Observe the Atmosphere

Make your own local environmental observations, in particular cloud cover, that can compliment NASA satellite observations. Why are clouds important? How can we help monitor cloud conditions? In this digital skill, we will use the Globe Observer App to help answer these questions.

Setup

An internet connection is not needed while making GLOBE Observer cloud observations. Data can be stored in the phone and users can submit them later when an internet connection is available. Since clouds cover Earth about 60% at all times they affect Earth's temperature. Understanding how clouds change with atmospheric changes can help scientists to predict future climate.The data collected by users will complement data collected by NASA via satellites.

Content

In this digital skill, we will use the Globe Observer App to help answer these questions and become a Citizen Scientist.
Join the GLOBE observer App community to help collect scientific data for NASA, students and other scientists worldwide.
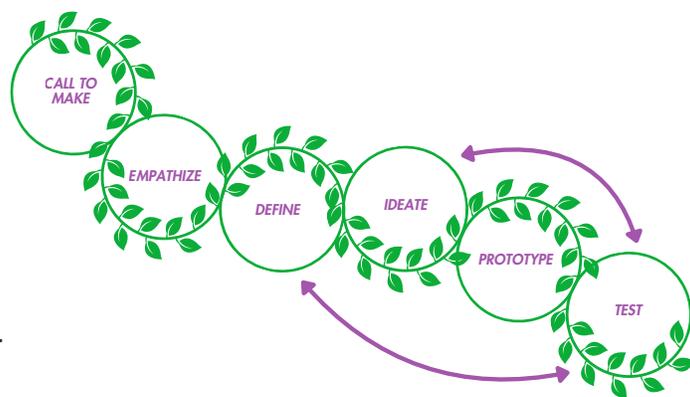
Skills
- Data Collection - identifying and collecting the types of clouds in your area
- Collaboration - sharing of data with others around the world and with NASA
- Communication - sharing results and contributing to the world database

Materials
- GLOBE Observer App
- Cell Phone

CALL TO MAKE

EMPATHIZE

DEFINE

IDEATE

PROTOTYPE

TEST

Call to make

Why do we need satellites? How do they affect your everyday activities? Why is it important to collaborate with others and become a citizen scientist? Why is it important to learn how to use different technology and data collection techniques/tools to share with others to help develop solutions to potential problems?

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Empathize

Climate change is a worldwide concern that affects everyone. How does cloud observations and atmospheric condition data from satellites and from the ground level help for action to be taken on climate change? How has our knowledge improved since the use of satellites such as those used by NASA?

Define

How could you help ensure that your observations and data collected were accurate?
How could you help refine your observations skills?
How well did your observations compare to the data collected by NASA satellites in the area? (note: collected data within 15 minutes of satellites in your are)
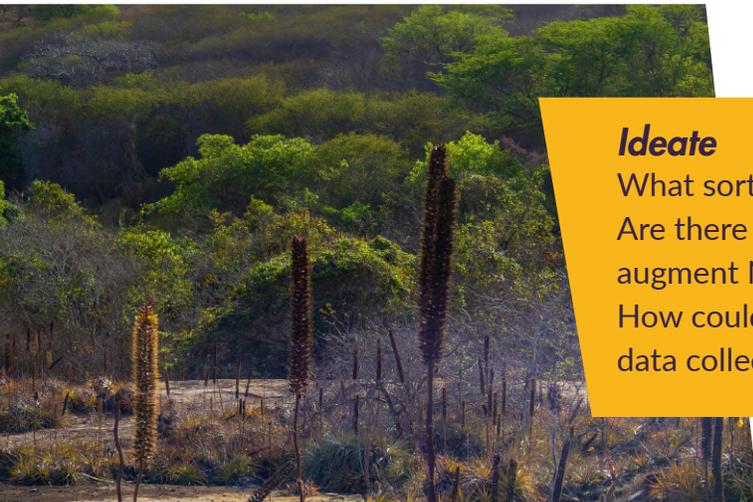
Ideate

What sort of measurements did you collect during your skill?
Are there other elements or methods that we could use to augment NASA satellite data?
How could you design or develop another element, App or data collection protocol to help address climate concerns?

Prototype

What other ways could you use to help ensure consistency in your observations? Observations are intended to be ongoing. Observations skills will be refined over time with greater familiarity using the technology and observing the various types of clouds and their characteristics.

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Test

Taking data at solar noon you can compare with other observers. How do your results compare?

If you take observations within 15 min of satellite movement you can compare with NASA data. How do your results compare?

What factors affected your ability to generate your end result - cloud observations in your local area?

The more you observe, the more you can refine your observations. Explain how your skills are improving over time?

If working with a partner, how did your observations collected compare with their observations? Were your observations similar/different? Describe.

Teachable Moments

Math

How important is data collection? What sort of measurements did you collect during your skill? Track your observations and data collected overtime. Has your accuracy improved over time when compared to NASA data collected from satellites?

