



Introduction to Glacial Change in Greenland - Instructor Guide

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Activity Summary

In this lesson, students will observe and measure the advance and retreat of glaciers in Greenland to see how glaciers change over time and how they respond to a changing climate. Students will compare glaciers in different locations to identify trends in glacier behavior.

Learning Goals and Outcomes

Students will...

- Measure the change in position of the glacier terminus to see how glaciers change over time
- Identify trends in the behavior of glaciers by comparing the change in 2 or more glaciers
- Describe how the behavior of the glaciers may be affected by climate change

Context for Use

Topic	Glaciology, Climate Change
Course Type	Curriculum
Audience	Introductory Undergraduate
Instructional Time	80 minutes
Context	This lesson is aimed at introductory students with little to no geology background knowledge. It is helpful for students to have some GIS knowledge that can be acquired through the QGreenland Beginner's Tutorial Series , either in class or students can watch videos on their own.
Materials	Computers that have QGIS and QGreenland installed. See requirements at www.qgis.org .
Materials Prep	Install software for QGIS and QGreenland on students' own machines or a computer lab if available. Instructor should be familiar with how to complete the QGIS exercises in the lab.

Description and Materials

Introduction to Glacial Change (20 minutes)



Introduce students to the difference between a glacier and an ice sheet and how glaciers respond to climate changes by showing this [Climate 101: Glaciers Video](#) (4 minutes, National Geographic)

Overview of QGreenland (20 minutes)

Give students an overview of geographic information systems (GIS) and QGreenland by having students watch and complete the exercises for the first 4 videos of the [QGreenland Beginner's Tutorial Series playlist](#).

Measuring Terminus Retreat (40 minutes)

Demonstrate for students how to access terminus locations data for specific years and how to measure the position of the glacial terminus in several locations and record their data on the data sheet.

Here's a link to the [Student Materials](#) for this exercise.

Teaching Notes and Tips

Students may work individually to measure terminus location over time. Pooling data or having students share their measurements in groups will allow glacial trends to be more apparent to students.

This lesson aligns with these standards:

- [Polar Literacy Principle 2A](#): Ice is dynamic and comes in many shapes and sizes- big, small, floating in water or layered, thin or thick, solid or porous soft.
- [Polar Literacy Principle 2B](#): Ice shapes the Polar landscape.

Assessment

[Rubric](#)

References and Resources

- National Geographic (11 December 2017) *Climate 101: Glaciers*. Available at: <https://www.youtube.com/watch?v=WJgpDyP9ewQ> (Accessed: 3 September 2026)
- QGIS (n.d.) *Spatial without Compromise*. Available at: <https://www.qgis.org/> (Accessed: 3 September 2026).
- QGreenland (2022) *QGreenland Beginner's Tutorial Series*. Available at: <https://www.youtube.com/playlist?list=PLSRiyMridUCwyu-vqpAFtm8bVERgTvs7q> (Accessed: 3 September 2026).