

Maple Syrup's Connection to Climate Change

Author
Grade Level
Duration

Sue Pendleton
7-8
2 class periods

National Standards

GEOGRAPHY

Element 1: The World in Spatial Terms

1. How to use maps and other geographic representations, geospatial technologies, and spatial thinking to understand and communicate information

Element 5: Environment and Society

14. How human actions modify the physical environment

15. How physical system affect human systems.

Element 6: The Uses of Geography

17. How to apply geography to interpret the past

18. How to apply geography to interpret the present and plan for the future

NEXT GENERATION OF SCIENCE STANDARDS

MS-ESS3-3. Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.
MS-ESS3-5. Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century.

AZ Standards

ELA

Writing Production and Distribution of Writing

7 and 8.W.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

Research to Build and Present Knowledge

7.W.7 Conduct short research projects to answer a question, drawing on several sources and generating additional related, focused questions for further research and investigation.

8.W.7 Conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration.

SCIENCE

Earth and Space

8.E1U3.7 Obtain, evaluate, and communicate information about data and historical patterns to predict natural hazards and other geological events.

8.E1U3.8 Construct and support an argument about how human consumption of limited resources impacts the biosphere.

Arizona Social Science Standards

GEOGRAPHY

The use of geographic representations and tools helps individuals understand their world.

7.G1.1 Use and construct maps and other geographic representations to explain the spatial patterns of cultural and environmental characteristics. Key tools and representations such as maps, globes, aerial and other photos, remotely sensed images, tables, graphs, and geospatial technology

8.G1.1 Use geographic tools and representations to analyze historical and modern political and economic issues and events. Key tools and representations such as maps, globes, aerial and other photos, remotely sensed images, tables, graphs, and geospatial technology

Human-environment interactions are essential aspects of human life in all societies.

7.G2.1 Explain how cultural demographic patterns, economic decisions, and human adaptations shape the identity of nearby and distant places.

8.G2.1 Examine impact of and responses to environmental issues such as air, water, and land pollution, deforestation, urban sprawl, and changes to climate.

Examining human population and movement helps individuals understand past, present, and future conditions on Earth's surface.

7.G3.3 Evaluate the influences of long-term, human-induced environmental change on spatial patterns and how it may cause conflict and promote cooperation.

Global interconnections and spatial patterns are a necessary part of geographic reasoning.



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7.G4.4 Explain an issue in terms of its scale (local, regional, state, national, or global)
8.G4.1 Take an active stance on a geographic issue reflecting its scale (local, regional, state, national, or global)

SIOP Elements		
Preparation Adapting content Linking to background Linking to past learning Strategies used	Scaffolding Modeling Guided practice Independent practice Comprehensible input	Grouping Option Whole class Small groups Partners Independent
Integrating Processes Reading Writing Speaking Listening	Application Hands on Meaningful Linked to objectives Promotes engagement	Assessment Individual Group Written Oral

Arizona English Language Proficiency Standards

Stage IV

Writing

Standard 5: The student will demonstrate research skills by using a variety of reference materials to complete a variety of writing tasks.

The student will demonstrate research skills by using a variety of reference materials to complete a variety of writing tasks as evidenced by the following:

B-4: paraphrasing information from at least one source.

Overview

Students should be aware that our global temperatures are changing, and this change can affect how people live and our economy.

Purpose

In this lesson, students will learn about the climate and landscapes of the New England States while making connections between the maple syrup industry and climate change. Students will also learn to create and interpret a climograph. This lesson includes strategies for diverse learners (ELLs).

Key Vocabulary

temperature: how hot or cold something is

precipitation: water falling from the clouds like rain or snow

tapping: putting a tube in a maple tree so the sap will drip out

climograph: a graph that shows precipitation and temperature over a long time

sap: juice in a plant (like blood in a human)

weather: the daily temperature and precipitation

climate: average of the temperatures and precipitation of a place taken over many years

Materials

- Pre/Post Test Engaging Questions and Answer Key
- Computer and projector
- Maple Syrup's Connection to Climate Change PowerPoint



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- United States map (with state names)
<https://geoalliance.asu.edu/sites/default/files/maps/US-NAMES.pdf>
- Youtube Tapping Trees for Vermont Maple Sap (3.06 min)
<https://www.youtube.com/watch?v=XnRXXhvDCZM>
- Background Information on New England and the Maple Syrup Industry reading
- Making a Climograph data sheet
- Climograph (Climate Graph) worksheet and Answer Key
- Colored pencils
- Vocabulary Cards
- Drawing Conclusions assessment and Answer Key
- Vocabulary Test and Answer Key

Objectives

The student will be able to:

1. Create a climograph.
2. Interpret a climograph.
3. Research a topic.
4. Identify ways to take action.

Procedures

Prerequisite Knowledge: Students know some of the reasons for global climate change.

