

GREEN Student Project

Overview for Teachers:

This program is designed as a way for teachers at almost any level from 2nd grade through high school to either jump start or reinforce the teaching of environmental stewardship. The by-product of this program is also an increased appreciation for math and science, and the concept that measurement is the key to management. Plus, students develop a simple but powerful understanding about how small individual gestures can make a large impact on a community and planet.

The program involves three parts:

1: The Eco Home Chart

This is about measuring a few home activities over the course of one week (naturally the younger students will need the support of their siblings and parents). Please note that these are anonymous in order to protect any possible concerns over privacy.

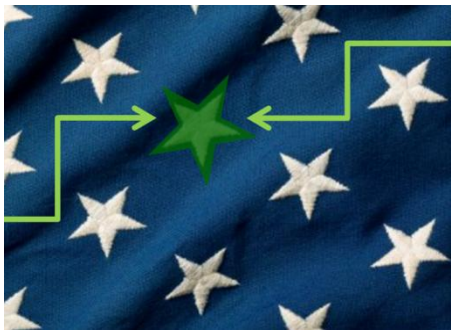
2: The In-Class Discussion and /or Demonstration

Following the week of measurement, the teacher collects the Eco Home Charts from each student and tallies the totals for the class. The teacher can then just run the unit calculation totals provided in this file on page #5 - the 'Class Summary' (1 of 3) of the Eco Home Report. The 'tally' and discussion topics included in this document serve as the springboard for the discussion and/or optional demonstrations.

3: The Eco Report

This report puts in perspective the amount of resources that American families use and the potential for savings. Each student is given a copy to take home and share with their family. The report illustrates the impact of the 'home' measurements relative to the pounds of plastic and paper and gallons of water consumed. The report also provides perspective on the consumption levels for families of student tiers across the country including elementary school, high school, and college. Plus students and their parents learn simple facts that may motivate a shift towards eco-stewardship, such as..." If every household in the U.S. replaced just one roll of virgin-fiber paper towels (typ. 70 sheets) with 100% recycled ones, we would save over 500,000 trees."

The following pages reflect the sequence of activity, and it all starts by inspiring the students to take a few minutes each day to record some activities at home.



Eco Home Chart

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It's a team sport
to save our Planet,
Health, and Money...

*Take a week to keep score, and we'll show
you the impact and potential savings.*

Monday Tuesday Wednesday Thursday Friday Saturday Sunday Your
TOTALS:



Instructions: Do your best to count the number of plastic bottles that you and your family throw away (and hopefully recycle) as well as the rolls of paper towels that you use. Your family may not use a whole roll of paper towels (typ. 70 sheets) in a day, so you can estimate fractions since the total usage of paper towel rolls for the week is most important. Also, record the number of showers or baths that you take each day, and the number of times that you flush the toilet.



Plus, count the total number of light bulbs in your home and write in the number of people living in your home below:

Number of Incandescent Bulbs: _____

Number of Household Members: _____

American Homes and Offices use over 40% of our energy...so let's start to make a difference today.!

2: The In-Class Discussion and/or Demonstration

First: WATER. We start with water because it is easy for everyone to see in a cup and we use it every day. More advanced and high school classes can get into the nuances of plastic and paper recycling and CO₂ emissions. As well, we envision that this is an ongoing curriculum at least once a year, so the layers of information can build upon each other over time.

Recommended 'Props':

- 1) A simple cup filled with tap water
- 2) A Globe or Map of the world
- 3) One gallon jug or one gallon bucket plus a tablespoon (This is for illustrating the fact that if the entire world's water were a gallon jug, the fresh water available for us to use would equal only about one tablespoon.)

The teacher explains that there are four (4) cups in a quart, four (4) quarts in a gallon, and 128 fluid ounces in a gallon. Since the weight of the plastic bottles and paper towels are factored in percentage of a pound, it is also relevant to share with the class that there are 16 ounces in a pound. Then the teacher shares some facts on water. The extent of the discussion on the facts is relevant to the class level. For a full list of facts, refer to the appendix of this file. In the appendix, the ones highlighted in green are the ones listed below. Teachers can also turn each fact into a question for the class to try to answer. For convenience, the "answers" are in bold.

WATER FACTS:

- On average in the US, it takes **2 gallons** to brush your teeth, **2 to 7** gallons to flush a toilet, and **25 to 50 gallons** to take a shower.
- The average person needs a minimum of **2 quarts** of drinking water a day. The rule of thumb is to drink **50% - 75% of your body weight in fluid ounces**. A 150 lb adult would drink 75 oz daily.
- Each American at home uses about **100 gallons** of water each day (80 in the winter and 120 in the summer). The higher summer consumption is typically due to lawn and garden irrigation.
- The United States consumes water at **twice** the rate of other industrialized nations.
- Water covers nearly **three-fourths** of the earth's surface. If the entire world's water were fit into a gallon jug, the fresh water available for us to use would equal only about one **tablespoon**. Only **one percent** of the earth's water is drinkable, and with increases in global population drinking water is a precious resource. Americans extract **3,700 billion gallons** per year more than we return to aquifers and other natural water sources.
- Every day more than a billion people will make a **three-hour** journey on foot just to collect water. That is one out of every six people on earth or about **15% that do not have running water**.
- Water & Food: It takes about **6 gallons** of water to grow a single serving of lettuce. More than **1,000 gallons** for cheeseburger and **2,600 gallons** is required to produce a single serving of steak. About **6,800 gallons** of water is required to grow a day's food for a family of four. The average American consumes 1,500 pounds of food each year; 1,000 gallons of water are required to grow and process each pound of that food—**1.5 million gallons** of water is invested in the food eaten by just one person! This 200,000-cubic-foot-plus of water-per-person would be enough to cover a football field **four feet deep**.

