STEM - High School
Leading Class Discussion on STEM Carbon Footprint

Scenario Guide
Activation Date:
Intensity Level: Low

Author(s)	Avatar(s) & Environment	Suggested Learner Audience
Simulations for Secondary Science Teachers Conference Stacey Culleny Dr. Norm Herr Valecia Kelly Alicia Lane Dr. Michael McVey **Mursion** Jessica Gasparolo	**Host Avatar(s)** Nina/Michael **Simulation Avatars** Ciara, Angela, Jordan, James, Stephanie **Environment [ML3z]** 11th Grade High School Classroom	• Pre-Service Teachers • Non-credentialed Teachers • Novice Teachers
Delivery Mode(s) Available for Scheduling 1:1, Facilitated Group		
This scenario was created in partnership with AACTE and the convening, Enhancing Science Education through Virtual Reality: A Conference to Design Simulations that Enhance the Clinical Preparation of Secondary Science Teachers, is funded by the National Science Foundation (NSF) 20-572 Discovery Research PreK-12, award #2040747.		

Learner-Facing Vignette:

You are the teacher of a high school STEM class. Today is the second day of your lesson exploring the engineering design process and carbon footprints. The students understand that a Carbon Footprint is the amount of carbon dioxide and other carbon compounds emitted due to the consumption of fossil fuels by a particular person. In preparation for today's class discussion, the students have calculated their own carbon footprints and have them pre-loaded on their tablets. You intend to begin your discussion by asking the students to state their findings about their day-to-day energy consumption. You plan to encourage the students to discuss why some people's footprints have more of an impact than others, and guide the students to brainstorm possible solutions they can employ in their day-to-day lives that can reduce their carbon footprints.

Learner Outcome:

Your goal is to lead a class discussion, encouraging the students to break a large-scale problem down into smaller more manageable problems that can be solved through engineering.

Strategies/Best practices to consider:

- Ask higher-order thinking questions to engage the students critically on the topic
- Promote the analysis and interpretation of data to problem-solve
- Encourage students to make assertions stemming from evidence

Information about Intensity Level: Low

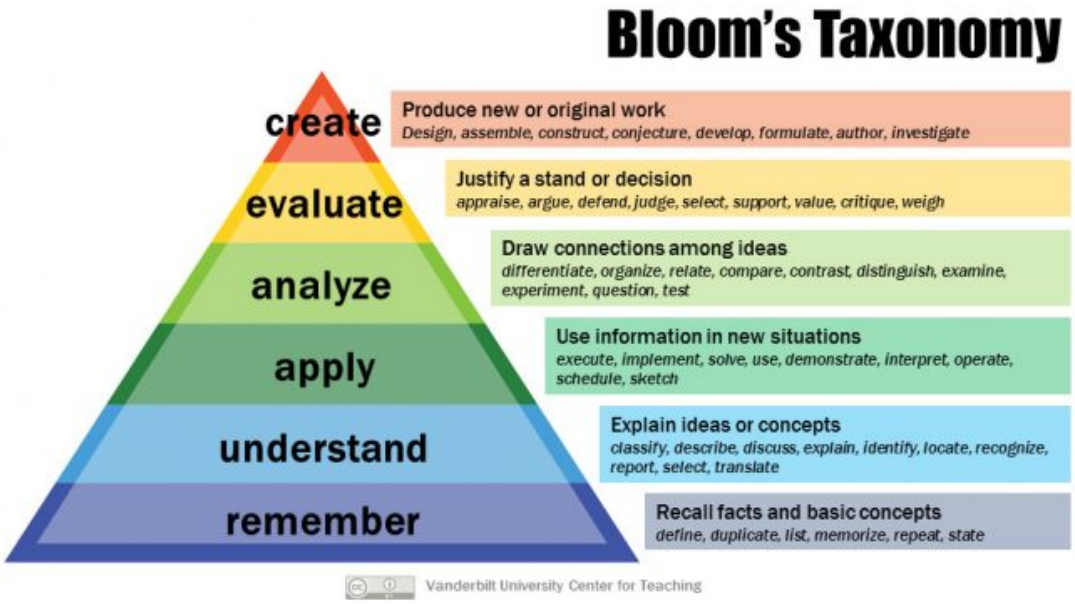
- Low intensity sessions are meant to build confidence for the learner. This setting is recommended for first time learners.

Supplemental Materials:

Students Prior Knowledge:
The definition of a carbon footprint. The students understand that a Carbon Footprint is the amount of carbon dioxide and other carbon compounds emitted due to the consumption of fossil fuels by a particular person. Outside of this the students may have limited to no prior knowledge.

This scenario is gearing toward practicing the following of the
Next Generation Science Standards 8 Practices of Science & Engineering:[1]

HS-ETS1-1 Engineering Design
Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.
HS-ETS1-2 Engineering Design
Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.



[1] NSTA, and using information from Appendix F of the Next Generation Science Standards © 2011, 2012, 2013 Achieve, Inc. "Science and Engineering Practices." *National Science Teaching Association*, 2014, https://ngss.nsta.org/practicesfull.aspx. Accessed 10 8 2021.

