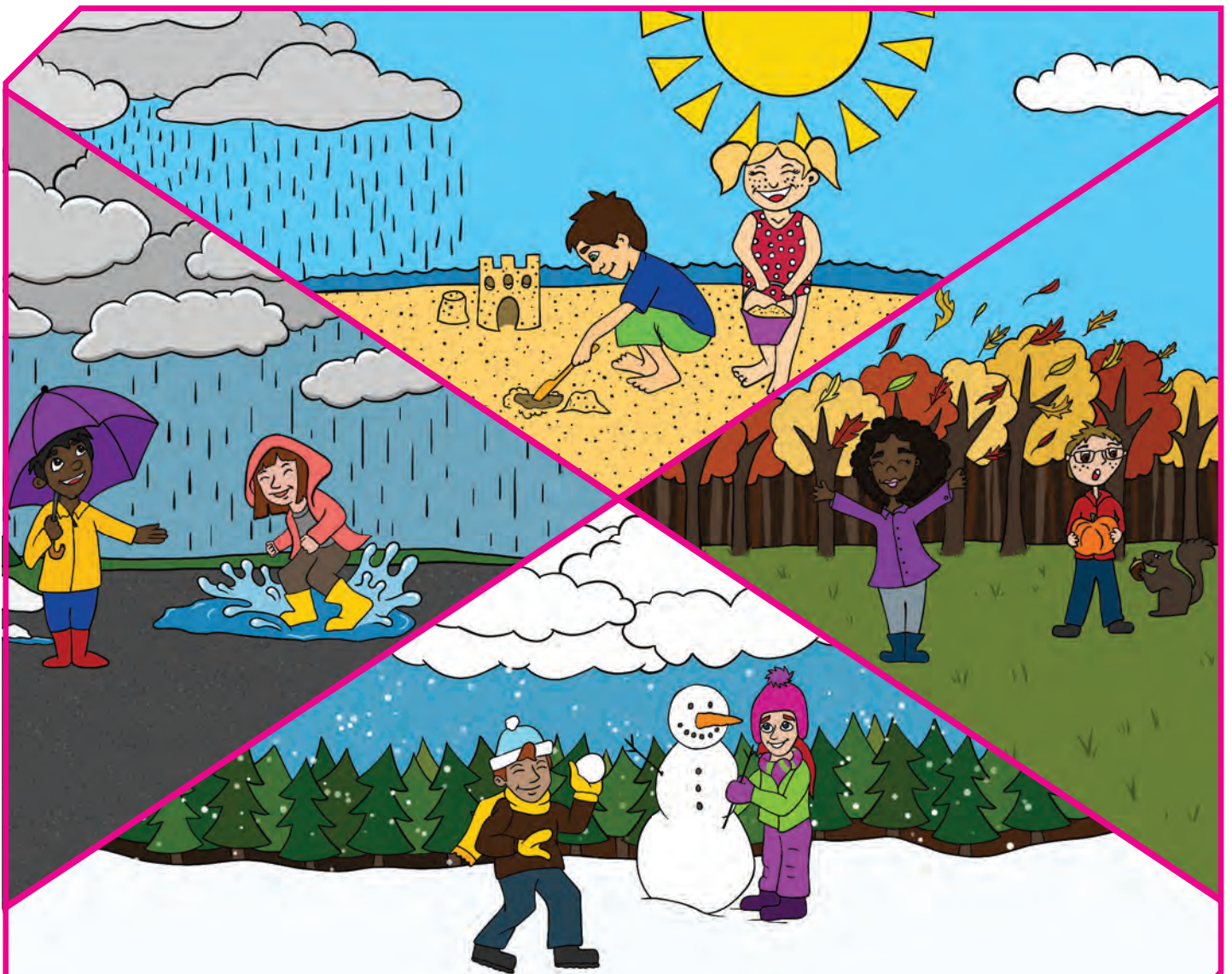


# Teacher Guide and Student Journal

## Sample Activity and Planning Pages

# Weather and Climate

# KENG



S E C O N D   E D I T I O N

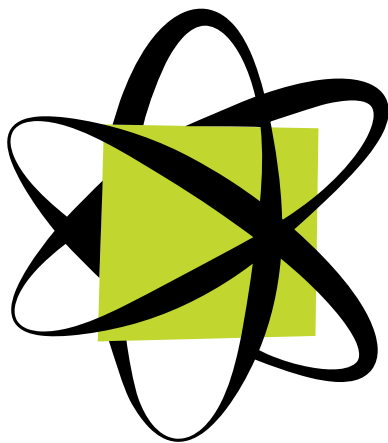
A kindergarten unit supporting Next Generation Science Standards  
and Michigan Science Standards



S E C O N D E D I T I O N

# Weather and Climate KENG

A kindergarten unit supporting **Next Generation Science Standards** and the **Michigan Science Standards** developed and written by the Battle Creek Area Mathematics and Science Center for



**CEREAL CITY  
SCIENCE™**

by BCAMSC



# Weather and Climate

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# PLANNING

**NEXT GENERATION SCIENCE STANDARDS**

Disciplinary Core Ideas	Activities
<b>PS3.B: Conservation of Energy and Energy Transfer</b> • Sunlight warms Earth’s surface	2,4
K-PS3-1. Make observations to determine the effect of sunlight on Earth’s surface.	2,4
K-PS3-2. Use tools and materials to design and build a structure that will reduce the warming effect of sunlight on an area.	2
<b>ESS2.D: Weather and Climate</b> • Weather is the combination of sunlight, wind, snow or rain, and temperature in a particular region at a particular time. People measure these conditions to describe and record the weather and to notice patterns over time.	1,2,3,4,5,6,7
K-ESS2-1. Use and share observations of local weather conditions to describe patterns over time.	1,2,3,4,5,6,7
<b>ESS3.B: Natural Hazards</b> • Some kinds of severe weather are more likely than others in a given region. Weather scientists forecast severe weather so that the communities can prepare for and respond to these events.	6
K-ESS3-2. Ask questions to obtain information about the purpose of weather forecasting to prepare for, and respond to, severe weather.	6
<b>ETS1.A: Defining and Delimiting an Engineering Problem</b> • Asking questions, making observations, and gathering information are helpful in thinking about problems.	2,3
K-PS3-2. Use tools and materials to design and build a structure that will reduce the warming effect of sunlight on an area.	2

## NEXT GENERATION SCIENCE STANDARDS

Science and Engineering Practices	Activities
<p><b>Asking Questions and Defining Problems</b> Asking questions and defining problems in grades K–2 builds on prior experiences and progresses to simple descriptive questions that can be tested.</p> <ul style="list-style-type: none"> <li>• Ask questions based on observations to find more information about the designed world.</li> </ul>	1,2,6
K-ESS3-2. Use tools and materials to design and build a structure that will reduce the warming effect of sunlight on an area.	2
<p><b>Planning and Carrying Out Investigations</b> Planning and carrying out investigations to answer questions or test solutions to problems in K–2 builds on prior experiences and progresses to simple investigations, based on fair tests, which provide data to support explanations or design solutions.</p> <ul style="list-style-type: none"> <li>• Make observations (firsthand and from media) to collect data that can be used to make comparisons.</li> </ul>	2,4,5,6
K-PS3-1. Make observations to determine the effect of sunlight on Earth’s surface.	2,4
<p><b>Analyzing and Interpreting Data</b> Analyzing data in K–2 builds on prior experiences and progresses to collecting, recording, and sharing observations.</p> <ul style="list-style-type: none"> <li>• Use observations (firsthand and from media) to describe patterns in the natural world in order to answer scientific questions.</li> </ul>	1,2,4,5,6,7
K-ESS2-1. Use and share observations of local weather conditions to describe patterns over time.	1,2,3,4,5,6,7
<p><b>Constructing Explanations and Designing Solutions</b> Constructing explanations and designing solutions in K–2 builds on prior experiences and progresses to the use of evidence and ideas in constructing evidence-based accounts of natural phenomena and designing solutions.</p> <ul style="list-style-type: none"> <li>• Use tools and materials provided to design and build a device that solves a specific problem or a solution to a specific problem.</li> <li>• Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena.</li> </ul>	2,3,4,5,6,7
K-PS3-2. Use tools and materials to design and build a structure that will reduce the warming effect of sunlight on an area.	2



