

# THE (no fear) GUIDE TO ENERGY EFFICIENCY



ART PROJECTS & INVESTIGATIONS

Dana B. Rubin

Recommended for Late Elementary & Middle School Education

## About the Author:

The following guide was created by Dana B. Rubin for her senior independent project in Environmental Studies at Mount Holyoke College. Dana began her project working with the Cambridge Energy Alliance in Cambridge, MA in the summer of 2011. Working with the city's school district and the CEA, Dana spread her lessons through the city's public schools and youth centers to be used as supplemental lessons for classroom learning. Beginning in the fall of 2011, Dana expanded her work to Western Massachusetts where she ran a 12-week after school program at Peck Middle School in Holyoke, MA to encourage small behavior and lifestyle changes at school and within the home. Dana has gone on to run similar programs at the Amherst Common School in Amherst, MA.



*“ ...if we teach our students to be more environmentally aware at an earlier age, being efficient and resourceful will be instinctual...that is my hope...”*

Thank you:

Cambridge Energy Alliance  
Mount Holyoke College & The Center for Environment  
Peck Middle School  
Amherst Common School  
Lauret Savoy  
Tim Farnham  
Pam Matheson  
Friends & Family

Dedication:

To Mom, Dad & Renée

# How to Use THE (no fear) GUIDE TO ENERGY EFFICIENCY



## Teachers:

Students should feel comfortable running these activities by themselves or in small groups. Keep the book accessible for choice activities and free-times.

Activities can also be run as full classroom investigations to supplement your required curriculum. Accompanied with each activity is a *teacher's guide* to help deplete your stress, highlight discussion points, and to provide you with scholarly information on each topic.

Get creative with the activities and see where you can take them!

Enjoy!

# FUN Activities for Energy Efficiency

## 1

What IS energy efficiency?

When one is energy efficient, they use fewer finite and natural resources to perform daily activities

## 2

It is important that we become *more energy efficient* because we are using **TOO MUCH ENERGY**. Our high energy-use is putting too many pollutants into the atmosphere, which are altering our climate and weather.

## 3

Our energy largely comes from the burning of fossil fuels. When we burn fossil fuels like coal, petroleum and natural gas, we send many Greenhouse Gases (GHG) up into the Atmosphere, causing damage to the the biosphere.

## 4

We can become more energy efficient by turning off lights and computers, air drying our clothing, turning off the faucet when brushing our teeth, biking and using public transportation.



pg. 4-5

Animal Abodes



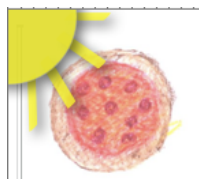
Pg. 19  
& 20

Spin your Wind



pg. 6-7

The Better Bulb



Pg. 21  
& 22

Solar Cookin'



pg. 8  
& 10

Classroom Food  
Unglued



Pg. 23  
& 24

Stop Polluting  
your Computing



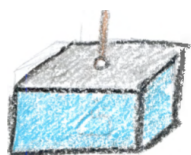
pg. 9  
& 10

Promote a Snack  
Tote



Pg. 25  
& 26

The Tap Water  
Challenge



pg. 11  
& 12

Plunger Washer



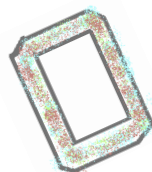
Pg. 27  
& 29

Yogurt Gardens



pg. 13  
& 16

Fight for Air Tight!



Pg. 28  
& 29

Flashy Trash  
Frames



pg. 14  
& 16

Passive Light Keeps  
a Room Bright!



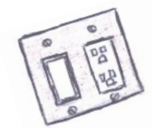
Pg. 30  
& 31

Transportation  
Investigation!



pg. 14  
& 16

Popsicle Stick  
Energy Houses



Pg. 32

Switch Fix!



pg. 17  
& 18

Conservation  
Determination!



Pg 33

Reduce my Use  
Pledge!



Pg. 34

Energy Sleuth!



# Animal Abodes

**Background:** The Humane Society is an organization that aims to help protect animals in our communities that need more TLC. Be an environmentalist *and* a friend to our furry friends by making sure that pets have a safe home. Sponsor your local Humane Society by donating your time or even your scrap paper products. One of the best ways to recycle paper is to shred up scrap paper and put it to use in another creative way. This project reuses paper by creating paper-cushioned beds for pets that need a cozy space to get some zzz's.

**Materials:**



**Activity:**

1. Cut off the flaps of a medium-sized box. Cut half-way down on one of the sides so it is easy for a pet to jump into.
2. Hunt around the classroom and school to find newspaper and double-printed paper to use as a matting for the box.
3. Carefully with a pair of scissors, shred the paper into strips.
4. Place the strips in the box and fluff them so they are ready for a pet resident.
5. As a group, gather your recycled pet-beds and take them down to your local humane society.



# Animal Abodes

## Teacher's Notes

- De-Stresser Hints:** 1. For younger groups of children, have newspapers pre cut. For older students, make sure that the newspapers do not have any distracting advertisements.

- Discussion Points:** Why is it important to reuse scrap paper?  
Recycling paper uses a significant amount of energy too, so being able to creatively reuse double-sided paper and newspaper, lengthens the life of the resource. When paper is recycled the ink must be removed with water and turned into pulp. Then, a process called "deinking" bleaches the paper with chemicals to get it back to its egg-white color. Paper making the 4th most energy-intensive industry. It takes approximately 5,000 trillion Btus to produce the country's annual supply of paper.

### What's the Humane Society's Mission?

We help animals by advocating for better laws to protect animals; conducting campaigns to reform industries; providing animal rescue and emergency response; investigating cases of animal cruelty; and caring for animals through our sanctuaries and wildlife rehabilitation centers, emergency shelters and clinics.

[www.humanesociety.org](http://www.humanesociety.org)

- Chalkboard Points:**
- The average American uses **700 pounds of paper** per year
  - When we use less paper and reuse paper, we **save wood, water and reduce pollution levels.**

- For Teacher's Sake!:**
- Journal Articles:**
- " **Risk of cancer among paper recycling workers**"  
Rix, Villadsen et al.
- Online Resources:**
- <http://www.thedailygreen.com/environmental-news/latest/7447>
  - [www.environmentalpaper.org](http://www.environmentalpaper.org)
  - [www.whatsinyourpaper.com](http://www.whatsinyourpaper.com)
  - [www.pulpwatch.org](http://www.pulpwatch.org)
  - **Department of Energy: Make Paper Mills more Energy Efficient**
  - [www1.eere.energy.gov/manufacturing](http://www1.eere.energy.gov/manufacturing)



# The Better Bulb

## Vocabulary: **Incandescent Light bulb:**

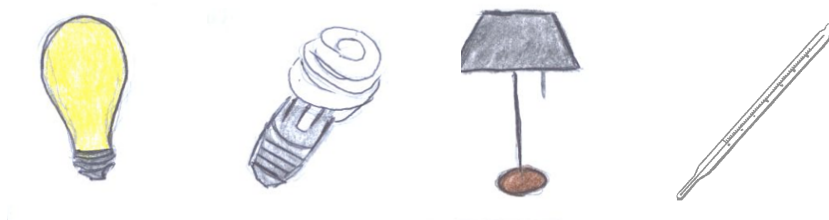
An electrical current heats up the metal filaments that are contained within the glass bulb to produce light.

## **Compact Fluorescent Light bulb:**

An electrical current converts a gas contained in the bulb to produce a short-wave of light.

**Background:** More than 125 years ago, Thomas Edison invented the *incandescent light bulb*. For more than a century Edison's invention, with the help of many others, lit up the world like never before. We have learned that the incandescent light bulb only uses 10% of the electricity it produces! We have discovered that *compact fluorescent light bulbs* are much more energy efficient; they use 75% LESS energy and they last 10 times longer! The following activity will test the bulbs differences.

