

SCIENCE

KINDERGARTEN

UNIT ONE

WEATHER



Science

K Unit 1

WEATHER

STANDARDS AND INDICATORS:

A7, A8

Weather-Describe and record daily weather conditions throughout the year. (Try incorporating into Saxon meeting time)

CONCEPTS:

1. Weather changes day to day.
2. Weather includes many features including:
 - Cloud cover
 - Precipitation
 - Wind
 - Temperature
3. Tools used for measuring weather.
 - Wind scale (sock)
 - Thermometers
 - Rain gauges
4. Weather can be predicted by patterns.
5. Weather affects decision we make about clothing and activities.

SKILLS: Be able to do:

1. Record-(pictures/words)
 - Graph-(pictograph/bar/line)
 - Observe-(use senses)
 - Use senses
2. Understand and use proper vocabulary (try substituting science books during comprehension/vocabulary time and use pre-set objectives)
 - Cloud cover (types)
 - Precipitation (rain, snow, sleet, hail)
 - Wind
 - Temperature (hot/cold)
3. Measure using: wind indicator, thermometer, rain gauge.
4. Record/read and interpret daily/weekly weather patterns to predict future weather.
5. Interpret weather patterns to determine appropriate clothing and activity choices. (Using senses)

MATERIALS

Weather STC kits
Graphs
Thermometer
Websites-weatherbug, etc.
Wind indicators-flag, sock

SUGGESTED BIG IDEAS/ESSENTIAL QUESTIONS:

1. What is weather? (Cold/hot, humid/dry, windy, cloudy, precipitation).
2. What tools do we use to measure weather and how do we use the tools?
3. How does weather influence our clothing choices? How does weather influence our activity choices?
4. What makes a weather pattern?

SCIENCE CONTENT STANDARD K.3

CONCEPTUAL
THEME:

*Energy in the Earth's
Systems - How do
external and internal
sources of energy
affect the Earth's
systems?*

CONTENT
STANDARD:

**K.3 – Weather
conditions vary daily
and seasonally.**

GRADE-LEVEL CONCEPT: ♦ Daily and seasonal weather conditions affect what we do, what we wear and how we feel.

GRADE-LEVEL EXPECTATIONS:

1. The sun is the source of heat and light that warms the land, air and water. Variations in the amount of sunlight that reaches the earth cause the weather.
2. Weather conditions can be observed and described as sunny, cloudy, rainy, foggy, snowy, stormy, windy, hot or cold. Weather observations can be made based on how we feel, what we see or hear, or by using weather measurement instruments such as thermometers.
3. Changes in weather conditions can be recorded during different times of day, from day to day, and over longer periods of time (seasonal cycle). Repeated observations can show patterns that can be used to predict general weather conditions. For example, temperatures are generally cooler at night than during the day and colder in winter than in spring, summer or fall.
4. Weather influences how we dress, how we feel, and what we do outside.
5. Weather affects the land, animals and plants, and bodies of water.
6. When the temperature is below “freezing,” water outside freezes to ice and precipitation falls as snow or ice; when the temperature is above freezing, ice and snow melt and precipitation falls as rain.
7. Clouds and fog are made of tiny drops of water. Clouds have different shapes, sizes and colors that can be observed and compared. Some cloud types are associated with precipitation and some with fair weather.
8. Wind is moving air. Sometimes air moves fast and sometimes it hardly moves at all. Wind speed can be estimated by observing the things that it moves, such as flags, tree branches or sailboats.

KEY SCIENCE VOCABULARY: weather, season (winter, spring, summer, fall), thermometer, precipitation, freezing, melt

**CMT EXPECTED
PERFORMANCES**

A7

Describe and record daily weather conditions.

A8

Relate seasonal weather patterns to appropriate choices of clothing and activities.

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LESSONS

A useful structure for inquiry-based learning units follows a **LEARNING CYCLE** model. One such model, the “5-E Model”, engages students in experiences that allow them to observe, question and make tentative explanations before formal instruction and terminology is introduced. Generally, there are five stages in an inquiry learning unit:

- **Engagement:** stimulate students’ interest, curiosity and preconceptions;
- **Exploration:** first-hand experiences with concepts without direct instruction;
- **Explanation:** students’ explanations followed by introduction of formal terms and clarifications;
- **Elaboration:** applying knowledge to solve a problem. Students frequently develop and complete their own well-designed investigations;
- **Evaluation:** students and teachers reflect on change in conceptual understanding and identify ideas still “under development”.