**NEXT GENERATION SCIENCE STANDARDS**

Science and Engineering Practices	Activities
<p><b>Obtaining, Evaluating, and Communicating Information</b>                      Obtaining, evaluating, and communicating information in K–2 builds on prior experiences and uses observations and texts to communicate new information.</p> <ul style="list-style-type: none"> <li>• Read grade-appropriate texts and/or use media to obtain scientific information to describe patterns in the natural world.</li> </ul>	1,2,3,4,6,7
<p>K-ESS3-2. Use tools and materials to design and build a structure that will reduce the warming effect of sunlight on an area.</p>	2
<p style="text-align: center;"><i>Connections to Nature of Science</i></p> <p>Scientific Investigations Use a Variety of Methods</p> <ul style="list-style-type: none"> <li>• Scientists use different ways to study the world.</li> </ul>	2,3
<p>K-PS3-1. Make observations to determine the effect of sunlight on Earth’s surface.</p>	2
<p><b>Science Knowledge is Based on Empirical Evidence</b></p> <ul style="list-style-type: none"> <li>• Scientists look for patterns and order when making observations about the world.</li> </ul>	1,2,3,4,5,6,7
<p>K-ESS2-1. Use and share observations of local weather conditions to describe patterns over time.</p>	1,2,3,4,5,6,7

## NEXT GENERATION SCIENCE STANDARDS

Crosscutting Concepts	Activities
<b>Cause and Effect</b> <ul style="list-style-type: none"><li>• Events have causes that generate observable patterns.</li></ul>	2,4,5,6
K-ESS3-2. Ask questions to obtain information about the purpose of weather forecasting to prepare for and respond to severe weather.	6,7
K-PS3-1. Make observations to determine the effect of sunlight on Earth's surface.	2,4
<ul style="list-style-type: none"><li>• K-PS3-2. Use tools and materials to design and build a structure that will reduce the warming effect of sunlight on an area.</li></ul>	2
<b>Patterns</b> <ul style="list-style-type: none"><li>• Patterns in the natural world can be observed and used to describe phenomena, and used as evidence.</li></ul>	1,2,3,4,6
<ul style="list-style-type: none"><li>• K-ESS2-1. Use and share observations of local weather conditions to describe patterns over time.</li></ul>	1,2,3,4,5,6,7

**COMMON CORE STATE STANDARDS - READING**

<b>Reading Standards for Informational Text—Kindergarten</b>	<b>Activities</b>
<b>Key Ideas and Details</b>	
<b>RI.K.1</b> - With prompting and support, ask and answer questions about key details in a text.	1,2,3,4,5
<b>RI.K.2</b> - With prompting and support, identify the main topic and retell key details of a text.	2,3,4,5
<b>RI.K.3</b> - With prompting and support, describe the connection between two individuals, events, ideas, or pieces of information in a text.	1,2,3,4,5,7
<b>Craft and Structure</b>	
<b>RI.K.4</b> - With prompting and support, ask and answer questions about unknown words in a text.	2,4,5
<b>RI.K.5</b> - Identify the front cover, back cover, and title page of a book.	2,4,7
<b>RI.K.6</b> - Name the author and illustrator of a text and define the role of each in presenting the ideas or information in a text.	2,4,7
<b>Integration of Knowledge and Ideas</b>	
<b>RI.K.7</b> - With prompting and support, describe the relationship between illustrations and the text in which they appear (e.g., what person, place, thing, or idea in the text an illustration depicts).	2,3,4,5,7
<b>RI.K.8</b> - With prompting and support, identify the reasons an author gives to support points in a text.	2,4,5
<b>RI.K.9</b> - With prompting and support, identify basic similarities in and differences between two texts on the same topic (e.g., in illustrations, descriptions, or procedures).	7
<b>Range of Reading and Level of Text Complexity</b>	
<b>RI.K.10</b> - Actively engage in group reading activities with purpose and understanding.	2,3,4,5,6,7

# PLANNING

## COMMON CORE STATE STANDARDS - WRITING

Writing Standards–Kindergarten	Activities
<b>Text Types and Purposes</b>	
<b>W.K.1</b> - Use a combination of drawing, dictating, and writing to compose opinion pieces in which they tell a reader the topic or the name of the book they are writing about and state an opinion or preference about the topic or book (e.g., My favorite book is...).	2,7
<b>W.K.2</b> - Use a combination of drawing, dictating, and writing to compose informative/explanatory texts in which they name what they are writing about and supply some information about the topic.	2,3,4,6,7
<b>W.K.3</b> - Use a combination of drawing, dictating, and writing to narrate a single event or several loosely linked events, tell about the events in the order in which they occurred, and provide a reaction to what happened.	2,6,7
<b>Production and Distribution of Writing</b>	
<b>W.K.4</b> - (Begins in grade 3)	
<b>W.K.5</b> - With guidance and support from adults, respond to questions and suggestions from peers and add details to strengthen writing as needed.	2,3,4,6,7
<b>W.K.6</b> - With guidance and support from adults, explore a variety of digital tools to produce and publish writing, including in collaboration with peers.	7
<b>Research to Build and Present Knowledge</b>	
<b>W.K.7</b> - Participate in shared research and writing projects (e.g., explore a number of books by a favorite author and express opinions about them).	2,7
<b>W.K.8</b> - With guidance and support from adults, recall information from experiences or gather information from experiences or gather information from provided sources to answer a question.	1,2,3,7

**COMMON CORE STATE STANDARDS - LANGUAGE**

Language Standards—Kindergarten	Activities
<b>Conventions of Standard English</b>	
<p><b>L.K.1</b> - Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.</p> <ul style="list-style-type: none"> <li>a. Print many upper- and lowercase letters.</li> <li>b. Use frequently occurring nouns and verbs.</li> <li>c. Form regular plural nouns orally by adding /s/ or /es/ (e.g., dog, dogs; wish, wishes).</li> <li>d. Understand and use question words (interrogatives) (e.g., who, what, where, when, why, how).</li> <li>e. Use the most frequently occurring prepositions (e.g., to, from, in, out, on, off, for, of, by, with).</li> <li>f. Produce and expand complete sentences in shared language activities.</li> </ul>	1,2,3,4,5,6,7
<p><b>L.K.2</b> - Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.</p> <ul style="list-style-type: none"> <li>a. Capitalize the first word in a sentence and the pronoun.</li> <li>b. Recognize the name end punctuation.</li> <li>c. Write a letter or letters of most consonant and short-vowel sounds (phonemes).</li> <li>d. Spell simple words phonetically, drawing on knowledge of sound-letter relationships.</li> </ul>	1,2,3,4,5,6,7
<b>Vocabulary Acquisition Use</b>	
<p><b>L.K.4</b> - Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on kindergarten reading and content.</p> <ul style="list-style-type: none"> <li>a. Identify new meanings for familiar words and apply them accurately (e.g., knowing duck is a bird and learning the verb to duck).</li> <li>b. Use the most frequently occurring inflections and affixes (e.g., -ed, -s, re-, un-, pre-, -ful, -less) as a clue to the meaning of an unknown word.</li> </ul>	1,2,3,4,5,6,7

# PLANNING

## COMMON CORE STATE STANDARDS - LANGUAGE

Language Standards—Kindergarten	Activities
<b>Vocabulary Acquisition Use</b>	
<p><b>L.K.5</b> - With guidance and support from adults, explore word relationships and nuances in word meanings.</p> <ul style="list-style-type: none"><li>a. Sort common objects into categories (e.g., shapes, foods) to gain a sense of the concepts the categories represent.</li><li>b. Demonstrate understanding of frequently occurring verbs and adjectives by relating them to their opposites (antonyms).</li><li>c. Identify real-life connections between words and their use (e.g., note places at school that are colorful).</li><li>d. Distinguish shades of meaning among verbs describing the same general action (e.g., walk, march, strut, prance) by acting out the meanings.</li></ul>	2,5
<p><b>L.K.6</b> - Use words and phrases acquired through conversations, reading and being read to, and responding to texts.</p>	1,2,3,4,5,6,7

**COMMON CORE STATE STANDARDS - MATHEMATICS**

Counting and Cardinality - K.CC	Activities
<b>Know number names and the count sequence.</b>	
K.CC.1: Count to 100 by ones and by tens.	1,5,7
K.CC.2: Count forward beginning from a given number within known sequence (instead of having to begin at 1).	7
K.CC.3: Write numbers from 0 to 20. Represent a number of objects with a written numeral 0 to 20 (with 0 representing a count of no objects).	1
<b>Count to tell the number of objects.</b>	
K.CC.4: Understand the relationship between numbers and quantities; connect counting to cardinality. a. When counting objects, say the number names in the standard order, pairing each object with one and only one number name and each number name with one and only one object. b. Understand that the last number name said tells the number of objects counted. The number of objects counted is the same regardless of their arrangement or the order in which they were counted. c. Understand that each successive number name refers to a quantity that is larger than one.	4,7
K.CC.5: Count to answer “how many” questions about as many as 20 things arranged in a line, a rectangular array, or a circle, or as many as 10 things in a scattered configuration; given a number from 1 to 20, count out that many objects.	
<b>Compare numbers.</b>	
K.CC.6: Identify whether the number of objects in one group is greater than, less than, or equal to the number of objects in another group (e.g., by using matching and counting strategies).	4,6
K.CC.7: Compare two numbers between 1 and 10 presented as written numerals.	4
Measurement and Data - K.MD	
<b>Describe and compare measurable attributes.</b>	
K.MD.1: Describe measurable attributes of objects, such as length or weight. Describe several measurable attributes of a single object.	4,5,7
K.MD.2: Directly compare two objects with a measurable attribute in common to see which object has “more of”/“less of” the attribute, and describe the difference.	4,5,7
<b>Classify objects and count the number of objects in each category.</b>	
K.MD.3: Classify objects into given categories; count the numbers of objects in each category and sort the categories by count.	

