Weather Pacing Guide[1]

Use the information below to assist you in determining the amount of time needed to complete the entire unit. These recommendations assume the **average science class period is 45 to 60 minutes in length**. We recommend teaching science a minimum of three sessions per week in order to maintain consistency and keep students engaged. Many teachers accomplish this by rotating a science unit with a social studies unit, enabling you to teach more science sessions in one week and finish the unit in fewer weeks. We highly recommend that all teachers participate in the Expository Writing and Science Notebooks Program in order to further develop students' science understandings, as well as their scientific thinking and writing skills. To implement the science-writing curriculum requires, for most lessons, a separate 20 to 30 minutes for a science-writing mini-lesson and independent writing time. Time for these mini-lessons is not included in this pacing guide.

Lesson and Common Assessments (see corresponding pages in the Instructional Guide for lesson planning)	**Recommended Number of Periods**	**GLEs Addressed/Big Idea(s) of the Lesson**	**Considerations for Planning**	**Recommended Applications and Extensions**
Lesson 1: **What We Know About Weather** Students share prior knowledge about today's weather and discuss how it affects what we wear and what we do.	1	**GLE 3.2.4**: Understand how humans depend on the natural environment. **Big Idea**: Meteorologists are scientists who study, observe, and record information about the weather. Weather affects decisions people make in their lives (e.g., about clothing, activities, business, safety).	• **Modification:** New engagement piece; follow the Instructional Guide for this stage of the lesson. • Bring clothes that would suit many types of weather. • Save the pre-assessment charts until the end of the unit.	**Extensions** (manual, p. 16): #2 – Do not read *Weather Words* until students have been studying weather for a number of weeks.
Lesson 2: Observing the Weather Students go outside and use their senses to observe the day's weather.	1	**GLE 3.2.3:** Know how knowledge and skills of science, mathematics, and technology are used in common occupations. **Big Idea:** We can observe the weather by using our senses.	**Reading selection:** You can do this during language arts time. Ask students how they think the meteorologist uses science, mathematics and/or technology in her job.	**Extensions** (manual, p. 25): • #1 – It's more effective if the meteorologist visits after the students have been studying weather for at least a month. • #3 – If you integrate painting, make sure students have a concrete understanding of the weather they are painting.
Lesson 4: Estimating Wind Speed Students learn about the wind scale and construct model wind flags to measure the wind speed. They keep track of wind data for the week.	2, plus daily wind observations	**GLE 1.1.2:** Understand the position and motion of common objects. **GLE 1.2.1:** Understand that things are made of parts that go together. **Big Idea:** Wind changes from day to day. Air is a substance that surrounds us, and we feel its movement as wind. We use simple tools (e.g., wind flag) to measure weather indicators (e.g., wind).	This lesson is spread over a week. One period is needed for students to learn how to measure wind speed, then a few minutes every day to record wind data. One long period is needed on the last day to analyze the wind data for the week. **Do not use** the Wind Data Graph in the manual; instead, use the Wind Data Table provided in the Instructional Guide.	**Extensions** (manual, p. 45): • #2 and #3 – Reading and discussing the books would be beneficial • #4 – Making a weather vane and observing it would help students develop an understanding of GLEs 1.1.2 and 1.2.1.

[1] Pacing Guide for use with the *WEATHER* Teacher's Manual, National Academy of Science (1995)

