POST-VISIT ACTIVITY: SIMPLIFIED VERSION

TEP BRIGHT STUDENTS: THE CONSERVATION GENERATION

Tucson Electric Power

Part A. Energy Savings Kit

Review the contents of the Energy Savings Kit with students. Make sure that all students know **where** to install each device. Make sure students also remember the basic benefits of each device (e.g. the low-flow showerhead saves energy and water and, therefore, money). Consider a brief role-play in which students practice explaining the function and location of the devices in the Energy Savings Kits. Remind students that the aerator has an instruction card.

Part B. Home Efficiency Measures

Lead a classroom discussion with students about different energy efficiency measures they can undertake at home, either alone or with the help of parents. See "Home Efficiency Measures" handout.

Optional: Have students pledge to do at least 5 energy efficiency measures. Ask students to write down their 5 (or more) choices and pledge together as a class to become more energy efficient.

Part C. Home Energy Savings

Students will do an inventory of the light bulbs in their house, broken down by incandescents, CFLs, and LEDs. Students will do basic addition to determine how many bulbs are in their homes as well as basic multiplication to determine the total wattage for each type of bulb in their homes. Students will continue to use basic addition and multiplication to answer various questions about the bulbs in their homes.

Part D. On-Line Extensions

Explore some of the energy efficiency tips and strategies available at www.tep.com/tips. Consider promoting the following with your students:

- The Carbon Footprint Calculator (https://www.tep.com/efficiency/tools/carbon/)
- The Kilowatt Counters Charts (https://www.tep.com/efficiency/tools/kilowatt/)
- Other Energy Games and Tools (https://www.tep.com/efficiency/tools/world/)
- The TEP Home Energy Report – a comprehensive and interactive tool that TEP customers can use once they have logged into their accounts online. Available at (https://tep.opower.com/ei/app/dashboard)

Home Efficiency Measures

Home Energy Efficiency Measures can be thought of in two ways:

1. Using efficient devices that will automatically save energy anytime they are being used (e.g. CFL and LED light bulbs).
2. Changing behavior to become more energy efficient.

The lists below are differentiated by these two different types of Home Energy Efficiency Measures. They are also ranked in terms of cost. So, the items at the top of the list are the lowest cost to implement while the items at the bottom of the list are highest cost. Use these lists as a tool when brainstorming ways to become more efficient with your students.

Note: These lists are comprehensive though by no means absolute. Feel free to add to them!

Efficient Devices

- CFL light bulbs
- Weather stripping
- Pipe insulation
- Air filter whistle
- Metallic duct tape to seal ducts
- Faucet aerator
- Low-flow showerhead
- Caulk to seal gaps near windows
- Refrigerator and freezer thermometers or temperature cards
- LED night lights
- LED light bulbs
- Plant trees on the south and/or west side of your house
- Use smart power strips
- Note: The following devices are much higher cost and, obviously, fall to the discretion of parents. The benefits, however, are tremendous:
  - EnergyStar certified pool pump
  - EnergyStar certified refrigerator
  - EnergyStar certified dishwasher
  - EnergyStar certified clothes washer
  - EnergyStar certified clothes dryer
  - EnergyStar certified HVAC unit

Efficient Behavior

- Use ceiling fans
- Turn off lights when leaving the room
- Adjust hot water heater temperature to 120° F
- Adjust air conditioner to 78° F or higher in the summer
- Adjust heater to 68° F or lower in the winter
- Run the dishwasher only when full
- Use the dishwasher's energy saving mode if it has one
- Run the washing machine only when full and only in cold water
- Clean the lint filter on the dryer before every use
- Hang dry clothes on a clothes line or clothes rack instead of using the dryer
- Clean refrigerator coils
- Use a home energy monitor
- Get a home energy audit from an energy professional

Student Worksheet: Home Energy Savings

Name: _____ Class: _____ Date: _____

Part I. Comparing Incandescent, Compact Fluorescent Lights, and Light Emitting Diodes

A. Light Bulb Inventory

1. Go through your entire home and count how many incandescent light bulbs you have. Write that number below:

_____ Incandescent bulbs

2. Go through your entire house and count how many CFL bulbs you have. Write that number below:

_____ CFL bulbs

3. Go through your entire house and count how many LED bulbs you have. Write that number below:

_____ LED bulbs

4. How many total light bulbs are in your house? _____ bulbs.

B. Light Bulb Energy Use

5. The average incandescent light bulb uses **60W** of electricity. How many total W of electricity do all of your incandescent light bulbs use? (hint: use the number of bulbs you listed above in #1)

