WEATHER STATION CREATION

Garden

ADAPTED GRADES K–5 | SCHOOL PARTNER LESSON PLAN

TIME AND LENGTH
45 min

LOCATION
Garden

ESSENTIAL QUESTIONS

- Why do we plant the seeds and plants we do?
- How does weather data help guide us as farmers & gardeners?

MATERIALS

- 4 good anemometers
- 4 thermometers that are little-kid friendly
- 4 3-in-1 soil ph/temp deals
- Hourglass timer
- 4 trays
- Seeds in small plastic pots of soil (2 dry and the other 2 watered really well)
- Earth/Sun Model
- Weather Station Creation Water Cycle Handout (can be optional)
- Anchor charts ("Weather and Seasons in Austin Anchor Chart K–2 Handout" or "Weather and Seasons in Austin Anchor Chart 3–5 Handout")
- Twine (daily box)
- Tent stakes (daily box)
- Magnifying glasses (daily box) Not needed if teachers are leading weather tools
- Clipboards (daily box)
- Paper (daily box) Not needed if teachers are leading weather tools
- Pencils (daily box)
- "Weather/Season/Plants Background Handout"

NOTE:
Adapted from **Grade 2 Garden Lesson #8: Weather Station Creation**, pg 137.

CUNNINGHAM ELEMENTARY SCHOOL
AUSTIN Independent School District

PEAS
PARTNERS FOR EDUCATION, AGRICULTURE & SUSTAINABILITY

CREATED BY
Cunningham Elementary School
and Partners for Education in 2021

Abc VOCABULARY

- Anemometer
- Thermometer
- Rain gauge
- Soil
- Transect line

TEACHER BACKGROUND

See Weather/Seasons/Plants Background handout at the end of lesson.

LESSON DESCRIPTION

In this lesson students will learn the importance of observing & recording weather data in order to guide our behaviors in the garden. Students will learn how to use the tools necessary to create a weather station.

LEARNING OBJECTIVES

- Students will understand that certain plants are planted at certain seasons and in certain regions. Gardeners have to be aware of weather and how changes in weather will affect the garden.

ACADEMIC STANDARD CONNECTIONS

Texas Essential Knowledge and Skills (TEKS) for Science, Elementary, Revised 2022

1.8 Earth and space. The student knows that the natural world includes the air around us and objects in the sky. The student is expected to:

(A) record weather information, including relative temperature such as hot or cold, clear or cloudy, calm or windy, and rainy or icy

(D) demonstrate that air is all around us and observe that wind is moving air

2.8 Earth and space. The student knows that there are recognizable patterns in the natural world and among objects in the sky. The student is expected to:

(A) measure, record, and graph weather information, including temperature, wind conditions, precipitation, and cloud coverage, in order to identify patterns in the data

(B) identify the importance of weather and seasonal information to make choices in clothing, activities, and transportation seasonal information to make choices in clothing, activities, and transportation

3.8 Earth and space. The student knows there are recognizable patterns in the natural world and among objects in the sky. The student is expected to:

(A) observe, measure, record, and compare day-to-day weather changes in different locations at the same time that include air temperature, wind direction, and precipitation

4.8 Earth and space. The student knows that there are recognizable patterns in the natural world and among the Sun, Earth, and Moon system. The student is expected to:
(C) collect and analyze data to identify sequences and predict patterns of change in shadows, seasons, and the observable appearance of the Moon over time

5.8 Earth and space. The student knows that there are recognizable patterns in the natural world and among the Sun, Earth, and Moon system. The student is expected to:
(A) differentiate between weather and climate

HEALTH STANDARD CONNECTIONS

Texas Essential Knowledge and Skills (TEKS) for Health Education, Elementary, Revised 2022

1.2 Physical health and hygiene—personal health and hygiene. The student understands health literacy, preventative health behaviors, and how to access and evaluate health care information to make informed decisions. The student is expected to:
(B) describe personal hygiene and health habits that enhance individual health such as personal hygiene, oral hygiene, and getting enough sleep

3.2 Physical health and hygiene—personal health and hygiene. The student understands health literacy, preventative health behaviors, and how to access and evaluate health care information to make informed decisions. The student is expected to:
(A) explain the importance of seeking assistance in making decisions about health
(B) describe methods of accessing information about health
(C) identify the benefits of decision making about personal health
(D) identify the importance of taking personal responsibility for developing and maintaining personal hygiene and health habits

3.11(B) gather data to help make informed health choices

Lesson Sequence

Engage

Cultivate Curiosity:

- Present two or more plant starts (or pots with soil in them) at varying degrees of dampness.
  1. Help students take turns feeling the dry soil and the wet soil with their fingers.
  2. Prompt students to pair-share as they describe the soil.

