

Changing Ice Melt of Freshwater Bodies

Objective: To explore the effect of climate on ice melt

Introduction: As climate changes, ice coverage of rivers, lakes and other freshwater sources decreases. The effect may be a change in both ecology and human utilization of these resources. This lesson plan helps students assess the monitoring of change in ice coverage and some of the implications of the changes.

Curriculum Connections:

Unit 2: 5av, 8c

Supplies / Materials:

- Location to safely monitor ice with a visual across the river/stream/lake
- Ice measurement tool – ice tool, drill with wood auger, Nordic ski pole etc (**Resource 1**) if school allows
- Clipboards, papers and pens

Hook: Inform students before going out about your plan to find a good ice spot – have them share their favourite ice spot/activity. This may help you select a spot for monitoring.



SCIENCE FOCUS

Lesson Subject

Experiential Science 30

Topic

Freshwater Ice

Location

Field and/or Classroom

Length

30-40 minutes field, 50 minutes Classroom



Intro Activity: Gather the students in a group and have them create rules around ice safety.

1. Have them define boundaries (based on school policy and time of year, you may or may not want to be on the ice at all).
2. Discuss emergency protocol.
3. If you are using tools, have them define the use of tools
4. Talk about keeping warm.

Field Activity:

1. Tell students their role will be to monitor ice melt of freshwater in the community. Ask them to work in groups to come up with a monitoring strategy
 - a. What makes an ideal monitoring spot? Students may need to consider both visibility of the body of water but also their own safety and/or comfort
 - b. What variables do you want to monitor? (Could be thickness, percent open water, reflection of light etc.)
 - c. When should the variables be monitored? (When does ice melt in your community?)
 - d. How do you get consistent monitoring of those variables? (Well marked observation spot, consistent observers and/or clear communication between, clear definitions etc.)
2. If possible take a few measurements of the ice.

Independent Student Work: Have students pick a monitoring spot and describe it in such a way that they themselves or someone could find the spot.

Classroom Activity:

1. Discuss monitoring procedures. Introduce the monitoring used for IceWatch and discuss merits/challenges.
2. View data from NWT and other regions of Canada. What is this telling us about the ice?

3. Have students brainstorm some of the implications of earlier ice melt / longer open water:
 - a. Increased ecological activity, including great algal blooms, longer feeding seasons for fish
 - b. Change in conditions for fish – T, O₂, mixing
 - c. Change in fishing and hunting seasons
 - d. Flooding
 - e. Less absorption of solar energy
4. Discuss measurements of ice thickness. Why measure? (track change, safety) How did the class measurements go? What do they feel about the accuracy? Why might sonar and radar be the measurement tools of choice (precision, data on quality, safety etc.)

Conclusion / Review: Why should we monitor ice melt/formation in our community?

Homework:

1. Read more about the effects of climate change on river ice (Ex Science 30 textbook)
2. Have students revisit their spot and submit IceWatch observations

Resources:

- 1) Ice measurement tools: <http://lakeice.squarespace.com/testing-tools/>
- 2) Ice watch data (note you need to create a sign-in): <https://www.naturewatch.ca/download/>