



Carbon Foot Printing and the Importance of Global Citizenship

A Collaborative 3rd Grade Project

The choices we make in our homes, our travel, the food we eat, and what we buy and throw away all influence the carbon footprint we leave on our environment. By making more environmentally-friendly choices, we can positively impact our environment on a local, national, and global level ensuring a healthier environment now and for generations to come.

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Objective(s) for Student Learning:

- Students will be able to develop a sense of interconnectedness to the global community, so that when they research carbon foot printing, they will generate solutions to positively impact their local community as well as impacting the global community as a whole.
- Students will increase their background knowledge on the topic of carbon foot printing, so that when asked, they will successfully generate and deliver a presentation on the importance of global citizenship, and making smart environmental choices.

Project Description:

- At no cost to the district, students will be participating in a cross-curricular project containing experiments and activities aimed at increasing their background knowledge, developing critical problem-solving skills, and their overall sense of citizenship to their local, national, and global community.

Key Experiments and Activities:

- **Dry Ice Experiment (45 min):** In this experiment, students will be utilizing the scientific method to ultimately calculate the volume of dry ice that is equal to the quantity of CO₂ that is generated each year by a typical American family. Key curricular concepts that will be covered include the phases of matter, density, and a concrete understanding of the measure of one ton of CO₂. (Resources used: BOCES Density Kits)
- **Completing Carbon Foot printing Calculator Survey (3-5 days):** In this phase of the project, students and their families will be completing a survey containing general questions regarding their eating habits, travel, and the disposal of waste. Students will then be inputting this data, into an online survey which calculates the amount of CO₂ (in tons) generated in a year by each family. Key curricular concepts that will be covered include: surveying, data collection, graphing, measurement, citizenship, and pollution.

We are using the first site to estimate our carbon footprint.

<http://www.nature.org/initiatives/climatechange/calculator/>

[http://blog.austinkids.org/2008/08/08/kids-carbon-footprint-](http://blog.austinkids.org/2008/08/08/kids-carbon-footprint-calculator/http://www.epa.gov/climatechange/kids/calc/index.html)

[calculator/http://www.epa.gov/climatechange/kids/calc/index.html](http://www.epa.gov/climatechange/kids/calc/index.html)

http://www.zerofootprintkids.com/kids_home.aspx

There are many options but we would like you to please use the same calculator.

- **Global Collaborative Discussion on Research Findings:** To sum up this project, students will be using the Distance Learning Lab to communicate with another third grade possibly in China, who will have also completed the dry ice experiment, and carbon foot printing survey. Both classes will engage in a collaborative discussion in which they will report their findings, as well as discuss future goals and objectives based on what they have learned. Key curricular concepts that will be covered may include: critical thinking and problem-solving strategies, a cross-curricular unit on China, as well as summarizing and comprehension strategies.

Integration of New York State Standards and Curriculum:

- **3/ELA/1: Information and Understanding**- Students will read, write, listen, and speak for information and understanding.
- **3/ELA/3: Critical analysis and Evaluation**- Students will read, write, listen, and speak for critical analysis and evaluation.
- **3/ELA/4: Social interaction**- Students will read, write, listen, and speak for social; interaction.
- **3/S.S./3: Geography** - Students will use a variety of intellectual skills to demonstrate their understanding of the geography of the interdependent world in which we live— local, national, and global—including the distribution of people, places, and environments over the Earth’s surface.
- **3/S.S./3: Civics, Citizenship, and Government** - Students will use a variety of intellectual skills to demonstrate their understanding of...the roles, rights, and responsibilities of citizenship, including avenues of participation.
- **3/MST/1: Mathematical Analysis and Scientific Inquiry**: Students will use mathematical analysis, scientific inquiry, and engineering designs, as appropriate, to pose questions, seek answers, and develop solutions.
- **3/MST/2: Information Systems**: Students will access, generate, process, and transfer information using appropriate technologies.
- **3/MST/7: Interconnectedness**: Students will apply the knowledge and thinking skills of mathematics, science, and technology to address real-life problems and make informed decisions.

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CRCS

Name _____

Dry Ice Experiment

Date _____

Objective: Calculate the volume of dry ice that is equal to the quantity of CO₂ that is generated each year by a typical American family.

Assumptions:

The density of CO₂ gas at 0⁰ C and 1 atm of Pressure = 1.977 g/L

The Density of Air at 0⁰ C and 1 atm of Pressure = 1.2754 g/L

1 ton (2,000 lbs) of CO₂ gas is equal to 459,281 L

A 14m x 12m x 3m classroom is 504,000 L

A typical American Family is a 5 person household generating 130 Tons of CO₂ eq/year.

How many classroom equivalents are there in Cuba Elementary School? ~ 40

Procedure:

Set up and observe the sublimation of Dry Ice in a cup with a surgical glove over it.

Set up and observe the sublimation of Dry Ice in a cup submersed in water.

Set up and observe the sublimation of Dry Ice in a cup submersed in water with a few drops of dish soap.

Set up and observe the sublimation of Dry Ice in a film canister.

Calculate the volume of CO₂ that a typical family from your country generates each year in the space below and on the back.