

Lesson 1: What do we already know, or think we know, about climate & Antarctica?

Driving Question(s):

- Is ice in Antarctica melting?
- How do we know?
- What data do scientists currently use to study (ice melt in) Antarctica?

Part 1: Climate and Antarctica Chalk Talk

You will spend approximately 10 minutes moving from poster to poster and writing down your answers to the question on each one. You should spend approximately 1 minute per poster. If you see something you agree or disagree with already written, you must elaborate on it, modify it, or otherwise explain your agreement/disagreement - you can't just say, "I agree"!

- What is weather? What is climate? What is the difference?
- What controls weather patterns on Earth?
- What do you know about Antarctica?
- Why is Antarctica so important in studying weather and climate?
- What kinds of data do we collect to understand Antarctica?
- How does data we are collecting in Antarctica connect to understanding our local environment?

We will gather as a class to discuss and summarize all of your responses.

Part 2: Introduction to Satellite Imagery

In this section, you will start asking and answering the question, "What data do scientists currently use to study (ice melt in) Antarctica?"

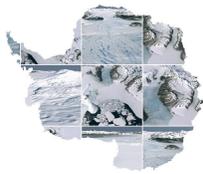
Satellite Images

You will be divided into up to at least 4 groups. Each group is given a collection of satellite images of different regions in Antarctica. Please use the following observation chart to start record your observations about the images, their similarities / differences, and start thinking about patterns:



These materials were developed by Meghan Mosher, Penny Rodrick-Williams, Allen Pope, Anna Ruth Halberstadt, Luke Trusel, and Mahsa Moussavi in collaboration with CIRES Education & Outreach at CU Boulder. Funded by NSF OPP Award #1643715.



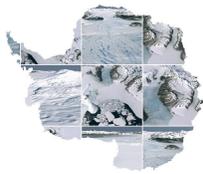


Notice (Observe)	Wonder (Infer)



These materials were developed by Meghan Mosher, Penny Rodrick-Williams, Allen Pope, Anna Ruth Halberstadt, Luke Trusel, and Mahsa Moussavi in collaboration with CIRES Education & Outreach at CU Boulder. Funded by NSF OPP Award #1643715.





Google Earth Engine

GEE is a cloud-based geospatial analysis platform that enables users to visualize and analyze satellite images of our planet. Scientists and nonprofits use Earth Engine for remote sensing research, predicting disease outbreaks, natural resource management, and more.

Here is an app developed within Earth Engine:

<https://sleuthyruthie.users.earthengine.app/view/images-through-time>

...where you can investigate these same areas you were presented with above, but across multiple years instead of just one! You can zoom in and out to find all 4 areas around Antarctica. (Note that Landsat 8 imagery, which you are looking at, is only available from 2013 to the present.)

Click on a date (each slider bar position is a 16-day interval, because that's how often the Landsat satellite passes exactly over each grid cell of the Earth)



These materials were developed by Meghan Mosher, Penny Rodrick-Williams, Allen Pope, Anna Ruth Halberstadt, Luke Trusel, and Mahsa Moussavi in collaboration with CIRES Education & Outreach at CU Boulder. Funded by NSF OPP Award #1643715.





Part 3: Interpreting Satellite Imagery

In this section, you will continue asking and answering the question, “What data do scientists use to study Antarctica?” In order to think about these questions, we need some vocabulary. Therefore, in this section, you will match components of satellite imagery and regular photos with specific vocabulary terms.

Term	Definition (a-i)	Photograph (A-I)	Satellite Image (1-10)	Notes
Land Ice				
Sea Ice				
Ice Sheet				
Ice Shelf				
Supraglacial lake				
Supraglacial stream				
Firn				
Blue ice / Glacial ice				
Nunatak (or outcrop)				

Summary Question: What can the satellite images tell us about Antarctica?

