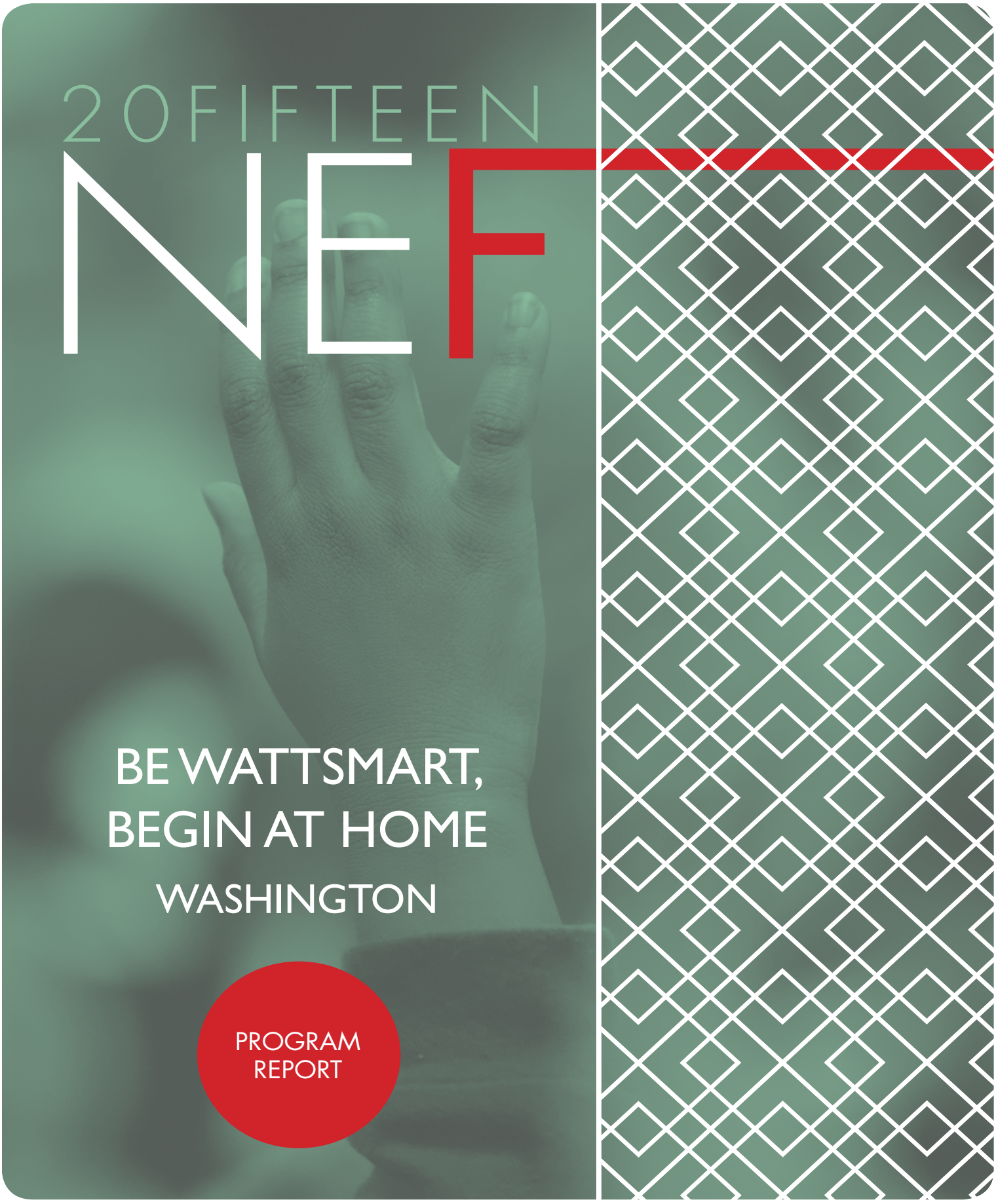

2015

NEF

BE WATTSMART, BEGIN AT HOME

WASHINGTON

PROGRAM REPORT

Prepared for:

Let's turn the answers on.