## Materials:



## Activity:

1. Carefully screw in an incandescent light bulb into a lamp.
  - a. How long does it take for the lightbulb to reach its full brightness?
2. Take a thermometer and hold it next to the bulb for one minute. Record the temperature.
3. Switch out the Incandescent Light bulb for the Compact Fluorescent Light bulb and observe the light that is produced.
4. Hold the thermometer to the CFL and record the temperature
  - a. Was there a difference in how much light was produced between the two bulbs?
  - b. What bulb produced more heat?

**Conclusion:** CFLs use 75% less energy and last 10 times longer than Incandescent Light bulbs. Since CFLs are more energy efficient, fewer greenhouse gas emissions are generated and money is saved!





# The Better Bulb

## Teacher's Notes

### De-Stresser

#### Hints:

1. Children might want to get rambunctious with the lights off, it is recommended to have all the students sit in a circle around the lamp to keep attention focused on the activity.

### Discussion

#### Points:

Where can you dispose an incandescent light bulb?

Incandescent light bulbs can be disposed in home and/or school trash receptacles.

Where can you dispose a CFL light bulb?

CFL light bulbs should be brought to local hardware stores and designated household hazardous waste collection sites.

How much mercury is in a CFL? Is it safe?

We consume more mercury eating canned tuna; mercury found in a CFL is about the volume of the tip of a ballpoint. Therefore, CFLs are very safe and are not be feared.

Why are CFLs more energy efficient?

CFLs are more energy efficient because they produce light by converting a gas into a wave of light, versus an incandescent which requires energy to heat up a filament at the center of the bulb. This allows for the same level of brightness but produces half the heat.

CFLS prevent increased levels of sulfide oxide, carbon dioxide and high-levels of nuclear waste.

### Chalkboard

#### Points:

- CFLs use **75% less energy** than incandescent bulbs and **last 10 times longer**
- Over its lifetime, a CFL will save a person \$30/bulb
- Using CFLs reduces the amount of coal that is burned to produce electricity.

### For Teacher's

#### Sake!:

#### Journals:

**Simplicity without Reduction**

Borman & Holmberg et al., 2000

#### Online Resources:

- [www.Earth911.com](http://www.Earth911.com)
- [www.mnn.com/earth\\_matters](http://www.mnn.com/earth_matters)
- [http://eartheasy.com/live\\_energyeff\\_lighting.htm](http://eartheasy.com/live_energyeff_lighting.htm)

#### Books:

**The Ultimate Guide to Greening your Home**

Anthony Gilbreath, 2010

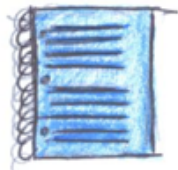


# Classroom Food unglued

**Vocabulary:** **Environmental Stewardship:** Thoughtful and careful responsibility of the land.

**Background:** Grocery stores have aisles and aisles of packaged products. Frozen foods, kids snack-packs, soda drinks and packaged meats are just a few of the examples. 1/3 of packaging is used to get food from the store to home. If packaging declined, landfill space would plateau, goods would be cheaper to produce and fewer harmful plastics would improve air quality. This activity investigates daily food consumption.

**Materials:**



**Activity:**

1. Beginning on Monday, write down in a journal the food items that you brought for lunch. How many items are in a package? How many snacks are in plastic bags? Calculate the total and make a pledge that for the following day, you'll decrease this number by one. For example, pack your snacks in a zip-block bag that already has been used, use a cloth snack pack, and/or bring a fruit that has no packaging.
2. For each day of the week, decrease the amount of packaged items in your lunch sack.
3. By the end of the week, have everyone share in the class their plastic free lunches.

**Take it to the next step!**

1. Rather than wasting food that we have chosen not to eat, donate your canned and boxed goods to food shelters that sponsor the homeless that are hankering for a meal.
2. For a full week, bring in at least one canned/boxed good to donate to a food shelter.

**Conclusion:** If we all did our part to reduce food waste and buy products with less packaging, it would be equivalent to taking off 1 out of every 4 cars off of the roads. Now that is something to think about!



# Promote a snack Tote

## Vocabulary:

**Plastic:** A human created product made from petroleum. Plastic originally was made from organic matter, cellulose. By the 1950s plastics were designed from non-degradable polymers, polyethylene, polyvinyl chloride, polycarbonates, polystyrene and Styrofoam, just to name a few. We have become a plastic-dependent country.

## Background:

Today we consume six hundred billion pounds of plastic annually. Consider how much “stuff” in our lives is plastic. Everything from plastic water bottles, chewing gum ( sorry, it’s made from plastic), food tubs, our clothing and shoes, packing and electronics. Can you think of more? One simple way to get away from plastic is to start with our food packaging.

## Materials:



## Activity:

1. Take a large piece of fabric and cut out a circle, make sure it is quite large. Tracing a wall clock or measuring 8-9 inches across should be the best size for this craft.
2. Once a circle of fabric has been cut, using a hand hole puncher, punch holes every 1 inch around the circumference of the fabric circle.
3. Take about 3 feet of yarn and weave it through each hole.
4. Draw the string together, wollah! You have a drag-string snack pack.

## Take it to the next step!

1. Make fabric templates and collect old fabric from your home. Get the whole school involved and make drag-string snack totes for everyone. Set a challenge for the school to bring in fabric totes everyday. Hand wash them and hang them to dry.
2. Consider what plastic packing you can take out of your daily life and your family’s life and write a list. Granola and energy bars, cleaning supplies, shampoos and soaps, grocery bags. Set a year goal to see how much plastic packing you can remove from your life.

## Conclusion:

If we all did our part to reduce food waste and buy products with less packaging, it would be equivalent to taking off 1 out of every 4 cars off the road. Now that is something to think about!



# Food for Thought

## Teacher's Notes

### De-Stresser

#### Hints:

1. Create a chart for the students to fill-out each morning, checking off how many items of food in their lunch is not wrapped in plastic.

### Discussion

#### Points:

What is a food desert?

There are many areas within the United States that are deprived easy access to nutritious food. Food deserts are often common in rural communities and low-income districts. It is important to consider that the fresh, non-packaged foods are not always accessible. Today, over 2.5 million Americans live in a food desert.

What are some steps that can be taken to reduce the number of food deserts within the United States?

Incentivize local food programs, encourage farmers' markets and local gardens. This is one struggle that can be defeated, and thanks to First Lady, Michelle Obama, redistribution of this country's food is being greatly considered.

Cheap food & Plastic, what do they have in common?

Consider the plastic wrappers that conceal foods that have little to zero nutritional value. At this point, each American has plastic within their body because of all the chemicals we consume in our artificial, plastic wrapped foods.

### Chalkboard

#### Points:

- Each pound of **solid waste** generates **2 pounds of CO<sub>2</sub> emissions!**
- Shop the perimeters of grocery stores to ensure the healthiest, plastic-free foods.
- The UN estimates that **5 million pieces of plastic** enter the ocean **each day!**

### For Teacher's

#### Sake!:

#### Journals:

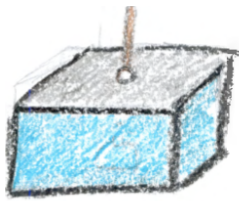
- USDA's Report to Congress: Access to Affordable & Nutritious Food: Measuring & Understanding Food, 2009
- Food Deserts & Their Consequences.

#### Online Resources:

- [www.Earth911.com](http://www.Earth911.com)
- [www.whitehouse.gov/photos-and-video/video/eliminationg-food-deserts](http://www.whitehouse.gov/photos-and-video/video/eliminationg-food-deserts)
- [www.plasticpollutioncoalition.org](http://www.plasticpollutioncoalition.org)
- [www.myplasticfreelife.com](http://www.myplasticfreelife.com)

#### Books:

- Plastic Ocean**  
Capt. Charles Moore, 2011
- Plastic: A Toxic Love Story,**  
Susan Freinkel, 2011



# Plunger Washer

## Vocabulary: **Clean-Tech:**

Clean-Tech uses innovative technologies to reduce our impact on the environment. Clean-tech technologies are efficient and rely on fewer finite resources. Examples of clean technologies are wind power and sun power. Clean-Tech programs focus on ways to benefit the market and the country's economy.

