

All the Places You Go (Carbon Footprint)

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Grade Level 6
Duration 1-2 class periods

National Standards

GEOGRAPHY
Element 5: Environment and Society
 14. How human actions modify the physical environment
 15. How physical systems affect human systems

AZ Standards

ELA
Reading
Integration of Knowledge and Ideas
 6.RI.7 Integrate information presented in different media or formats (e.g., visually, quantitatively) as well as in words to develop a coherent understanding of a topic or issue.
Speaking and Listening
 6.SL.2 Interpret information presented in diverse media and formats (e.g., visually, quantitatively, and orally) and explain how it contributes to a topic, text, or issue under study.

SCIENCE
 6.L2U3.11 Use evidence to construct an argument regarding the impact of human activities on the environment and how they positively and negatively affect the competition for energy and resources in ecosystems.
 6.L2U3.12 Engage in argument from evidence to support a claim about the factors that cause species to change and how humans can impact those factors.

Arizona Social Science Standards

GEOGRAPHY
Global interconnections and spatial patterns are a necessary part of geographic reasoning.
 6.G4.2 Describe how natural and human-made catastrophic events and economic activities in one place affect people living in nearby and distant places. Key concepts include but are not limited to disease, war, items exchanged, ideas spread along trade routes, and natural disasters

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
 Grade 6-8
 Basic

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Listening and Reading

Standard 1 By the end of each language proficiency level, an English learner can construct meaning from oral presentations and literary and informational text through grade appropriate listening, reading, and viewing.

Speaking and Writing

Standard 4 By the end of each language proficiency level, an English learner can construct grade appropriate oral and written claims and support them with reasoning and evidence.

B-1: construct a claim about a topic or text..

Overview

Students can make conscious, smart, environmental choices when they understand the principles of the carbon footprint. Understanding one's impact on the environment allows us to explore options to reduce negative environmental impacts by maintaining a proper balance and finding ways to reduce our carbon footprint.

Purpose

In this lesson, students be able to identify human activities and new innovations that are contributing to climate change, disturbing the flow of energy. This lesson will help them understand entropy: the inflow of energy should always be equal to the outflow of energy in order to keep a balance in an ecosystem.

Key Vocabulary

carbon dioxide: a gas that is produced when people and animals breathe out or when certain fuels are burned, harmful to animals and people but is used by plants for energy

human activities: the various actions done by people (work, recreation, building, daily life, etc.)

carbon footprint: the amount of carbon dioxide emitted into the atmosphere by the activities of humans

resource - any useful material found in the environment

fossil fuel: an energy source such as coal, oil or natural gas that is formed in the earth from dead plants or animals

environment: all of the surroundings and conditions that affect living things such as water, soil, land and air

climate change: long term change in the earth's climate due to an increase in atmospheric temperature

Materials

- White Paper

- YouTube Video: *Simpleshows Explains the Carbon Footprint*. (2 min)
https://www.youtube.com/watch?v=8q7_aV8eLU
- Carbon Footprint Worksheet
- Carbon Footprint Calculator (EPA website)
<https://www3.epa.gov/carbon-footprint-calculator/>
- Vocabulary Cards
- Each Country's Share of CO2 Emissions graph
<https://www.ucsusa.org/resources/each-country-share-co2-emissions>
- Student Internet access and electronic devices
- Vocabulary Test

Objectives

The student will be able to:

1. Identify how human activity and technological changes are influencing our world.
2. Explain how the carbon footprint can be lessened by human actions.

Procedures

Prior to this lesson: Cover the floor, outside of the classroom, with white sheets of paper--one for each student. Before entering the class, have students line up and then stand on one of the sheets of paper.

Prior to this lesson, have students take home the Carbon Footprint Survey and get help if needed with completing the survey.

Prerequisite Knowledge: Students have learned about resources, natural resources, and renewable and non-renewable resources.