# PLANNING

## UNIT AT A GLANCE

Activity	Time to Complete	Lesson Level Learning Goals	Phenomena/ Engineering Challenge	Summary: Students Will...
1 <b>Weather Watchers - Making Observations</b>	Preparation: 15 minutes Activity 1: 3 classes Lesson 1A: 55–60 min. Lesson 1B: 45–50 min.	Make observations to find patterns that give evidence for the change in weather from day to day and throughout the day.	The weather changes from day to day and throughout the day.	<ul style="list-style-type: none"> <li>make weather observations and record findings.</li> <li>raise questions based on weather observations.</li> <li>record weather observations over a period of time.</li> <li>identify different weather conditions for observation and data collection.</li> </ul>
2 <b>Temperature</b>	Preparation: 15 minutes Activity 2: 5 classes Lesson 2A: 45–50 min. Lesson 2B: 45–50 min. Lesson 2C: 45–50 min. 3 classes	<p>Plan and conduct an investigation into the sun’s warming of the earth.</p> <p>Use evidence to determine a cause-and-effect relationship between temperature in direct sunlight and shade.</p>	<p>The weather changes from day to day and throughout the day.</p> <p>Temperature in the shade is different from the temperature in the sun.</p> <p>Animals seek the shade when in the hot sun.</p>	<ul style="list-style-type: none"> <li>make weather observations and record findings.</li> <li>conduct an investigation to determine the difference in temperature in the sun and in the shade.</li> <li>use resources to determine how animals react differently to the sun.</li> <li>design and build a shelter that will protect an animal from the sun.</li> </ul>
3 <b>Blowing in the Wind</b>	Preparation: 10 minutes Activity 3: 3–4 classes Lesson 3A: 45–50 min. Lesson 3B: 45–50 min. 2–3 classes	<p>Use our senses to make first hand observations of the wind.</p> <p>Design a windsock to aid in observing the speed and direction of the wind.</p>	<p>The weather changes from day to day and throughout the day.</p> <p>Engineering Challenge: Design and build a device to show wind speed and direction.</p>	<ul style="list-style-type: none"> <li>make weather observations and record findings.</li> <li>raise questions about weather related to wind.</li> <li>determine if the wind direction and speed changes with different locations around the schoolyard.</li> </ul>



## UNIT AT A GLANCE

Students Figure Out How To:	Practices/Crosscutting Concepts	Assessment
<ul style="list-style-type: none"> <li>• use daily weather observations to recognize patterns in data.</li> <li>• use patterns to make predictions in weather.</li> <li>• use weather instruments to record weather observations and data for a variety of weather conditions.</li> </ul>	<p>Asking Questions and Defining Problems</p> <p>Analyzing and Interpreting Data</p> <p>Constructing Explanations and Designing Solutions</p> <p>Obtaining, Evaluating, and Communicating Information</p> <p>Patterns</p>	<p><b>Formative Assessment:</b></p> <p>Science Talk</p> <p>Journal Entry</p> <p>Weather Observation Log</p>
<ul style="list-style-type: none"> <li>• use daily weather observations to recognize patterns in data.</li> <li>• collect data of the temperature in the direct sun and in the shade.</li> <li>• determine a cause-and-effect relationship between the sun and the warming of the earth.</li> <li>• make connections between information from resources and findings from their investigations.</li> <li>• select materials to design and build a shelter that will protect an animal from the sun.</li> </ul>	<p>Asking Questions and Defining Problems</p> <p>Planning and Carrying Out Investigations</p> <p>Constructing Explanations and Designing Solutions</p> <p>Obtaining, Evaluating, and Communicating Information</p> <p>Analyzing and Interpreting Data</p> <p>Connections to Nature</p> <p>Cause and Effect</p> <p>Patterns</p>	<p><b>Formative Assessment:</b></p> <p>Science Talk</p> <p>Activity Page</p> <p>Journal Entry</p> <p><b>Summative Assessment:</b></p> <p>Journal Entry</p> <p>Engineering Design Product</p> <p>Science Talk</p>
<ul style="list-style-type: none"> <li>• use daily weather observations to recognize patterns in data.</li> <li>• make a device to determine the direction and speed of the wind.</li> <li>• collect data on the direction and speed of the wind.</li> <li>• determine a cause-and-effect relationship between the motion of the windsock and the strength of the wind.</li> </ul>	<p>Constructing Explanations and Designing Solutions</p> <p>Obtaining, Evaluating, and Communicating Information</p> <p>Developing and Using Models</p> <p>Patterns</p>	<p><b>Formative Assessment:</b></p> <p>Science Talk</p> <p>Activity Page</p> <p>Observation chart</p> <p><b>Summative Assessment:</b></p> <p>Journal Entry</p> <p>Science Talk</p> <p>Windsock Products</p>

# PLANNING

## UNIT AT A GLANCE

Activity	Time to Complete	Lesson Level Learning Goal	Phenomena/Engineering Challenge	Summary: Students Will...
4  <b>Clouds</b>	Preparation: 10 minutes Activity 4: 2 classes Lesson 4A: 45–50 min. Lesson 4B: 45–50 min.	Recognize a cause-and-effect relationship between cloud cover and temperature and cloud cover and precipitation.  Design an investigation to determine how clouds are formed and produce rain.	<i>The weather changes from day to day and throughout the day.</i>  <i>Clouds come in many shapes and sizes and have an effect on temperature.</i>	<ul style="list-style-type: none"> <li>• make weather observations and record findings.</li> <li>• raise questions about weather related to clouds.</li> <li>• determine if clouds have an effect on temperature and precipitation.</li> <li>• gather information to determine that clouds are formed from water droplets that once were in lakes, rivers, ponds, streams, and oceans.</li> </ul>
5  <b>It's Raining! It's Pouring!</b>	Preparation: 10 minutes Activity 5: 2 classes Lesson 5A: 45–50 min. Lesson 5B: 45–50 min.	Recognize a cause-and-effect relationship between cloud cover and precipitation. Design an instrument to determine how much rain or snow has fallen.	<i>The weather changes from day to day and throughout the day.</i>  <i>Rain falls from the clouds and creates puddles. The puddles dry up over time.</i>	<ul style="list-style-type: none"> <li>• make weather observations and record findings.</li> <li>• make rain observations using senses.</li> <li>• measure precipitation.</li> <li>• determine that temperature has an effect on the type of precipitation.</li> </ul>

## UNIT AT A GLANCE

Students Figure Out How To:	Practices/Crosscutting Concepts	Assessment
<ul style="list-style-type: none"> <li>• use daily weather observations to recognize patterns in data.</li> <li>• design and carry out an investigation to find out what happens to water on land and how clouds are formed.</li> <li>• use data to determine how fast water evaporates in different sized containers.</li> </ul>	<p>Constructing Explanations and Designing Solutions</p> <p>Planning and Carrying Out Investigations</p> <p>Obtaining, Evaluating, and Communicating Information</p> <p>Cause and Effect</p>	<p><b>Formative Assessment:</b></p> <p>Science Talk</p> <p>Activity Pages</p> <p>Observation chart</p> <p>Journal Entries</p>
<ul style="list-style-type: none"> <li>• design a rain gauge.</li> <li>• plan and conduct an investigation into the amount of precipitation in different areas.</li> <li>• determine if there is a cause-and-effect relationship between clouds and precipitation.</li> </ul>	<p>Planning and Carrying Out Investigations</p> <p>Constructing Explanations and Designing Solutions</p> <p>Analyzing and Interpreting Data</p> <p>Obtaining, Evaluating, and Communicating Information</p> <p>Developing and Using Models</p> <p>Patterns</p> <p>Cause and Effect</p>	<p><b>Summative Assessment:</b></p> <p>Journal Entries</p> <p>Science Talk</p> <p>Rain gauge models</p>