2: The Optional ‘Bonus’ ‘show and tell’

Bonus Demonstration:

Seeing is Believing, so go for Multiple Buckets. To illustrate that Americans individually each use on average 100 gallons of water per day, schools can keep on hand one master set of either 100 gallon buckets or empty washed out milk jugs, or twenty 5 gallon buckets. The cost for twenty empty 5 gallon buckets is about \$100 at a local home supply or paint supply store and the visual impact is highly effective when they are laid out across the room. The volume of water per household members comes from showers, baths, laundry, dishwashing, sprinklers, etc. Americans use at least twice the water as Europeans and more than ten times the water as the rest of the world per capita per day.

The teacher lays out the buckets that would hold 100 gallons, and then asks the class if the volume represents, the use for a day, week, month, or year for an average American. The answer is a surprising single day. The teacher then fills one or more of the buckets with water and picks a few students to carry the buckets from one end of the classroom to the other. The work is hard, and the teacher lets the students know that a lot of children around the world have to help carry water over a mile each day, because they do not have running water.

Bonus Project: GREEN Campus Elements:

Walk the Talk of conservation: Since water conservation is one of the benchmarks of sound environmental policy and this curriculum includes water as a key topic, the school administration may want to consider purchasing a few items such as a 50 gallon water collection ‘Rain Barrel’ to help students at every level see first-hand the advantages of conservation, etc. Some schools may be eligible to receive a free rain barrel as part of the program.

Based on availability, a member of the GREENandSAVE team will come on site to participating schools to provide one or more of the Bonus Programs as a demonstration to a few classes.

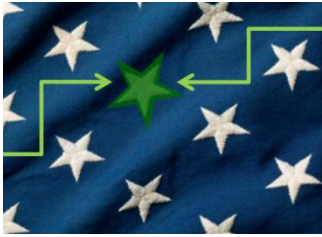
3: The Eco Report

The size and scope of the report and Eco Family Guide is tailored in part to the grade level and the ‘tally’ of the measurements collected by the participating classes.

The report puts in perspective the amount of resources that American families use and the potential for savings. Each student is given a copy to take home and share with their family. The report illustrates the impact of the ‘home’ measurements relative to the pounds of plastic and paper and gallons of water consumed. The report also provides perspective on the consumption levels for families of student tiers across the country including elementary school, high school, and college. Plus students and their parents learn simple facts that may motivate a shift towards eco-stewardship, such as...” If every household in the U.S. replaced just one roll of virgin-fiber paper towels (typ. 70 sheets) with 100% recycled ones, we would save over 500,000 trees.”

The customized report for the school is designed so that the teachers may also edit and choose content categories to ‘dig deeper’ for future class discussions. To review a sample of the ‘graphic impact’ and information, see the downloadable template PDF file here:

<http://www.greenandsave.com/greenguide/family.html>



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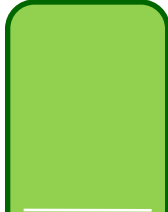
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Consumption in a week:

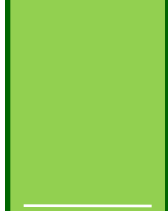
Number of students in the class: _____

Total number of household members represented by the Student Class: _____

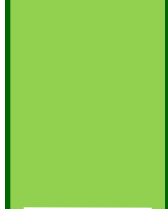
Class Totals X Average Unit Factor = Consumption Weekly Calculated Monthly Calculated Annual



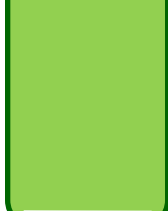
Plastic bottles weigh .05 Pounds on average



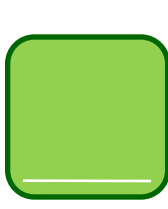
Paper towel rolls weigh .5 Pounds on average



10 minute showers use 25 Gallons on average

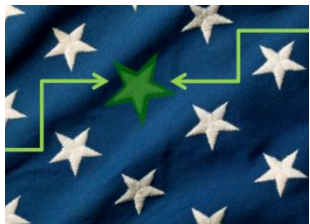


Toilets use 2.5 Gallons per flush on average



60 Watt bulbs burn 1.12 kWh per week on average

CALCULATIONS: The Information above has been tallied by your teacher based on the individual student's "Eco Home Charts" that each student completed over a week of home recording. The average unit factors and the information on the following pages have been compiled from research from the following sources: U.S. Department of Energy, the Environmental Protection Agency, ENERGY STAR® for Homes Program, US Green Building Council's LEED for Homes Program, American Council for an Energy-Efficient Economy (ACEEE), International Energy Conservation Code, PLUS information directly from University Studies, Architects, Manufacturer Specifications, Distributors, seasoned Builders and Installers, and Home owners with actual Performance Feedback.



