

PROGRAM
1

Clouds

Learning goal: Learn about three aspects of clouds—height, cover, and type—and their effect on precipitation, weather, climate, and temperatures. Understand cloud formation through the “cloud in a jar” STEM activity. Understand why scientists are studying clouds and how participants can help scientists by collecting data using the GLOBE Observer app.

Audience level: Families and children age 5+

Length of program: 90-120 min.

Supplies needed: (equipment, books, apps)

- ACTIVITY: Clouds in a jar materials
 - 1 clear glass jar per group
 - 1 metal tray or plate (e.g., pie pan) per group
 - 1 bag of ice (enough for fill 5 12oz-mugs or paper cups)
 - Hot water (enough to fill up to 2 inches in height of each jar)
 - Thermos (for hot water; optional but highly recommend)
 - Coffee stirrer or wooden chopstick
 - One 12-oz mug or paper cup per group
 - Pencil (one per participant)
 - Blank paper (one per participant)
 - [Instructions](#)

- ACTIVITY: Outdoor Cloud Observation
 - Smart device with data plan
 - Mobile Hotspot/MiFi (optional)
 - Clipboards
 - Pencils
 - [GLOBE Cloud data sheet](#) (for individuals without mobile devices)
 - [Cloud Identification charts](#)
- ACTIVITY: Cloud Mobile materials:
 - Popsicle sticks
 - Wooden skewers
 - Cardstock
 - White twine or yarn
 - Blue or silver tinsel
 - Scissors, scotch tape

**Booklist:**

- Costa, Vila M, and Jordi Mazón. *Conocer Las Nubes*. Lectio, 2009.
- Day, John A. *The Book of Clouds*. Sterling Publishing Co, 2006.
- Edison, Erin. *Nubes/Clouds*. Capstone Press, 2013.
- Hansen, Grace. *Clouds*. Abdo Kids, 2016.
- Kovacs, Vic. *Get into Citizen Science*. Crabtree Publishing Company, 2018.
- Pretor-Pinney, Gavin. *The Cloud Collector's Handbook*. Chronicle Books, 2011.
- Pretor-Pinney, Gavin. *The Cloudspotter's Guide: The Science, History, and Culture of Clouds*. Tarcher Perigee Book, 2007.
- Rajczak, Michael. *Be a Citizen Scientist!*, Gareth Stevens Publishing, 2019.
- Teckentrup, Britta. *Look at the Weather*. Owlkids Books, 2018.

Apps

- NASA [GLOBE Observer](#) Clouds Module

Activities, step by step

Specific preparation in advance of this program:

2-4 weeks before the program:

- Download, play and familiarize yourself with the features in the [NASA GLOBE Observer Clouds Module](#)
- Take a picture of the clouds in the sky and make a sample cloud mobile corresponding to the cloud patterns in the photo. Note the date of observation on the mobile.

Day before the program:

- Make sure there will be hot water and ice for the program.

Let the program begin...

1. Divide participants into groups of 2-4 and go over program agenda.
2. Go over safety rules and ethics guidelines and collect liability waiver and/or photo release forms. Remind participants not to touch the materials for hands-on activities until instructed to do so.
3. Introduce Neighborhood Science and GLOBE Clouds concepts with [Neighborhood Science & Clouds powerpoint presentation](#)
4. Start ACTIVITY: “Cloud in a jar”
 - Give each group a cup of ice and ask a participant to pour it on the metal tray.
 - Pour 2 inches of hot water in each group’s glass jar. Ask one member per group to stir the hot water for a couple of seconds, then put the metal tray with ice on top of the jar, making sure to cover the jar opening completely.

- Ask one member per group to lightly swirl the jar while holding the metal tray in place. What is happening?
 - Give participants a few minutes to draw the reaction forming inside the jar.
 - Explain again how clouds are formed by referring back to the Powerpoint slides.
5. Prep the groups for ACTIVITY: Outdoor cloud observation:
 - Go over the steps to set up a GLOBE Observer account.
 - For participants who do not wish to create an account, ask them to sign in using the library’s GLOBE Observer account.
 - Have them choose group roles, supply with clipboards, pencils, Cloud data sheets (for participants who don’t have a mobile device) and Cloud identification charts.
 6. Start ACTIVITY: Outdoor cloud observation:
 - Take groups to safe outdoor area (park, patio etc.) for 15-20 minutes of cloud observation and data collection.
 - Demonstrate how to use the Cloud identification chart and record their observations using the GLOBE Observer app.
 - Gather the groups when time is up.
 - Allow 5-10 minutes to compare and share observations.
 7. Return to the program room.
 8. Start ACTIVITY: Create a [Cloud Mobile](#) based on participants’ observation of clouds (i.e., demonstrating cloud types and heights).