Michael S. Snow, Manager, Regulatory Projects

Barbara Modey, Customer and Community Communications

PacifiCorp

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Portland, OR 97232

Prepared by:

Marilyn Clark

Program Director

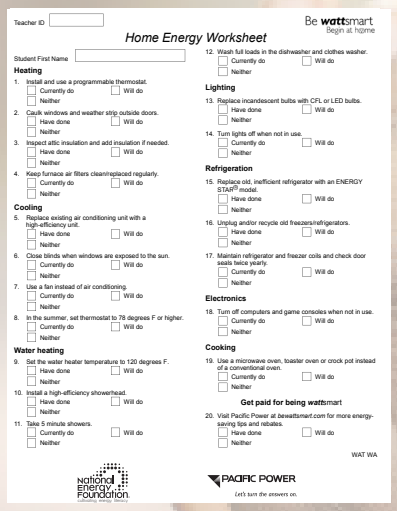
National Energy Foundation

4516 South 700 East, Suite 100

Salt Lake City, UT 84107

February 17, 2016

Savings



Teacher ID

Be *watt*smart
Begin at home

Home Energy Worksheet

Student First Name

Heating

1. Install and use a programmable thermostat.
   Currently do ☐ Will do ☐ Neither ☐
2. Caulk windows and weather strip outside doors.
   Have done ☐ Will do ☐ Neither ☐
3. Inspect attic insulation and add insulation if needed.
   Have done ☐ Will do ☐ Neither ☐
4. Keep furnace air filters clean/replaced regularly.
   Currently do ☐ Will do ☐ Neither ☐

Cooling

5. Replace existing air conditioning unit with a high-efficiency unit.
   Have done ☐ Will do ☐ Neither ☐
6. Close blinds when windows are exposed to the sun.
   Currently do ☐ Will do ☐ Neither ☐
7. Use a fan instead of air conditioning.
   Currently do ☐ Will do ☐ Neither ☐
8. In the summer, set thermostat to 78 degrees F or higher.
   Currently do ☐ Will do ☐ Neither ☐

Water heating

9. Set the water heater temperature to 120 degrees F.
   Have done ☐ Will do ☐ Neither ☐
10. Install a high-efficiency showerhead.
    Have done ☐ Will do ☐ Neither ☐
11. Take 5 minute showers.
    Currently do ☐ Will do ☐ Neither ☐
12. Wash full loads in the dishwasher and clothes washer.
    Currently do ☐ Will do ☐ Neither ☐

Lighting

13. Replace incandescent bulbs with CFL or LED bulbs.
    Have done ☐ Will do ☐ Neither ☐
14. Turn lights off when not in use.
    Currently do ☐ Will do ☐ Neither ☐

Refrigeration

15. Replace old, inefficient refrigerator with an ENERGY STAR® model.
    Have done ☐ Will do ☐ Neither ☐
16. Unplug and/or recycle old freezers/refrigerators.
    Have done ☐ Will do ☐ Neither ☐
17. Maintain refrigerator and freezer coils and check door seals twice yearly.
    Currently do ☐ Will do ☐ Neither ☐

Electronics

18. Turn off computers and game consoles when not in use.
    Currently do ☐ Will do ☐ Neither ☐

Cooking

19. Use a microwave oven, toaster oven or crock pot instead of a conventional oven.
    Currently do ☐ Will do ☐ Neither ☐

Get paid for being *watt*smart

20. Visit Pacific Power at *bewattsmart.com* for more energy-saving tips and rebates.
    Have done ☐ Will do ☐ Neither ☐

WAT WA

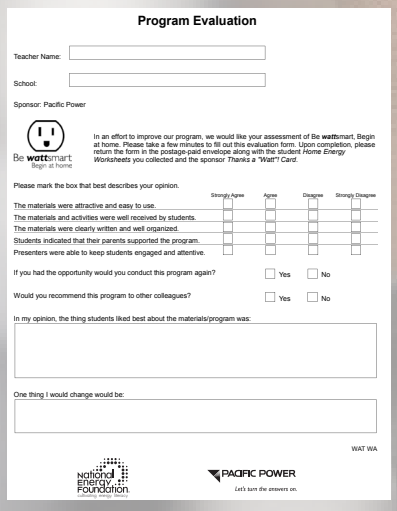
National Energy Foundation

PACIFIC POWER
Let's turn the answers on.