Lesson 3: Recording the Weather Students observe and record the daily weather and observe changes and patterns in the weather over time.	1, plus 5 minutes each day for Weather observations	**GLE 1.3.6** Know common weather indicators and understand that weather conditions change from season to season. **GLE 3.2.4** Understand that humans depend on the natural environment. **GLE 1.2.5** Know daily positions of the sun. **Big Idea:** Scientists observe, record, and study information about weather over time.	• **Modification: Follow the Instructional Guide for this lesson. Do not use the manual.** • One long session is needed on the first day. Then, students will need a few minutes each day to observe and record the weather. • Periodically, students will write about the daily weather, the weekly weather data, and the monthly weather data.	Have students begin to observe the Sun's position in the sky. When you pick up students after recess on sunny days, have them notice where the sun is. Help them see that the sun is in different positions in the sky both during the day and through the seasons.
CBA A: Interpreting Weather Data	1	**GLE 1.3.6** Know common weather indicators and understand that weather conditions change from season to season.	Students need to do Assessment A at least after the third and sixth weeks of collecting data.	
Lesson 5: **Reading a Thermometer** **Lesson 6**: **Making a Thermometer** Students learn how to read a thermometer, make a model thermometer, and collect temperature data. They discuss temperature changes and patterns over time.	2	**GLE 1.2.1** Understand that things are made of parts that go together. **GLE 3.2.2** Know that people have invented tools for everyday lives. **GLE 3.2.3** Know how knowledge and skills of science, mathematics, and technology are used in common occupations. **Big Idea**: We use simple tools (e.g., thermometer) to measure weather indicators (e.g., temperature).	You might want to have the students keep the model thermometers at their desks so that they can practice reading the thermometers whenever there is a spare moment.	**Lesson 5**: Extension #3 (manual, p. 55) has a strong mathematics connection. **Lesson 6**: Extension #2 (manual, p. 65) is worthwhile.
Lesson 7: **Comparing Inside and Outside Temperature** Students set up a fair test to measure, record the inside and outside temperature.	1-2	**GLE 2.1.1** Understand how to ask a question about objects, organisms, and events in the environment. **GLE 2.1.2** Understand how to plan and conduct simple investigations following all safety rules. **GLE 2.1.3** Understand how to construct a reasonable explanation using evidence. **GLE 2.1.4** Understand that models represent real objects, events, or processes. **GLE 2.1.5** Understand how to record and report investigations, results, and explanations **GLE 2.2.1** Understand that all scientific observations are reported accurately even when the observations contradict expectations. **GLE 2.2.2** Understand that observations and measurement are used by scientists to describe the world. **GLE 2.2.3** Understand that similar investigations may not produce similar results. **Big Idea:** Indoor and outdoor temperatures usually are different. We use simple tools (e.g., thermometer) to	• It is best to do this investigation on a day when it isn't raining since you need to go outside. • Students will begin adding the daily temperature to their weekly weather data sheets.	The extensions in the manual (page 75) are worthwhile.

		measure weather indicators (e.g., temperature).		
Lessons 13 and 14 Observing Clouds and Classifying Clouds – Students observe the properties of clouds and learn the 3 main cloud types – *cirrus, cumulus, and stratus.*	2	**GLE 1.1.1** Understand simple properties of common natural and manufactured materials and objects. **Big Idea:** Clouds can be distinguished by their properties—color, size, shape, texture, and height from the ground. Clouds and fog usually are made of tiny droplets of water.	• This lesson needs to be done on a day when there are clouds in the sky. • **Do not** do the *Final Activities* section on page 133 in the manual. Students will make a representation of clouds at the end of lesson 14.	**Lesson 13:** Do not do extensions #2 or #3 on page 134 in the manual because they do not develop scientific understanding. Extension #1, however, would be intriguing. **Lesson 14:** Read The Cloud Book by Tomie DePaola.
Lesson 8: Measuring Water Temperature Students set up a fair test to find out what happens when you mix cold and hot water together.	1	**GLE:** See lesson 7 **Big Idea:** When cups of cold and hot water are mixed together, the temperature of the water is somewhere between the temperatures of the cup of hot water and the cup of cold water.	• This lesson can be done at any time after you have taught the first 7 lessons. • You will need ice cubes and a source of hot water for this lesson. • Use the temperature recording sheet provided in the instructional guide; **do not** use the table from the manual.	• Students can test different proportions of hot and cold water. • *Extension*, page 84, #1, creates an equity issue. You can provide opportunities for students to do both of these extensions in the classroom.
Lesson 9: Experimenting with Color and Temperature Students set up a fair test to investigate whether the temperature will be higher on the thermometers in black bags or white bags when they are placed in the sun.	1	**GLE: 1.1.1** Understand simple properties of common natural and manufactured materials and objects. **GLEs—Inquiry**: See Lesson 7 **Big Idea:** Dark colors take in (absorb) sunlight, so they make us feel hotter when we are in the sunlight than light-colored clothes do. Light colors push away (reflect) sunlight, so we wear light-colored clothes to feel cooler in the sunlight on a hot day.	• This lesson can be done at any time after you have taught the first 7 lessons. • This lesson needs to be taught on a sunny day (with higher temperatures, if possible).	**Extensions** (manual, p. 94): • #1: Students can design their own fair test about what happens with other colors. • #2 is not recommended.
Assessment B: Reading a Thermometer	1	**GLE 2.1.2** Understand how to plan and conduct simple investigations following all safety rules.	Assess after lesson 9 and at the end of the unit. If 80% of students have not developed these skills by this point, continue the modeling, practice, and constructive feedback, then reassess in a few more weeks.	
Lesson 10: Making a Rain Gauge Students make a rain gauge and use it to measure the rainfall every day for a week. They collect rainfall data in a table.	2, plus 3 10-minute observations	**GLE 1.2.1** Understand that things are made of parts that go together. **Big Idea:** We use simple tools (e.g., rain gauge) to measure weather indicators (e.g., rainfall).	• Plan to do this lesson on a week were rain is forecast. • The students will learn about and set up the rain gauges in the first session. For the rest of the week they will record the amount of rainfall each day.	**Extensions** (manual, p. 103): #3 is the best. After the class has collected some rainfall data and graphed it, you can share with them some published rainfall graphs. For example, in its *Local News* Section,