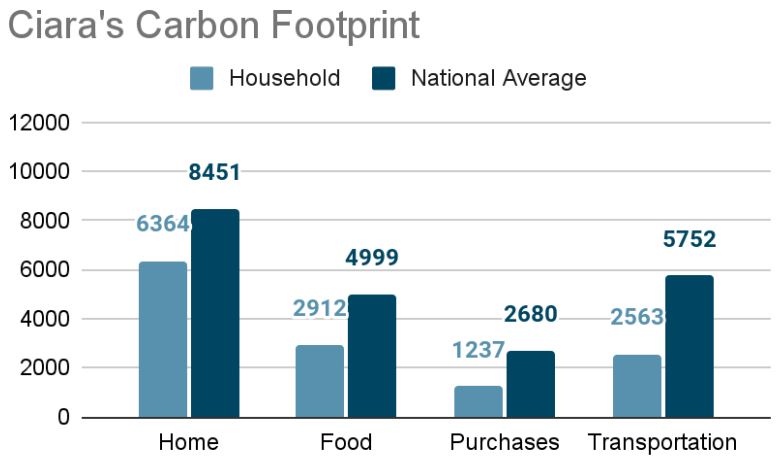
Student Work:

Graphed data is reported in kgs.

Ciara (she/her/hers)

Household details:

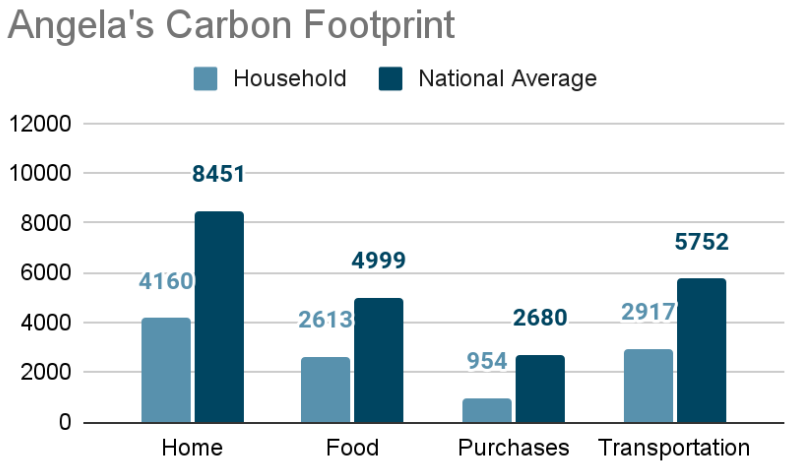
Lives with her parents in military base lodging. Her mother is a military chaplain and her father is a translator. She has one sibling, but he does not live with them. She has a pet betta fish.



Angela (she/her/hers)

Household details:

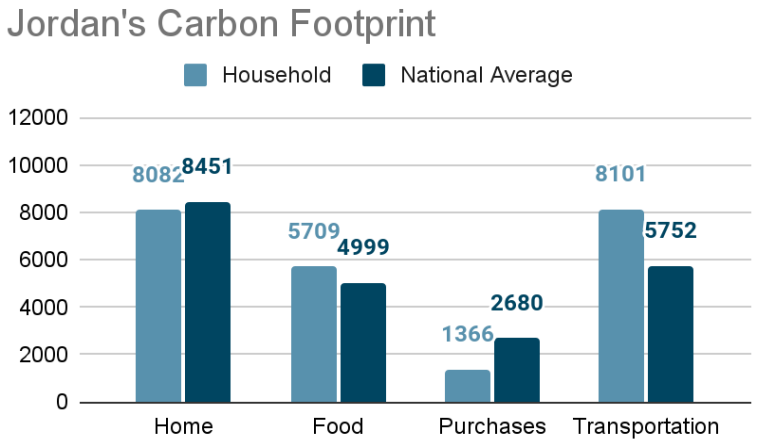
Lives with her mother and step-father. Her mother is an attorney and her step-father is a stay-at-home dad. She has two siblings (one living at home & one in college) and a pet cat.



Jordan (they/them/theirs)

Household details:

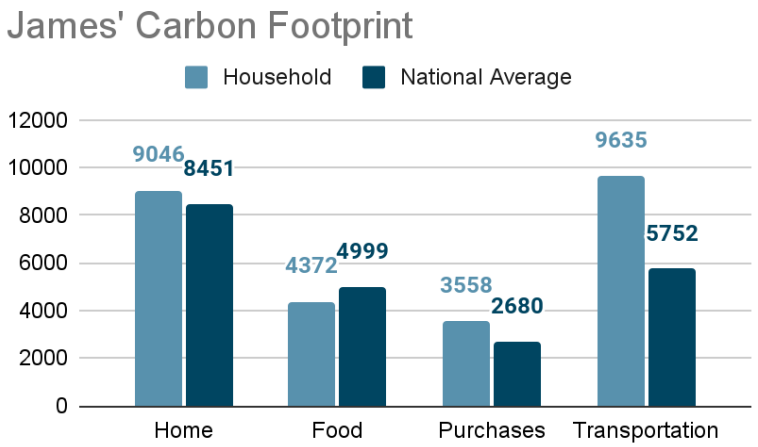
Lives with their mother. Their mother is a case manager for a community service agency. They have two siblings and a pet guinea pig.



James (he/him/his)

Household details:

Lives with his parents. His mother is a retail manager, and his father is a long-haul trucker. No siblings. No pets.



Stephanie (she/her/hers)

Household details:

Lives with her parents. Her father is a commercial airline pilot, and her mother manages a high-end clothing boutique. She has one sibling and a pet dog.