- Ask:
  - How does the soil feel?
  - How does the soil look?
  - What would it mean if the soil felt squishy or muddy? (Too much water.)

Explore **Root Around:**

- Ask students to think about how the weather affected the way the soil might have felt? If the soil was dry, what kind of weather might we have had? If the soil was wet, what kind of weather might we have had? What is the weather this week? Will the weather be the same in December? Will it be the same in the spring? No! Weather is different during different seasons.

- Show students the anchor chart ("Weather and Seasons in Austin Anchor Chart K–2" or "Weather and Seasons in Austin Anchor Chart 3–5") and fill in JUST THE INFORMATION FOR SUMMER. See Weather Station Creation PEAS for handout. This is based on what students can remember about the summer. Was it rainy? Hot? Cold? Cloudy? Windy? Was it dark in the afternoon, or light? Does it feel the same now that it did in summer? Why not?

- **Grades Pre-K–2:** Use the more seasons anchor chart and discuss seasons. Finish with the season we are in right now.

Explain **Grow Understanding:**

- Seasons are caused by the amount of direct sun the earth gets as it revolves around the sun. Show students the model (ordered). In summer, the earth is tilted towards the sun, and we get lots of hours of sunlight! It gets very hot! In fall, we are not tilted towards or away from the sun, and so we get some days that are warm and some days that are cooler. Some plants can grow in colder temperatures and others can tolerate a lot of heat. (Farmers and gardeners are guided by seasons and weather to determine when to plant and harvest fruits and vegetables.)

- What was the weather like in summer? After debriefing summer, ask if it is a good time to plant vegetables? Fill in the typical weather for fall and tell students we are going to measure the weather to see what the fall weather is like in our garden.

Elaborate **Observe the Fruits:**

- Today we will investigate how the fall weather has affected our garden, and plant some plants in our garden that will do well in the fall and winter weather. We are also going to explore our garden to find out how the weather is affecting the soil that plants grow in. Gardeners have to know what the conditions are in the garden to know what we have to do to take care of our plants. We also plant certain plants at certain times of the year.

- **Grades Pre-K–2:** Omit the 3-in-1 soil ph/temp tool. Outdoor Education Specialist can record on the laminated line transect data sheet.

- **Grades 3–5:** Complete the transect line in one of the garden beds with the weather station tools. Students can record on their own data sheet.

Evaluate **Reflect:**

- **Grades Pre-K–2:** How is our garden doing? Was there enough moisture in the soil? What's the weather song...?

- **Grades 3–5:** In northern climates where it is cold in the winter, many farmers do not farm in the winter because it is just too cold for many plants to grow. In Texas, farms try to find crops that do not need as much water in the summer or they have to use a lot of irrigation to keep things alive because we do not get enough rain to support the plant life. Who can tell me what irrigation means?
  - How is the garden doing? Do we need to change anything? Did what we plant go along with the seasons? (root vegetables, squash, carrots?)
  - Why did we plant the plants we planted? Why did we plant carrot seeds? Radish seeds?
  - How does the weather and seasons affect our planting?
  - How do we know if the outdoor space is getting enough/too much rain?
  - Bring it back to their garden space.

ADAPTATIONS

Students will plant seasonally appropriate seeds with their teacher. Students can use magnifying glasses to observe soil. Students can check on and measure the height of plants (see"Tracking Garden Changes—Plant Growth" handout). Students can draw a picture of the weather in the outdoor space today, listing things that are different from previous lessons (evidence of fall).

POSSIBLE EXTENSIONS

Students could create a weather station at multiple locations on the school campus to collect more extensive data.