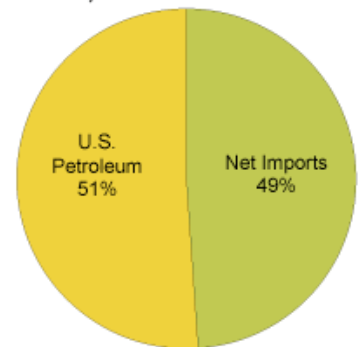
## **Energy-Security:**

Making sure we have clean, local and reliable energy sources for the future

**Background:** The United States relies heavily on oil from abroad to run automobiles, electronics and heats sources. According to the Energy Information Association, almost 50% of oil demands are imported! (Check out the chart on the right!)

It is important that we reduce our dependence on other countries finite reserves to build up our economy. We can build alternative renewable energies to increase our energy-security!

**Net Imports and Domestic Petroleum as Shares of U.S. Demand, 2010**



Source: U.S. Energy Information Administration, *Monthly Energy Review*, Table 3.3a (April 2011), preliminary data.

## Materials:



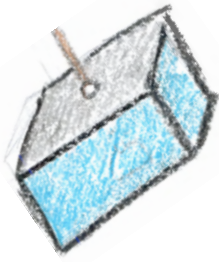
## Activity:

This project is done together as a class!

1. Clean out the class trash-can and fill it with a layer of chemical-free laundry detergent.
2. Place dirty clothes and classroom rags that need cleaning into the receptacle. Go on a hunt around the school to see if any other teachers need rags and dish towels cleaned.
3. Pour about 5 gallons of water over the clothing.
4. With a clean plunger, begin pumping to swish the clothing in the water. Rotate so everyone has an opportunity to clean!
5. After 10 minutes, take out the clothing and dry them on a clothing line in the classroom!

## Conclusion:

Clean-Tech is all about developing intuitive technologies. This washing machine is an innovative because it does not rely on finite fuels, recycles water, is efficient and costs less than a traditional machine! What a great way to be energy-secure! Can you design a clean-tech machine?



# Plunger Washer

## Teacher's Notes

### De-Stresser Hints:

1. Wash out 2 large containers before the class arrives
2. Pour just the right amount of detergent into a cup to prevent spillage.

### Discussion Points:

What are some Clean-Tech energies?

Wind, Solar and Geothermal

What are Fossil Fuels?

-The 3 major types of FFs are Petroleum, Coal and Natural Gas, which are the result of the decomposition of organisms from millions of years ago. FFs are non-renewable due to their extensive length of production time. FFs contain large amounts of carbon which in-turn releases great amounts of carbon dioxide into the atmosphere. Carbon Dioxide.

Where do we get our oil from?

Examples: Iraq, Saudi Arabia, Venezuela, Kuwait, the United Arab Emirates, Algeria & Ecuador

Why is energy security important?

In the same way people have insurance, energy security ensures a future that will allow us to run our lives similarly to our lives today, but with cleaner more local resources. Currently, the United States and many other countries, are dependent on the above list of nations and what they choose to do with their energy supply.

### Chalkboard Points:

- Clean Technologies are **innovative** machines that **do not rely on Fossil Fuels**.
- They are efficient technologies that **benefit** the **environment** and the **economy**
- Clean Technologies **Do not rely on Foreign Oil** and help us become more self-sufficient

### For Teacher's Sake!:

- This activity was inspired by Joshua Piven, author of "This Green House."
- **Journal Articles:**
  - "Making Smarter Clean-Tech Investments"  
William J. Grieco and Adam Javan, 2010
  - "How to Jump Start the Clean-Tech Economy"  
Mark. W. Johnson and Josh Suskewicz, Harvard Business Review 2009
- **Online Resources:**
  - <http://www.epa.gov/epahome/technology.htm>
- **Books:**
  - **Clean Technology:**  
Daniel L. Laird, 2009



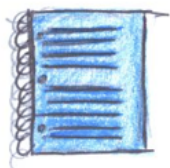
# Fight for Air Tight!

**Vocabulary:** **Insulation:** An extra layer of protection against air flow for a house. Properly insulating a home will keep the living spaces warm and attics, basements and garages cool! There are several types of insulation: foam board, insulated panels and concrete blocks, just to name a few.

**Ventilation:** Make sure outside air is flowing into the house and inside air is flowing out. This exchange removes house odors and pollutants. The amount of ventilation needs to be monitored. In the cold months we do not want the cold outside air to seep in through house cracks. The goal is to keep a house air tight and prevent air leakages!

**Background:** Heating and cooling a house uses a high amount of energy from coal and natural gas. According to the Department of Energy, only 20% of homes built before 1980 are properly insulated. When a home is “super-insulated” it can decrease the amount of energy needed to heat and cool a home by 75%! You and a partner will work together to test air drafts around your school.

## Materials



## Activity:

1. Rip off 1 ft. X 1 ft. strip of plastic wrap and wrap a pencil once around the top edge. Have your partner help you tape down the pencil. How easy, You've just created “ a draft tester”
2. Travel around the room to see how sensitive the plastic wrap is to the movement of the air. A draft means that there is a loss of heat in the winter time or in the summer, a loss of air conditioning.
3. Record what areas of the room have the biggest drafts. Windows? Doors? Ceiling? Floor?
4. Expand this activity beyond the classroom and see what's going on in your home
5. Record: Exhaust fans in a bathroom? Doors? Fireplaces? Light fixtures? Attic Door? Mail Chutes? Cracks in the houses foundation? Rate each location as a strong, medium or small draft in your notebook. Discuss with your other classmates which areas within your homes had the strongest draft.

**Conclusion:** Keeping a house sealed keeps room temperatures consistent and uses less energy!

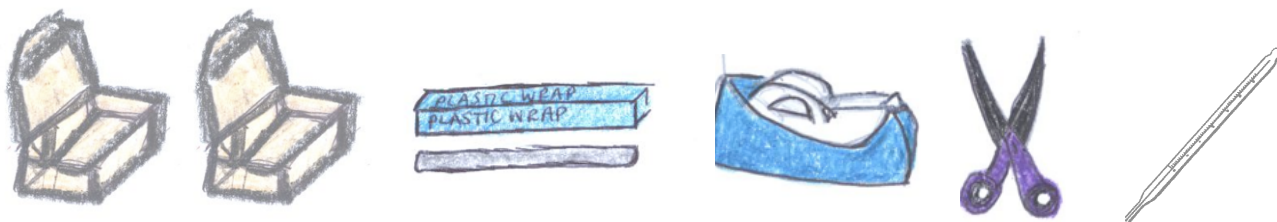


# Passive Light keeps a room Bright

**Vocabulary:** **Passive Energy:** Passive Energy takes advantage of local climates to warm and cool a house without using fossil fuels!

**Background:** Passive houses have the modern comforts of any standard house but only use 15-20% less the energy! Those that build passive homes consider direct and indirect gains. Direct gains is when sunlight comes through a window and heats up a space. Indirect gains absorb heat on a dark surface which is absorbed into a room. When building a passive home, architects focus on having open floor plans, south facing windows and using earth friendly building products such as recycled newspaper for insulation. This activity will focus on light and how it is beneficial to have 2 pane windows to keep in warmth from the sun.

**Materials:**



**Activity:**

1. Pick a partner to work on this activity together. Cut out a window in the front and back of the shoe boxes provided to you.
2. Tape a sheet of plastic wrap to the front and back of one of the boxes.
3. Tape a sheet of plastic wrap only on the front of the second box.
4. With the point of your scissors, poke a hole at the top of each box.
5. On a sunny day, place both boxes in a window in the classroom & let them sit for about an hour
6. At the end of an hour, take the temperature of each box by sticking a thermometer in the hole at the top of the box.
  - a. Which box has the higher temperature?