# PLANNING

## UNIT AT A GLANCE

Activity	Time to Complete	Lesson Level Learning Goal	Phenomena/Engineering Challenge	Summary: Students Will...
<b>6</b>  <b>Weather Through the Seasons</b>	Preparation: 10 minutes Activity 6: 8 classes Lesson 6A: 50 min. 2 class periods Lesson 6B: 50 min. 2 class periods Lesson 6C: 50 min. 2 class periods Lesson 6D: 50 min. 2 class periods	Analyze data to determine that weather conditions change throughout the seasons.  Describe severe weather events that occur in each season and the safety precautions that should be taken.	<b>The weather changes throughout the seasons.</b>	<ul style="list-style-type: none"> <li>• make weather observations and record findings.</li> <li>• describe severe weather events.</li> <li>• determine safety procedures for severe weather events.</li> <li>• collect evidence to determine the season.</li> </ul>
<b>7</b>  <b>Making Sense of Our Weather Data</b>	Preparation: 10 minutes Activity 7: 5 classes Lesson 7A: 45–50 min. 2 class periods Lesson 7B: 45–50 min. 3 class periods	Compare weather-related data (temperature, cloud cover, wind direction and speed, and precipitation) to the four seasons.  Use weather data collected over time to find patterns to predict future weather events.	<b>The weather changes from day to day and throughout the day.</b>  <b>The weather changes throughout the seasons.</b>	<ul style="list-style-type: none"> <li>• analyze and interpret weather data.</li> <li>• relate data to seasons.</li> <li>• find patterns in data.</li> </ul>

## UNIT AT A GLANCE

Students Figure Out How To:	Practices/Crosscutting Concepts	Assessment
<ul style="list-style-type: none"> <li>gather evidence to determine the current season.</li> <li>make observations of different animal and human activities during the different seasons.</li> </ul>	<p>Planning and Carrying Out Investigations</p> <p>Analyzing and Interpreting Data</p> <p>Obtaining, Evaluating and Communicating Information</p> <p>Constructing Explanations and Designing Solutions</p> <p>Asking Questions</p> <p>Engaging in Argument from Evidence</p> <p>Cause and Effect</p> <p>Patterns</p>	<p><b>Summative Assessment:</b></p> <p>Journal Entries</p> <p>Science Talk</p> <p>Pre-writing Strategy</p> <p>Venn Diagram</p>
<ul style="list-style-type: none"> <li>use patterns in data to determine cause-and-effect relationships among weather conditions.</li> <li>gather information from data.</li> <li>develop an informational book about weather and the seasons.</li> </ul>	<p>Analyzing and Interpreting Data</p> <p>Obtaining, Evaluating and Communicating Information</p> <p>Constructing Explanations and Designing Solutions</p> <p>Cause and Effect</p> <p>Patterns</p>	<p><b>Summative Assessment:</b></p> <p>Seasons booklet</p> <p>Presentations</p> <p>Science Talk</p> <p>Activity Page</p> <p>Journal Entry</p>

# PLANNING

Dear Parent,

Your child is beginning a new unit created at the Battle Creek Area Mathematics and Science Center. This unit was designed to promote inquiry-based science and is complete with materials to accompany the activities. During the next twelve to thirteen weeks, your child will be actively involved with the *Weather and Climate* unit. This unit is geared for kindergarten students and focuses on the “Big Idea” that weather changes with the seasons and weather information can be observed and collected with the use of weather instruments. The unit emphasizes the following enduring understandings of science content:



1. Weather is described in terms of temperature, cloud cover, wind, and precipitation.
2. Weather data collection tools are used to record temperature, precipitation, wind speed, and direction.
3. Weather changes with the seasons.
4. Safety precautions should be followed during severe weather events.

During this unit of study, your child will learn to record air temperature using a thermometer in Celsius and Fahrenheit scales, observe wind speed and direction using a windsock and flag, and measure precipitation in centimeters using a rain gauge. This would be a good time to take an active look at the local weather forecasts with your child and discuss the information that the meteorologist gives during the broadcast.

Your child will also be learning about the seasons in your state and the weather related to each season. Severe weather and appropriate precautions during severe weather are also addressed in this unit. Discuss with your child the safest place in the house during a thunderstorm and tornado. Practice safety measures in your own home.

Your child will be actively participating in scientific inquiry and reasoning by observing, questioning, investigating, recording, and developing solutions to problems. The students will become more skilled at analyzing and communicating their findings about the weather and seasons.

During our study of the wind your child will be making a windsock. If you have scraps of fabric or ribbon please send them with your child to add to the windsock-making supply table.

Suggestions for activities to do at home are included in this letter. These activities will reinforce the concepts taught during this unit of instruction.

We hope you enjoy discussing the concepts involved in *Weather and Climate* with your child. Let us know if we may be of assistance.

The Outreach Staff  
Battle Creek Area Mathematics and Science Center  
(269) 213-3907 or (269) 213-3905

## ACTIVITIES TO DO AT HOME

1. **Weather Walks:** Go for a wind walk! While you and your child are standing very still with your eyes closed, feel the wind on your face and hands. What do you hear? What do you feel? Open your eyes and watch the trees sway while you listen very carefully. What do you hear? Go to the library to check out *Gilberto and the Wind* by Marie Hall Ets. Have your child tell you what windy words are included in the story.

Go for a snow walk! While you and your child are standing very still with your eyes closed, let the snow touch your face and hands. What do you feel? Do you hear anything? Open your eyes and watch the snowflakes. Do all the snowflakes come straight down, or do they come down in different directions? Be a snow detective with your child. Find some prints or marks in the snow and try to decide who or what made them. You might check out a book from the library to verify your decisions. (While you're there, check out the book *The Snowy Day*, by Ezra Jack Keats, to read together.) Figure out what type of snow is best for packing. When the packing is good, build a snow castle.

Go for a rain walk! While you and your child are standing very still with your eyes closed, feel the rain on your face and hands. What do you feel? Do the raindrops come straight down, or are they slanted? Do the raindrops bounce when they hit something? What happens when the raindrops hit a puddle? Find a spot where the water is moving similar to that of a river. Float a leaf or twig on the moving water and watch where it goes.

Go for a sun walk! While you and your child are standing outside, facing the sun, close your eyes. (Be sure to discuss with your child why we do not look directly at the sun.) What do you feel? Do you feel the air around you? Do you hear anything? Lie on the grass and watch the clouds. Where are they going and why? Do they change shape as the wind blows them along? What imaginary pictures can you depict the clouds as forming? Have fun making shadows with your child.

2. **Make a Seasons book:** Look through newspapers, magazines and catalogs for seasonal pictures with your child.
3. **Weather Charts:** Have your child use weather symbols to record the weather each day. Keep a daily chart or use a calendar to record the symbols. After several weeks, have them count the number of rainy, sunny, cloudy, and windy days by counting each kind of symbol.
4. **Help your child recognize the signs of the seasons.** Observe the plants and animals around your home, as well as weather patterns and the length of day. Have your child describe your observations.
5. **Take your child to the library or book store to find magazines and books about weather and seasons.**

*Oh Say Can You Say What's the Weather Today: All About Weather* by Tish Rabe & Aristides Ruiz

*What Will the Weather Be?* by Lynda DeWitt & Carolyn Croll

*Weather Words and What They Mean* by Gail Gibbons

*Clouds* by Anne Rockwell & Frane Lessac

*Wild Weather Soup* by Caroline Formby

*Weather Forecasting* by Gail Gibbons



# ACTIVITY 1

## WEATHER WATCHERS: MAKING OBSERVATIONS

### Teacher Background Information

In this activity the students make observations based on what they already have observed about weather. The initial observations, and the brainstorming session that follows, give the students the opportunity to orally discuss what they think and have experienced about weather and listen to the ideas of others. This also provides an opportunity for you to listen for misconceptions and gain an understanding of their previous experiences with weather and weather-related phenomena.

Children are naturally interested in weather and the cause-and-effect relationship between weather and their daily activities. The first activity provides high-interest content to which students come with a wide variety of experiences and opinions. Students may begin to describe weather in terms of animal behavior, recreational activities, plant growth, or personal opinions about conditions. Take this opportunity as a class to define weather observations that include actual weather occurrences, such as temperature, wind, cloud cover, and precipitation, in their descriptions.

The reading of *Cloudy With a Chance of Meatballs* provides the opportunity for students to begin to think about patterns and especially patterns in weather conditions. Recognizing patterns plays an important role in figuring out changes in weather from day to day and throughout the day.

### Considerations for Students With Special Needs, Diverse Backgrounds, and Emerging Bilingual Learners

Read *Cloudy With a Chance of Meatballs* aloud to students. Stop and ask students to retell the passage. Ask a bilingual speaking student/or adult translator to translate or retell the passages in Spanish or other language that is common in your classroom.