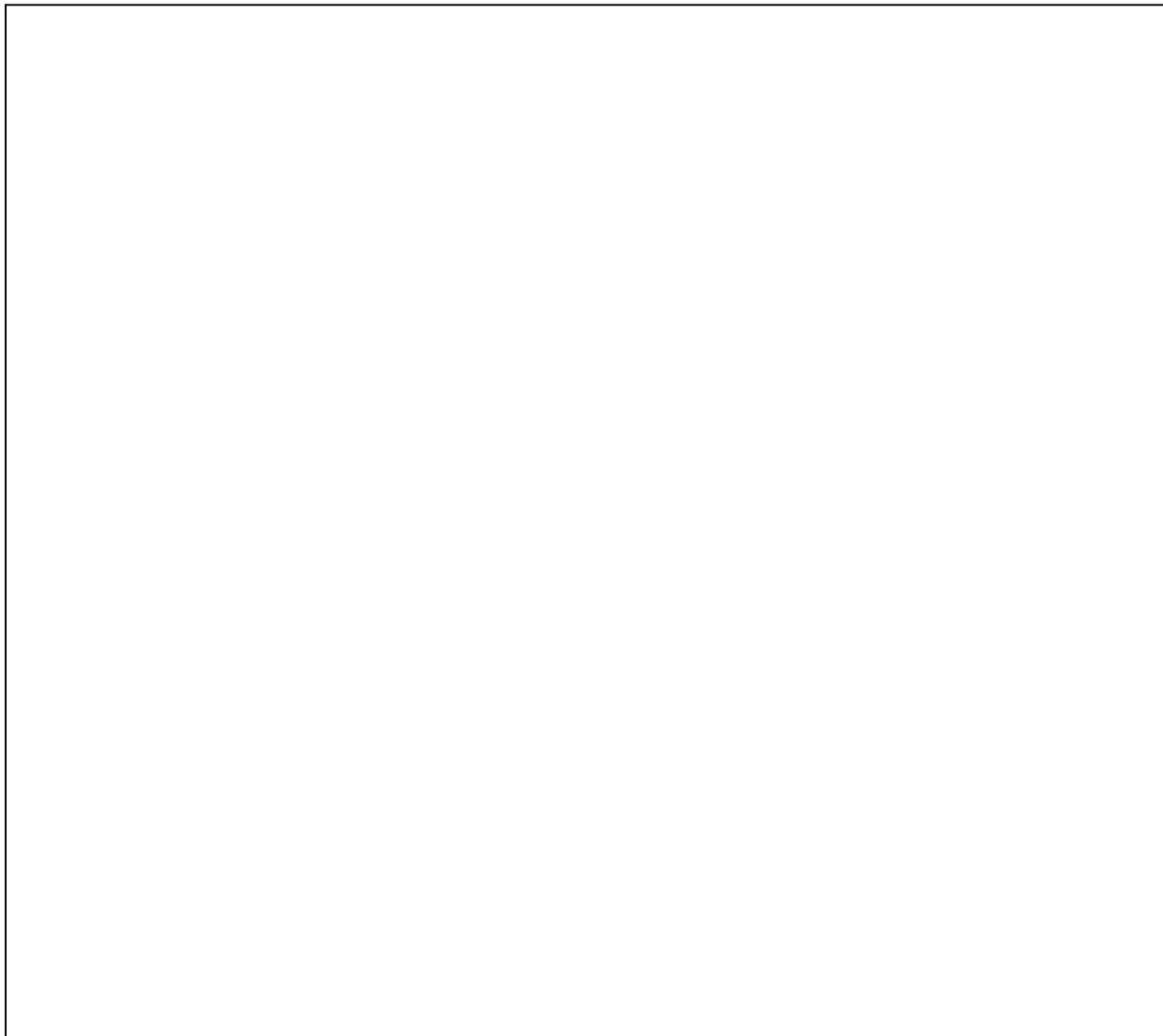


These materials were developed by Meghan Mosher, Penny Rodrick-Williams, Allen Pope, Anna Ruth Halberstadt, Luke Trusel, and Mahsa Moussavi in collaboration with CIRES Education & Outreach at CU Boulder. Funded by NSF OPP Award #1643715.





Resource Type: Student Handout
Grade Level: High School



These materials were developed by Meghan Mosher, Penny Rodrick-Williams, Allen Pope, Anna Ruth Halberstadt, Luke Trusel, and Mahsa Moussavi in collaboration with CIRES Education & Outreach at CU Boulder. Funded by NSF OPP Award #1643715.