Science

What are some new questions or problems that arose from what was learned? Compare your collected data to NASA satellite observations for the day. Compare your observations to those collected by other Globe users. To compare and contrast your results with others around the world, you need to collect data near solar noon. Why is it important to keep time constant? What is the role of collecting evidence and finding relationships between the observed data and satellite data to our everyday lives? How has the evidence gathered through satellites changed our understanding of climate change? Of other areas of our lives? Describe the different components that are needed to build a satellite. Describe possible positive and negative effects of satellite development. In your opinion, what is the best way to balance these competing priorities? What are some Canadain contributions to the development of satellites and the collection and use of satellite data? Why is more than one source of observations important to scientific data? Suggest improvements to the data collection design. Identify and describe examples of scientific questions and technological problems addressed in the past from the use of satellite data. Describe examples of how Satellite data and technology have been used to solve problems in their community and region

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Language Arts

Create a story on the day in the life of one of the cloud types you observed. As you collect more observations over time, create your own tips sheet for other users. Write a persuasive essay (or another form of representation) concerning the issue of becoming a citizen scientist. Why is it important for global citizens to become more involved with initiatives such as data collection to support scientists and their work? Create a procedural writing piece explaining how to identify and characterize clouds. Create a procedural piece of writing to explain to a younger student how to use the Globe Observer App.

Social Studies

Did you compare your observations to other Globe users? How can you assure that your N, S, E, W coordinates were correct? i.e. your location was correctly identified by your phone. Before making observations, can you predict your orientation, N S, E, W, relative to your observation point. Did you collaborate with anyone when taking observations? If so, did you experience any problems or issues? How did you resolve these issues? Compare data collected from Globe App users around the world. Ensure to choose geographically diverse locations. Compare and contrast the geographical features of the area and relate it to the observed conditions..

Take it Further

Continue with data observations over an extended period of time and continue to compare to NASA satellite data.

Glossary

Cirrus

One of the most common types of clouds that can be seen at any time of the year. They're thin and wispy with a silky sheen appearance

Cirrocumulus
These usually form at about 5 km above the surface with small white fluff patterns that spread out over the sky

Cirrostratus
clouds have a sheet-like appearance that can look like a curly blanket covering the sky. They're quite translucent which makes it easy for the sun or the moon to peer through.

Altocumulus
form at a lower altitude so they're largely made of water droplets though they may retain ice crystals when forming higher up. They are sometimes called 'social clouds' because they appear in groups. They have a grayish-white color with some portions darker than the others.

Altostratus
They're uniformly gray, smooth, and mostly featureless .They spread over thousands of square miles and are strongly linked to light rain or snow.

Nimbostratus
These gloomy clouds are the heavy rain bearers out there forming thick and dark layers of clouds that can completely block out the sun.

Stratus
A low level cloud that are composed of thin layers of clouds covering a large area of the sky. This is simply mist or fog when it forms close to the ground.

Cumulus
A low level cloud and it's the most recognizable out of all the types of clouds.These adorable 'piles of cotton' form a large mass with a well-defined rounded edge

Cumulonimbus
Often called a tower cloud it is fluffy and white like cumulus but the cloud formations are far larger.

Stratocumulus
A low level cloud that looks like a thick white blanket of stretched out cotton. They resemble cumulus clouds except they're far bigger.

Contrails
Found at high levels, a trail of condensed water from an aircraft or rocket at high altitude, seen as a white streak against the sky.

Fog
a thick cloud of tiny water droplets suspended in the atmosphere at or near the earth's surface which obscures or reduces visibility
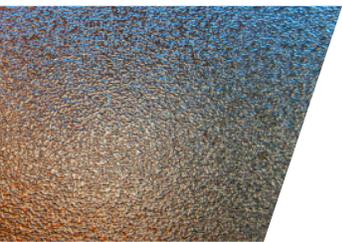
Transparent
Materials that allow light to pass through so that objects behind can be seen

Translucent
Materials that allow light to pass through but objects, etc., on the opposite side are not clearly visible

Opaque
This describes thick clouds (or any material) which does not allow light to pass directly through.

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Resources

Become a Global Citizen with NASA - Observing the atmosphere

Become a Global Citizen with NASA - Observing the atmosphere

youtube.com/watch?v=Iny3j8Dkk5Y

Globe cloud chart

Useful to have when looking at the clouds in the Sky

globe.gov/documents/348614/782194b1-b5c3-4416-b3aa-b4a208ea5812

Get the app

observer.globe.gov/about/get-the-app

4 QUALITY EDUCATION

13 CLIMATE ACTION

15 LIFE ON LAND

14 LIFE BELOW WATER

Learning continuum:
Sustainable Innovation Through Holistic Connection

Based on **three emerging pedagogies*** and in recognition of indigenous knowledge, the natural maker educational continuum aims to support the learner through a holistic journey of connection to the earth, the community, oneself and others, in order to evolve globally towards a more open, humble, democratic and decolonized way of thinking, learning and living.

* wild pedagogies, conscious pedagogies and decolonization of education
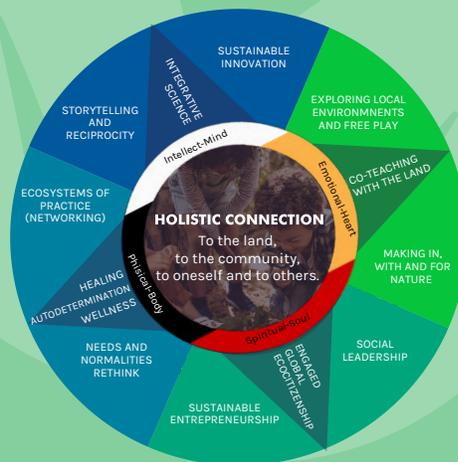
#EarthDayWithNature

#ActForEarth #ClimateAction

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