All prompts and passages in the Student Journal should be read aloud, with repeated directions and checking for understanding prior to writing.

Students are asked to draw and write in their Student Journals. Students may benefit by working with a partner in the longer writing pieces. Students with an IEP should be allowed to dictate their ideas and answers.

### ESTIMATED TIME

Lesson 1A: 45–50 minutes  
Lesson 1B: 45–50 minutes  
2 classes

### LESSON LEVEL LEARNING GOAL

- Make observations to find patterns that give evidence for the change in weather from day to day and throughout the day.

### MATERIALS NEEDED

#### For each student:

student page

#### For the class:

book: *Cloudy with a Chance of Meatballs*

#### Teacher provides:




Weather Watchers Checklist  
chart paper/marker  
sticky notes  
clipboards  
paper  
pencils

### TEACHING TIP

Throughout the activities in the Teacher Guide, you will notice that specific student instructions from the Student Journal pages are given first and italicized. Additional information for the teacher follows the italicized instructions in plain print.

# LESSON 1A

## Weather Watchers Checklist Sample

When we make weather observations, we...	
• Use our senses	
	sight: what weather conditions do you see?
	smell: what weather conditions do you smell?
	hear: what weather conditions do you hear?
	touch: what weather conditions can you touch?
	taste: what weather conditions can you taste?
• Never look directly at the sun	
• Draw pictures	
• Label pictures	
• Write about it	

### PATTERNS

- **Patterns in the natural world and human design can be observed and used as evidence.**

### TEACHING TIP

Keep the What We Think chart visible and refer to it often as the unit progresses. At this point in their learning, most students are non or emergent readers and writers. Be sure as you record their ideas that they are in their words and reflect their ideas and questions. Review and read the chart often to help students to hear their learning story unfold. A key to student understanding is the ability to recognize and verbalize when and why they have had a shift in their thinking about different concepts.

Pair students for weather observations on the school yard to accommodate students that have difficulty understanding directions or need multiple reminders of the purpose of the outing.

### Engage the Learner

This lesson introduces and activates prior knowledge regarding weather in the area and how it changes. Students make connections between previous observations and with the learning task. After exploring weather on the schoolyard, the class will brainstorm and compare ideas about what they already have experienced and have observed regarding weather.

## LESSON 1A: WEATHER WATCHERS: MAKING OBSERVATIONS

### Advance Preparation

Conduct a survey of your schoolyard for the weather observations. Look for areas with sun and shade, and open spaces for cloud observations.

Prepare a What We Think chart to record students' initial ideas, investigation ideas, and conclusions throughout their explorations into motion.

### What We Think About the Weather

What We Think About Weather	Questions We Have	What We Did	What We Figured Out	How Does That Help Us to Understand Changes in Weather?

Make a Weather Watchers Checklist to display and add to throughout the unit. (See sample chart.)

Pre-read *Cloudy With a Chance of Meatballs* and become familiar with the patterns introduced in the book.

Check the weather forecast in your area to plan your outdoor weather observations. Look for a day to go outside just before or just after a day where the weather changes. For example, if it rained the day before, go outside and observe the weather on the clear day and discuss the differences from one day to the next.

### Procedure

*Engage the learner.*

Read *Cloudy with a Chance of Meatballs*. Examples of discussion and text to revisit and discuss following the reading:

- Ask students if they think food falling from the sky could really happen. Revisit page 4. Ask students what the author means by a “tall-tale bedtime story.”
- Reread pages 7 to 14 of the story to the students and have them focus on when the food fell like precipitation and what kind of food fell from the sky.
- Discuss what observations they can make about the type of food and time of day and see if any patterns emerge in their thinking.
- Make a chart on the whiteboard or chart paper to help students visualize the patterns. Examples: breakfast food fell in the morning, lunch food fell at midday, and dinner food fell at the end of the day.
- Ask students to retell when drinks fell from the sky. Listen for ideas that relate to the end of each meal to “wash” down the food.
- Discuss the term pattern and relate patterns in the students’ daily routines (getting up, breakfast, teeth brushing, school schedules, etc.).
- Ask students how patterns might be helpful in predicting future activity.
- Reread starting on page 16, when the “weather takes a turn for the worse,” and discuss what happens when the pattern is interrupted.
- Have students relate times when their daily patterns were interrupted (snow days, illness, special events, holidays, etc.).

Ask students how they think patterns might be important in learning about the weather. Accept all ideas at this time. Record their ideas on the What We Think chart. Listen for ideas that represent an understanding that a pattern is something that can be predicted based on past observations or that a pattern is something that is repeated. As the unit progresses, guide students to look for patterns by reviewing past observations and comparing them with current observations.

*Explore the concept.*

Ask students to describe the weather from the day before (yesterday). What weather conditions do they remember?

Divide the class into teams of weather scientists. Ask the teams to look out the window and think of one word that would describe the weather today and write or draw the word on a sticky note. Have the teams post their weather description word on the board or bulletin board and explain why they chose that

## READING

### Key Ideas And Details

**RI.K.1:** With prompting and support, ask and answer questions about key details on a text.

**RI.K.3:** With prompting and support, describe the connection between two individuals, events, ideas, or pieces of information in the text.

## ESS2.D: WEATHER AND CLIMATE

- Weather is the combination of sunlight, wind, snow or rain, and temperature in a particular region at a particular time. People measure these conditions to describe and record the weather and to notice patterns over time.

## OBTAINING, EVALUATING, AND COMMUNICATING INFORMATION

Obtaining, evaluating, and communicating information in K–2 builds on prior experiences and uses observations and texts to communicate new information.

- **Read grade-appropriate texts and/or use media to obtain scientific information to determine patterns in the natural world.**

# LESSON 1A

## ASKING QUESTIONS AND DEFINING PROBLEMS

Asking questions and defining problems in K–2 builds on prior experiences and progresses to simple descriptive questions that can be tested.

- Ask questions based on observations to find more information about the designed world.

### TEACHING TIP

Throughout the activities in the Teacher Guide, you will notice that specific student instructions from the Student Journal pages are italicized. Additional information for the teacher follows the italicized instructions in plain print.

### TEACHING TIP

**Science Talk** is a conversation among students that allows them to have the opportunity to orally express their ideas and listen to the ideas of others. Allow sufficient time for each student to express ideas and opinions. Encourage student-led conversation in the classroom.

word to describe the weather. Look for observations that include sunny, cloudy, rainy, cold, warm, and windy.

Ask students to describe what they observed that led them to their descriptive word for today's weather. Organize their ideas by grouping them by commonalities.

Tell the students that they will be going out into the schoolyard to make weather observations. Ask students to predict what they might observe that is related to weather.

Take this opportunity to discuss what a good weather observation might look like. Ask the students for their ideas and then display the Weather Watchers Checklist to the class. Refer to the students' initial observations and what sense(s) they used to make their observations.

Remind the students not to look directly at the sun, but to instead observe the effects of the sun on themselves and objects in the schoolyard. Set boundaries for the weather observations and remind students that they are weather scientists who are making observations and collecting data. Encourage students to observe weather in different locations in the schoolyard. Distribute Student Journals and a pencil to each team of students. Assist the students in writing the date and time at the top of the Student Journal activity page.

### *First Weather Observation*

*Date:*

*Time:*

*Draw and write weather you observed today.*

**Go outside and observe the weather.** Facilitate the weather observations by circulating among the teams, observing their log entries, and listening to their exchange of ideas. To help students make sense of observations and elaborate on their explanations, ask:

- What have you observed so far?
- How is your observation related to weather?
- What do you mean when you say...?
- Tell me more about what you have drawn or written.
- How might you learn more about...?
- What are some other possibilities?
- What do you already know about \_\_\_\_\_ that makes you think that?

- Do you think that if you moved to a different area of the schoolyard that you would make the same observation? What makes you think that? How can you find out?
- What information about the weather can you learn if you observe a tree? What makes you think that?
- What information about the weather can you learn if you observe the ground, grass, or sidewalk?
- What questions do you have about your weather observations?
- How is the weather different today than it was yesterday?
- What do you mean when you say \_\_\_\_\_? Can you say more about that?

Record any questions the students might generate from their observations and save for Science Talk. Encourage all teams to make observations in different areas of the schoolyard and to observe in an open area and an area under trees or beside the school building.

After students have had sufficient time to make observations, return to the classroom for discussion and raising questions that can be investigated.

Allow sufficient time for each team of students to discuss their observations and complete their writing and drawing of their initial weather observations on the schoolyard.