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Weather:(K)

Lesson 1: Sharing What We Know about Weather

Pre-unit assessment

Goal: Students will share what they know about weather through discussion about today's weather and about how they decide what to wear to school. (Discussion will be repeated after unit).

Objectives:

- Students observe and describe today's weather.
- Students discuss how they decide what to wear to school each day.
- Students organize information about their favorite types of weather on a class graph.

Lesson 2: Observing the Weather

Goal: Students will use their senses (sight, hearing, smell, and touch) to find out about the weather.

Objectives:

- Students will use their senses to observe the weather.
- Students discuss and record data about observable weather features.
- Students brainstorm questions they have about weather.
- Students read about and discuss how meteorologists study weather.

Lesson 3: Recording the Weather

Goal: Students will begin observing and describing the weather in the first two lesson, focusing on cloud cover and precipitation. Recording observations on a daily weather calendar introduces student to long-term data collection. At the end of the unit, students will summarize the weather data they have collected.

Objectives:

- Students observe and discuss cloud cover and precipitation.
- Students collect data about cloud cover and precipitation.
- Students record weather data on a calendar.

Lesson 4: Estimating Wind Speed

Goal: Students will make a wind flag and then learn to use a simple wind scale. The students will add wind data to their daily weather calendar helping them to acquire a more complete picture of the daily weather.

Objectives:

Students describe how they know when the wind is blowing.

Students observe and describe a flag moving in the wind.

Students discuss and record the speed of the wind.

Students apply a wind scale to the movement of the flag.

Lesson 5: Reading a Thermometer *Lesson 1 of 3

Goal: Students will explore temperature and be introduced to a thermometer a tool for measuring temperature. Students will use a really thermometer to discover how a thermometer reacts to temperature and a model thermometer to learn to read the scale. As they practice reading this scale, they begin to see that the higher numbers on the scale correspond with hotter temperatures and the lower numbers correspond with colder temperature.

Objectives:

- Students observe and discuss thermometers as tools that measure temperature.
- Students read the numbers on the thermometer scale.

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- Students relate the numbers on the scale to hotter or colder temperatures.
- Students observe and record cloud cover, precipitation, and wind on the Weather Calendar.

Lesson 6: Making a Model Thermometer *Lesson 2 of 3

Goal: Students will continue to explore temperature by making their own thermometer. The students will work on reading the thermometer scale and relating the numbers on the scale to hotter or colder temperatures. Students will practice adjusting their thermometers to match temperatures.

Objectives:

- Students read temperatures on model thermometers.
- Students read and record the temperature shown on an illustration of a thermometer.
- Students relate a specific temperature to appropriate activities and clothing.
- Students observe, discuss, and record today's weather on the Weather Calendar.

Lesson 7: Comparing Inside and Outside Temperatures *Lesson 3 of 3

Goal: Students will continue their exploration of temperature and thermometer by recording and comparing actual temperature in the classroom and outside. A classroom discussion helps students recognize that it is the outside temperature that gives them information about the weather. Students begin to use their second long-term data collection tool, the Temperature Graph, to record the daily temperature. They will continue recording temperature on the graph throughout the rest of the unit.

Objectives:

- Students read the scale on a real thermometer.
- Students measure, record, and compare the temperatures in the classroom and outside.
- The class compiles temperature data on a graph.
- Students continue to collect weather data and record it on the Weather Calendar.

Lesson 8: Embedded assessment of student's growth in learning to read and record temperature. Introduction of thermometer as measurement tool for temperature.

Goal: Students will be introduced to thermometers as a measurement tool for temperature using real and model thermometers.

Objectives:

- Students measure the temperatures of hot and cold water.
- Students conduct an experiment and discuss the results.
- Students record their data on a graph.
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Lesson 9: Experimenting with Color and temperature

Goal: Students will apply knowledge of thermometer reading to experiment with the effects colors can have on thermometer readings. This can help the students determine the color of the clothing they might choose to wear in specific types of weather.

Objectives:

- Students set up a simple experiment with thermometers
- Students record the temperature shown on thermometers placed in black and white coverings.
- Students will interpret the data.
- Students apply the results of the experiment to draw practical conclusions.

