

Unit Title: Climate Change

Grade Level: 10-12

Subject Area: Biology

Duration/Length/Number of class periods: 6-8 class periods (depending on the amount of in class work time given)

Description:

Students will complete a “[menu](#)” featuring appetizers, main course options and dessert to learn and show their learning about climate change. Appetizers will lay the foundation and background for the basic climate change topics. The main course will give students the choice to research areas of interest and to share their new knowledge in a format that best suits them. The dessert will have students calculate their “carbon footprint” and create a plan of action steps that they can complete to help reduce their carbon footprint.

[Established Goals](#) (National, State, Local):

MN Science state standard: 9.4.4.1.2 Describe the social, economic and ecological risks and benefits of changing a natural ecosystem as a result of human activity.

What [Enduring Understandings](#) are desired?

Students will be able to understand information in the media regarding climate change, recognize false information and be able to articulate “the facts” of climate change to others.

Students will understand their role in climate change and be able to make choices in their personal lives that will positively impact climate change.

What [Essential Questions](#) will be considered?

Factual - What is the Greenhouse effect? What human behaviors lead to climate change?

Conceptual - What is the relationship between your action and climate change?

Debatable - Can the effects of climate change be reversed or minimized by human behavior changes?

Students will know/be able to:

Students will understand the fundamentals of climate change.

Students will be knowledgeable about several topics in detail and be able to share their knowledge with others.

Students will be able to recognize their impact on climate change and create steps to lessen their impact.

Description	Formative	Summative	Introductory Activity	Learning Activity	Student Technology Used	Teacher Technology Used	ISTE Standards
All assignments, handouts, and resources are linked in the "climate change menu."							
Greenhouse Effect Lab - In this lab students will answer the question, Does the Concentration of Carbon Dioxide Affect the Air Temperature in a Closed Environment? Bottles (1 filled with "regular" air and another with a higher CO ₂ level) will be placed under a heat light. The temperature of the bottles will be recorded over a period of time to see how the added CO ₂ affects the temperature rise. Students will record and graph data and explain their understanding.	X		X	X	Computer, Webquest and probe (optional)		4 C
Global Ecology Webquest - Students will use several websites to gain background on various topics involved in climate change (population density, energy consumption, contributions to climate change, reactive gases), use maps to see trends, and learn about young climate activists.			X	X	computer		2 A 5 A, B
Greenhouse Effect and Climate Change Basics Quiz - After completing the "appetizer" assignments students will take a schoology assessment to ensure they have learned the "basics" before moving on to the research project. Students must score a 3* or higher to move on. Students that score less than 3 will need	X				computer		5 A, B

to sit down with a teacher and go over the appetizer assignments. (*our district uses a 4-point SBG scale)							
Climate Change Project - Students will research 2 topics of their choice from the list of options. For each of these topics they will show their learning in a format that works best for them and the topic. They are encouraged to do 2 different project types. If topics can be linked, 1 project will be accepted but must be as robust as two projects.		X			computer		3 A, B, C, D
Calculating Carbon Footprint and Personal Action - Students will calculate their carbon footprint using an online calculator. Using this data, they will create an action plan to help reduce their “footprint.”				X	computer		4 B C

Materials, tools and resources: Greenhouse Effect Lab: (per team) • 2 empty plastic bottles • 1 Alka-Seltzer tablet • 2 thermometers or Lab quests with temperature probe • water • lamp (with 100-watt bulb) • graduated cylinder • timer • clay Climate change projects - “project supplies” - markers, colored pencils, paper, scissors, glue, etc.
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