ADDITIONAL RESOURCES

Texas A&M Ag Extension Planting Guide

Grades K–2

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Weather
Temperature
Plants

Weather
Temperature
Types of plants

WEATHER and SEASONS

Weather
Temperature
Types of plants

Weather
Temperature
Types of plants

Grades 3–5

WEATHER and SEASONS

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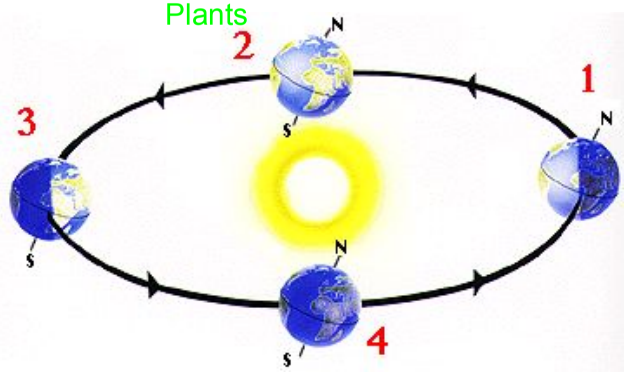
Weather
Temperature
Plants



Weather
Temperature
Types of plants

Weather
Temperature
Types of plants

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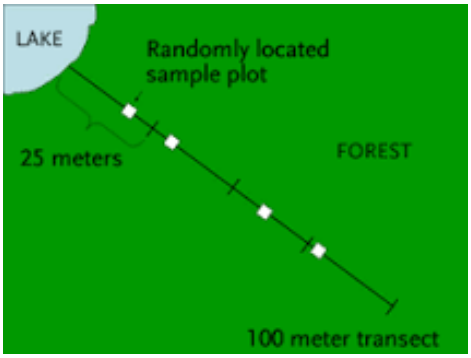
WEATHER/SEASONS/PLANTS BACKGROUND

Soil Sampling Tasks

Make a line transect A tape or string laid along the ground in a straight **line** between two poles as a guide to a sampling method used to measure the distribution of organisms. Sampling is rigorously confined to organisms that are actually touching the **line**.
Every 3 feet in the garden bed measure wetness, temp., air temp.

For upper grades- when a plant freezes it affects the water in the cell walls.



What is Ph?- PH is potential hydrogen- used to rank the basicity or acidity of substances based on the amount of hydrogen ion activity in a substance. Visit - https://www.sunset.com/garden/garden-basics/acid-alkaline-soil-modifying-ph

How to Use a 3-In-1 Soil Tester
Use a 3-in-1 soil tester to tailor the optimal conditions for your garden.
Signs of a Low pH in Plants

A 3-in-1 soil tester is a metal pronged instrument that is inserted into the soil to test soil pH, light intensity, and moisture levels. A soil tester takes some of the guesswork out of where and how to plant your flowers, shrubs or trees. You can use the tester to determine the current levels of the soil, and alter them according to the specific needs of the plants you wish to place there. Plant grasses, shrubs, flowers or trees that need similar conditions together in one area, with those needing different conditions in a separate area of the yard or garden.

1

Clean the prongs of the tester with distilled water and a clean cloth before use, and between uses. This will keep the readings from being affected by the pH of a previous test or tap water.

2

Insert the prongs into the soil you wish to measure. The first reading that appears will be a pH, which is measured on a scale from 1 to 14, with 1 being the most acidic and 14 being the most alkaline. Seven is a neutral pH. Most plants will grow in a pH between 6 and 7.5. The soil tester measures pH levels from 3.5 to 8. Alter soil pH by adding limestone to raise it, or sulfur to lower it.