Home Energy Worksheets

– Returned: 2,589 –

– 62.73% –



Program Evaluation

Teacher Name:

School:

Sponsor: Pacific Power

Be *watt*smart
Begin at home

In an effort to improve our program, we would like your assessment of Be *watt*smart. Begin at home. Please take a few minutes to fill out this evaluation form. Upon completion, please return the form in the postage-paid envelope along with the student *Home Energy Worksheets* you collected and the sponsor *Thanks a "Watt"! Card*.

Please mark the box that best describes your opinion.

	Strongly Agree	Agree	Disagree	Strongly Disagree
The materials were attractive and easy to use.	☐	☐	☐	☐
The materials and activities were well received by students.	☐	☐	☐	☐
The materials were clearly written and well organized.	☐	☐	☐	☐
Students indicated that their parents supported the program.	☐	☐	☐	☐
Presenters were able to keep students engaged and attentive.	☐	☐	☐	☐

If you had the opportunity would you conduct this program again? ☐ Yes ☐ No

Would you recommend this program to other colleagues? ☐ Yes ☐ No

In my opinion, the thing students liked best about the materials/program was:

One thing I would change would be:

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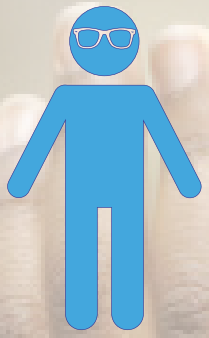
PACIFIC POWER
Let's turn the answers on.

Teacher Packets

– Returned: 115 –

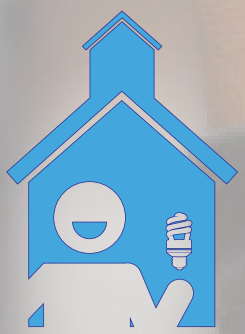
– 75.65% –

Participants



Students
– 4,127 –

Teachers
– 152 –



Schools
– 50 –

Table of Contents

Program Overview

Program Administration

National Energy Foundation (NEF) is pleased to report on activities of the Be wattsmart, Begin at home energy efficiency education program conducted during the 2015– 2016 school year. Our mission remains constant, to cultivate and promote an energy literate society. The objective is to provide Washington teachers and students with a quality educational experience and materials to support them in teaching and learning this valuable message. NEF acknowledges that through the support of Pacific Power, the Foundation has been able to move the mission forward. Thank you for your commitment to this very important task.

Be wattsmart, Begin at home is administered by National Energy Foundation, a non-profit organization (established in 1976) dedicated to the development, dissemination, and implementation of supplementary educational materials, programs and services relating primarily to energy, water, natural resources, science, math, technology, conservation, energy efficiency and the environment.

Anne Lowe, Vice President - Operations, oversees program organization. Gary Swan, Vice President - Development, oversees contract accounting. Marilyn Clark, Program Director, is responsible for the implementation of the scope of work and the program reporting. Pat Schwartzendruber, Program Coordinator/Scheduler, is responsible for scheduling presentations and teacher communication. A team of trained and seasoned presenters brought the interactive, hands-on program to Washington schools.

Program Summary

The fall 2015 Be wattsmart, Begin at home program provided quality energy education to schools in the Pacific Power Service territory. The program consisted of a 60-minute assembly given to groups of fourth and fifth grade students and their teachers. Two professional presenters from National Energy Foundation were involved in the implementation of each interactive program. Important energy concepts learned through these presentations were then communicated to Pacific Power households through the *Student Guide* and implementation of the *Home Energy Worksheet.*

Building Collaborations

Washington Office of Superintendent of Public Instruction Learning Standards correlate well to the content of Be wattsmart, Begin at home. Teachers appreciated the collaborative efforts to align program components to their learning standards. Curriculum correlations were provided to teacher participants in their *Teacher Materials Folder* and also on the program registration website bewattsmart.com/begin.

