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:

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).