When teams have completed their entries, encourage them to collaborate with another team and discuss and compare their findings. Invite groups to share their discoveries of similarities and differences among observations.

### Science Talk

Ask the students to bring their weather observations and come together and sit in a circle. Invite a team to share one observation to start the conversation. Ask:

- \_\_\_\_\_, I noticed that your team wrote down some weather observations. Can you share one of your observations with the class?
- Did anyone else have a similar observation?
- Is that a weather observation that we see everyday?
- What do you mean by that? Who can add to that idea?
- What questions do you have about your observation of \_\_\_\_\_?
- Who has a different observation to share?

### TEACHING TIP

To help students recognize changes in weather from day to day or week to week, plan on additional whole-class outings. If possible, choose a day with blustery winds, fog, or light rain so students can engage their senses in weather observations.

### CONSTRUCTING EXPLANATIONS AND DESIGNING SOLUTIONS

Constructing explanations and designing solutions in K–2 builds on prior experiences and progresses to the use of evidence and ideas in constructing evidence-based accounts of natural phenomena and designing solutions.

- **Use information from observations (firsthand and from media) to construct an evidence-based account for natural phenomena.**
- Use tools and materials provided to design and build a device that solves a specific problem or a solution to a specific problem.

# LESSON 1A

## WRITING

### Text Types And Purposes

**W.K.2:** Use a combination of drawing, dictating, and writing to compose informative/explanatory texts in which they name what they are writing about and supply some information about the topic.

### Production and Distribution of Writing

**W.K.5:** With guidance and support from adults, respond to questions and suggestions from peers and add details to strengthen writing as needed.

- Does anyone have any questions about \_\_\_\_\_?
- How might we find out more about weather?

Record student ideas and observation on the What We Think column of the What We Think chart. Ask students to share any weather-related questions that may have come up during their observations and add their questions to the Questions We Have column. Refer to observations and questions you recorded during your facilitation to help students get started in raising questions.

Ask:

- Did anyone observe clouds today? What did you observe? What do you wonder about the clouds?
- Did anyone observe temperature today? What did you observe? What do you wonder about temperature?
- Did anyone observe wind today? What did you observe? What do you wonder about the wind?
- How are our observations today different from the weather we remember from yesterday?
- What do you think the weather conditions will be like tomorrow? What makes you think that? How can we find out?

Explain that as the students become weather watchers they will be trying to figure out the answer to the question:

*How can we use observations about weather to gather information about how weather changes from day to day?*

Write the overarching question about weather on the What We Think chart. Begin to build a Weather Word Wall using the terms the students use to describe the weather (warm, cold, hot, cool, windy, rainy, cloudy, damp, sunny, clear, foggy, etc.) Have the students answer the Student Journal Entry page as a collaborative effort.

### Journal Entry

1. Draw and label a picture of the weather you like the **most**. Circle the weather in your picture that you observed today.
2. Draw and label a picture of the weather you like the **least**. Circle the weather in your picture that you observed today.
3. Write what you wonder about the weather.

### Assessment: Formative

Use the Science Talk and Journal Entry to assess the students' initial ideas about the components that make up weather. Use the reading integration to assess the students' understandings of the term patterns.

## LESSON 1B: WEATHER WATCHERS: COLLECTING AND RECORDING DATA

### Advance Preparation

Prepare five stations: thermometer station, windsock station, rain gauge station, compass and North, South East, and West sign station, and the recording station (Weather Watchers Observation chart).

Display the What We Think It Measures chart for the class.

What We Think It Measures		
Instrument	What It Measures	How Can We Use It?
thermometer		
wind sock		
rain gauge		
direction signs		
observation chart		

The *Weather Watchers Observation Chart* is intended to be used to record weather data over twelve weeks. Use a dry erase marker and write Week 1 through Week 12 on the charts. Each chart will reflect data over a three week period. Display the charts together to help students recognize patterns in their data.

Plan for a second outdoor weather observation on a day where the weather is different from the first observation. The weather may change in one or several days.

### Procedure

*Explain the concept and define the terms.*

Review the findings from the weather observations from the previous lesson. Ask: If you went outdoors and observed the weather today, do you think you would gather the same information? Why or why not?

Explain that in the previous lesson they used their senses to gather weather information. Ask students if they can think of any other instruments or tools they could use to make weather observations. Ask students if they can think of any weather instruments that are used by weather scientists.

Display the *Weather Watchers Observation chart*. Have students use the stickers to make their entries from the previous day's observations. Ask students if they can think of ways they could make their weather observations more detailed.

### MATERIALS NEEDED

#### For each student:

student pages

#### For the class:

weather stickers

instrument stations:

thermometer (outdoor)

windsock

rain gauge

compass

signs: *North, South, East, and West*

*Weather Watchers Observation chart*

*What We Think It Measures chart*

#### TEACHER PROVIDES:

clipboard/paper

dry erase marker

### TEACHING TIP

Questioning techniques and a method of record keeping during teacher facilitation of group discussions are key in helping students to develop the ability to reason and justify their ideas with evidence. During facilitation of the instrument stations, carry a clipboard with paper to record key student responses and ideas for elaboration during the Science Talk.

# LESSON 1B

## SCIENCE TALK

Science Talk is a critical component of science lessons. Science Talk provides an avenue for the exploration of ideas and exchange of points of view, and is intellectually and academically challenging. Science Talk is not an add-on to the lesson and provides academically productive talk that is critical for learning in science. (See Science Talk in the Appendix.)

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## TEACHING TIP

Your class may not yet have a grasp of recognizing and reading numbers when engaged in this unit. Determine if your students will record temperature data in terms of ranges in temperature (cold, cool, warm, and hot) or numbers.

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## MATH

### Counting and Cardinality

**K.CC.1:** Count to 100 by ones and by tens.

**K.CC.3:** Write numbers from 0 to 20. Represent a number of objects with a written numeral 0–20 (with 0 representing a count of no objects).

Show the class the weather instrument stations. Tell the class that the most reliable way of making weather observations is by measuring and recording weather conditions. Divide the class into five different groups. Explain that within their groups they are to look at each instrument at each station and try to figure out what it measures and how it might be helpful when making weather observations. Allow five to six minutes for each weather instrument station.

Facilitate the students' discussions at each station by circulating among the stations, observing their interactions with the instrument and listening to their conversations. To help students make connections among ideas about the weather and the instruments, ask:

- How does that instrument relate to weather observations? What might it tell you? What makes you think that?
- Can you give me an example of how you might use that instrument? How might it be useful in making weather observations?
- Why do you think that?
- When have you seen a similar instrument?
- How might we find out how that instrument works?

## Science Talk

Have the class gather in front of the What We Think It Measures chart. Take this opportunity to allow students to share their initial thinking about the weather instruments and data collection tools from their discussions at the instrument stations.

Hold up the thermometer and ask a student volunteer to share ideas about what the thermometer measures when making weather observations. Encourage other students to share their ideas and add to the conversation. When the class reaches a consensus on the purpose of each of the instrument, record student ideas on the What We Think It Measures chart. Take this opportunity to demonstrate how to read the thermometer and the temperature ranges that indicate cold, cool, warm, and hot.

Continue the sharing of ideas with the remaining tools observed in the instrument stations. Ask students for their ideas of why they think it important to include the observation chart as a weather tool.

Refer to the *Weather Watchers Observation chart*.



*Elaborate on the concept.*

As a class, discuss the placement of the different instruments for daily measurements of daily weather conditions. Discuss where on the schoolyard each instrument should be placed to get the most accurate measurements; for example, indoors or outdoors, in sunlight or shade, near the building or in the open yard, near grass or pavement. Discuss ideas as a whole class to come to a consensus on the location and then place the instruments in the designated areas.

Example instrument placement:

Thermometer—sunny location, low enough for students to be able to make an accurate reading

Windsock—open location, away from buildings that may interfere with the speed and direction of the wind.

Rain Gauge—open location, away from trees and roof runoff.

Direction Signs—near windsocks

Weather Watcher Observation Chart—in the classroom

Go outside to conduct a second weather observation and place the instruments in the appropriate location.

*Second Weather Observation*

*Date:*

*Time:*

*Draw and write weather you observed today.*

*Evaluate the students' understanding of the concept.*

Conduct a weather data collection practice with the class. Tell students that you would like them to practice reading and recording the measurements of each of the weather instruments. After the students have had the opportunity to practice reading the instruments, go inside and record their findings on the class *Weather Watchers Observation chart*. Demonstrate how to read the day of the week and assist students in recording the time of day. Have student volunteers place the weather stickers in the appropriate row and column of the *Weather Watchers Observation chart*.

Ask students why it is important to record the time of day on the *Weather Watchers Observation chart*. Listen for ideas of changes in temperature, cloud cover, and precipitation throughout the day.