Promotional Materials

During the month of May 2015 an invitation to register for the fall 2015 program was sent via email to all schools that had participated in 2014. In August Pat Schwartzendruber made phone calls to all unregistered schools.

Be wattmart, Begin at home had 49 schools registered in September. Approval was received from Barbara Modey to count Selah Intermediate as two schools. Selah has combined all 4th grade students in an intermediate school. John Campbell had participated in the past but Robert Lince had not previously participated, both schools were now part of the intermediate school.

Program Registration

Registration for the program was online at bewattsmart.com/begin. Registration for the program was followed by a series of email communications with teachers, sent automatically by the program registration website. The website calculated *Home Energy Worksheet* returns as well as earned gift card levels and communicated this information to the participant. Later communications were customized through programming to be sent only to teachers needing a reminder to return their program documents. Automatic email also contained live links to vital program documents such as the *Spanish Home Energy Worksheet* and *Spanish Student Booklet.*

Be wattsmart, Begin at home Presentation

The Be wattsmart, Begin at home presentations were given during the period of October 12th through November 13th, 2015. The presentation featured a custom Keynote slideshow that brought energy concepts to the forefront of Washington education. The presentation focused on important concepts, such as natural resources, electrical generation, the energy mix used by Pacific Power to generate electricity and tips for energy efficiency in the home.

The presentation provided interactive activities that involved and engaged the audience. Students participated in making a human electrical circuit, during which they learned key core curriculum concepts such as insulators and conductors of electricity and electrical generation. Student volunteers used props to demonstrate the process of electrical generation for their classmates. All students reviewed material learned with an "Energy Lingo" review activity at designated points throughout the presentation. To help students remember energy efficiency tips, participants watched Slim the Lineman energy efficiency video vignettes. At the end of each short video, students completed a rhyme about Slim's wise energy choice.

The last portion of the presentation communicated the importance of program take home pieces. These documents enabled households to participate in energy education along with students.

Student and Teacher Materials

A *Parent Letter* was provided to explain the importance of Be wattsmart, Begin at home. In addition, students took home a *Student Guide* and *Home Energy Worksheet* to share with their families. Students who returned their worksheet received a special reward, an Energy Star© rated nightlight featuring the Pacific Power Logo.

Educators were also given helpful energy educational materials. Each teacher participant was provided with a custom Be wattsmart, Begin at home folder. It contained a custom *Teacher Guide* with additional information and activities to supplement and continue energy education in the classroom. Also in the folder were the NEF instructional posters, *Electrical Generation* and *Bright Ways to Save Energy*.

A program *Implementation Steps Flier* assisted teachers in carrying out the program. It also gave simple steps for successfully returning the *Home Energy Worksheets,* the *Program Evaluation*, and the sponsor *Thanks a "Watt" Card* in the postage paid envelope provided in the *Teacher Materials Folder*. A *Rewarding Results Flier* gave information concerning the Visa® gift card teacher participants could receive for a return of their student surveys. Educators could receive a $50 gift card for an 80% return, or a $25 gift card for a 50 – 79% return by the December 4, 2015 deadline.

Program Accomplishments – Fall 2015

- 54 Be wattsmart, Begin at home presentations completed at 49 Schools
- 4,127 students and families reached
- 152 Washington teachers reached
- 62.73% *Home Energy Worksheet* survey return
- $50 Visa gift cards delivered to 97 Washington teachers
- $25 Visa gift cards delivered to 13 Washington teachers

Summary and Attachments

National Energy Foundation is pleased to participate with Pacific Power in bringing this informative program to Washington teachers, students and families. The partnership between the organizations has been successful in developing and continually enhancing program deliverables. Be wattsmart, Begin at home is now an established part of the Washington educational community culture. It is also an important resource for bringing energy literacy to the forefront of fourth and fifth grade student education. Thank you for your continued commitment to Washington Schools.