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Health, and Money...

Take a look at the impact our consumption has on the environment.



Plastic

Problem: 80% of water bottles sold in the U.S. end up in landfills, creating over 30 Billion bottles of waste.

Solution: Recycling is a great start but, water filters for home, office and school reduce the waste before it starts.

Go for the 'Filtered Pitcher and Canister' Strategy. Also buy concentrated non-toxic cleaners that make a healthier home and reduce the cost and the CO² emissions used in trucking the cleaners from manufacturing to retail. If every household replaced just one 48 oz box of petroleum based laundry detergent with vegetable based products, we could save almost 100,000 gallons of oil. The savings is enough to heat over 5,000 U.S. homes for a full year.



Paper

Problem: Americans use over 90 million tons of paper, averaging 700 pounds of paper products per person each year.

Solution: If every household in the U.S. replaced just one roll of virgin-fiber paper towels (typ. 70 sheets) with 100% recycled ones, we would save over 500,000 trees.

Every 2,000 lbs (1 ton) of paper towels requires about 4 trees. Overall, try to use washable cloth towels and napkins. If every family replaced just one package of paper napkins (typ. 250 napkins) with recycled ones, we'd save 1 million trees. Replace one roll of toilet paper (typ. 500 sheets)...save 400,000 trees, and one box of facial tissue (typ. 175 sheets)...save 150,000 tree. Paper can typically be recycled 5-7 times!



Water

Problem: At an individual average of 100 gallons per day, Americans consume water at twice the rate of other industrialized nations.

Solution: The latest technology for Low Flow shower heads and toilets delivers high pressure and only uses about two thirds of the water.

You can reduce your hot water heating bill by about \$60 per year just by installing a smart shower head, because you reduce the cost of heating the water, which typically cost between \$300 and \$500 per year! Take a shower that is just 1 minute shorter and save 2.5 gallons each day for each household member. This 1 minute reduction could save America over half a billion gallons of water a day!

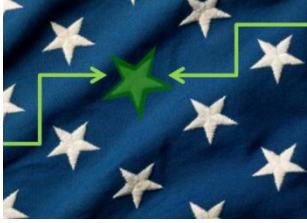


Energy

Problem: The U.S. has 5% of the world's population, but uses 23% of its energy, more than 4 times the global average.

Solution: Compact Fluorescent Bulbs (CFLs) use 66% less energy than traditional bulbs, and each CFLs saves home owners almost \$40 over the life of the bulb.

CFLs will also last about 10 times longer than traditional bulbs, but LEDs will last 100 times longer than traditional bulbs. LEDs have the added advantage of 'dimmiability' to save even more money. Overall, replace old bulbs as they burn out with CFLs or LEDs, especially the ones that are in areas of your home that are left on for long periods of time.



It's a team sport
to save our Planet,
Health, and Money...

Check out the financial and environmental savings your family can make.

Four Cornerstones of Home SAVINGS...	Added Cost	Annual Savings	Pounds of CO ² Savings
<p>Reduce Plastic Waste: Recycle even half of your household waste, and use a filtered pitcher and reusable canister instead of plastic bottles.</p> <p>Also, use concentrated eco-cleaners that can be mixed for different cleaning purposes.</p>	\$40 \$12	\$60 \$120	1,000 lbs
<p>Reduce Paper Waste: Save more using cloth, but replace at least one pack of paper towels, napkins, toilet paper & facial tissue with ones made of recycled paper.</p>	\$6	\$0	.34 lbs
<p>Reduce Water Waste: Install a water efficient low flow 'amplifying' shower head with 1.6 gallons per minute.</p> <p>Also, install a faucet aerator with 1.6 gallons per minute.</p>	\$30 \$2	\$60 \$10	560 lbs
<p>Reduce Energy Waste: Replace just 10% of your traditional incandescent light bulbs with CFL bulbs.</p> <p>Also, Set the Programmable Thermostat. (Over 70% of Americans have not set their programmable units.)</p>	\$7.50 If needed: \$35 +	\$10 \$180	1,520 lbs
Totals	\$97.50	\$440	3,080 lbs

For less than \$10 a month...you can SAVE over \$400 a year and SAVE well over a ton of CO²!

Impact across the US Students	Annual Savings	Pounds of CO ² Savings
Nursery School and Kindergarten Students: (9 million in the United States and their families)	\$4 billion	27 Billion lbs
Elementary School Students: (33 million in the United States and their families)	\$14.4 billion	100 billion lbs

If every family that has nursery school through elementary school students makes the few changes outlined above, the impact would be massive. The average U.S. household spends over \$1,900 a year on energy and emits 27.3 tons of CO₂. We've got a lot of opportunity and ...

A little bit goes a long way!