

# Weather & Trees



## Submitted By:

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## Overview

Students will study weather and climate using trees as they examine how weather and climate impact our lives.

## Grade Levels

5

## Curriculum Correlation

5.E.1.1, 5.E.1.2, 5.L.5b, 5.G.2, CCSS.ELA-LITERACY.RI.5.3, CCSS.ELA-LITERACY.RI.5.4, CCSS.ELA-LITERACY.RI.5.7

## Duration

Seven 20-30 minute sessions

## Location

Outdoors, Classroom

## Materials

Science notebooks, weather instruments (rain gauge, thermometer, anemometer, barometer, cloud ID chart, wind sock or compass for wind direction)

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## Procedure

### Day one

#### **Engage** – 5 minute warm up

*Analyze quotes/metaphors about weather and seasons*

Think Pair Share – Each table group will have a quote that relates weather and the seasons to human life as metaphors. Students will reflect on the quote in their science journal, then share their interpretation with their table group. Groups can share with the class what their quote was and their interpretation.

“No winter lasts forever, no spring skips its turn.” – Hal Borland

“The season of failure is the best time for growing the seeds of success.” – Paramahansa Yogananda

“Time will pass and seasons will come and go.” Roy Bean

“If you want to see the sunshine, you have to weather the storm.” - Frank Lane

“Bad weather always looks worse through a window.” - Tom Lehrer

#### **Explore** – 20 minutes

[SERC Earth Labs: Climate and the Biosphere; Weather and Climate and Trees; Lab 1A Weather and Plants in Your Region](#)

Materials required: Science notebooks, weather instruments (rain gauge, thermometer, anemometer, barometer, cloud ID chart, wind sock or compass for wind direction)

1. Introduce the Essential Question: How do weather and climate impact our lives?
2. Use the Page Keeley “Are They Talking About Climate or Weather?” assessment probe to evaluate the students’ initial ideas about weather vs. climate. Use the card sort method, removing options G and H (for better student use).

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3. Introduce weather and climate using the M&M Sorting activity (Courtesy of Amber Hutchins and Brian Macarelli) [Weather vs. Climate M&M Activity](#)

4. Next, use the Jigsaw approach so students can study more about the elements of weather:

Temperature, Wind, Pressure, Precipitation, Clouds

Students will have “Home” groups, and “Expert” groups. Students will work in Expert groups to study these different factors of weather. Then they will return to their Home groups to present what they learned to each other and how they interact.

<https://scijinks.gov/menu/answers/clouds-water-and-ice/>

Precipitation team will read “What Makes It Rain?”

Clouds team will read “Types of Clouds”

Pressure team - <http://eo.ucar.edu/kids/sky/air2.htm>

Temperature team - <http://www.weatherwizkids.com/weather-temperature.htm>

Wind team - <http://www.weatherwizkids.com/weather-wind.htm>

5. Briefly introduce definitions of the Earth System Spheres on the worksheet. Each student group will share with the other groups what they learned about their topic. Students who are listening will track which “sphere” the other groups are representing; don’t focus on the interactions just yet – it is important for students to first make the connection to the earth systems.

They can list each on this diagram: [ESS Spheres](#)

\*The students will hopefully notice that they are primarily hydrosphere and atmosphere.

The group will go outside to record weather data in chart form in a science journal or Excel spreadsheet on their computers.

\*Repeat weather data collection for 5 days\*

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Date:

Temperature:

Wind speed:

Wind direction:

Pressure:

Precipitation:

Cloud coverage:

Cloud type:

[Data sheet reference from Earth Lab](#)

6. Next students will locate a tree in the school yard (or use their Nature's Notebook tree) to observe and record data about:

Type of tree: (Northern Red Oak, Red Maple, Sugar Maple)

Size:

Age(?):

Include a drawing or photo of the plant

Look up the tree using a tree field guide or using an online program like [Leaf ID](#) (this program uses a dichotomous key which is good practice for students to categorize and sort).

**Critical Thinking:** How does this tree adjust to seasonal changes in its ecosystem? (Probing: is it deciduous or evergreen; does it flower in fall or spring; when does it produce fruit/seeds)

How do these actions affect the ecosystem? \*Think of interactions\*

[Data sheet reference from Earth Lab](#)

