Weather & Climate:
Observing, Predicting, and Responding to Weather

Weather & Climate

Humans design and create all kinds of things in response to weather and climate. From houses we live in, to the clothing and shoes we wear, to the kinds of outdoor games we play, weather and climate influence how we live, dress, play, and travel. Questions like: *Will it be warm enough for us to go swimming this weekend? Should I build my house with a flat or sloping roof if I live in snowy New England? Will I need a raincoat when I walk my dog today? Should I pack my sled if I am moving to Arizona? all consider issues related to weather and climate.*

Although the words weather and climate both deal with what is happening outside, they each have different meanings and are useful to know about for different reasons. Weather describes what is happening in the atmosphere right now or in the very near future. It helps us plan our activities for today. Climate describes what atmospheric conditions are typical for a certain place throughout the year and is based on observations of the weather made over 30 or more years. Climate helps us determine our yearly wardrobe or when we should start planting our garden each spring.

To know what the weather is right now, you can look out the window and see what is happening. You can even learn to make observations and collect data today that will help you predict what tomorrow's weather might be. To know what the climate is, we need to look at data about weather patterns collected by scientists over many, many years. Who knows, if you collect and share your own data about the weather in your area, will scientists perhaps use it to help them determine the climate of New England 30 years from now?

Become a Weather & Climate Scientist: Observe the Weather

This activity is a great way to learn how to view and predict the weather by recording observations in a weather journal. For the next 7 to 14 days keep a record of the weather. You will need several pieces of paper or you can make a more official Weather Observation Journal by following the directions at the end of this activity. Make and record your observations at the same time each day. You can write or draw your weather observations—or do both!

Make Observations: Use Everyday Objects

Supply List
Be sure to ask an adult to help you gather your supplies.

- An empty glass, jar, or can (to be left outside)
- 12" long piece of yarn or string
- A twig
- Sunglasses or a baseball hat
- A wet finger

Rain: Place the glass, jar, or can outside to see if it rained during the night and how much rain took place in the day overall.

Wind: Tie the twig to the 12" long piece of yarn or string. With the twig dangling at the bottom of your string or yarn, observe if the twig moves in the wind and how much.

Sunny: Put on sunglasses or a baseball hat and step outside. Now remove them and notice if the sun is bright enough that wearing either item is needed?

Make Observations: Use Your Senses

No fancy instruments or everyday objects are needed to observe the weather when you have you senses. Your senses can help you predict the weather in many different ways…

- Is there a smell to the air? The air smells damp just before a rainstorm.
- What does the air feel like? If the air feels humid, sticky and thick on your skin, that usually indicates a storm is brewing.
- Do you hear leaves moving in the trees? It may be a windy day.
- Wet your finger and see which way the wind is blowing. The side of your finger that feels coolest is the direction that the wind is blowing from. If the wind is blowing from the west, that usually indicates good weather. If it is blowing from the east, that is a sign of bad weather to come.

Make Observations: Look Up and Use the Clouds

The type of clouds in the sky can be used to predict the weather. Look up! What do the clouds look like?

White and wispy usually means a clear day

Flat clouds suggest stability in the atmosphere, bringing little immediate change to the weather

Big fluffy clouds suggest the atmosphere is less stable and storms could be on their way

Small puffy clouds that build over the course of the day may indicate a storm coming

High clouds are usually a sign of good weather, but a storm could develop later in the day

Low clouds indicate bad weather is near

Black clouds are present when stormy conditions are expected

White clouds mean good weather for the moment, by a storm could develop later in the day

Gray clouds that cover the sky, suggest a light storm, but one that may be around for a while

Next: Record Your Findings

Once you have made your observations using your everyday objects, your senses, and/or the clouds, draw or record what you have found and what tools you used. Do this every day, at the same time each day for the next 7 to 14 days and record:

- Today's date
- Temperature: cold/ warm/ hot or if you have a thermometer you can take and record a reading
- General Conditions: Windy/ rainy/ sunny
- Cloud Type
- Other Observations
- Tools used

At the end of each week answer these questions:

Do you see any patterns in the weather for the week (mixed weather, every day was sunny, cloudy, but no rain for one day and then rain)?

What tools worked the best?

Which tool was the most fun to use?

Take It To the Next Level!
Can you make predictions on what the weather will be tomorrow? Give it a try by looking at the sky. Day and night the sky can help determine the weather. Look for these signs:

- "Red sky at night, sailors delight. Red sky in the morning, sailors take warning."
- "Rainbow in the morning, gives you fair warning."
- A moon with a halo indicates the presence of cirrus clouds, which indicate coming precipitation.

Become a Weather & Climate Scientist: Climate Engineering Challenge

Try your hand at designing and building a shelter that protects an imaginary animal from a climate that challenges its existence.

Supplies
Be sure to ask an adult to help you gather your supplies.

