Observing Change in Greenland's Far North

Learning Objectives

- Identify reservoirs and transport pathways in the Arctic water cycle.
- Describe methods of data collection in watersheds in the Far North of Greenland.
- Create hypotheses about changes to watersheds in the Far North of Greenland.
- Collaborate on ways to communicate scientific understanding on the Arctic water cycle.

Homework Review

1. Which locations are reservoirs?

2. Which processes are transport pathways?
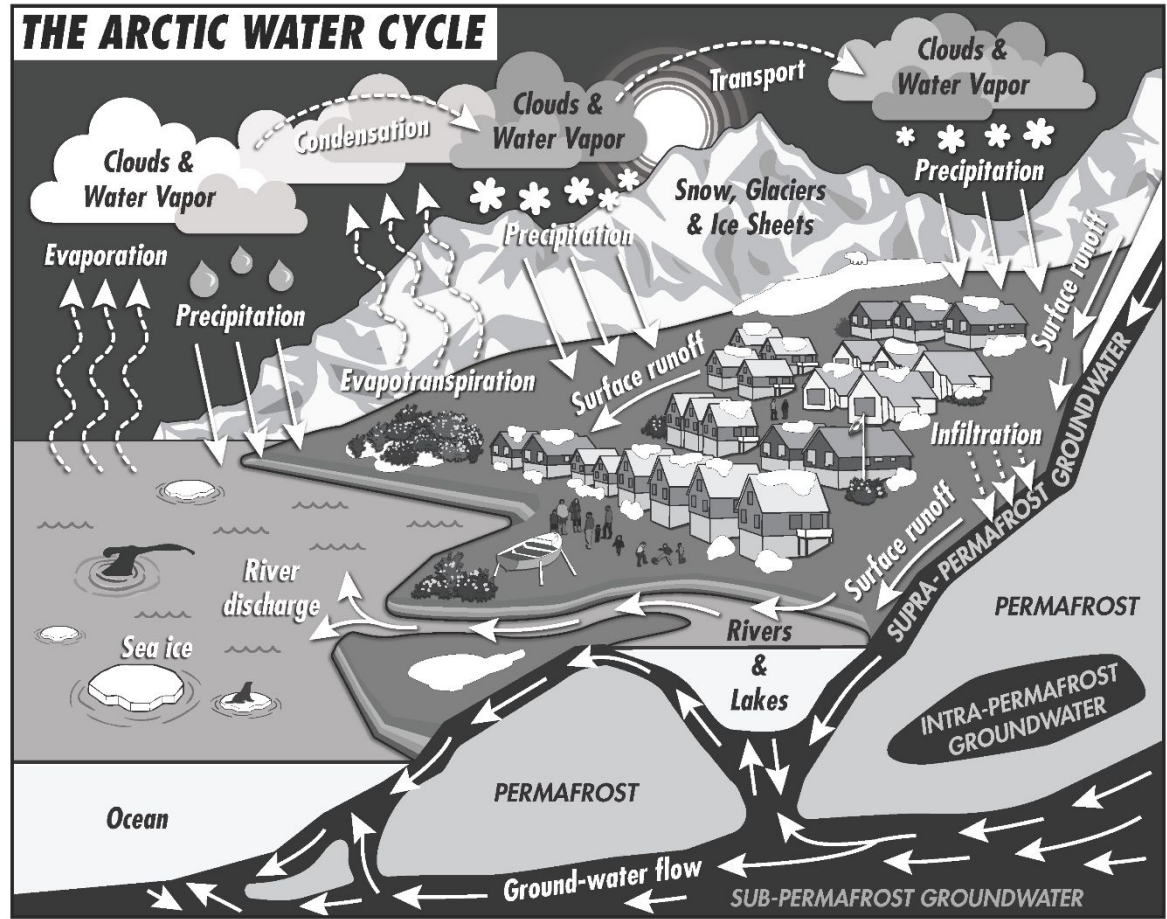
3. Match the term to its definition.

#1. tundra biome

#2. permafrost

#3. fjord

#4. albedo

A. long, narrow sea inlet with steep sides or cliffs, created by a glacier

B. ground that remains completely frozen for at least two years straight

C. percentage of radiation reflected by a surface

D. cold, treeless region
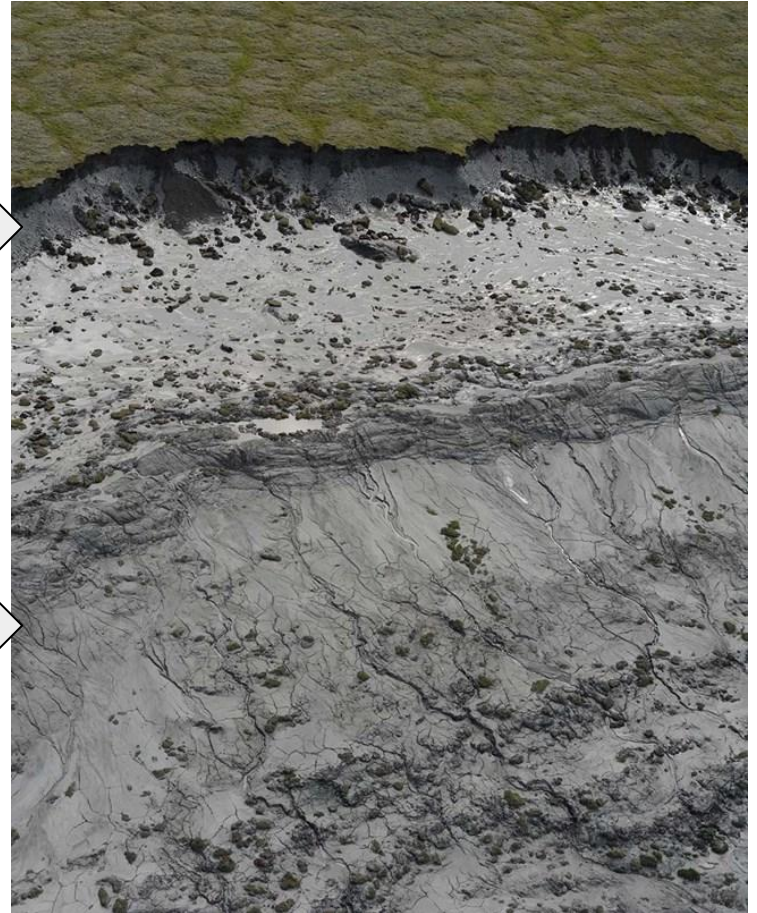
4. Match the term to its photo.

#1. thaw slump
#2. thaw scarp
#3. polygonal ground

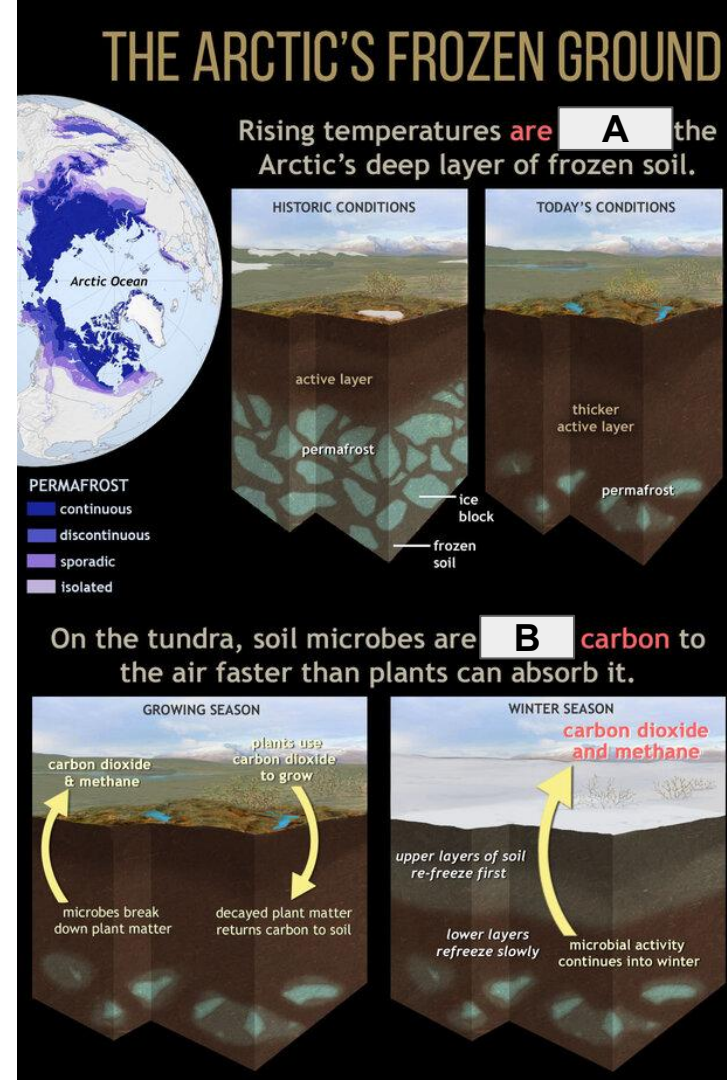A

B

C

5. Fill in the blanks (A & B).

THE ARCTIC'S FROZEN GROUND

Rising temperatures are [A] the Arctic's deep layer of frozen soil.

HISTORIC CONDITIONS

TODAY'S CONDITIONS

Arctic Ocean

PERMAFROST
continuous
discontinuous
sporadic
isolated

active layer

permafrost

ice block

frozen soil

thicker active layer

permafrost