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Lesson 10: Making a Rain Gauge *Lesson 1 of 3

Goal: Students will construct and practice using a rain gauge, which is the third scale they will use in the unit.

Objectives:

- Students construct rain gauges.
- Students measure and record the amount of rainfall in their rain gauges.
- The class results are recorded on a chart.

Lesson 11: Exploring Puddles *Lesson 2 of 3

Goal: Students will explore what happens to puddles (collections of rain) through observation and discussion. Students will continue to explore their weather knowledge with an historical story about the invention of a special umbrella called the “Mud Puddle Spotter.”

Objectives:

- Students observe the process of evaporation.
- Students record the changes in puddles that take place as the water evaporates.
- Students read about and discuss the historical development of the umbrella.

Lesson 12: Testing Rainy Day Fabrics *Day 3 of 3

Goal: Students will experiment with three different fabrics and explore how they respond. Through discussion of their results students will use their observations to draw conclusion about which fabric would keep them driest on a rainy day. *Students will be exposed to a story that will help them recognize that rain day fabrics have been the subject of experimentation in the past.

Objectives:

- Students conduct an experiment with fabrics and water.
- Students record their results and draw conclusions.
- Students read about and discuss the history of the mackintosh raincoat.

Lesson 13: Observing Clouds *Lesson 1 of 2

Goal: Students will take a closer look at clouds (from their cloud cover on the weather calendar). The students will increase their awareness of many different ways clouds can look focusing on the diversity of cloud shape and size.

Objectives:

- Students observe and discuss clouds.
- Students make three-dimensional pictures to record their observations of clouds.

Lesson 14: Classifying Clouds *Lesson 2 of 2

Goal: Students will describe how clouds look to them. Students will be introduced to the scientific terms for basic types of clouds: stratus, cumulus, and cirrus. Students will see examples of all three types in photographs and then sort them by scientific categories.

Objectives:

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- Students create their own classification schemes for sorting cloud photographs.
- Students sort the cloud photographs using the categories stratus, cumulus, and cirrus.
- Students organize information about clouds on a classification chart.

Lesson 15: Comparing Forecasts to Today's Weather

Goal: Students will recognize the close connection between student's new knowledge about weather and the world of meteorology. Students will compare their own observations of today's weather with a meteorologist's forecast; this will help the students recognize that the observable weather features they have become familiar with are the same features that meteorologists use in their daily forecasts.

Objectives:

- Students compare a weather forecast from the newspaper with the day's actual weather.
- Students discuss the fact that forecasts are predications based on observed and recorded data.
- Students discuss ways that forecasts can help them make decisions about outdoor activities.

Lesson 16: Summarizing Our Weather Observations

Goal: Students will discuss what they have learned about weather over the past unit. They will determine the weather in the past by using the weather calendar and weather graph.

Objectives:

- Students review and discuss the data from the Weather Calendar and the Temperature Graph.
- Students tally collected weather data.
- Using their data, students summarize characteristics of the weather over a long period of time.

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FINAL ASSESSMENTS:

Assessment 1 asks students to pretend to be a meteorologist reporting the weather and to suggest suitable clothing to go with the day's weather.

or

Assessment 2 asks students to draw a picture and label it in answer to the question "What have you learned about weather?"

BIG QUESTION: How can/do you remember what the weather was like two weeks before? *By examining the data from the Weather Calendar and Temperature Graph, they are able to summarize the weather over the past few weeks.*

Culmative project: Create a daily weather calendar or weather report for the entire school or class room that can be displayed each day for everyone to see.

PRACTICAL SUGGESTIONS FROM KINDERGARTEN TEACHERS:

I know you are wondering where am I going to find the time? Well you do not need to find time you just need to be creative. Look at the objectives and see if they can met during a time that already exists. Why not track the weather during the Saxon math meeting. Why not write about weather during writing. Switch or add books to the vocabulary/comprehension block. Why not add a science reading center you could read, write, label, create, letter match, sound match all about weather. Why not let them visit www.weatherbug as a reward or let some older students buddy up with your students and explore some of the weather websites. Train your kids to the weather report daily and then let them share it during announcements at either the beginning or end of the day. There are many ways to incorporate science/weather into your day without having to create time.