SESSION ONE

Engage:

- a. Begin the session by having students complete the Pre/Post Test Engaging Questions worksheet. Collect and set aside for later. (**Preparation: Adapting content, Linking to Background**)
- b. Show PowerPoint Slides 1 and 2 and ask if anyone has ever tasted pure maple syrup before. Have classmates share their descriptions of pure maple syrup. Provide some for tasting if desired. (**Preparation: Adapting content, Linking to Background**)

Explore:

- a. Distribute The United States (with state names) maps and colored pencils. Project Slide 3. Tell the students that maple syrup comes from the New England states. Ask where are the New England states located? After students have contributed their responses clarify that the New England states are Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, and Connecticut. Project Slide 4.

Have the students color in the New England states. (**Application: Hands on, Application: Linking to Learning**)

- b. Project Slide 5. Instruct students to watch for clues as to what the landscape is like in the New England States. Then show YouTube video of the maple syrup industry. (3.06 min)
<http://www.youtube.com/watch?v=XnRXXhvDCZM>

(**Scaffolding: Comprehensible Input**)

- c. Record students' impressions of the landscape on the white board. (**Application: Promotes Engagement**)

Explain:

- a. Distribute Background Information on New England and the Maple Syrup Industry. Show the slides 5-11 about the four seasons and the maple syrup industry. Have students read the slides or read from the paper copies.
- b. Project Slide 12 and explain the Maple Syrup Vocabulary. Hand paper copies of the Vocabulary Cards to students who might benefit from paper copies. (**Integrating Processes: Reading, Scaffolding: Comprehensible Input**)
- c. Project Slide 13 of the Average Monthly Temperature and Rainfall for Vermont. Explain how a climograph contains lines and bars to show different information. (**Scaffolding: Comprehensible Input**)
- d. Distribute the Making a Climograph data and the Climograph (Climate Graph) worksheet. Read and explain the directions to the worksheet and allow students to pair up and create their climographs. If time, read the paragraph at the bottom of the worksheet. (**Grouping Option: Partners, Application: Hands on**)
- e. Worksheet can be homework if not finished.

SESSION TWO

- a. Begin the session by having students read the paragraph below their climograph on the Climograph worksheet. Instruct them to underline the information about when is the best time for maple syrup production.
 - b. Then have students discuss in small groups why the Maple Syrup Industry might be having difficulty. However, before sharing ideas with the large group, have students share within the small groups so that ELLs have an opportunity to rehearse their answers. (**Integrating Processes: Speaking**) Ask groups to share out their ideas. (**Integrating Processes: Listening**)
- Elaborate:**



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a. Once again review of the vocabulary associated with this lesson by projecting Slide 12. Have students pair/share with a partner and define the words as you call them out. **(Application: Promotes Engagement)**

Evaluate:

- a. Distribute the Drawing Conclusions worksheet. Allow students to pair up and use their climographs to answer questions 1-3. **(Assessment: Written, Group)**
- b. Then have students use the computer lab or handheld devices to complete questions 4-6. **(Assessment: Written, Group)**
- c. When students are done with the Drawing Conclusions worksheet, have them complete the Post Test. **(Assessment: Written, Individual)**
- c. Students can also complete the vocabulary test on the words associated with this lesson. **(Assessment: Written, Individual)**

Assessment

Geography, Science, and ELA

The Post Test can be graded using the points assigned for each question. Mastery will be considered a score of 28 points or higher.

The Climograph can be graded for accuracy. Mastery will be considered a score of 40 points or higher.

The Drawing Conclusions assessment can be graded using the points assigned to each question. Mastery will be considered a score of 40 points or higher.

Extensions

Students can compare Arizona trees to those found in the New England area by using, What Tree Is That? Interactive tree identification field guide <http://www.arborday.org/trees/whatTree/>

Students can write a report comparing and contrasting the weather of Arizona to that of the New England States. The report would include both the climograph of New England already completed and a new one for Arizona.

Sources

YouTube video: Tapping Trees for Vermont Maple Sap
<http://www.youtube.com/watch?v=XnRXXhvDCZM>

Information on Maple Trees and Climate from
<http://serc.carleton.edu/eslabs/weather/1c.html>

U.S. Climate Data
<https://www.usclimatedata.com/climate/burlington/vermont/united-states/usvt0033>



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