### ESS2.D: WEATHER AND CLIMATE

- Weather is the combination of sunlight, wind, snow or rain, and temperature in a particular region at a particular time. People measure these conditions to describe and record the weather and to notice patterns over time.

### CONSTRUCTING EXPLANATIONS AND DESIGNING SOLUTIONS

Constructing explanations and designing solutions in K–2 builds on prior experiences and progresses to the use of evidence and ideas in constructing evidence-based accounts of natural phenomena and designing solutions.

- Use information from observations (firsthand and from media) to construct an evidence-based account for natural phenomena.
- Use tools and materials provided to design and build a device that solves a specific problem or a solution to a specific problem.

# LESSON 1B

## **ANALYZING AND INTERPRETING DATA**

Analyzing data in K–2 builds on prior experiences and progresses to collecting, recording, and sharing observations.

- Use observations (firsthand and from media) to describe patterns in the natural world in order to answer scientific questions.

For the following weeks, assign Weather Watcher teams of students an instrument to check each day until all teams have taken measurements and recorded the data with each instrument. Explain that each day, the Weather Watcher team will be responsible for entering the data on the *Weather Watchers Observation chart* and for presenting a daily report of their findings. At the end of the unit, students will work together to prepare a weather report skit that will inform an audience of the current weather conditions and the forecast for following days.

Revisit the What We Think chart and record new ideas, questions and What We Did in the appropriate columns. Ask students what they have Figured Out so far and record their ideas.

### **Assessment: Formative**

Use the Science Talk and entries on the *Weather Watchers Observation chart* to assess the students' understanding of weather conditions and measurements.



## ENGINEERING DESIGN PROCESS

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The Engineering Design Process provides students with a series of steps to guide them as they solve problems and design and test products, models, and solutions. The process is cyclical, yet not necessarily in an order. Students are encouraged to evaluate as they progress through the process, revisit the mission often, and revise thinking and their plan multiple times as the process unfolds.

Engineers do not always follow the Engineering Design Process steps in order, one after another. It is very common to design something, test it, find a problem, and then go back to an earlier step to make a modification or change the design. Engineers must always keep in mind the mission or problem they are trying to solve and the limitations (cost, time, material, etc.) that are part of the solution to the problem. Two key elements in working as an engineer are teamwork and design-test-and-redesign.

### **Mission**

- Defines the problem and what the engineers are trying to design or build.
- Describes the limitations within which the engineers must solve the problem.

### **Brainstorm Ideas**

- Imagine, discuss, and sketch possible solutions.
- Conduct research into what has already been done.
- Discover what materials are available, time frame, and other limitations.

### **Plan and Design**

- Draw and write a plan.
- Design your solution through drawing and manipulating materials.
- Develop a plan or steps and a schedule.

### **Build**

- Construct your engineering device or project.
- Follow your plan.
- Adjust and test along the way.

### **Test and Adjust**

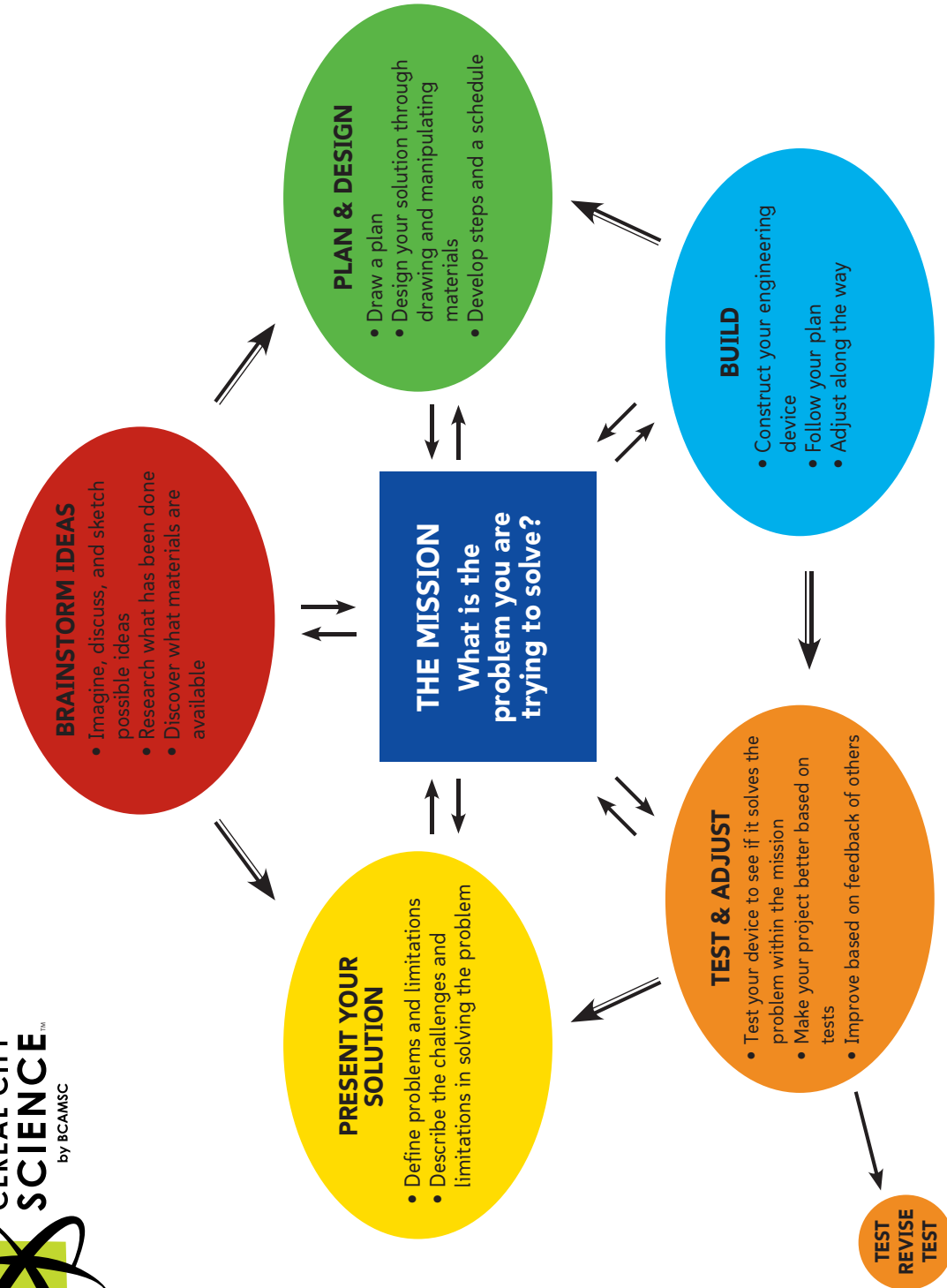
- Test your device to see if it solves the problem within the mission and limitations.
- Make your project better based on tests: Test → Revise → Test.
- Improve based on feedback of others.

### **Present Your Solution**

- Demonstrate how your solution solves the problem.
- Define problems and limitations.
- Describe the challenges and limitations in solving the problem.
- Describe additional revisions that could improve the device or project.

