (° F)

Sun	Mon	Tues	Wed	Thurs	Friday	Sat
60	68	70	63	53	57	48

Evidence for this season _____

Page 17 (D) = Fall or could accept Spring

Closing the Lesson

Discuss the months of the year, in New York State, that fall within each season. Prompt the students to write in the appropriate months of the year on the top right corner of each of the Student Science Journal pages.

Have pairs of students talk with each other about the answer to this prompt:

The higher the temperature on the thermometer, the _____ the weather is.

(hotter or warmer)

Ask the students to discuss what the class can add to the graphic organizer about Weather (from Lesson 2). Suggestions may include how to use a thermometer, that high temperature numbers mean the weather is hot and low temperature numbers mean that the weather is cold, that different seasons have typical weather conditions.

Assessment

Formative Assessment: Observe the level of success of students in terms of whether they were able to match the season to the temperature. If students did not see the relationship between high numbers on the thermometer and hot temperatures, they should continue to use the thermometers, perhaps at a station, where students are asked to find the coldest/warmest part of the classroom, etc.

CCC: Crosscutting Concept(s):

Patterns:

Similarities and differences in patterns can be used to sort and classify natural phenomena.

Patterns of change can be used to make predictions.

Connections

Differentiation: This lesson relies heavily on photographs and symbols. It is important to check in with all students to be sure they are interpreting the symbols correctly. In addition, ELL students may not be familiar with the seasons of the year in the Northeastern part of the United States. A mini lesson using videos may help them learn about the seasons.

Students are expected to recognize the use of higher and lower numbers and associate them with temperatures. If students struggle in this area, perhaps the use of a number line would be helpful.

Cross-Discipline Extensions:

ELA: Use the Leveled Reader entitled "Shawna and the Seasons" from the BOCES 4 Science website.

Next Lesson Preparation

In the next lesson, students will be learning about the wind and will need to go outside with the teacher for a few minutes at the end of the lesson. Plan to teach the lesson before a natural outdoor break in the day, such as at recess. It will help if it is scheduled on a day with a light breeze in order to learn about the wind. It is also a good idea to practice using the digital anemometer before the day that it is scheduled to be used with students.