

Name: _____

Date: _____

Lab Role: _____

PERMAFROST INQUIRY – STUDENT INVESTIGATION SHEET

Objectives

1. At the conclusion of this activity, students will be able to state what permafrost is and where it is found.
2. Students will design an experiment to demonstrate the effect of permafrost melt on structures.

Materials

Clear, wide-mouthed plastic containers or jar (approximately 500 mL) per group
Ice cubes
Sand and local soil (enough to fill one jar with each)
One scoop or small shovel to move soil and sand per student group
Toothpicks
Modelling clay and/or other construction materials
Twigs (optional)
Water
Freezer
Student Investigation Sheet
Rubric

Procedure

DAY 1

1. Fill permafrost jar about 1/3 full with wet soil, sand, or other material. Do NOT mix them!
2. Put several ice cubes on top. Fill with more of the same wet material. Note that the ice cubes represent ice wedges that form when melt water seeps into through permafrost and then refreezes.
3. Measure and record the size of each layer (centimeters). Describe each layer.

4. Put the permafrost models into the freezer overnight.

DAY 2

5. Write a hypothesis as a statement about what is expected to happen to buildings placed on permafrost when it later melts and why this change is anticipated.
6. Construct buildings. Use toothpicks to anchor the buildings.
7. Describe the structure.

8. Allow permafrost models to thaw overnight.

DAY 3

9. Observe your model and those of the other groups.
10. Collect class data on a projected spreadsheet or a black/whiteboard. Record the materials used and the result.

DISCUSSION QUESTIONS

1. What happened to the surface of the ground when the permafrost thawed? How did this affect your structure?
2. Look at other groups' models. Did using different materials cause different outcomes? In what way(s)?
3. Permafrost contains large quantities of stored organic carbon; this is in the plants and roots that have not decayed because the ground is so cold. How might the tundra ecosystem change as permafrost melts? Explain what might happen to the plant and animal communities that live there now. Your answer should be a complete paragraph.