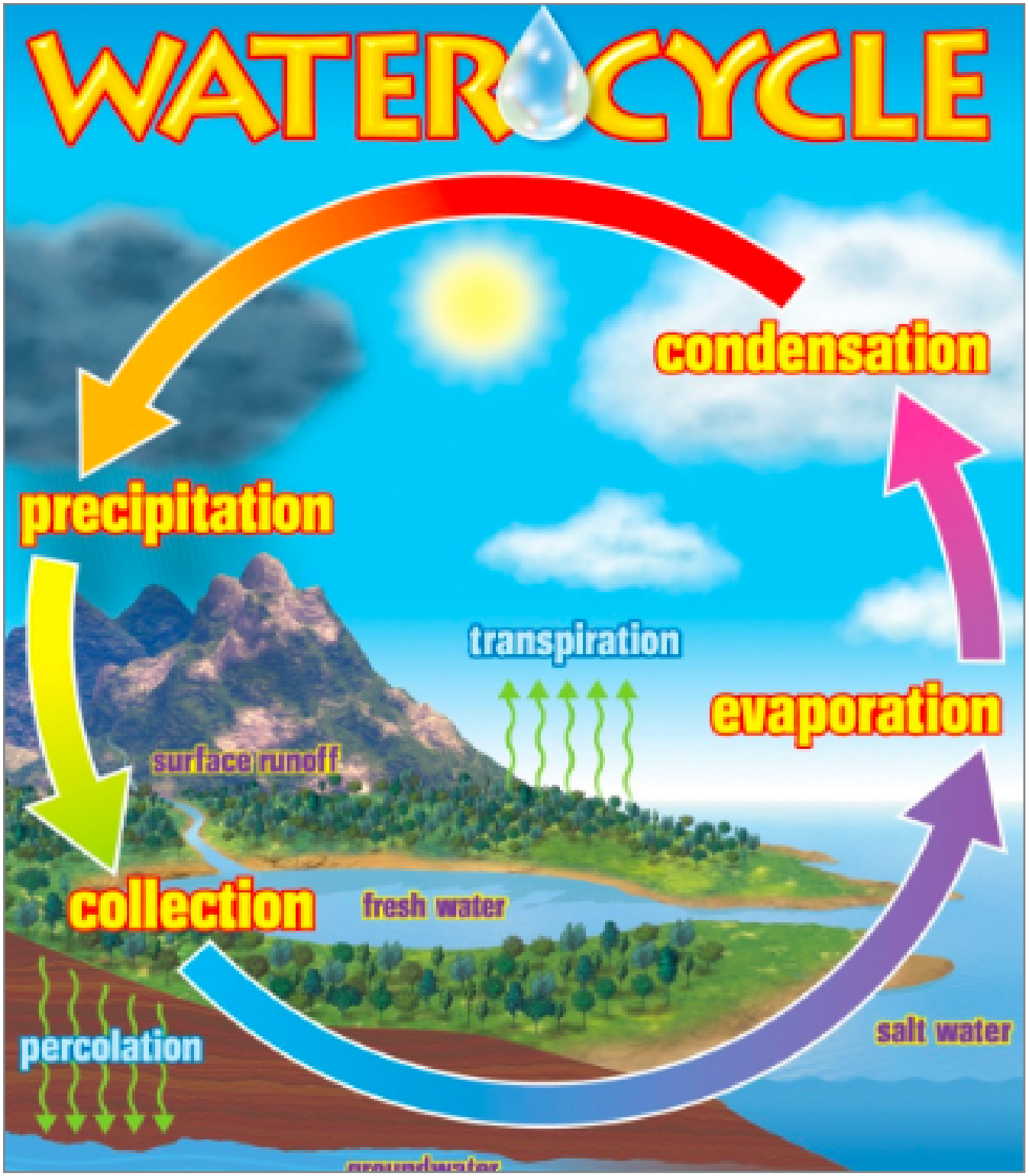
3

Press the button on the tester to view the moisture readings. The tester measures the percentage of moisture content in 10 percent increments, from no moisture to complete saturation. Most plants will want moist soil in the mid-range. Sand can be added to soil to increase drainage capabilities for excessively wet soil.

4

Press the button on the tester again to view the light readings. Light readings measure light intensity in foot-candles from 0 to 2,000. For reference, average indoor home lighting is around 100 foot-candles. Plants requiring full sun can be planted in the upper light ranges, and plants requiring shade can be planted in the lower light areas.

Believe it or not, foot candles are the most common unit of measure used by lighting professionals to calculate light levels in businesses and outdoor spaces. In a nutshell, a foot candle is a measurement of light intensity and is defined as the illuminance on a one-square foot surface from a uniform source of light.



Source: Water Cycle Poster