Energy Audit
Answer Key

Prediction

Copy the list of appliances that you will be testing from the board. Which one do you think will use the most energy? Please circle **ONE**.

List of appliances will vary, and student answers will vary

Procedures

1. Using your Kill-a-Watt meter, measure the wattage of each appliance.
2. When you get to an appliance, plug your Kill-a-Watt meter into the outlet.
3. Push the "watt" button and be sure your Kill-a-Watt meter is reading 0.
4. Plug your appliance directly into the front of the Kill-a-Watt meter.
5. Write the name of the appliance in your data table. Record the wattage while the appliance is off but plugged in.
6. Turn on the appliance. If you need assistance, please ask. Record the wattage while the appliance is on for at least 5 seconds. The wattage may not stay consistent. If this happens, record a general measurement that reflects the average wattage when it is turned on.

Data

	Appliance	Wattage While Appliance is OFF (W)	Wattage While Appliance is ON (W)
1	***MacBook Laptop***	***21.7 (sleeping)***	***51.2***
2	***Projector***	***0.5***	***254***
3	***Hair dryer***	***0***	***1552***
4	***Microwave***	***1.4***	***1229***
5	***Table lamp***	***0***	***77.8***
6	***iPhone 6Plus***	***0.3 (charger only)***	***6.0***
7			
10			

Student answers will vary, sample data shown

Results

1. Which appliance from your energy audit used the most energy? ***Student answers will vary***

2. Do your results support your prediction? In other words, did the appliance that you chose in question 1 question use the most energy?

Student answers will vary

Yes No

Analysis

1. Did some appliances use energy when they were plugged in but NOT turned on?

This is usually the case → Yes No

2. Choose <u>one</u> of the appliances from the data table that you use at home and could either reduce the use of OR unplug when not in use. <u>Choose one</u> table below and complete it according to your chosen appliance.

REDUCE USE
Appliance:
How many hours per day could you <u>reduce</u> the use of this appliance? (Record minutes as a fraction of an hour. For example, 30 minutes = 0.5 hours.)
How many days per week could you do this action?
Wattage when ON:

Student answers will vary, sample data shown

OR

UNPLUG WHEN NOT IN USE
Appliance: ***Microwave***
How many hours per day could you leave this appliance <u>unplugged</u>? ***23*** (Record minutes as a fraction of an hour. For example, 30 minutes = 0.5 hours.)
How many days per week could you do this action? ***7***
Wattage when OFF: ***1.4 W***

3. Enter the numbers from the table you chose above into the equation below to calculate the number of watt-hours you could save per year.

1.4	X	***23***	X	***7***	X	52	=	***11,720***
watts		hours/day		days/week		weeks/year		watt hours/year

4. Convert watt hours/year to kilowatt hours (kWh)/year.

11,720	÷	1000	=	***11.72***
watts hours/year		Watts/kilowatt		kWh/year

5. Calculate the mass (in kilograms) of carbon dioxide that you could keep out of the atmosphere every year.

11.72 kWh/year X 0.75 g of CO_2/kWh = ***8.79*** kg of CO_2/year

Raise your hand when you have this number so that it can be added to the class data table on the board.

Student answers will vary, sample data shown

6. Enter the class data from the board and add them all together to calculate the total amount of carbon dioxide that could be conserved by your class.

Class Data					
Student	**Potential CO_2 Conserved (kg of CO_2/year)**	**Student**	**Potential CO_2 Conserved (kg of CO_2/year)**	**Student**	**Potential CO_2 Conserved (kg of CO_2/year)**
1	***8.79***	13		25	
2		14		26	
3		15		27	
4		16		28	
5		17		29	
6		18		30	
7		19		31	
8		20		32	
9		21		33	
10		22		34	
11		23		35	
12		24		36	
Total amount that could be conserved by your class					kg of CO_2/year

7. Which animal is the ... st in mass to the mass of the carbon dioxide that your class could keep ... sphere in a year?

Student answers will vary

a. ...an dog (20 kg)
b. Black bear (110 kg)
c. Polar bear (270 kg)
d. Ayrshire cow (550 kg)

8. What if ... ts in New Mexico conserved the amount of carbon dioxide that ... selected appliance? Use the circled number on page 3 of this ... the number of students your teacher wrote on the board.

Student answers will vary, sample data shown

8.79	X	***25,000***	=	***219,750***
kg of CO_2/year (from page 3)		# students (from board)		kg of CO_2/year

9. How does energy production contribute to the rise in global temperatures?

Coal and natural gas are the most common fuels used for energy production in the United States. In the power plants, the fuels are burned to heat water and produce steam. Steam turns turbines to generate electricity. When fossil fuels like coal are burned, they release carbon dioxide into the atmosphere. This greenhouse gas traps thermal energy and re-radiates it to Earth's surface, causing global warming.

10. As the number of people on Earth continues to grow toward eight billion, how do you think the atmosphere will be affected? Think about your energy measurements and your knowledge of the enhanced greenhouse effect to answer this question.

More people on Earth will likely mean more energy use and more energy production. If fossil fuels continue to be used as a major source of energy production, more carbon dioxide will be released into the atmosphere.