			At the end of the week they will discuss and write about the weekly data. • Assessment A: Remember to do this assessment again sometime during the unit.	the *Seattle Times* publishes the rainfall for each month.
Lesson 11/Assessment C: Exploring Puddles Students observe what happens to puddles over time. They also set up a class investigation where they observe a puddle with a lid and one without a lid.	2, plus 2-3 shorter observation sessions	**GLEs—Inquiry**: See Lesson 7 **Big Idea:** We can conduct investigations that show that water can "disappear" (evaporate). [The concept of changes of state—e.g., when water "disappears" or evaporates, it turns into a gas (vapor), which is invisible, in the air—will be developed in later grades when developmentally appropriate. In grade 1, students need only to observe that the water "disappeared," and infer that it probably went into the air.]	• This lesson is *Assessment C: Conducting an Investigation about Evaporation*. • Try to do this ongoing investigation during a week when students will be able to observe puddles made by rainfall. • **Modification:** Set up a second investigation as a class with puddles in open and closed containers. Observe and discuss these puddles daily as well.	**Reading Selection:** The terms – and ideas – of *invent, inventor*, and *invention* obviously are critical in science. Be sure to add the words to the word bank as the class discusses the reading selection. Ask them to think of something that people might invent that could be helpful in terms of how weather affects our lives.
Lesson 12: Rainy Day Fabrics Students conduct a fair test to see which fabrics would be best to wear in the rain.	2	**GLE 1.1.1** Understand simple properties of common natural and manufactured materials and objects using properties. **GLEs—Inquiry:** See Lesson 7 **Big Idea:** We can conduct investigations and draw conclusions about which fabrics, because of their different properties, are most useful in which kinds of weather.	Make sure you test the fabrics in advance. If necessary, wash the fabrics to remove any sizing.	• Sometime after the students have completed the investigation, have them check the labels on their jackets again. Then have a discussion that leads to their conducting an investigation outdoors in which they determine which jackets actually keep them driest in the rain. • **Extensions** (manual, p. 124-125): #3 and #4 are not recommended.
Lesson 15: Comparing Forecasts to Today's Weather – Students look at the actual weather and the weather forecast and compare the two.	2	**GLE 1.3.6** Know common weather indicators and understand that weather conditions change from season to season. **GLE 3.2.3** Understand how knowledge and skills of science, mathematics, and technology are used in common occupations. **GLE 3.2.4** Understand how humans depend on the natural environment. Describe what humans obtain from their environment [sunlight; water from rain]. **Big Idea:** To forecast the weather, meteorologists can use	• **Do not** use the table in the manual; instead, use the *Forecast and Actual Weather* table in the instructional guide. • Bring in a copy of the weather forecast from the newspaper or from the internet. • The discussion should come back to the unit's overarching questions, particularly the last two.	**Extensions** (manual, p. 145): #2 and #3 would be worthwhile.

		information about the weather that they observe, collect, and record.		
Lesson 16: Summarizing Our Weather Observations			Don't do this lesson as it has already occurred at least twice during the unit (see notes for lesson 3).	
Unit Assessments: Closure to the Unit – Students answer the two focus questions from the beginning of the unit and compare their responses with their responses from the beginning of the unit.	1		To bring closure to the unit, you can choose to do one or more of the assessments at the end of the manual (pp. 159-161).	
Assessment B: Reading a Thermometer	1	**GLE 2.1.2** Understand how to plan and conduct simple investigations following all safety rules.	Do this assessment one last time.	