Engage:

1. Once everyone is inside the classroom, remove the sheets from outside the class and put them on the board so each student can compare and find their footprint. (**Application: Promotes engagement, Hands on**)

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- Tell students that today they will learn about another kind of footprint. Project the YouTube Video: *Simpleshow Explains the Carbon Footprint*. (2 min)
https://www.youtube.com/watch?v=8q7_aV8eLU
E (Preparation: Linking to background)
- Explain to the students that everything they use each day requires some form of energy that we get by burning fossil fuels which emits carbon dioxide. This is called our “carbon footprint.” Share a typical example, such as taking the bus to school each day, and discuss with students how this activity depends on the burning of fossil fuels and leads to an increase in carbon dioxide emissions. Ask students to consider their own daily activities and how these may create a carbon footprint. **(Scaffolding: Modeling)**

Explore:

- Distribute the Carbon Footprint Worksheet. Ask students to think about their daily schedule from the time they get up in the morning and record all of their typical daily activities. Then have students consider and explain how their activities are creating their carbon footprint; that is, how these actions are causing the emission of carbon dioxide. Lastly, instruct students to identify ways that can reduce their carbon footprint.
- Put students into groups to share their daily schedule of activities and then work together to find out how much carbon was emitted in their one-day of activities. Have students access the carbon footprint calculator found at:
<https://www3.epa.gov/carbon-footprint-calculator/> Have students record their findings on their worksheet. **(Application: Meaningful & Promotes engagement, Grouping Options: Independent and Small groups)**
- Pass out the vocabulary cards to student groups and have them go through the words together, discussing connections to what they have discussed and learned about the carbon footprint. As a whole class discuss and clarify the meanings of the vocabulary words and the connections that students have made to their learning. **(Grouping Options: Small groups and Whole class, Scaffolding: Comprehensible input)**

Explain:

- After students have used the carbon footprint calculator to calculate their total carbon emissions, have them return to the Carbon Footprint Worksheet. Allot time for them to work collectively to find solutions to reduce carbon emissions by making changes to their daily

routines and/or the kinds of resources they use daily. **(Grouping Options: Small groups)**

Elaborate:

- Explain how some countries are totally dependent on fossil fuel for their energy needs, thus creating a huge carbon footprint. This will allow students to connect the impact of their carbon footprint on the world geographical scale to better understand how their country’s impact compares to the impact of other countries.
- Have the students work in groups to identify carbon footprints of 5 different countries around the world using: Each Country’s Share of CO2 Emissions graph
<https://www.ucsusa.org/resources/each-country-share-co2-emissions> Students should identify 5 countries and their carbon emissions on the last section of the Carbon Footprint Worksheet.
- Still working in groups, instruct students to make a key note presentation on some of the ways a country can reduce its carbon footprints. Have groups share out their ideas to the whole class. **(Integrating Processes: Writing & Speaking)**

Evaluate:

- Have students take the Vocabulary Test.

Assessment

The Carbon Footprint Worksheet can be graded for completion and accuracy of ideas using the points assigned for each section. Mastery will be considered a score of 80% or above.

Students can take the Vocabulary Test to assess their learning of the lesson’s vocabulary. A score of 90% or above will be considered mastery. **(Assessment: Written, Individual)**

Extensions

To extend learning, students can create a flow chart of their day to day activities and connect it with carbon cycle with a graphic representations.

Students can write an argument discussing how the environment is affected by our carbon footprints using their notes from the Carbon Footprint Worksheet.

Sources

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YouTube Video--

https://www.youtube.com/watch?v=8q7_aV8eLUE

Carbon footprint calculator

<https://www3.epa.gov/carbon-footprint-calculator/>

<https://footprint.wwf.org.uk/#/>

Each Country's Share of CO2 Emissions

<https://www.ucsusa.org/resources/each-countrys-share-co2-emissions>

Teacher Resource Article on the carbon footprint

<https://www.sciencenews.org/article/climate-change-actions-reduce-carbon-footprint>