

ANCHORAGE MUSEUM

CITIZEN SCIENCE: REPEAT PHOTOGRAPHY

BACKGROUND INFORMATION

The Anchorage Museum has partnered with [Geocaching.com](https://www.geocaching.com) to develop a repeat photography citizen science project where people search for specific geocaches and take a particular photograph at each geocache site. These photographs are then compared. Differences and similarities between the images help demonstrate changes happening over time. This lesson provides three activity options that can be done as stand alone activities or completed in the suggested order for more extensive exploration.

STUDENTS WILL:

- Understand and analyze repeat photography as a comparison tool
- Use data sheets to make and record observations
- Think critically and support answers with evidence
- Engage in citizen science

MATERIALS

Activity 1, 2, & 3: Provided activity sheets and pencil

Activity 2 & 3: Camera

Activity 3: Cell phone with GPS, Camera, & free [Geocaching App](https://www.geocaching.com/mobile)

RECOMMENDED GRADE LEVEL

Third through sixth

Adapt for K-12 and adult learners

KEY TERMS

Citizen science: members of the public contribute to scientific research by helping collect or analyze data; this approach usually allows researchers to collect and analyze more data than would otherwise be possible

Geocaching: a real-world, outdoor treasure hunting game using GPS-enabled devices; participants navigate to a specific set of GPS coordinates and then attempt to find the geocache container hidden at that location; [Geocaching.com](https://www.geocaching.com) is a listing service for geocaches around the world

Repeat photography: a way to observe the timing of certain events through taking pictures of the same place throughout the year

In the Anchorage Museum project, photographs help provide information about the length and timing of seasons through capturing events like snowfall, snowmelt, plants blooming, and trees dropping their leaves. The geocache ensures that all the images are taken at the same location. Since so many images are needed to gather meaningful data, enlisting citizen scientists allows for more consistent and frequent repeat photography.

ACTIVITIES

This lesson plan provides three activity options and explains each of them in detail on the next page. Complete one or more activities.

1. **Activity 1:** Analyze provided photographs, taken from the Campbell Creek Geocache site.
2. **Activity 2:** Set up a home repeat photography project.
3. **Activity 3:** Locate the geocache(s) and take specified photograph(s) using the Geocaching App.



ACTIVITY 1

Analyze provided photographs, taken from the Campbell Creek Geocache site.

[20 minutes]

In this activity, you will compare repeat photographs taken from the Museum's Campbell Creek Geocache site. Using **Appendix A**, examine each photograph and answer the provided questions.

After answering the questions, note when the photographs were taken:

- Photo 1 was taken November 11, 2019.
- Photo 2 was taken August 13, 2019.
- Photo 3 was taken January 13, 2020.

ACTIVITY 2

Set up a home repeat photography project.

[10 minutes daily for at least 7 days]

In this activity, you will take a daily photograph of the same area. You will be able to see how this area changes over a matter of days or weeks.

1. Select an outdoor area you can easily photograph from your home or school (areas with snow patches, trees, or other plants will be interesting to track over time).
2. Figure out how to take the same photograph each day. For example, you could hold your camera at the exact same place on a balcony railing or window sill. Mark that spot with tape.
3. Each day: Take a photograph of the same outdoor area and complete one row of the Home/School Scientific Observation Sheet (**Appendix B**) for each photograph taken. Repeat for at least one week and for as long as you desire.
4. Compare your photograph collection. Answer the questions at the end of the Home/School Scientific Observation Sheet.

ACTIVITY 3

Locate the geocaches and take specified photograph using the Geocaching App.

[15-45 minutes, depends on travel time]

In this activity, you will be a citizen scientist because you will collect data (photographs) that will be combined with other people's photographs to track change over time.

1. Download Geocaching App from [geocaching.com](https://www.geocaching.com)
2. Search for one (or more) of these unique identifiers in the Geocaching App (these identifiers will take you to the Museum's geocaches):
 - GC7X47F – Necropolis View
 - GC6MRT4 – Campbell Creek View
 - GC6MM3C – Chugach Mountain Front View
 - GC6MRQP – Middle Glacier View
3. Go outside and locate the geocache. (Note these geocache sites are around Anchorage and one is in Portage. Travel time will vary.)
4. Take a photo following the instructions under the "Description" tab in the Geocaching App.
5. Include your photo when you "log your find" in the App.
6. Complete the Geocache Scientific Observation Sheet at the geocache site (**Appendix C**).



CAMPBELL CREEK GEOCACHE PHOTOS

Photo 1



Photo 2



Photo 3



CAMPBELL CREEK GEOCACHE PHOTOS

1. Examine the provided Campbell Creek Geocache photos. Describe the area where these photos were taken:

2. What are your first observations of each photo?

Photo 1:

Photo 2:

Photo 3:

3. How would you describe the weather for each photo?

Photo 1:

Photo 2:

Photo 3:

4. What season do you think each photo was taken? What evidence do you see that makes you think that?

Photo 1:

Photo 2:

Photo 3:

5. What else can you find in these photos?

6. What do these photos remind you of? Have you been to a place that looks like this?

7. Activity: On another sheet of paper, draw what your favorite outdoor place looks like in each season.



HOME/SCHOOL SCIENTIFIC OBSERVATION SHEET

Start when you set up your repeat photography project and complete daily entries

1. Describe where you set up your repeat photography project:

2. Describe what you will be photographing:

3. Record the following each day:

Day #	Date	Time of Day	Weather (sunny, cloudy, foggy, etc.)	Other Observations (Is anything different from the day before?)
1				
2				
3				
4				
5				
6				
7				

If you want to continue taking photos after seven days, print another chart or continue chart on a separate page.

After at least seven days, answer:

1. What changed?
2. What stayed the same?
3. Why did these changes happen?
4. Is there anything about the area you did not notice before starting to take photographs?



GEOCACHE SCIENTIFIC OBSERVATION SHEET

Complete outside when you locate the geocache

1. Geocache Found (circle one): Necropolis View Campbell Creek View Chugach Mountain Front View Middle Glacier View
2. Note the following:

Date	Time of Day	Season (spring, summer, fall, winter)	Weather (sunny, cloudy, foggy, etc.)	Other Observations (what do you see, smell, hear?)

3. Describe what is in the photograph you took:

4. How would the area that was photographed look different in different seasons? (Think about: How would the ground change? How would the plants change? How would the water change?)
(Don't answer for the season you took the photo in)

- Spring

- Summer

- Fall

- Winter

