

What's With Weather?: Rain

We've learned about forecasting weather, but what about one of the components of weather—rain?! Learn about precipitation and create your very own water cycle before building another tool for your weather station! (If you haven't checked out our "What's With Weather: Forecast It!" Discovery at Home you might want to start there!)

Supplies:

- For Experiment:
 - Ice cubes
 - Pot & Stovetop
 - Cookie sheet or pan**OR**
 - Glass jar
 - Plate
 - Ice cubes & water
- For Rain Gauge:
 - Empty plastic bottle (2 liter soda bottle works best!)
 - Scissors
 - Rocks, gravel, or marbles
 - Ruler
 - Tape & Marker

What's With Rain?

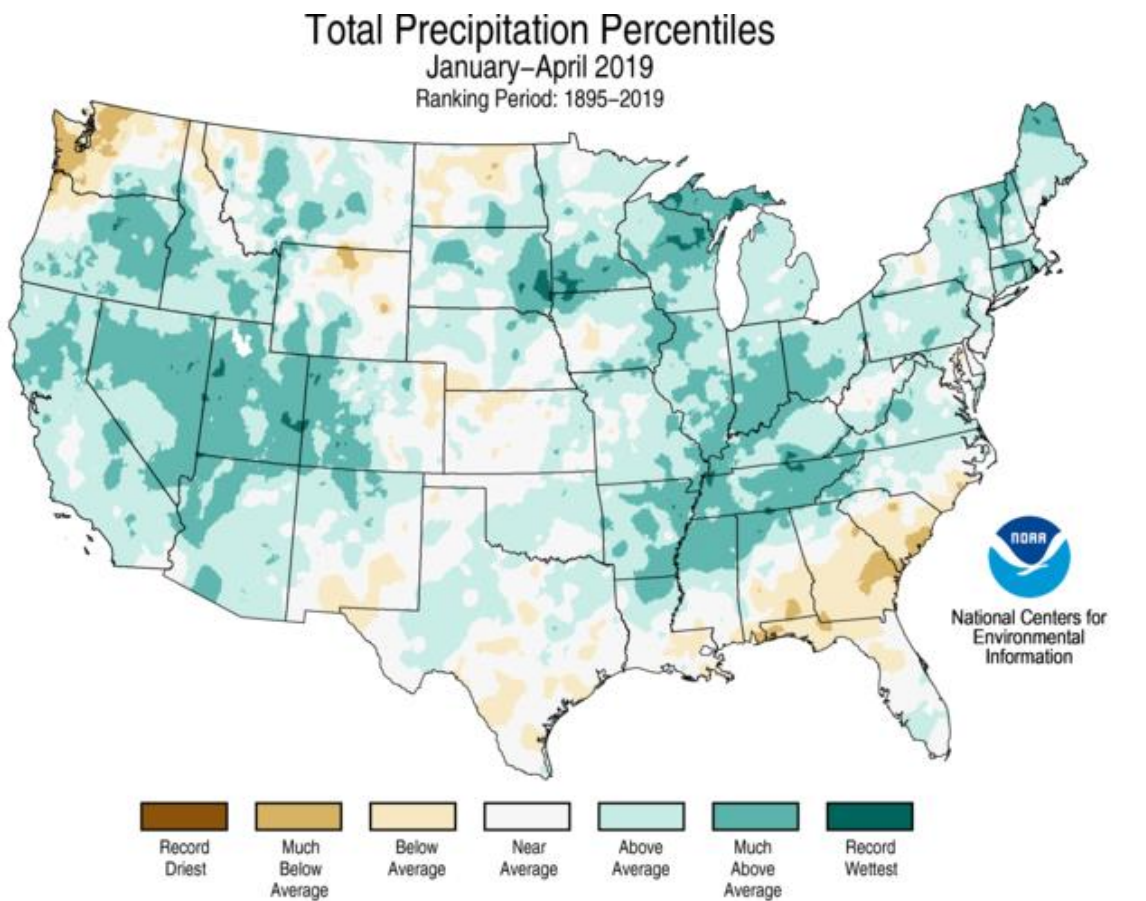
We've already learned that **weather** is the mix of events that happen each day in our **atmosphere**. We know that there are many different pieces that make up weather, but **temperature**, **atmospheric pressure**, **wind**, **humidity**, **precipitation**, and **cloudiness** are especially important! We've also learned that **meteorologists** are scientists who study and **forecast**—predict—the weather and learned about some of the tools they use to make accurate forecasts! [TIP: If you haven't tried out "What's With Weather: Forecast It!", you might want to try that Discovery at Home first! If you've got little ones, check out our Pitter Patter Storytime & Craft!]

Today we're going to learn about one of those important pieces—**precipitation**!

Precipitation is any liquid or frozen water that forms up in the atmosphere and falls back to Earth. Precipitation can be snow, rain, hail, or sleet and is one of the steps in the **water cycle**. The water cycle is the path that all water follows as it moves around our planet and starts when liquid water on Earth's surface **evaporates** and rises into the atmosphere. There it **condenses**—changes from water vapor to liquid water—into water droplets. The droplets grow bigger and bigger until they're heavy enough to fall back to earth as precipitation! If the cloud the water condenses in is cold enough, the droplets may crystalize into ice and fall as hail or snow! But, water can't just magically turn into droplets! It needs a particle of dust, smoke, or pollen known as **condensation nuclei** for the water vapor to condense around and turn into a droplet! It takes many pieces—sun, temperature, air pressure, dust, and more for precipitation to fall!