- Small toy animal or creature
- Cup of water
- Sunny spot outdoors
- Any objects found outside, such as:
  - Sticks
  - Leaves
  - Rocks
  - Pieces of bark
- Any additional tools you can find from the recycle bin that are clean and dry, such as:
  - Cardboard or flattened boxes
  - Plastic containers

- Egg cartons
- Paper
- Aluminum foil
- Plastic lids

What To Do

Imagine that your animal is very sensitive to sunlight and precipitation (rain), and sadly lives in a climate that has lots of sun for most of the year, but experiences rainy downpours a few times a year. Design and build a shelter that will shade your animal from sunlight and protect it from getting wet during the rainy season. Once your shelter is designed and built, place your animal inside.

Did your shelter keep your animal out of the sun and rain? Let's find out…

Protected from the sun

Is your animal in the sun or shade?

Is there just one spot in the shelter that your animal needs to stay in order to be out of the sun?

Do you think later in the day when the sun is in a different location, that your animal will remain in the shade?

Protected from the rain

Fill a cup of water and slowly pour the water over the shelter. Check on your animal inside.

Is your animal still dry?

If the top of your animal was dry, but the ground beneath it got wet, can you think of a way to change your design to protect your animal not only from the top, but the bottom too?

If part of your structure leaked or a certain material didn't work the way you expected, can you think of a different way to use it or replace it with another material?

Take It To the Next Level!

- Imagine if each material you used cost one hundred dollars. Calculate the cost of the structure you built? Could you redesign and build a less expensive, but still successful structure that would protect your animal?
- Imagine that there is a big storm coming with lots of wind. Would your structure hold up to a strong gale? How might you reinforce or redesign your structure?
- Imagine you could use any material. Can you think of ways of improving your design? What materials would you use and why?

Make a Handsewn Weather Journal

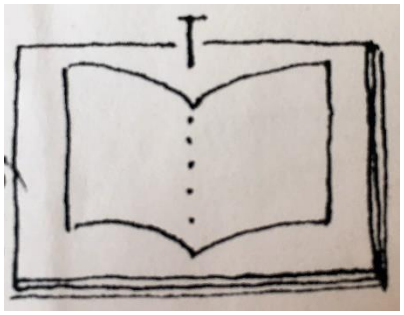
You can make your own special weather journal using items from around your house. Make sure to draw or decorate the first page to make it your own!

Supplies
Ask an adult help you gather the supplies and create your journal.

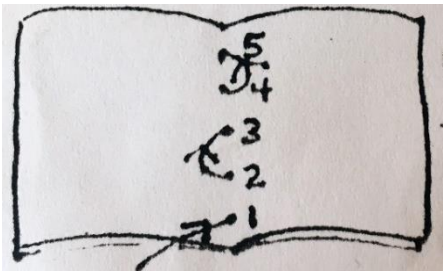
- Paper – 10 sheets of blank 8.5x 11-inch paper
- A one-inch thick pad of cardboard or newspaper (to protect work surface when hammering)
- Small nail
- Hammer
- Needle
- 30" of strong thread
- Scissors

To Make the Journal

1. Fold paper in half
2. Unfold the paper and place on a one- inch pad of cardboard or newspaper
3. Using the nail, hammer 5 evenly spaced holes on the fold of the paper (see photo)



4. With needle and thread sew pages together (see photo):
    - Insert needle down through hole 1, leaving 6 inches of thread hanging
    - Bring needle and thread up through hole 2
    - Push needle and thread down through hole 3
    - Pull needle and thread up through hole 4
    - Push down the needle and thread through hole 5
    - Push the needle back up through hole 4, and then down through hole 3
    - Pull the needle back up through hole 2



5. Cut the needle free, leaving a good length of hanging thread
6. Tie the two ends of the thread together tightly.

You now have a bound journal to fill with weather observations!

Share Your Discoveries with Us!

We want to know about your weather and climate explorations. Share your experience with us in any of the following ways:

- Draw a picture
- Take photos of your game
- Write down what happened, what surprised you, what didn't surprise you, or anything else that was fun or interesting about your experiences.

Then email us at myhomediscoveries@discoveryacton.org, we can't wait to hear from you!

Resources

Videos

Weather vs Climate Crash Course Kids:
https://www.youtube.com/watch?v=YbAWny7FV3w

Be a Weather Watcher: https://www.youtube.com/watch?v=Uo8lbeVVb4M

Webpages

NASA's weather and climate page for kids featuring issues around climate change
https://climatekids.nasa.gov/menu/weather-and-climate/

The Weather Channel What's the weather in your area:
https://weather.com/weather/monthly/l/d337dc6fbc4503045f88acb7b876fe953e7554c0e6783f063887891b467d8458

Become a Citizen Scientist! https://scistarter.org/

Use climate data to learn more about the climate of specific towns in Massachusetts
https://www.usclimatedata.com/climate/massachusetts/united-states/3191