**Conclusion:**

Two pane windows keep a home at a consistent temperature and reducing the reliance on fossil fuels!





# Popsicle Stick Energy Houses

## Vocabulary:

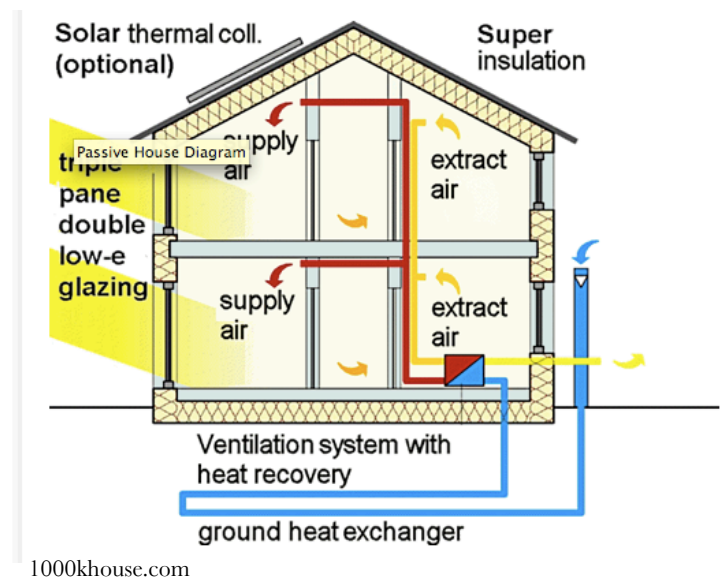
**Locality:** Using nearby resources. Net-Zero homes consider how far resources travel. Using locally harvested woods and other material reduces the amount of travel fuel and emissions.

**LEED certified: Leadership in Energy & Environmental Design.** An international certification system that rates buildings on their use of passive energy, renewable energy, locality of resources & environmental health. LEED, sponsored by the U.S. Green Energy Council, honors innovative building ideas.

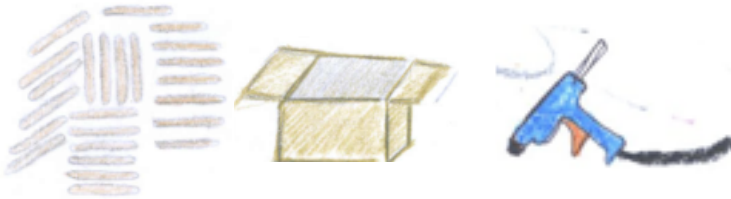
## Background:

The Germans designed the Passive Energy home back in the late 1980s. Since then, they have become world leaders in energy-efficient design. According to the U.S. Energy Information Administration, buildings release 48% of our annual greenhouse gas emissions.

*Refer to [Passive Energy Keeps a Room Bright & Fight for Air Tight](#), for more background information about Passive Energy.*



## Materials:



## Activity:

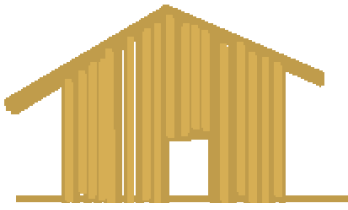
1. Layout supplies: clay, popsicle sticks and hot-glue guns. Take a sheet of cardboard to act as your foundation.
2. Speak through the basic laws of passive energy that are mentioned in *Passive Energy Keeps a Room Bright* and *Fight for Air Tight*.
3. Use your imagination to create their own popsicle stick homes.

## Take it to the Next:

1. Investigate local companies to find out what building resources can come from just a few miles away.

## Conclusion:

Using local materials & making a home incredibly insulated, requires less-energy and releases and fewer carbon emissions. Passive Energy homes use 90% less energy than a traditionally built home.



# Passive Energy

## Teacher's Notes

### De-Stresser

#### Hints:

1. Have a hot-glue gun at each work table
2. Use clay to make corners for walls

### Discussion

#### Points:

Why is passive energy design important?

Passive energy is like our skin. Skin sweats to keep a body cool and skin muscle insulates a body for warmth. Insulation and ventilation act as a permeable wall to allow air to properly flow.

We might not have the resources to build an entirely new home, but what are some actions that can be taken to make a more passive home?

1. Installing double-pane windows. 2. Keeping blinds closed to keep rooms cooler. 3. Utilize fans instead of air conditioners. 3. Air-seal a home. 4. Invest in a thermostat to best stabilize household temperatures.

### Chalkboard

#### Points:

- **Passive Energy homes uses 90% less energy** than a traditionally built house.
- There are **5 parts** to have a successful, energy saving home:
  - 1. A large south facing window to bring in sun.
  - 2. Dark floors to absorb heat
  - 3. A thermal mass such as cellulose that absorbs heat.
  - 4. Overhangs that blocks the sun's radiation.

### For Teacher's

#### Sake!:

#### - Journal Articles:

" The Energy Impacts of Solar Heating"

- Chris Whipple, Science AAAS, 1980

#### - Online Resources:

- [www.zeroenergypowerhouse.com](http://www.zeroenergypowerhouse.com)

- [www.usgbc.org/DisplayPage.aspx?CMSPageID=1988](http://www.usgbc.org/DisplayPage.aspx?CMSPageID=1988)

- [www.passivehouse.us](http://www.passivehouse.us).

#### Books:

- **Passive Solar Energy Book**

- Mazria, E. 1979



# Conservation Determination: Pudding Challenge

## Vocabulary:

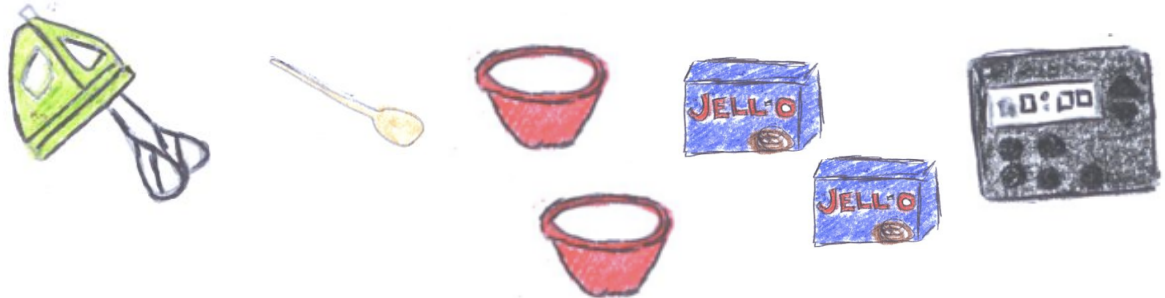
**Non-Renewable Energy:** A form of energy that once it is used, it is gone. “A finite resource” Fossil Fuels are considered to be non-renewable because it takes millions of years for coal, oil and natural gas to be produced.

**Renewable Energy:** A form of energy that is infinite. Wind and sun are two examples of renewable energy because they will never run out.

## Background

Most cars and electric appliances run off of a non-renewable energy. Non-Renewable sources release carbon dioxide and methane, two gases that are severely harmful to the atmosphere and life on earth! Do we ALWAYS need to use electric appliances? Can we get to the same results by using more simplistic methods? This activity will focus on how to make same tasty pudding with less electrical energy.

## Materials:



## Activity

1. Separate into 2 Teams. Have each group prep the Jell-O pudding mix in each of the bowls. Flip a coin to decide what team will use the wooden spoon and what team will have the electric mixer.
2. Begin stirring the pudding mixture and every 10 seconds rotate mixers so everyone can stir.
3. How long did it take to make the pudding with the electric mixer? How long with the spoon?
4. Switch the stirring utensils and repeat the activity.
5. After allowing the Jell-O to chill, taste both batches. Do they taste any different?

## Conclusion:

This activity demonstrates that stirring with a spoon, which uses no electricity, produces the same product as the electric mixer. Are there activities we perform throughout the day that can be done without electricity? Drying our hands? Drying our hair? Making pudding!?