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Bibliography of Additional Literature

Fiction and Non-Fiction

Check your school library for these books; you might also suggest your librarian or literature coach

**My Five Senses. by Aiki (BIG BOOK)

Kids Discover STC Reader : Weather

The Kid's Book of Weather Forecasting: Build a Weather Station: Read the Sky" & Make Predictions! By Mark Breen & Kathleen Friestad

Weather Forecasting. By Gail Gibbons.

What Will the Weather Be: (Let's-Read-and-Find-Out Science 2). by Lynda DeWitt

Oh Say Can You Say What's the Weather Today?: All About Weather. (Cat in the Hat's Learning Library) by Tish Rabe

The Weather/Eltiempo(English and Spanish Series) (Book #6) (Bilingual). By Gladys Rosa-Mendoza, Carolin Cifuentes, Cd Hullinger, and C.D.

Weather Words and What They Mean. By Gail Gibbons.

Weather ABC: An Alphabet Book (A+ Books). by B.A. Hoena

If Frogs Made the Weather. By Marion Dane Bauer

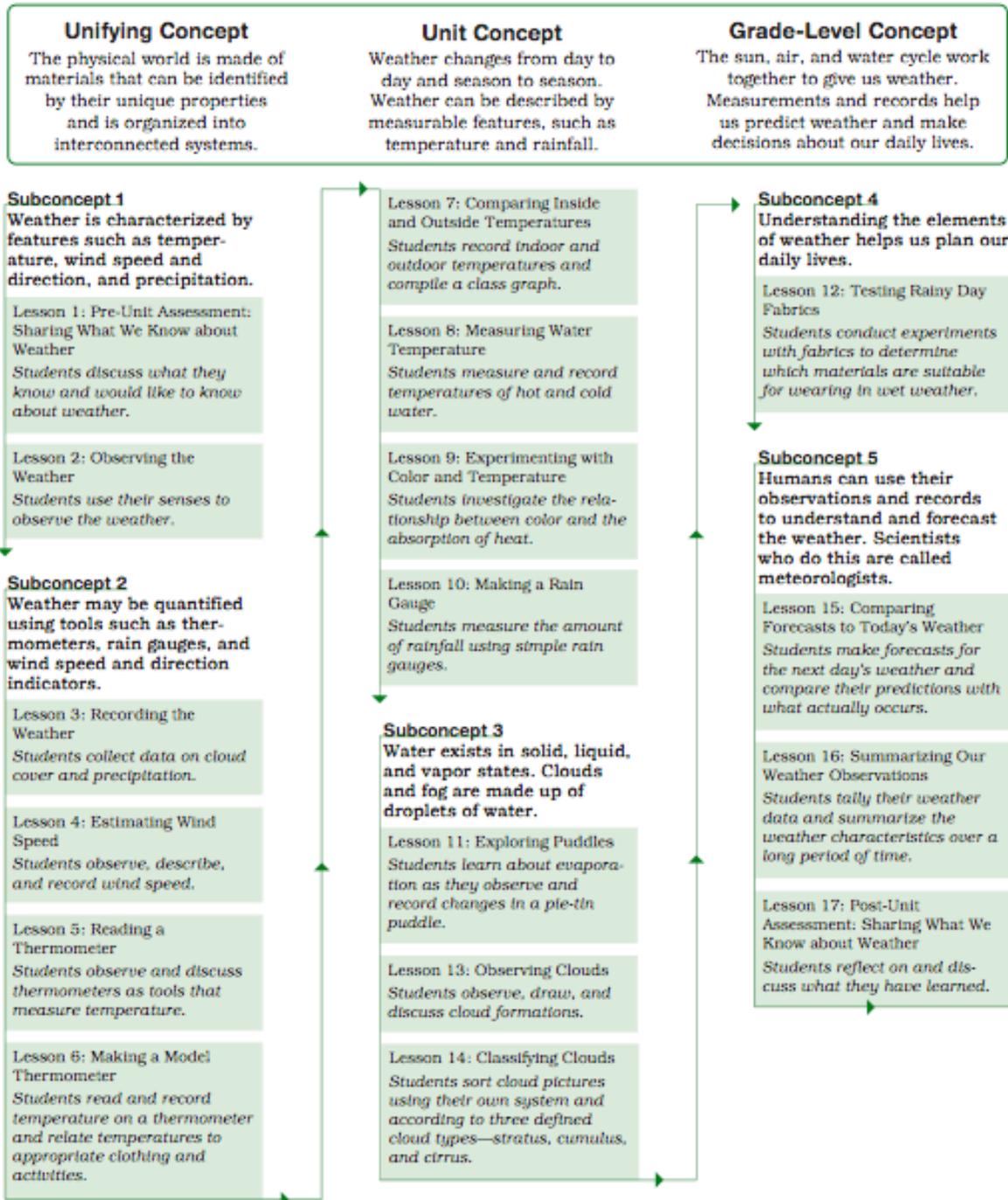
Weather: Poems for All Seasons. By Lee Bennett Hopkins and Melanie Hall