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## Day Two through Four

**Explore** - Repeat weather data collection

## Day Five

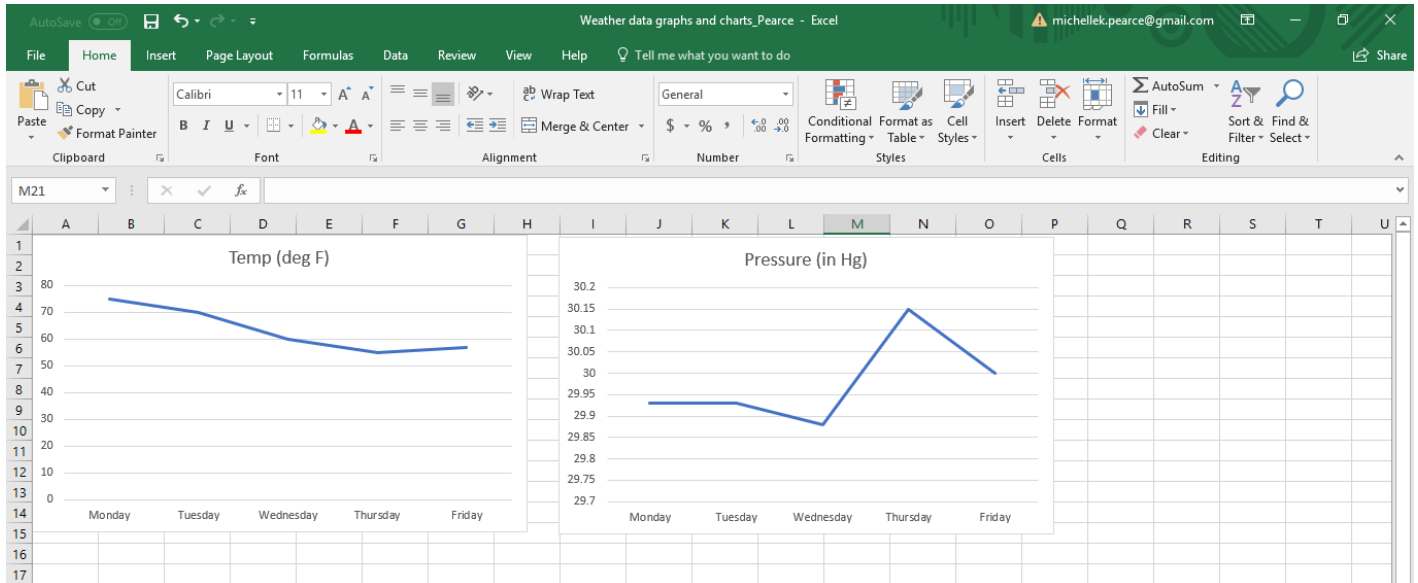
**Explain** - 30 minutes

*Graphing Our Data*

Using the weather collected from the week, work with students to graph their temperature and pressure data. Work with them to analyze and explain the changes they see, and challenge them forecast the next day's weather based on their results.

My Weather Data					
	Monday	Tuesday	Wednesday	Thursday	Friday
Temp (deg F)	75	70	60	55	57
Wind Speed (mph)	4	8	16	10	5
Wind Direction	NW	W	S	N	N
Pressure (in Hg)	29.93	29.93	29.88	30.15	30
Precipitation (in)	0	0	0.12	0	0.12
Cloud Coverage (%)	30	20	100	50	100
Cloud Type	cirrus	cirrus, cumulus	cumulonimbus	cumulus	stratus

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Example prediction: I think with the decrease in pressure and the presence of stratus clouds that there will be more rain and cooler temperatures on Saturday.

## Day Six

### **Elaborate**

*Introduce phenology and the National Phenology Network*

Begin the class with the book “Sky Tree” by Thomas Locker

<https://www.amazon.com/Sky-Tree-Seeing-Science-Through/dp/0064437507>

Use the Nature’s Notebook activity “Phenology Bingo” to introduce phenology – changes into spring and summer seasons based on bioindicators.

[https://www.usanpn.org/files/USA-NPN\\_Phenology\\_Bingo\\_o.pdf](https://www.usanpn.org/files/USA-NPN_Phenology_Bingo_o.pdf)

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Use the traditional bingo directions but create a unique bingo card to the region and your citizen science project – i.e. Seen a dogwood tree bloom, a hummingbird visit a red flower (pollination!), a squirrel with white ear fur (in winter!), seen a daffodil bloom, watched robins look for worms after a rain, seen a box turtle, eaten sourwood honey, picked and eaten a fresh fruit or vegetable from a garden (the rest on the sheet are still applicable)

**Student led discussion:** What are some other indicators you look for when the seasons change?

**Critical Thinking Question:** How does the definition of weather apply to seasons? How does the definition of seasons apply to climate? Can you show it in an analogy?

Weather: seasons :: seasons: climate

Use the ESS Spheres chart. Looking at how the students sorted the elements of weather into Hydrosphere and Atmosphere, ask “Where could we put the trees we studied? (Biosphere) What would go in the Lithosphere circle? (Soil/roots)”

In the center circle we’ll use the example of a severe thunderstorm. Explain that where the circles overlap are ways that those things interact.

Working with student led observation and experience, record all responses on the board.

1. How does the thunderstorm interact with the Biosphere? (The rain could keep animals away, the lightening could strike the tree down)
2. How does the thunderstorm interact with the Atmosphere? (the storm takes place in the atmosphere; the temperature is changing during the storm, the sun is blocked because of clouds; there might be strong winds or a tornado)
3. How does the thunderstorm interact with the hydrosphere? (the rain is part of the water cycle; lots of rain will fill waterways and maybe flood them; strong rain could cause severe flooding)

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4. And the Lithosphere? (the strong rain could over saturate the soil or cause it to wash away)
5. Go back to each response to see how that cause interactions between the spheres – how would severe flooding (hydrosphere) from the thunderstorm impact the biosphere? (plants are damaged, humans lose their homes or cars)

## Day Seven

### **Evaluate**

Start the day looking at the ESS Worksheets from the day before. Use a different example to continue the idea that weather connects all of the spheres: A warm winter season.

Return to the quotes used to introduce the weather topic.

Now that weather and climate have been explained further, have the students re-evaluate their interpretation of their quote.

How does it describe weather (thinking literally)?

How does it describe life (thinking figuratively)?

**Discussion Question:** Why do we use weather and seasons in nature as comparisons for things that happen in life?

Re-take the Page Keeley “Are They Talking About Climate or Weather?” Assessment; use the card sort method again and keep G and H out of the options.

Exit ticket: How does weather and climate impact YOUR life?