Binogi in Your Science Classroom

Grade 8 (ON) - Understanding Earth and Space Systems Lesson: Water System

Supported by

Resource Guide for Teachers

Please visit:
https://escapeprojects.ca/ for additional resources and information

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Gr. 8 Understanding Earth and Space System: Learning Objectives and Big Ideas

Overall Expectation

E2. Exploring and Understanding Concepts: demonstrate an understanding of the characteristics of Earth's water systems and of factors that affect these systems

Specific Expectation

2.4 identify factors, including climate change, that have contributed to the melting of glaciers and polar ice-caps, and describe the effects of this phenomenon on local and global water systems (ON Science Grade 8 Curriculum, p. 5)

Learning Objectives

Understanding factors that change the size of glaciers and ice caps and how it affects the water systems.

Big Ideas

Understanding how human actions cause change in climate and consequently, in the ecosystem and our lives.

Assessment

1. Assessment FOR

Diagnostic questions, Minds On, Action, Consolidation

2. Assessment AS: Consolidation

C1. Mathematical Terms and Resources/Materials

Vocabulary

glacier, ice cap, global warming, climate change, glacier melting

Pair/Group Activities

Please follow your school's **Covid-19 safety protocols** for any pair/group activities.

Language Friendly Pedagogy

At the beginning of the lesson, students will be invited to add key terms in their Concept Detective and add any new words that they come across throughout the lesson.

Binogi Related Resources

Climate Change - the biology perspective

The History of Climate Change

Other Resources

Curriculum Mapping

Slide 15: Kassam, A. (2018, July 17). Canada's high Arctic glaciers at risk of disappearing completely, study finds. The Guardian. Retrieved from https://www.theguardian.com/world/2018/jul/18/canadas-high-arctic-glaciers-at-risk-of-disappearing-completely-study-finds

Slide 15: Statistics Canada. (2013, December). Trends in glacier mass balance for six Canadian glaciers. Government of Canada. Retrieved from https://www150.statcan.gc.ca/n1/pub/16-002-x/2010003/part-partie2-eng.htm

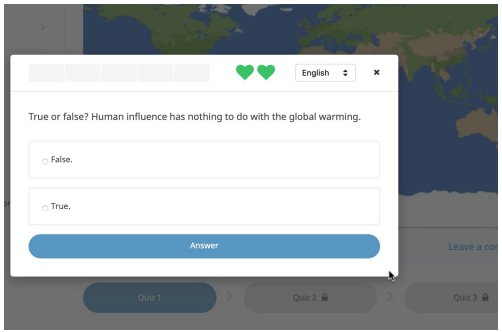
At the beginning of class… (5 ~ 10 min)

1. Share learning objectives - *Understanding factors that change the size of glaciers and ice caps and how it affects the water systems.*
2. Co-create success criteria
    - Sample :
        - ***I can…..***
3. Ask the students to add the following words in their Concept Detective which they will fill in throughout the lesson:

    glacier, ice cap, global warming, climate change, glacier melting, and any new terms
4. Diagnostic Questions: Teachers should systematically start with 2 or 3 diagnostic questions. Examples of diagnostic questions can be found:

    a) using the previous year's specific expectations;

    b) using Binogi quiz - level 1



Minds On

Task Component	Instruction	Assessment Focus Look Fors	Notes
Before (Activation/ Review) ~ 10 mins **Resources:**	1. Teacher writes "Glaciers and Ice Caps" on the board with a photo. *Teacher writes students' responses on the board; if online, use Jamboard or any other online whiteboard platform.*   - Popcorn style discussion: students shout out words that are related to the terms on the board (if online, each student writes) OR - students use sticky notes, where they can draw and use their first language to respond to the terms. Then, students stick their notes on the board, then the teacher goes over them.  - students share their experiences and thoughts on glaciers and ice caps : Do these terms exist in their first language? : Do students associate the term with negativity or positivity?	How do students represent their understandings and linkages between concepts? How does the activity connect to, and help prepare students for problem solving? How are you interacting with your students?	Teacher records answer / wonderings / understandings . Asks students to elaborate/expla in their responses with the class.

Action

Task Component	Instruction	Assessment Focus Look Fors	Notes
During (Working on it) ~15 mins **Materials:** **paper, markers, blocks, ruler, graph paper**	- The class watches the Binogi video on climate change; the teacher pauses the video and asks questions:  1. ⏸ at 0:43: Why do you think the temperature has increased drastically past 100 years? What is the term used to describe this phenomenon? 2. ⏸ at 2:31: Have you experienced or witnessed any consequences of global warming? Explain. 	What role do I and my students play during the problem solving process? What strategies do we predict students will use to do the math? What strategies are students using to do the math?	Have your students watch the videos in the language of their choice. Record students' thoughts. Think-pair-share: student thinks on their own first, then they share with their partner, then with the class.

Consolidation/Reflection- Gallery Walk

Instruction	Assessment Focus Look Fors
1. Students get into small groups and discuss the following questions: *(on a chart paper)* a) Check the images and graph from following websites: headline and photo, Location of High Arctic glaciers in Canada, and Cumulative net mass balance, High Arctic glaciers. - *What are your initial thoughts and feelings?* - *Who/what is going to be affected by glacier melt and how?* b) Have you witnessed or experienced effects of global warming (omit if you think this is not a safe question for students with trauma)? Explain. c) What can we do to stop global warming at a local, national, and global level? 2. Each groups put up the chart paper on the wall. 3. Do Gallery Walk. Each student leaves comments/feedback on other groups' responses, using sticky notes. 4. Students complete their Concept Detective.	How are you consolidating student learning? Which strategy was used (Congress, Gallery Walk, Bansho, etc.) and why? How do you determine what should be highlighted? How is it connected to the learning goal/expectations? How is student thinking annotated? What roles do you and your students take on during the consolidation?

Extensions & Differentiation/Modifications

Extension Ideas:

- Research the causes of global warming and its effects. Plan a campaign to stop global warming at a local level using multimedia.
- Calculate carbon footprint.

Parent and Community Connection

Home Assignment

Concept Detective - students can complete any terms they did not complete and add any mathematical terms they wish to include in their glossary with their parents.

Re-watch the Binogi video from class and do Quiz 1 (if they want to challenge themselves, try Quiz 2 and 3).

Discuss with the parents/caretakers factors that result in climate change and what can be done as a family to help stop the global warming.