**ENGINEERING DESIGN PROCESS**

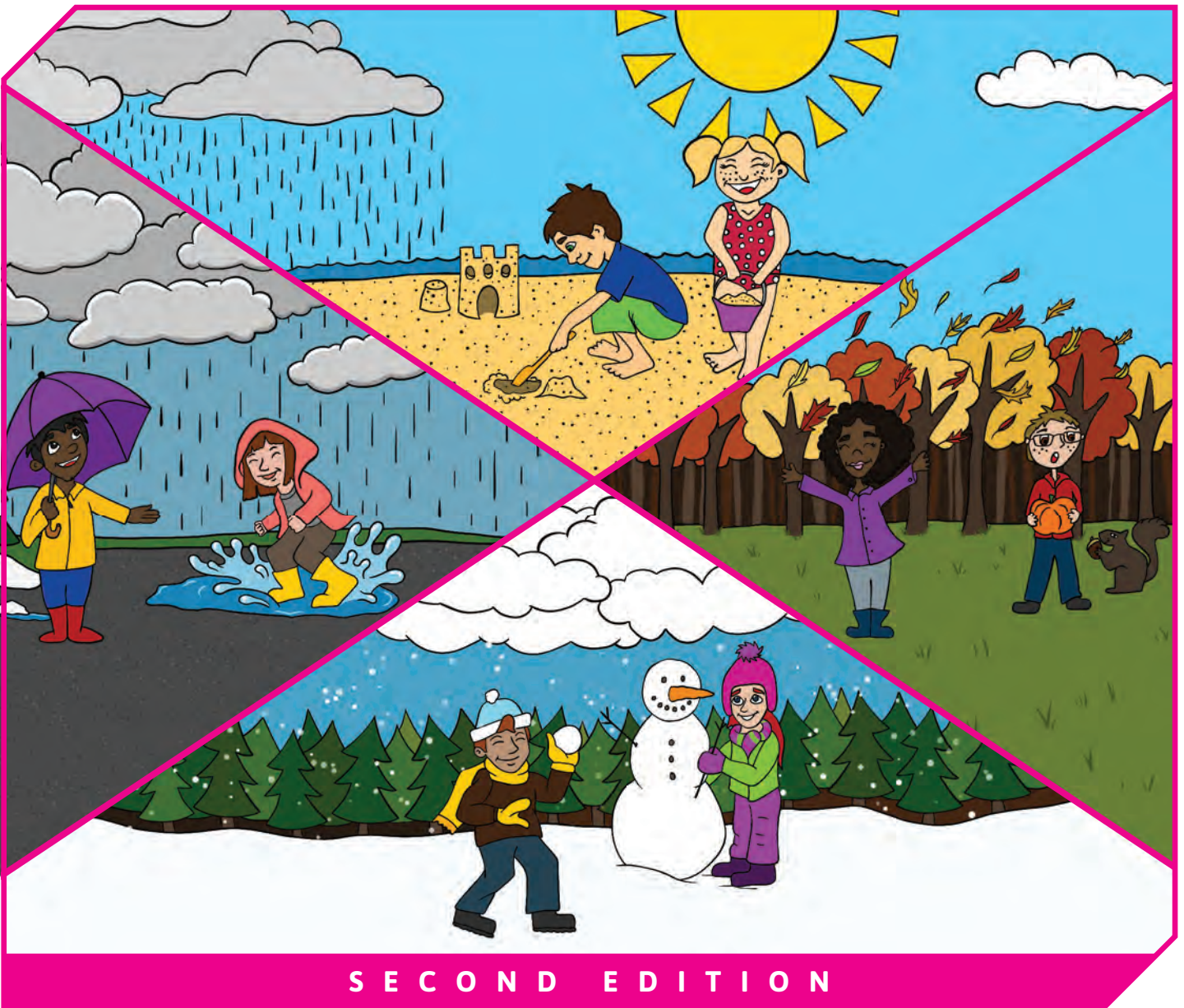
**ENGINEERING DESIGN PROCESS**



*by Battle Creek Area Mathematics and Science Center  
Cereal City Science  
Adopted from the Carnegie Mellon Robotics Academy*



# Weather and Climate KENG



SECOND EDITION

A kindergarten unit supporting Next Generation Science Standards  
and Michigan Science Standards

Name: \_\_\_\_\_





Name \_\_\_\_\_

Date \_\_\_\_\_

.....

First Weather Observation

\_\_\_\_\_

Date: -----

\_\_\_\_\_

\_\_\_\_\_

Time: -----

\_\_\_\_\_

Draw and write weather you observed today.

# 1A

A C T I V I T Y

## Weather Watchers: Making Observations

Name \_\_\_\_\_

Date \_\_\_\_\_

.....

1. Draw and label a picture of the weather you like the **most**.

Circle the weather in your picture that you observed today.




Name \_\_\_\_\_

Date \_\_\_\_\_

.....  
2. Draw and label a picture of the weather you like the **least**.

Circle the weather in your picture that you observed today.



# 1A

JOURNAL

## Weather Watchers: Making Observations

Name \_\_\_\_\_

Date \_\_\_\_\_

.....

3. Write what you wonder about the weather.

I wonder

\_\_\_\_\_

-----

\_\_\_\_\_

\_\_\_\_\_

-----

\_\_\_\_\_

\_\_\_\_\_

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\_\_\_\_\_

\_\_\_\_\_

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\_\_\_\_\_

\_\_\_\_\_

-----

\_\_\_\_\_

Name \_\_\_\_\_

Date \_\_\_\_\_

.....

Second Weather Observation

\_\_\_\_\_

Date: -----

\_\_\_\_\_

\_\_\_\_\_

Time: -----

\_\_\_\_\_

Draw and write weather you observed today.

# KEY TERMS

Name \_\_\_\_\_

Date \_\_\_\_\_

.....

**air**—Air is everywhere. It fills rooms and houses, and it surrounds you outdoors and indoors. You cannot see air.

**blizzard**—A blizzard is a snowstorm or heavy snow that lasts a long time. Blizzards are usually accompanied by strong winds.

**breezy**—Breezy is a gentle wind. A breeze is air that moves gently.

**calm**—Calm is to be still and quiet. Sometimes the air around us is calm and does not move much.

**Celsius**—Celsius is a scale on the thermometer where water freezes at 0° and boils at 100°.

**clear**—Clear describes a day when there are no clouds in the sky.

**cloud**—A cloud is made up of tiny water or ice droplets in the air that are usually high above the earth.

**cloud cover**—Cloud cover tells how much of the sky has clouds. Cloudy, partly cloudy, clear, and foggy are some words to tell about cloud cover.

**cloudy**—Cloudy describes a day when the sky is completely covered with clouds.

**cold**—Cold describes a low temperature.

Name \_\_\_\_\_

Date \_\_\_\_\_

.....

**cool**—Cool describes a temperature that is somewhat cold. Cool is between cold and warm.

**daily weather pattern**—A daily weather pattern is the everyday weather conditions that repeat or recur over a period of time.

**data**—Data is information about something that can be used to find out about different ideas.

**evidence**—Evidence is what is observed, read, or discovered that supports an idea or fact.

**Fahrenheit**—Fahrenheit is a scale on the thermometer where water freezes at 32° and boils at 212°.

**fall**—Fall is one of the four seasons on Earth. It is also called autumn. During fall, the leaves on the trees change color and fall to the ground.

**foggy**—Foggy describes a weather condition with tiny droplets of water that float in the air near the ground.

**freezing rain**—Freezing rain occurs when the air temperature near the ground is near or at 0°C and the rain droplets turn to ice instead of snow or hail.

**hail**—Hail is small lumps of ice that fall during thunderstorms.

**K E Y T E R M S**

Name \_\_\_\_\_

Date \_\_\_\_\_

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**hot**—Hot describes a very high temperature.

**lightning**—Lightning is the flashing of light caused by electrical charges that move from cloud to cloud or cloud to the earth.

**observation**—An observation is what is noticed when something is looked at closely using sight, hear, touch, taste, and smell.

**partly cloudy**—Partly cloudy describes a day when there is some clear sky and some clouds.

**precipitation**—Precipitation happens when water in some form falls from the clouds to the ground. Rain, snow, sleet, and hail are forms of precipitation.

**rain**—Rain is water droplets that fall from the clouds.

**rain gauge**—A rain gauge is an instrument used to measure the amount of rainfall or snowfall.

**season**—A season is one of four times of the year. Spring, summer, fall, and winter are seasons.

**severe weather**—Severe weather is any weather condition that can cause harm or damage.

**sleet**—Sleet is frozen or partly frozen rain.



Name \_\_\_\_\_

Date \_\_\_\_\_

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**snow**—Snow is small white crystals of ice formed from water vapor in the air.

**spring**—Spring is one of the four seasons on Earth. It happens between winter and summer. During spring, many plants begin to grow as the temperature warms.

**summer**—Summer is one of the four seasons on Earth. It happens between spring and fall and is the warmest season of the year.

**temperature**—Temperature is a measure of how hot or cold something is. In weather, temperature is the measure of how hot or cold the air is.

**thermometer**—A thermometer is a tool that measures how hot or cold something is. The thermometer measures temperature.

**thunderstorm**—A thunderstorm is a weather condition with thunder and lightning.

**tornado**—A tornado is a violent whirling wind that is described as a funnel cloud. Tornadoes move over land in a narrow path.

**warm**—Warm describes a temperature that is somewhat hot. Warm is between cool and hot.

**K E Y T E R M S**

Name \_\_\_\_\_

Date \_\_\_\_\_

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**water vapor**—Water vapor is water that cannot be seen in the air. When it cools, it can form clouds in the air.

**weather**—The weather is a description of what happens in the air, temperature, wind, clouds, and precipitation.

**weather conditions**—Weather conditions refer to the different types of weather, such as temperature, cloud cover, precipitation, and wind.

**weather observations**—Weather observations use the senses and tools to describe weather.

**wind**—Wind is air that is moving.

**windsock/wind vane**—A windsock or wind vane is a weather instrument that shows how hard and which way the wind blows.

**windy**—Windy is a strong wind.

**winter**—Winter is one of the coldest seasons of the year. It comes between fall and spring.