_____ W of Incandescent electricity use

6. The average CFL light bulb uses **13W** of electricity. How many total W of electricity do all of your CFL light bulbs use? (hint: use the number of bulbs you listed above in #2)

_____ W of CFL electricity use

Student Worksheet: Home Energy Savings *(Continued)*

7. The average LED light bulb uses **10W** of electricity. How many total W of electricity do all of your LED light bulbs use? (hint: use the number of bulbs you listed above in #3)

_____ W of LED electricity use

8. How many total W would all of your light bulbs use if you had them all turned on at the same time?

_____ W of all light bulb electricity use

C. Light Bulb Energy Savings

9. If your family only had incandescent light bulbs, how much energy (W) would your house use if you had them all turned on at the same time? (hint: incandescent bulbs use 60W each)

_____ W

10. If your family only had CFL light bulbs, how much energy (W) would your house use if you had them all turned on at the same time? (hint: CFL bulbs use 13W each)

_____ W

11. If your family only had LED light bulbs, how much energy (W) would your house use if you had them all turned on at the same time? (hint: LED bulbs use 10W each)

_____ W

D. Conclusions

12. Based on your work above, which type of light bulb is the most efficient (saves the most energy)?

_____

Student Worksheet: Home Energy Savings *(Continued)*

13. Based on your work above, which type of light bulb is not the most energy efficient but still offers a good opportunity for efficiency?

_____

14. Based on your work above, which type of light bulb does is the most inefficient (wastes the most energy)?

_____

Sample Teacher Answer Key

Name: _____ Class: _____ Date: _____

Note: Answers will vary based on student inventories.

Part I. Comparing Incandescent, Compact Fluorescent Lights, and Light Emitting Diodes

A. Light Bulb Inventory

1. Go through your entire home and count how many incandescent light bulbs you have. Write that number below:

32 Incandescent bulbs

2. Go through your entire house and count how many CFL bulbs you have. Write that number below:

5 CFL bulbs

3. Go through your entire house and count how many LED bulbs you have. Write that number below:

2 LED bulbs

4. How many total light bulbs are in your house? 32 + 5 + 2 = 39 bulbs.

B. Light Bulb Energy Use

5. The average incandescent light bulb uses **60W** of electricity. How many total W of electricity do all of your incandescent light bulbs use? (hint: use the number of bulbs you listed above in #1)

60W x 32 = 1,920 W of Incandescent electricity use

6. The average CFL light bulb uses **13W** of electricity. How many total W of electricity do all of your CFL light bulbs use? (hint: use the number of bulbs you listed above in #2)

13W x 5 = 65 W of CFL electricity use

Sample Teacher Answer Key *(Continued)*

7. The average LED light bulb uses **10W** of electricity. How many total W of electricity do all of your LED light bulbs use? (hint: use the number of bulbs you listed above in #3)

10W x 2 = 20 W of LED electricity use

8. How many total W would all of your light bulbs use if you had them all turned on at the same time?

1,920 + 65 + 20 = 2,005 W of all light bulb electricity use

C. Light Bulb Energy Savings

9. If your family only had incandescent light bulbs, how much energy (W) would your house use if you had them all turned on at the same time? (hint: incandescent bulbs use 60W each)

39 bulbs x 60 W = 2,340 W

10. If your family only had CFL light bulbs, how much energy (W) would your house use if you had them all turned on at the same time? (hint: CFL bulbs use 13W each)

39 bulbs x 13 W= 507 W

11. If your family only had LED light bulbs, how much energy (W) would your house use if you had them all turned on at the same time? (hint: LED bulbs use 10W each)

39 bulbs x 10 W = 390 W

D. Conclusions

12. Based on your work above, which type of light bulb is the most efficient (saves the most energy)?

LED light bulbs

Sample Teacher Answer Key *(Continued)*

13. Based on your work above, which type of light bulb is not the most energy efficient but still offers a good opportunity for efficiency?

CFL light bulbs

14. Based on your work above, which type of light bulb does is the most **inefficient** (wastes the most energy)?

Incandescent light bulbs