Let's Talk About Climate	Gr. 7-8 STEM Skills and Connections

Lesson Plan

Learning Outcomes	Specific Expectations
Students will be able to have effective conversations about climate change by developing arguments and debating climate change topics with each other.	A3.1 describe practical applications of science and technology concepts in various occupations, including skilled trades, and how these applications address real-world problems A3.2 investigate how science and technology can be used with other subject areas to address real-world problems **Gr. 7** E1.1 assess the social and environmental benefits of technologies that reduce heat loss in enclosed spaces or heat transfer to surrounding spaces E1.2 analyse various social, economic, and environmental impacts, including impacts related to climate change, of using non-renewable and renewable sources of energy **Gr. 8** E1.1 assess the social and environmental impact of the scarcity of fresh water, and propose a plan of action to help address freshwater sustainability issues E1.2 demonstrate an understanding of First Nations, Métis, and Inuit knowledges and values about water, connections to water, and ways of managing water resources sustainably E1.3 assess the impact of scientific discoveries and technological innovations on local and global water systems

Description

In this workshop, students will learn how to have effective conversations about climate change and put it into practice by developing arguments and debating climate change topics with each other.

Materials

- Computers
- Internet Access
- Worksheets
- PowerPoint

Introduction

This lesson is about communicating science, using curriculum-connected topics impacted by or impacting climate change as case studies. In the age of social media, AI, and the internet, learning to have conversations about science and misinformation is vital. Using a collection of basic communication and rhetoric techniques, students will prepare and debate a topic.

What is misinformation?
Misinformation is the spreading of false information. When this is done knowingly, it is called disinformation, but most misinformation spreads when people share a post without checking or talking about something they heard but haven't confirmed. People can be inoculated against misinformation if we discuss misinformation openly, and we can avoid sharing misinformation by using the SIFT method.

S – Stop. Before sharing a piece of information, take a pause. Be aware of your emotional response.
I – Investigate. Take a moment to understand the source. Who is the source? What else have they said or written? What biases might they have? Who considers them credible? What do other people say about them?
F – Find other sources. Has anyone else reported this fact? Is it corroborated? By whom? What do fact-checkers have to say about it?
T – Trace. Where did that information come from? If there are any quotes, numbers, etc., where did those come from? Are they being accurately represented?

If you have checked all these things, then something can be shared.

What is rhetoric?
Rhetoric is how we can analyze any speech, including written, audio, video, and visual. Rhetoric itself is neutral and used by all parties. Learning about rhetoric can help us recognize how a piece of speech works to persuade us, no matter who is doing the persuading, and can help us form good arguments.

Rhetoric is an incredibly vast field. This lesson focuses on Logos, Pathos, and Ethos, long-standing principles of argument.

Logos – Logic
Pathos – Emotion
Ethos – Authority

Logical appeals form the basis of any argument. Logic may be inductive (starting with a theory and using observations to support that theory) or deductive (starting with an observation, and forming a theory based on that). Both have their place in an argument, and they often go hand in hand. The scientific method is based on deductive reasoning, but hypotheses are formed with inductive reasoning.

Logical arguments also rely on proof, which can be intrinsic or extrinsic. The intrinsic proof is the arguments themselves; the extrinsic proof is any outside data, testimony, etc. It is important to support your arguments with extrinsic proof.

Logical appeals are vulnerable to fallacy. There are many types of logical fallacies; this lesson focuses on four common ones.

- Red Herring: Introducing an unrelated argument as opposition that you can more easily refute
- Strawman: Arguing based on distortion, exaggeration, or misunderstanding of the other person's arguments
- False Dilemma: Presenting two arguments as the only two options when there may be others, or as mutually exclusive when they may not be
- Hasty Generalization: Drawing a conclusion based on a small or biased sample

Emotional appeals can come from visuals, language, music, and more. A documentary about a fox would play sad music when the rabbit escapes, but a documentary about a rabbit would play celebratory music for the same video, for example. Charged language can also appeal to emotion. Look especially at inflammatory language in headlines, designed to make you want to click on something.

Appeals to authority come in two shapes: the speaker’s own authority, and the authority they can gain by referring to people their audience already believes has authority. If the author of a paper is a doctor, and they are writing about a medical crisis, most people will feel that a doctor has their own authority. However, the doctor may also choose to quote research done by others, which adds to authority for that audience.

The last type of rhetoric discussed in this lesson is visual rhetoric. The extension activity discusses condensation symbols and data visualization.

- Condensation symbols: an icon, graphic, or image meant to encapsulate an argument simply, and to evoke emotions. For example, a polar bear on a tiny iceberg, any hazard sign on a sign or label
- Data Visualization: data is rarely presented solely as a string of numbers and results. People want to present it in a way that is easier to read. Be mindful of distortion using scale or visual effects.

All speech uses rhetoric. It is not good or bad on its own. Learning how to use and recognize it can help us make better arguments, and to recognize and combat misinformation.

Action

1. Discuss with the students what tools we have for addressing climate misinformation.
    a. Our own voice, social media, news, magazine articles, trusted voices, TV, radio, podcasts, etc.
    b. Our voice is one of the most powerful tools we have!
2. Watch the video on miscommunication on the second slide of the PowerPoint deck provided.
    a. https://www.ted.com/talks/katherine_hampsten_how_miscommunication_happens_and_how_to_avoid_it?subtitle=en
3. Use slide 3 (Gr. 7) or slide 4 (Gr. 8) to introduce the debate topics students will research and form arguments about.
4. Hand out worksheets.
5. Split the class into groups. They should record their name and their group members on the worksheet.
6. Have each group choose one topic. They should write their topic on the worksheet.
7. Within their groups, have students decide who will debate which side of their topic. They should write this on their worksheet.
8. Give your students 15-20 minutes to research their topic.
9. Use slide 5 to discuss what an essential message is, and what they should consider when crafting one.
10. Have students craft their essential message on their worksheets.
11. Use slide 6 to discuss how to speak clearly.
12. Use slides 7-9 to learn about reasoning and some different types of logical fallacies.
13. Do the activity on the second worksheet, identifying the type of fallacy made in an argument.
    a. Answers: 1. Red Herring 2. Hasty Generalization 3. Strawman 4. False Dilemma
14. Give students 15-20 minutes to prepare their arguments for the debate.
15. One group at a time should come up to the front for their debate. Give each student a maximum of 2 minutes to speak uninterrupted, then let someone from the other side answer.

16. When every student in both groups has spoken, ask the rest of the class to vote by cheering for which side they think made the most effective argument.

Consolidation/Extension

In this activity, we learned about logical fallacies. However, there are other rhetorical devices which can strengthen an argument, such as the use of pathos (appeals to emotion) and ethos (appeals to authority), condensation symbols (visual shorthand), and data visualization (graphs and charts). Have students find an article about climate change online. It can be from the news, a blog, an online magazine, or even a video or a podcast – if it is for the public. Give them the Extension Handout and have them try to identify as many rhetorical devices as they can within the article they have chosen.

Additional Resources

EN
https://guides.lib.uchicago.edu/c.php?g=1241077&p=9082320 - learn about three methods for recognizing misinformation
https://harmonysquare.game/en

FR
https://harmonysquare.game/fr
https://ici.radio-canada.ca/info/decrypteurs/robot-conversationnel-combattre-desinformation/#top

Bilingual
https://app.crankyuncle.info/language