The Cloud Book. by Tomie DePaola

Little Cloud. By Eric Carle

Cloud Dance. By Thomas Locker

Weather Concept Storyline



Weather

Narrative Summary

This unit introduces first-graders to the concept of weather and how it affects their lives. Using a variety of tools, students observe, discuss, measure, and record data on cloud cover, precipitation, wind, and temperature. They learn how to read a thermometer and construct a rain gauge to measure precipitation. They also study cloud formations and use a wind scale to estimate the speed of wind. To apply their new skills and knowledge, students compare their own weather predictions with an actual weather forecast and use the weather data they have collected to form generalizations about the weather in their own locale.

Science Content

Throughout this unit, students use science tools to extend their senses. Students engage in scientific inquiry by setting up several simple investigations on the effect color has on temperature and heat absorption. Math skills are used in context when students apply a scale to their measurements and create graphs. Long-term data collection is emphasized when students take responsibility for collecting data, recording it in a class weather calendar, and making reports to their classmates. Students use data to look for patterns and learn to make predictions. Reading selections extend the unit's content by addressing the career of meteorology and the history and invention of the umbrella and mackintosh raincoat.



Assessment

In Lesson 1, students observe the day's weather and then discuss how they might use this information to decide what they will wear to school. A class graph serves as a means of organizing information about students' favorite types of weather. This pre-unit assessment, matched to a post-unit assessment following Lesson 16, serves as a basis for assessing students' growth in knowledge. Throughout the unit, assessments are incorporated, or embedded, into the lessons. Lesson 8, which serves as an embedded assessment, asks students to apply what they have learned about temperature to a new situation. By measuring the temperatures of hot, cold, and mixed hot and cold water, students demonstrate growth in learning to read and record temperature. At the close of the unit, students make sense of their data on wind speed, cloud cover, precipitation, and temperature by comparing their weather predictions with those of a meteorologist. Additional assessments at the end of the unit include developing and presenting student-made weather reports, drawing pictures of different types of weather, and presenting weather information to visitors. Students can also revisit a temperature activity from earlier in the unit.

STC TEACHER GUIDES

The NSRC's Science and Technology for Children® curriculum was completed in 1997. Since then, the NSRC and its publisher, Carolina Biological Supply Company, have been improving the content and structure of the curriculum to reflect feedback from students, teachers, and school administrators. This process of improvement has led to the second edition of the STC program materials.

The new edition of STC incorporates many useful improvements, including changes in the format, organization, and content of the STC Teachers Guides (TGs). The new TGs are hole-punched and contained within a binder. This improves ease-of-use and allows teachers to add materials as they prepare their lessons and participate in professional development programs. The new TGs are organized into sections, each clearly identified with a tab. The tabbed sections are as follows:

Revised STC program and unit overviews. **(Tabs 1 & 2)**

Information about equipment, supplies, and safety, contextualized to each of the 24 STC units. **(Tab 3)**

16 or more student investigations that incorporate either pre-, embedded, or post-unit assessments. **(Tab 4)**

The role of assessment in the STC program, with extensive background information for teachers and additional assessments. **(Tab 5)**

The role of notebooks in the STC program, including specific guidance for teachers. **(Tab 6)**

The use of reading resources for the STC program. This section highlights the role of science education in literacy, gives explicit instructions for teachers on how to use the reading selections in the STC units and spotlights the new

Science and Technology for Children® Books for children grades four through six. **(Tab 7)**

Additional resources that teachers can use to supplement the hands on investigations. Includes recommendations for videos, books, audiovisual, technology and other materials. **(Tab 8)**