On the tundra, soil microbes are [B] carbon to the air faster than plants can absorb it.

GROWING SEASON

carbon dioxide & methane

plants use carbon dioxide to grow

microbes break down plant matter

decayed plant matter returns carbon to soil

WINTER SEASON

carbon dioxide and methane

upper layers of soil re-freeze first

lower layers refreeze slowly

microbial activity continues into winter

Small Group Discussion #1

1. Introductions/Icebreaker: Share your name and whether you have ever experienced (or would want to experience) 24 hours of daylight or darkness.

2. Assign roles:
    a. Facilitator: Keeps the conversation going, makes sure everyone has a chance to participate.
    b. Notetaker: Takes notes on the conversation.
    c. Spokesperson: Will share key ideas to the class.

3. Share your responses to question 2-4 on the homework.
    (peer-reviewed article the Arctic water cycle or Greenland's hydrology)
    a. What were the most common methods used for data collection?
    b. What were the key findings?
    c. What questions do you still have?

Small Group Discussion #2

1. Introductions/Icebreaker: Share your name and whether you would want to join an Arctic research team in the Far North of Greenland.

2. Assign roles:
   a. Facilitator: Keeps the conversation going, makes sure everyone has a chance to participate.
   b. Notetaker: Takes notes on the conversation.
   c. Spokesperson: Will share key ideas to the class.
   d. Timekeeper: ~5 minutes for each question

3. Discuss your responses to 3-3 on the homework.
   (research method assigned to you)

4. Share your responses to question 3-4 on the homework.
   (hypotheses about the watersheds)

5. Imagine that you are part of a research team studying permafrost in Greenland. Discuss how you would communicate your research hypotheses with the local population. Use the tips below (Joubert 2024).

1. Know your audience.
2. Identify the goals of communication.
3. Start with the most important information.
4. Avoid jargon.
5. Be relatable.
6. Provide visuals.
7. Stick to three points.
8. Talk about the scientific process.
9. Focus on the bigger impact.
10. Develop an elevator pitch.

6. Prepare at three minute presentation.

Exit Ticket

On a piece of paper, write your name and today's date.

Write the question number and your detailed responses to the following questions.

1. What is the most important idea that you learned today? Explain the idea in two to three sentences.

2. What is one question you still have about what you learned today? Explain why you are asking this question.

3. What is something that you learned today that relates to your everyday life? Explain your response in two to three sentences.