# Conservation Determination

## De-Stresser

### Hints:

1. Put down newspaper to localize inevitable messes.
2. If you're able to, run this activity on a cooler day so pudding can be chilled outside

## Discussion

### Points:

Why is conservation important?

Conservation is about preservation! As world population increases and resources decline, it is crucial that we live within our means and distribute our resources fairly. Gifford Pinchot (1865-1946), the first Chief of the United States Forest Service, developed the "conservation ethic." An ethic which advocates for using resources wisely to protect the natural environment.

Define "Living within our means"

1. Buying only what we need and not what we just want
2. Sticking to a budget and not spending more than you earn.
3. "Live Below Your Means" Live below what you earn.

## Chalkboard

### Points:

- In the United States, **40%** of all food is thrown out
- Not only are we not conserving, we are trashing the planet. Wealthier countries **export their waste** to third-world countries
- Steps of Conservation:
  1. **Reduce:** Buy Less to reduce your consumer footprint
  2. **Reuse:** Forget throwaway products
  3. **Recycle:** Prevent manufacturing of raw materials

## For Teacher's

### Sake!:

#### - Journal Articles:

- "Living Within Our Means"
- Sohaib N. Sultan, 2012
- "Living Within Our Means"
- Ashley Gaffney, 2011

#### - Online Resources:

- [www.conservation.org](http://www.conservation.org)
- [www.globalissues.org/issue/235/consumption-and-consumerism](http://www.globalissues.org/issue/235/consumption-and-consumerism)
- [www.epa.gov/epawaste/conservation](http://www.epa.gov/epawaste/conservation)

#### Books:

- **The Story of Stuff**  
Annie Leonard



# Spin your Wind

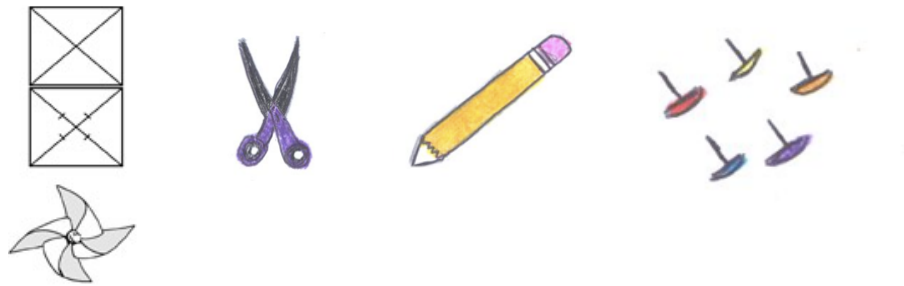
## Vocabulary:

**Wind Energy:** A renewable resource that uses energy produced by wind turbines.

## Background:

Wind has been used as an energy source for centuries. The renewable energy, produced from turning blades and an electric generator, lights up cities and towns around the world. The electricity produced can be used right away or stored in batteries for later use. Are there good locations in your town to set-up a wind turbine? What about a wind farm!?

## Materials:



## Activity:

1. Decorate a piece of square paper with colorful drawing utensils. Check out the recycling container for leftover paper.
2. Fold each corner into the middle to make a defined X and then unfold. Use scissors to cut along the defined lines. As the picture above illustrates, fold over each cut line to the right.
3. Pin the wheel to the top of a pencil and hunt for a windy spot. Place in the ground and watch the wheel spin.

## Conclusion:

If your wind wheel was attached to a generator it could produce energy to run an electronic device. Wind is a clean energy source because it will not pollute the atmosphere with greenhouse gases. Today wind powers more than 7 million homes. If wind turbines continue to be built around the nation, it could produce twice the electricity that coal currently produces.



# Spin your Wind

## Teacher's Notes

### De-Stresser Hints:

1. Remove paper wrapping from straws to prevent flying paper ships zooming around the classroom

### Discussion Points:

What are the positives to wind energy?

Wind energy is renewable and isn't a finite resource. As long as there is sun, there will be plenty of wind to generate electricity. Wind energy is also clean and emits little to no greenhouse gases into the atmosphere. Wind can be supplied anywhere, making it a local energy source, which makes us resilient. We don't have to rely on large plants outside of our home states to receive power. Wind turbines can be located on farm land that can be cultivated. Neighbors and friends can own wind turbines together, called a cooperative and split the initial costs, and then reap the future financial benefits.

What are the negatives to wind energy?

It takes quite a lot of energy to build a wind turbine. The largest wind-turbine company is located in Denmark, so transportation emissions and costs must be considered. Turbines that are built off-shore require aggressive drilling down through ocean floor, which uses cements and fossil-fuel energy. There are also complaints that wind-turbines generate too much noise.

What are the three main components of a wind turbine?

The shaft, generator and wind panels

### Chalkboard Points:

- Wind energy is sourced from the sun and is renewable
- Wind energy has the capability to generate **2.5% of the world's energy**

### For Teacher's Sake!:

#### Journal Articles:

- Power to the People: Electric Utility Restructuring and the Commitment to Renewable Energy
- Heiman & Solomon, 2004

#### Online Resources:

- [www.awea.org](http://www.awea.org)
- <http://windeis.anl.gov/guide/basics/index.cfm>

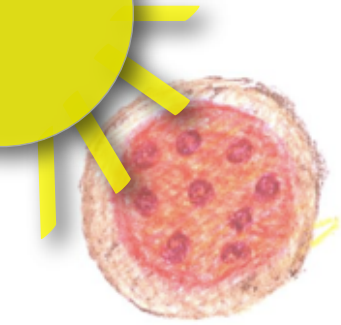
#### Books:

##### Wind Energy,

Sathyajith Mathew, 2006

##### -Fueling the Future: Wind Energy

Elizabeth Raum, 2008



# Solar Cookin'

**Vocabulary:** **Solar Energy:** Used the Sun's heat and light energy to generate electricity.  
**Solar Panels:** Sheets of panels that collect the sun's energy. \*Also called "photovoltaic cells."

**Background:** Solar Panels/Photovoltaics replace the traditional ways of heating a home. Solar Panels are attached to the South-side of roofs, where the sun prominently shines. Panels can also be grounded in open-fields and placed in large groupings. Are there any solar farms in your area? Solar Energy is an active renewable energy source because it uses equipment to capture energy, unlike in passive housing design.

## Materials:



**Activity:** As a class, work together to assemble a solar pizza box!

1. Begin by covering the inside of the pizza box with aluminum foil, do not cover the top of the box. Make sure the foil is firmly glued.
2. With a marker and ruler, draw a square on the top-flap starting one inch from the edge. Cut along three of the sides. The fourth line will act as the hinge.
3. Glue tin foil the newly created flap on the inside
4. Glue black construction paper to the bottom of the box
5. Wrap plastic wrap over the opening of the box to help seal the air in
6. Find a flat level surface outside and place the box there, but don't forget to put your food in!
7. Use the string to tie back the reflector flap so the most amount of sunlight can enter the box.
8. Cook up your pizza and enjoy!

**Conclusion:** The goal of this activity is to eat delicious pizza but to also learn about solar energy and how it can be a replacement for fossil fuels. Using a solar cooker is certainly not as efficient as a conventional stove but allow the project to get you thinking about our ability to change. Dig in!

# Solar Cookin'

## Teacher's Notes



### De-Stresser Hints:

1. Bake on a hot, sun shining day!

### Discussion Points:

What the positives to solar energy?

Solar panels ( photovoltaics) are an active renewable energy source and therefore do not expend dirty energy. Similarly to wind energy, solar energy is clean and is an alternative energy that can be applied on the small scale. Solar energy can harness electricity in remote areas. Residents and businesses can be self-reliant and be their own energy producers. Solar energy is noise-free.

What are the negatives to wind energy?

