

PROJECT REPORT

Northern Wyoming Community College District / National Science Foundation
Summer Energy Education Program 2011

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TITLE

Determining your individual or household Carbon Footprint

SUMMARY

This activity will demonstrate the embodied energy hidden in the products we use, purchase, throw away, and the travel we undertake. Students will use actual utility statements, spending habits, and travel history to calculate their carbon footprint and present the results to the class.

ENERGY CONTEXT

Carbon footprint values are calculated using a products embodied energy. Embodied energy is defined as the commercial energy (fossil fuels, nuclear, etc.) that is consumed in the manufacture of any product to bring it to market, and dispose of it. Embodied energy includes the energy necessary for an entire product lifecycle. This lifecycle includes raw material extraction, transport, manufacture, assembly, installation, use, disassembly, deconstruction and/or decomposition and disposal.

ANTICIPATED TIME REQUIRED

This project will require:

- Explain assignment – 15 minutes (in class)
- Gather required materials – 20 minutes (outside of class)
- Compile research – 30 minutes (in class)
- Present results – 5 minutes per student (in class)
- Discussion – 30 minutes (in class)

INTENDED STUDENT LEVEL

This project will present learning activities and assessment activities intended for students currently employed or seeking employment in the construction or facilities management trades.

ASSUMED PRIOR KNOWLEDGE

This project will assume that students have prior knowledge of:

- Basic mathematics
- Basic report writing
- Group work etiquette

LEARNING OBJECTIVES

- Understand the concept of embodied energy
- Understand what the Carbon Footprint concept means
- Identify Leverage Points that can be attempted to reduce an individual's carbon footprint without much effort

MATERIALS

Each person needs:

- Prior 12 months utility statements (Obtained from Montana-Dakota Utilities).
- Typical weekly/monthly grocery list
- Typical weekly/monthly fuel costs and miles driven
- Typical weekly/monthly dollars spent on Goods/Services
- Carbon Footprint Worksheet
- Calculator

INTRODUCTION / MOTIVATION FOR STUDENTS

Calculating their carbon footprint gives students a measurable number to compare with each other and with published averages from the US and other countries. Students will understand that all of the products we consume have hidden initial costs as well as ongoing life-cycle costs. At the conclusion of the experiment students can identify areas where they can make improvements that require little effort but can collectively add up to substantial reductions in carbon emissions.

PROCEDURE

- Hand out Carbon Footprint worksheets and explain
- Instruct students to collect required data from home
- Allow 30 minutes in class for students to compile data and fill out worksheets
- Discuss and compare in class

SAFETY ISSUES

None

TROUBLESHOOTING TIPS

Some students may have trouble defining a number for certain categories. In this case published averages can be used to fill in the blanks.

Students will need to determine whether they should calculate a personal or household footprint and adjust accordingly. If a personal footprint is the choice and their totals include costs from family purchase (groceries for example) instruct students to divide the totals by the number of family members to determine individual numbers.

ASSESSMENT

Pre-Activity Assessment

Question/Answer: Ask the students and discuss as a class:

- What does the term “Carbon Footprint” mean and why do we care?
- What are some of the obvious Embodied Energy types? What are some not so obvious?

Prediction: Ask the students to predict:

- Based on published averages, in what range will each student’s footprint fall and why?

Activity Embedded Assessment

Question/Answer: Ask the students and discuss as a class:

- What is the rationale for the varying carbon factors?
- Why are some factors so different?
- What could be the reason why other countries country averages are so different?

Post-Activity Assessment

Question/Answer: Ask the students and discuss as a class:

- Identify “Leverage Points”, Leverage Points are changes that can be made that do not require much effort but can collectively result in substantial changes or improvements to our carbon emissions.

SUGGESTED EXTENSIONS

Play “Devil’s Advocate”, research sources that dispute the validity of a “carbon footprint”.

Research the question, “If you feel that carbon footprint is not a valid measure, does the exercise still have any merit”?

Extending the exercise to determine company or organizational footprints.

Discuss how our built environment can either be part of the problem or part of the solution.

See http://en.wikipedia.org/wiki/List_of_countries_by_carbon_dioxide_emissions_per_capita for a list of per capita emissions by country

See www.myfootprint.org for an Ecological Footprint Worksheet