



Utah Core Objectives

7-12th Grade

Math Std. 1 Students expand number sense to perform operations & solve problems

Learning Objectives

By the end of this lesson, students will know how to:

- Calculate the cost of resource and energy waste
- Change their behavior to save resources and energy

Materials Needed

- Pens, pencils, paper
- Statistics on plastic bags generated (statistics worksheet)
- 1 plastic bag
- Reusable grocery bag
- Bag of shredded plastic
- Sample of Trex® lumber or Recycle Utah "karma stone"

How Do We Use Resources & Energy? Plastic Bags

Instructions

1. Hold up the plastic bag and ask students how many plastic bags they think were used on the earth last year. A: 270 billion and counting. Source: www.reusablebags.com
2. Distribute statistics worksheet to each student.
3. Tell students to use the first table in the worksheet to estimate how many plastic bags their household uses per week. Allow 1-2 minutes for writing. Then ask several students to share their answers.
4. Ask: How many of you know what plastic bags are made from? Validate: Petroleum.
5. Make these Learning Points:
 - Plastic bags are made from a by-product of petroleum. It takes energy to get the petroleum out of the ground, transport it, refine it and turn it into plastic bags.
 - With 207 billion plastic bags in circulation, how is the Earth affected in terms of energy and resource problems? Validate: Reduced availability of oil; energy costs of production, costs of picking up plastic bag refuse (How many of you have seen plastic bags in trees or stuck on fences?)
6. How can you reduce the number of plastic bags **you personally** use? Lead students to the right answers with these questions if necessary:
 - How many of you, when asked "Paper or plastic?", choose paper?
 - How many of you when asked "Do you need a bag?" say "No," and just take your receipt and the item you purchased?
 - How many of you take a reusable bag or backpack to the grocery store or the mall?
 - How many of you save plastic bags at home and recycle them?
7. Use the bag of shredded plastic and the sample of Trex® lumber or Recycle Utah karma stones to explain how plastic bags can be turned into useful products:
 - 15,000 pounds of plastic bags collected yearly
 - 4.5 pound of bags = one karma stone. Karma stones useful for paving and gardens; Trex® lumber useful for decks, stairs, and walkways.

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Materials Needed

- Pens, pencils, paper
- Statistics on water usage (on worksheet)

How Do We Use Resources & Energy? Home Water Use

Instructions

1. Introduce the topic by asking students: How many of you take showers? How many of you take a shower for ten minutes? Fifteen minutes? Six minutes?
2. Tell students to use the worksheet to estimate how much water they use daily.
3. Allow 1-2 minutes for writing. Then ask several students to share their answers. Discuss water conservation with these Learning Points:
 - It takes energy to heat water in your home. Energy costs your parents money, but do you know what it costs to make the energy – non-renewable resources like coal and natural gas. Coal pollutes the air. Natural gas is a finite resource.
 - Water itself is a scarce resource in the desert.
 - It takes energy to clean the water you use and put it back in the natural environment.
4. Ask: How can you personally save water at home? Lead students to the right answers with these questions, if necessary:
 - How many of you turn the water off and on when you brush your teeth?
 - How many of you turn the water off and on when you rinse dishes?
 - How many of you tell your parents when the faucet in your bathtub leaks?
 - How many of you take showers instead of baths?
 - How many of you are willing to take shorter showers?
 - How many of your parents have the water heater turned down?

This lesson plan
made possible by a
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Materials Needed

- Pens, pencils, paper
- Statistics on light bulbs (worksheet)
- Sample of incandescent light bulb
- Samples of CFL

How Do We Use Resources & Energy? Light Bulbs

Instructions

1. Introduce the topic by asking students: How many lamps do you have in your room? Elicit various answers. What kind of bulb do you have in your lamps: incandescent bulbs or compact fluorescent bulbs? Most students will say “regular” light bulbs.
2. Tell students to use the table in the worksheet to estimate how much energy they would save if they used CFLs instead of incandescent bulbs.

Note: Incandescent bulbs: 8000 hours costs \$48 in electricity

- CLFs: 8000 hours costs \$11 in electricity
 - Allow 3-5 minutes for writing. Then ask several students to share their answers.
3. Discuss energy conservation with these Learning Points:
 - It takes electricity to run a light bulb. 94% of Utah’s electricity is produced by coal-fired power plants. Coal pollutes the air. Mining coal has a negative impact on the environment.
 - The average lifetime of incandescent light bulbs is about 750-1000 hours.
 - It would take at least 6-11 incandescent bulbs to last as long as one compact fluorescent, which have an average lifetime between 8,000 and 10,000 hours.
 4. Ask: How can you personally save electricity at home? Lead students to the right answers with these questions, if necessary:
 - How many of you will tell your parents about CFLs and show them this worksheet tonight?
 - How many of you turn lights off when you leave the room? Televisions? Radios? Computers?

Resource & Energy Statistics

Plastic Bags

Domain	Last Year	How Many Per Week	Total Per Year
The Earth	207 <i>billion</i> *	----	---
Recycle Utah	15,000 <i>pounds</i>	----	---
Your Household	---		

* Statistic from www.reusablebags.com

Water

Activity	Gallons	Frequency	Total
Shower (per minute)	2.5-6.0	___ Minutes/day	
Brush Teeth	1.0-2.5	___ Times/day	
Flush Toilet (per flush)	1.6-7.0	___ Times/day	
Total			

Average per person per day: 100 gallons or 1,067 12oz cans!!*

* Statistics from the Snyderville Basin Water Reclamation District

Light Bulbs

Room	Number of
Your Bedroom	
Living Room	
Family Room	
Hall	
Total	

Bulb Type	# Bulbs in Your Room	Energy Cost/8000	Total
Incandescent		\$48.00	
CFLs		\$11.00	
Total Savings			

Incandescent bulbs: 8000 hours costs \$48 in electricity

CFLs: 8000 hours costs \$11 in electricity

* Statistics from www.wikipedia.org