The upfront costs of solar panels are expensive. The average price for one panel is about \$1,000. This cost reduces the incentive for homeowners in roof panels. Solar panel companies are growing abroad, to reduce transportation costs, panels should be constructed in the United States.

What are the four main components of a solar panel?

Photovoltaic cells, battery, charging controller and an inverter. The solar panel converts the sun's energy into electricity. DC energy that is produced is inverted into AC electricity.

### Chalkboard Points:

- On average, a photovoltaic produces **30X less carbon** than coal power.
- Solar Panels **increase our energy security** because they do not rely on a national grid.
- Solar systems on a home can be hooked into the national grid. You can either be an energy producer and turn your electrical meter back, or you can use the grid when as supplemental energy

### For Teacher's Sake!:

#### Journal Articles:

Sustainable Energy Authority of Ireland

#### Online Resources:

- **4 key Parts Needed For Solar Power Electricity**  
Krishnan Varadarajan  
[www.plugintothsun.uk](http://www.plugintothsun.uk)

#### Books:

**Solar Energy: Running on Sunshine**  
Amy S. Hansen, 2010

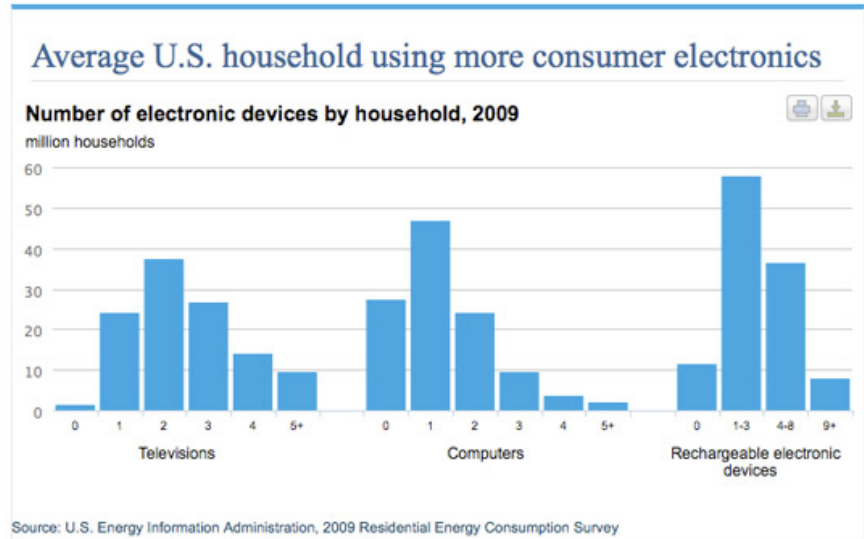


# Stop Polluting your Computing

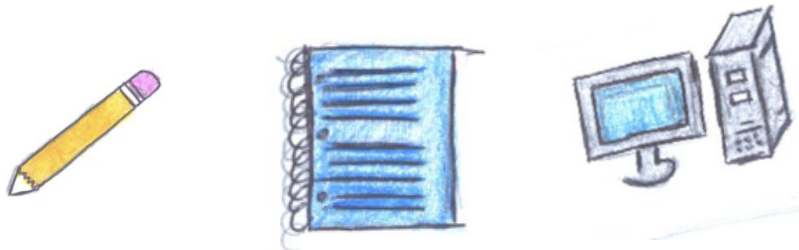


## Background:

According to the Environmental Protection Agency, United States businesses spend more than \$1 billion on electricity to run their computers and monitors each year! Remember, most of the electricity in the US is run by the burning of coal, a fossil fuel that releases high levels of greenhouse gases into the atmosphere. More than 50% of American homes have at least one home computer. The chart on the right, from the U.S. Energy Administration, shows the average number of computers per household. How many computers do you have in your household? How many are always turned on?



## Materials:



## Activity:

1. Grab a partner and put on your detective caps! Bring your notebook and pencil around and travel throughout the school to count the number of computers in each room. How many are on?
2. After you and your partner have successfully snooped for polluting computers, join back in the classroom and share your findings.
3. How can you remind teachers to turn their computers off at night?

## Conclusion:

The average computer costs 29 cents per day, that doesn't sound like very much but that's \$105.12 per year! If there are more than 60 million computers in American homes, that means that we're spending \$630, 000, 000 per year on electricity. Electricity fueled from coal = high levels of greenhouse gases! Turn off your computers!



# Stop Polluting your Computing Teacher's Notes

## De-Stresser Hints:

1. Send an e-mail to faculty & staff asking for permission to have students enter their classrooms.
2. Have pre-typed sheets for students to fill out.

## Discussion Points:

When and why did we become so reliant on computers?

The first computer was invented in 1951 but it was the personal computer that came into our lives in the mid-80s and 90s that revolutionized business and home entertainment forever. The internet "world wide web" was introduced in 1991, allowing us to collect information, from anyone, all over the world, instantaneously.

Is there equal access to computer technology?

There is unequal computer access in the United States and throughout the world. A computer is expensive technology, therefore communities, neighborhoods, families and schools located within areas of lower incomes cannot afford computers and therefore are unable to reach the information that computers can provide. Furthermore, those living in rural communities lack support and are isolated from computer and internet access.

How should computers be recycled?

Computers are filled with toxic chemicals and heavy metals, and must be parted with in a safe and environmentally conscience way. First, ask around to see if your computer can be passed to a new owner. Many companies allow you to sell the hardware back to the manufacturer, check out Ebay's Rethink program or FreeGreek which builds computers out of recycled parts.

## Chalkboard Points:

- As a collective, we are spending **\$630, 000, 000 per year** on computer electricity in the United States
- **Turn computers off** when they are not in use, sleeping mode still uses energy
- Use a power strip to turn off electronics simultaneously.

## For Teacher's Sake!:

### Journal Articles:

-What Difference did Computers Make?

-Jon Agar, 2006

-Computers in Manufacturing

-C.A. Hudson, 1982

How Alan Turing Invented the Computer Age

- Ian Watson, 2012

### Online Resources:

- <http://michaelbluejay.com/electricity/computers.html>

- <http://uclue.com/index.php?xq=724>



# The Tap water Challenge

## Vocabulary:

**Tap Water:** Locally cleaned water that comes from the faucet.

**Bottled Water:** Private companies that bottle water to sell for profit: Examples: Coca-Cola Dasani, Fiji and Poland Springs

## Background:

It takes 2,000 times more energy to produce bottled water than to clean tap water! Since 2007, U.S. consumers have purchased more than 33 billion liters of bottled water! That is a lot of energy! Plastic water bottles are made from OIL. The more water we drink from plastic bottles, the more oil we are using. 33 billion liters of bottled water equals 35-40 million barrels of oil!

## Materials:



## Activity:

1. Break into two teams and head outside!
2. Separate the water jug evenly between the two baking pans and dirty the water with dirt and mud
3. It was very easy to make the water dirty, but how easy is it to clean it up?
4. Tie cheesecloth around a bowl and see how many times the water must go through the cheesecloth for the water to become clear.

## Conclusion:

This activity demonstrates how much effort it takes to clean up water versus how much energy it takes to make it dirty. It is important to conserve water and therefore energy by turning off faucets and using less water when washing dishes and clothing. As we saw through this exercise, it takes a lot of energy to just clean water, now think of the added energy it takes to bottle, label and transport privatized water!

Give yourself a challenge: Use only reusable water-bottles filled with tap water!



# The Tap Water Challenge

## Teacher's Notes

### De-Stresser

#### Hints:

1. Provide 3 bowls to each group, so students can easily transfer the water back and forth between multiple containers.
2. Place down newspaper and be prepared for spills
3. Finer sands will be much more difficult to remove from the solution. It is recommended to use more organic matter: leaves, sticks etc. to dirty the water

### Discussion

#### Points:

What is water security?

Making sure a town/city has access to clean and healthy drinking water.

What is grey water?

Greywater is reusable waste water that can be used for irrigating lawns, bathroom toilets and other activities that do not require the water to be clean for drinking

How is recycling water beneficial?