- Fall 2015 Participating Schools
- Program Promotions
- Program Documents
    - Keynote Presentation
    - *Teacher Implementation Steps Flier*
    - *Rewarding Results Flier*
    - *Student Guide*
    - *Teacher Guide*
    - Lingo Card
    - Washington Learning Standards Correlations
    - *Parent Letter*
- *Teacher Evaluation*
- *Teacher Evaluation* Compilation
- *Home Energy Worksheet* (English)
- *Home Energy Worksheet* (Spanish)
- Wise Energy Behaviors in Pacific Power Washington Homes
- *Home Energy Worksheet* Summary – Pacific Power
- Sampling of *Thanks a "Watt" Cards*

ATTACHMENTS

Fall 2015 Participating Schools

School Name	School Address	School City	State
Adams Elementary - Wapato	1309 S. Camas Avenue	Wapato	WA
Adams Elementary - Yakima	723 S. 8th Street	Yakima	WA
Arthur H. Smith Elementary	205 Fir Avenue	Grandview	WA
Artz-Fox Elementary	805 Washington Street	Mabton	WA
Barge Lincoln Elementary	219 East I street	Yakima	WA
Blue Ridge Elementary	1150 W. Chestnut	Walla Walla	WA
Camas Elementary	1010 S. Camas Avenue	Wapato	WA
Chief Kamiakin Elementary	1700 E. Lincoln Ave	Sunnyside	WA
Cottonwood Elementary	1041 South 96th Ave	Yakima	WA
Davis Elementary	31 SE Ash St	College Place	WA
Dayton Elementary	302 E. Park St.	Dayton	WA
Discovery Lab School	2810 Castlevale	Yakima	WA
East Valley Elementary	1951 Beaudry Rd.	Yakima	WA
Edison Elementary	1315 E Alder	Walla Walla	WA
Garfield Elementary	505 Madison Avenue	Toppenish	WA
Garfield Elementary - Yakima	612 N 6th Ave	Yakima	WA
Gilbert Elementary	4400 Douglas Drive	Yakima	WA
Green Park Elementary	1105 E Isaacs Street	Walla Walla	WA
Harriet Thompson Elementary	1105 W 2nd St	Grandview	WA
Hoover Elementary	400 West Viola Avenue	Yakima	WA
Lincoln Elementary	309 N Alder St	Toppenish	WA
Martin Luther King, Jr Elementary	2000 S 18th St.	Union Gap	WA
McClure Elementary - Grandview	811 W 2nd Street	Grandview	WA
McClure Elementary - Yakima	1222 S 22nd Ave	Yakima	WA
McKinley Elementary	621 S. 13th Avenue	Yakima	WA
Naches Valley Intermediate	101 Shafer Ave	Naches	WA
Nob Hill Elementary	801 South 34th Avenue	Yakima	WA
Oakridge Montessori School	6403 Summitview Ave	Yakima	WA
Outlook Elementary	3800 Van Belle Rd	Outlook	WA
Pioneer Elementary	2101 East Lincoln Ave	Sunnyside	WA
Prescott Elementary	207 South A Street	Prescott	WA
Prospect Point Elementary	55 Reser Road	Walla Walla	WA
Ridgeview Elementary	509 West Washington	Yakima	WA
Riverside Christian School	721 Keys Road	Yakima	WA
Robertson Elementary	2807 West Lincoln	Yakima	WA
Roosevelt Elementary	120 North 16th Avenue	Yakima	WA
Satus Elementary	910 S Camas Avenue	Wapato	WA
Selah Intermediate School	1401 W. Fremont Avenue	Selah	WA
Selah Intermediate School #2	1401 W. Fremont Ave.	Seah	WA
Sharpstein Elementary	410 S Howard St.	Walla Walla	WA
St. Paul Cathedral School	1214 W. Chestnut Ave.	Yakima	WA
Summitview Elementary	6305 W. Chestnut Ave	Yakima	WA
Terrace Heights Elementary	101 N. 41st Street	Yakima	WA
Tieton Intermediate School	711 Franklin Road	Tieton	WA
Union Gap School	3201 South 4th St	Union Gap	WA
Waitsburg Elementary	184 Academy Street	Waitsburg	WA
Whitney Elementary	4411 West Nob Hill Blvd	Yakima	WA
Wide Hollow Elementary	1000 S. 72nd Ave.	Yakima	WA
Woodland Intermediate School	2250 Lewis River Rd	Woodland	WA
Zillah Intermediate	303 2nd Ave.	Zillah	WA