Why should you care about precipitation? Precipitation is so important for life on Earth! Plants need precipitation to grow and humans need precipitation to regulate our climates and to provide us fresh water to drink and use! Did you know that about only 3% of Earth’s water is fresh water (water we can drink)! Most of that is locked up in glaciers, ice caps, is in the atmosphere or is too polluted for us to drink. Only about 0.5% of Earth’s water is available fresh water!¹ We need precipitation to keep living on this planet!

Scientists keep track of precipitation to help us understand the climate and how it changes. Check out this map comparing precipitation across the U.S. from January –April 2019. What do you think this might tell scientists? Can you find Fort Collins? How did our precipitation rank? Can you remember any storms in those months of 2019 that might have affected this?



Created: Mon May 06 2019

Data Source: 5km Gridded Dataset (nClimGrid)

Your Turn!

Now that you know a bit about precipitation it’s your turn to recreate a water cycle and add your precipitation tools to your meteorologist tool kit!

¹ U.S. Bureau of Reclamation <https://www.usbr.gov/mp/arwec/water-facts-ww-water-sup.html>

Experiment: Make It Rain

Precipitation, including rain, is just one important part of the **water cycle**! The basics of the water cycle are evaporation, condensation, and precipitation but scientists who study our climate also think about how runoff from mountains, groundwater, plant uptake and more effect our water cycle! What can you think about that might effect where water goes and how it gets to the oceans? What might impact how it gets to the skies and back to us? Start by building your own water cycle!

1. Gather your supplies! You'll need a pot, stovetop, ice cubes, a cookie sheet or similar pan, and an adult's help!
2. Put your cookie sheet into your freezer. You'll need to let it get cold for a few minutes!
3. While your cookie sheet freezes, take out a good handful or two of ice cubes and put them in a pan.
What do you notice about the ice cube? What do you notice about water in its frozen form?
4. With an adult's help, put your pan full of ice cubes on a stove burner and heat them up. **What do you hypothesize will happen to the ice? What happened?** As the ice warms up, the molecules water can move! It's now a liquid! **What do you notice about water in its liquid form?** As the water gets warmer and warmer the water molecules can move faster and faster until they bump each other out of the pan! What you see isn't smoke but water vapor! **What do you notice about water in its gas state? Carefully, with your adult's permission hold your hand way above the pan and see what happens. Is your hand getting wet?**
5. Take your cookie sheet out of the freezer and hold it a few inches over the pan. You can put some extra ice cubes on top for good measure! **What do you hypothesize will happen? What do you notice now? What is happening to the water vapor?** Keep holding the cookie sheet there and watch the bottom where the water vapor is hitting. **After a few minutes what do you notice?** Is the water condensing? As the water vapor hits the cold cookie sheet it cools down and turns back into a liquid, condensing on the bottom of the sheet and falling back to the pot as rain!

You just made a mini-water cycle!

If you can't use a stovetop, you can do this rain experiment a different way!

1. Gather your supplies, you'll need a glass jar, hot water, a ceramic plate, and some ice cubes.
2. Pour your hot water into a glass jar and place your plate flat on top. **What do you notice?**
3. Wait a few minutes and then place some ice cubes on the plate. **What is happening on the bottom of the plate?**

Make Your Own Rain Gauge:

Meteorologists and other scientists track precipitation to better understand a place's **climate**. Knowing how much **precipitation** has fallen in an area also helps them better predict **droughts** and **floods**. This helps farmers and keeps communities safe! NASA helps track precipitation using satellites in space, but meteorologists track it from the ground too! You can track precipitation in your neighborhood by building your own rain gauge to measure how much rain and snow falls in your backyard! Does more or less rain fall than you hypothesized? Add your rain gauge to the weather station you might have built from "What's With Weather: Forecast It!" You can also track how precipitation your backyard gets in your weather journal you created with that activity or help out real scientists by checking out the citizen science opportunity at the end of this section!

1. Gather your supplies! You'll need rocks or gravel, a marker, ruler, scissors, tape, and clear bottle. A 2 liter soda bottle works best, but you can also use a water bottle, juice bottle, or even an empty milk jug!



2. With an adult's help, cut the top of the bottle or jug off, about 2-3 inches below the top. If you're using a jug with a handle, be sure to cut above the handle.



3. To keep your rain gauge from blowing over or away fill the bottom with some rocks or gravel. Then flip the top portion of the bottle over and fit inside. It should form a funnel! This will allow your rain gauge to better collect rain as it falls!



4. Tape the two bottle pieces together. Then, using a ruler, mark the side of your rain gauge! Place your rain gauge outside. You'll need to pick a good spot! You want somewhere level, open to the sky, and not likely to get too windy. Make sure nothing is hanging over the gauge (like a tree or roof).



Observe:

If it rains or snows within 24 hours, check your gauge and see how high the water is! That's how much rain has fallen in the last day! In your weather journal make a note of the day and amount of rain. Then go online and find the official rainfall amount...how closely did your amount match? Repeat whenever it rains!

Keep Observing: Citizen Science!

Do you love learning about rain and tracking precipitation in your neighborhood? Did you know you can actually help real scientists by joining a network of citizen scientists working to measure and map precipitation across America?! Check out the Community Collaborative Rain, Hail & Snow Network (CoCoRaHS) to see how you can join as a citizen scientist! <https://www.cocorahs.org/>

Keep Discovering!

Like this Discovery at Home? Keep your eye out for more "What's With Weather?" activities or try our Walking Rainbow or Investigating Clouds discoveries!

Show Us!

We'd love to see your rain experiments and rain gauges! Tag us @focomod