Recycled water saves us from purifying "new water" by using it in agriculture, or lawns, hydro energy, landscaping, bathroom water etc. Recycling water helps local environments by allowing rivers and lakes to flow freely without dams and human made divergences. Small ecosystems are much happier! Water recycling reduces pollution and energy. Recycling water reduces treatment procedures and the transport pollution and costs to areas that are require water to be brought into their communities

### Chalkboard

#### Points:

- On average, each of us consumes **1.2 billion gallons** of water each year
- 

### For Teacher's

#### Sake!:

#### Journal Articles:

- NRDC Annual Beach Report: Nationwide Closing & Advisory Days
- Alex Yerkey, 2011
- U.S. Drinking Water Challenges in the 21st Century
- Levin et al., 2002

#### Online Resources:

- <http://www.treehugger.com/clean-technology/how-many-gallons-of-water-does-it-take-to-make.html>
- Drip Calculator: <http://www.awwa.org/awwa/waterwiser/dripcalc.cfm>
- EPA: <http://www.wastewatereducation.org/w2w08/w2w08b.html>
- <http://www.epa.gov/watersense/kids/index.html>
- <http://wateruse.org/>
- [www.epa.gov/region9/water/recycling/](http://www.epa.gov/region9/water/recycling/)



# Yogurt Gardens

**Vocabulary:** **Recycle:** It is important to **Reduce** our Consumption, **Reuse** products and **Recycle** materials rather than throwing them away. When we recycle, products are broken back down into their raw form. This process saves energy because manufactures do not have to start from scratch! Recycling wisely uses the Earth's valuable resources

**Composting:** Saving food scraps and biodegradable products to be reused as an organic material for plantings and gardening.

**Background:** Numbers 1-7 are located on the bottom of bottles that can be recycled. It important to know what each of these numbers means so you can recycle your goods properly. Check your town recycling program to see how they prefer recyclables to be separated.

- 1- water/soda bottles: contains PET plastic
- 2- milk jugs and detergent: contains HDPE plastic
- 3- food wrap and bottles for cooking oils: contains PVC plastic
- 4- grocery bags and squeezable bottles: contains "low density polyethylene" plastic
- 5- yogurt containers, medicine bottles: contains " polypropylene" plastic
- 6-Styrofoam and disposable containers: contains polystyrene plastic.
  - \*It is recommended not to use #6 plastics because they are prone to leaching toxins.
- 7- Everything else that won't fit into categories #1-6 ex: i-pods, computers, food storage containers.

**Plastics 2, 4 and 5 are considered safe.** 1 is a safe plastic to use too but it is recommended to reuse at the risk of bacteria forming in the plastic.

**Materials:**



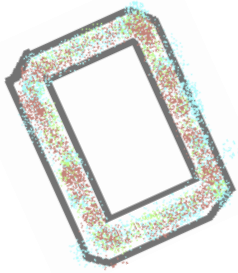
**Activity:** A large part of recycling is using a product in another way before it is broken back down into raw materials.

1. Scavenge around your house for empty yogurt containers. Don't worry, if you and your family don't buy yogurt you can collect similar #5 products. Check the underside of the product to see what type of plastic the containers are made out of.
2. Back in the classroom, pair up with a pal to make small yogurt planters. You can use soil from right outside!
3. After the seeds are planted, place the yogurt planters in a classroom window to watch your plants grow over the course of the next several months. Remember to keep the soil damp!

**Conclusion:** Take this project to the next level by starting a compost project.

Toss food scraps in a lidded bucket. Over time this will be a great fertilizer!

Reduce, Reuse, Recycle. What type of recycling program exists in your town?



# Flashy Trash Frames

## Vocabulary:

**Reuse:** Don't throw that away! Use an item more than once.

**Upcycle:** Using a product in a different way before it goes to the landfill

**Downcycle:** Reducing a product to a lesser product, to prevent wasting materials all together. "Deducing the quality of a material over time." - William McDonough and Michael Braungart

## Background:

In 2002, Authors William McDonough and Michael Braungart wrote, *Cradle to Cradle: Remaking the things we make*. This book shared the importance of reducing our waste, consumption and looking at products with a creative eye. How can we make things we no longer need to prevent digging into raw resources? Downcycling is the opposite of upcycling; downcycling is the act of taking a product and reducing its quality, which is not always the best solution when caring for the environment. For example, cardboard is turned into toilet paper.

## Materials:



## Activity:

- 5 Prior to the activity, cut-2X3 frames to be decorated by each person doing the activity.
1. Set-up the craft table with recycled snack wrapper confetti. Prior to the activity, clean and snip several old snack wrappers, the more "confetti-like" the better. Prep the table with bowls of modge-podge glue, sponge brushes, the recycled wrappers and recycled cardboard frames.
2. Each artist now has free reign to decorate their frames as they would like with the recycled snack-wrappers. At the end, each person will have poppin' frames to share as gifts.

## Conclusion:

A reuse mentality is very important. Before we throw away an item, we should look at it with a new set of eyes and see what it's second life could be. It costed 0 dollars to make beautiful picture frames from materials we are always trashing too quickly. The next time your consuming your favorite snack, imagine what you could create from it. Jewelry? Trading Cards? Bookmarks? Think outside of the box before you chuck that box!



# Recycling: Flash your Trash & Yogurt Gardens

## Teacher's Notes

### De-Stresser

#### Hints:

1. Pre-cut water bottles in half before the lesson to save time and cut fingers.
2. Pick up seed packets from your local seed nursery and/or have students bring in packets they may have at home. Empty the packets into small jars.

### Discussion

#### Points:

What is single stream recycling?

All plastics, papers and aluminum cans can be put into the same recycling container and are often picked up by a collection truck. This is much more stream-lined than separating recyclables out based on the commodity. This process reduces collection costs and encourages more people to recycle their goods stress-free.

Why so much waste? Refer to Strasser's book.

The "throw-out culture" has been a welcomed shift in the last several decades. Susan Strasser, author of *Waste and Want*, describes our relationship to waste very simply, It is "...central to our lives yet generally silenced or ignored." In previous decades, we used to have the skills and the desire to mend our clothing, make handmade tools and upcycle scraps. Today, there is often less attachment and sediment to goods, they can be easily thrown away, and easily replaced.

Where does our waste go?

Most of our trash goes straight to a landfill, and most landfills in the United States will reach their maximum capacity in the next 5-10 years. If more people were to recycle and compost, the country would save on the amount of gasoline used per year and curb carbon emissions. Today, the composting and recycling that is persuade saves the country 10 billion gallons of gas per year and 193 metric tons of Carbon Dioxide.\*

### Chalkboard

#### Points:

- Nearly **25%** of Americans **do not recycle**
- A US citizen produces more than **4 lbs** of waste per person/day
- There has been a **60%** in total waste production **since the 1960s**

### For Teacher's

#### Sake!:

#### Journal Articles:

- **An Application of Optimal Control to the Economics of Recycling**
- Jannett Highfill & Michael McAsey, 2001

#### Online Resources:

- <http://www.cleanair.org/Waste/wasteFacts.html>
- [http://www.massrecycle.org/recycling\\_benefits.html#saves\\_energy](http://www.massrecycle.org/recycling_benefits.html#saves_energy)
- [http://www.conserve-energy-future.com/Importance\\_of\\_Recycling.php](http://www.conserve-energy-future.com/Importance_of_Recycling.php)
- <http://people.hws.edu/halfman/Data/PublicInterestArticles/Landfills.pdf> \*

#### Books: **Waste and Want: A social history of Trash**

Susan Strasser, 1992

#### **Craddle to Craddle: Remaking the way we make things**

Michael Braungart & William McDonough, 2002



# Transportation Investigation

**Vocabulary:** **Fuel Efficient:** Using LESS gas to go FARTHER! “Better Bang for your Buck”

**Background:** The Department of Transportation has estimated that there are more than 250 Million vehicles in the U.S. It takes more than 20 Million Barrels of OIL each day to fuel all of the vehicles. All of this driving releases a lot of CO<sub>2</sub>! Think of 2,300 2-liter soda bottles. That’s the volume of CO<sub>2</sub> that is released from just 1 gallon of gasoline! 1 pound of CO<sub>2</sub> stays in the atmosphere for 200 years! Remember, this Carbon Dioxide heading into the atmosphere is changing the Earth’s natural cycles such as weather patterns and warming the Earth’s surface.