Program Promotions

Be *watt*smart
Begin at home

Dear Be *watt*smart, Begin at home 2014 program participant:

Thank you for participating in the 2014 Be *watt*smart, Begin at home program. Pacific Power is once again sponsoring this energy education program for the 2015-16 school year.

As a former program participant, you have the opportunity to enroll your fourth- or fifth-grade class in advance for the fall 2015 Be *watt*smart, Begin at home program.

The 60-minute school presentations include **FREE** wattsmart energy education posters, activities and student materials. They will be scheduled during the weeks of **October 12 - November 13, 2015**. Teachers may qualify to receive a mini-grant of up to $50 depending upon participation.

Register soon at: bewattsmart.com/begin to ensure your 2015 participation or email pats@nef1.org.

Thank you,

National Energy Foundation.

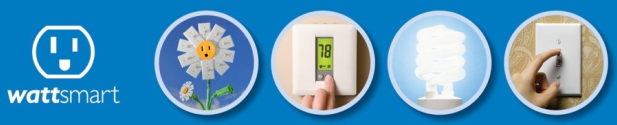
PACIFIC POWER

bewattsmart.com

Program Documents

Keynote Presentation

Be *watt*smart,
Begin at home



PACIFIC POWER
Let's turn the answers on.

1

What we will do today.

Learn about natural resources.

Learn how we make and use energy.

Learn how to use energy wisely by being *watt*smart.

Play energy LINGO.

2

What is ENERGY?

3

ENERGY is the ability to do **WORK**.

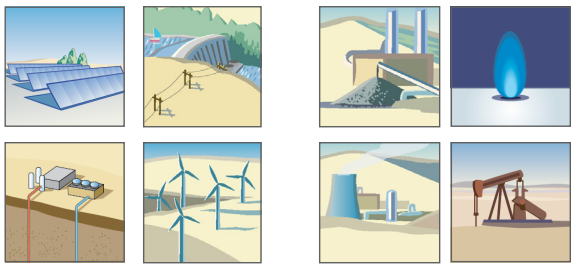
4

Natural resources

A **natural resource** is anything we use that comes from the earth or the sun.

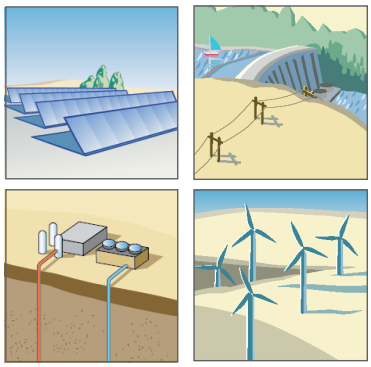
5

Renewable and nonrenewable resources



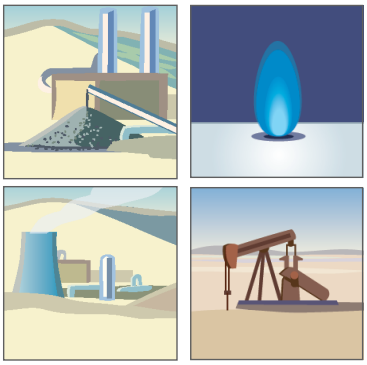
6

Renewable resources



7

Nonrenewable resources



8

Electricity

- The electricity we use is not a natural resource.
- It is made from natural resources.
- Since electricity is made from natural resources, it is called a **secondary energy source**.
- Power lines carry the electricity from where it is generated to where it is used.