**Activity:** We all have that DREAM car that we wish to drive when we are older but is it the most fuel efficient car to drive? How much is it going to cost to fuel up?

1. Pick three cars that you would like to investigate. Your dream car, the vehicle in your family and the Toyota Prius.
2. Head to **[fuelconomy.gov](http://fuelconomy.gov)** to see which vehicle is going to cost the most/least to drive.

	MILES PER GALLON	FUEL COST ( IN YOUR AREA)	ANNUAL COST OF FUEL ( ~15,000 mi/year)
TOYOTA PRIUS			
DREAM CAR			
FAMILY CAR			

**Take it to the next Step!:**

Design the country’s future transportation? Will we have roads, more public transit? Is everyone on a bike? What will cars look like that don’t use fossil fuels? Use your imagination and draw what transportation practices will look like in 50 years, what about 100 years!?

**Conclusion:**

When a vehicle is more fuel efficient, less fuel is needed and therefore there are fewer carbon emissions. Beyond fuel efficient vehicles, it is important to consider other forms of transit. Biking, Walking and public transit are all ways to reduce your transportation footprint. As Americans we drive approximately 7,176,200,000 miles per year. Take the Challenge to have your parents DRIVE LESS! Reduce your fuel consumption!





# Transportation Investigation

## Teacher's Notes

### De-Stresser Hints:

1. Allot under 10 minutes to shop the website, there are many cars to check out!
2. Have students team up, perhaps in the future they'll be carpooling and sharing their vehicles.

### Discussion Points:

What accelerated transportation in the United States?

In 1956, Congress passed the Federal-Aid Highway Act to construct a system of roads across the United States. Completed in 1990 and costing more than \$1 billion. Families began to travel for their vacations and families decentralized. This program also increased the trucking and shipping industry

What are the advantages & disadvantages to a hybrid vehicle?

Hybrid vehicles use less gasoline per mile of travel and therefore uses fewer finite resources and emits fewer pollutants. However, because a hybrid car runs off of charged electrical battery, rather than a combustion engine, energy is being supplied most likely with coal, the nation's most wide-spread resource for electricity production. According to the Energy Information Administration, coal combustion emits twice the amount of carbon dioxide as does the combustion of natural gas.

### Chalkboard Points:

- The Average American household owns **2 or more cars**
- The Average American drives more than **12,000 miles a year**
- The Average American walks **5 or less miles** each day

### For Teacher's Sake!:

#### Journal Articles:

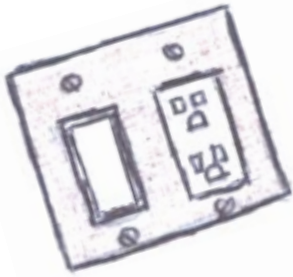
- **On Solving the Transportation Problem**
- Saul I. Gass 2012
- **The Environmental Impacts of Transportation**
- Dr. Jean Paul Rodrigue & Claude Comtois

#### Online Resources:

- Truecostblog.com
- [www.bts.gov/publications/national\\_transportation\\_statistics](http://www.bts.gov/publications/national_transportation_statistics)
- www.fueleconomy.gov
- www.epa.gov/cleanenergy

#### Books:

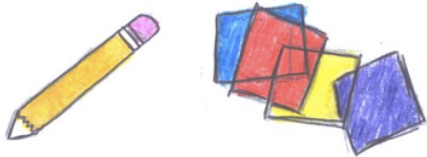
- **Green Transportation Basics**
- Dan Chiras, 2010



# Switch Fix

**Background:** On average, lights in a home make up 9% of a household's electricity use, that's approximately 936 kilowatts of electricity used per month! And THAT is equal to 400 pounds of coal per month! Simple changes such as turning off lights when they do not to be in use, keeping the refrigerator door closed and washing clothes in cold water, will reduce the amount of money and energy!

**Materials:**



**Activity:**

1. Cut out a piece of colorful construction paper 2 in. X 3 in.
2. Fold the construction paper in half and cut out a rectangle 1 cm. X 2 cm.
3. With coloring utensils write a phrase that will encourage those exiting the room to turn off the lights.
4. "Switch me off" "Turn me off" "Turn off the lights, save electricity!"



# T-Shirt Pride

**Materials:**



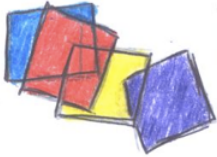
**Activity:**

1. Now it's your time to spread the message about being more energy efficient. Come up with your own slogan to decorate a recycled t-shirt that you no longer wear. Make several and give them out to your family and friends! Be an energy efficiency activist.



# Reduce-my Use Pledge

## Materials:



## Activity:

1. As a large group recycle paper-towel rolls to create a 3-D model of a tree.
2. Using a hot glue gun, attach tree limbs. Use your imagination and bring it to life!
2. Have everyone cut out a leaf using recycled paper: newspaper, old construction paper etc.
3. On the leaf, right a pledge. One goal you have for reducing your energy use.  
Example: “ I pledge to take 5 minute showers, “ I will carpool to school” “ I will turn off the lights when I leave my bedroom”
4. Have everyone glue their leaf on to a section of the tree.

## Conclusion:

This project represents that together we can make a big difference. If we all make one change in our lives, we're helping the greater whole! As time goes on, add more pledges to the tree to keep it thriving!



# Energy Sleuth

**Activity** Now that you've investigated ENERGY EFFICIENCY, become an Energy Sleuth and keep a tally of the energy efficiencies in your home and school! Keep track of areas that could be improved too! Follow the below check list to help your teachers and parents make smart energy efficient choices.

## CLASSROOM ENERGY EFFICIENT CHECKLIST

- The Teacher or a student turns off the lights when the class leaves the room.
- During the day when it's bright out, are the classroom curtains open to bring in natural sunlight?
- The computers in the classroom are turned off when they are not in use
- The Classroom thermostat is set at 68-70 degrees in the winter time and 78-80 degrees in the summer.
- The classroom light bulbs are CFLs

## HOME ENERGY EFFICIENT CHECKLIST

- The faucets around the house are not dripping water and you and your family take 5 minute or less showers
- The house has CFL light bulbs in every room
- The house has energy-star appliances; clothing is air-dried and the refrigerator door is always closed.
- The thermostat is set at 68 degrees in the winter and 78 in the summer
- You and your family reuse and recycle!

# Other Educational Resources

[www.10percentchallenge.org](http://www.10percentchallenge.org)

[www.acespace.org](http://www.acespace.org)

[www.cambridgeenergyalliance.org](http://www.cambridgeenergyalliance.org)

[www.climateclassroom.org/teens](http://www.climateclassroom.org/teens)

[www.cleantech.org/clean/educational\\_resources](http://www.cleantech.org/clean/educational_resources)

[www.energystar.gov](http://www.energystar.gov)

[www.ecokids.ca](http://www.ecokids.ca)

<http://energyliteracy.org>

[www.green.harvard.edu](http://www.green.harvard.edu)

[www.pse.com/savingsandenergycenter/ForSchools/Pages/Renewable-Schools.aspx](http://www.pse.com/savingsandenergycenter/ForSchools/Pages/Renewable-Schools.aspx)

U.S Department of Energy:  
Office of Energy Efficiency and Renewable Energy  
Energy Education and Workforce Development

United States EPA: A Student's guide to Global Climate Change

University of Texas at El Paso:  
Knowledge is Power, Curriculum Supplement