9

Let's LINGO

Find the words on your LINGO board that match these definitions:

- The ability to do work. **Energy**
- A resource often found with oil. **Natural gas**
- A secondary energy source. **Electricity**
- Something useful from the earth or the sun. **Natural resource**

10

Pacific Power

Electric generation by energy source

Coal 62%

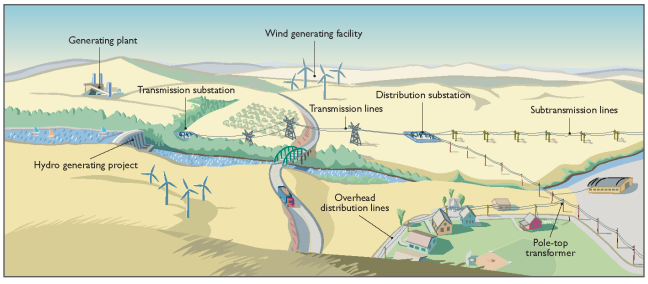
Renewables 15.32%

Natural gas 17.35%

Other sources 5.33%

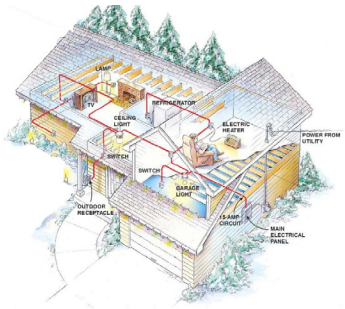
11

Electric generation



12

What is a circuit?

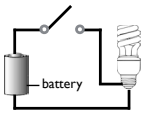


13

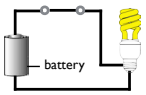
Let's make a circuit.

What things do we need to make an electrical circuit?

- An **energy source**, such as a battery.
- A **conductor** to carry electrical energy, such as wire.
- A **load** to use the energy, such as a light bulb.



Open circuit:
No electricity can flow



Closed circuit:
Electricity can flow

14

Energy efficiency

Energy efficiency

- Using less energy to accomplish the same amount of work.

Technology

- Install energy-efficient products, appliances and devices.

Behavior

- Use less energy through wise behaviors that conserve energy.

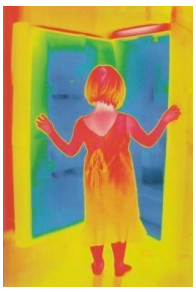
15

Know what you want before you open the refrigerator.

16

Refrigerators and freezers

What can you do to be *watt*smart?



Decide what you want to eat quickly!

17

Use CFLs

18

Turn off the TV when you leave the room.

19

Electronics

What can you do to be ***watt***smart?

- Unplug the thug. Beware of **phantom loads**.
- Turn off TVs, computers and game consoles when not in use.

- Use power strips to reduce phantom load.

20

Turn off the lights when you leave the room.

21

Lighting

What can you do to be ***watt***smart?

Turn off the lights when you leave a room.

Replace standard bulbs with **CFLs** (compact fluorescent light) bulbs or LEDs (light-emitting diode) light bulbs.

Let daylight shine in.

22

Let's LINGO

Find the words on your LINGO board that match these definitions:

- Using less energy to accomplish the same amount of work. **Energy efficiency**
- An energy resource that is capable of being renewed or is replaceable. **Renewable**
- Fossil fuels – such as coal, natural gas and oil – are considered **Nonrenewable** resources.
- A resource used to produce gasoline. **Oil**

23

Home heating and cooling

What can you do to be ***watt***smart?

- Use a fan instead of an air conditioner.
- Install a programmable thermostat.
- Look for the ENERGY STAR® label.
- Change furnace filters at least every 3 months.
- Insulate your home and seal air leaks.

24

Water heating

What can you do to be *watt*smart?

- Install a water-efficient showerhead.
- Take shorter showers.
- Turn off the water when brushing teeth.
- Tell your parents that your **water heater** should be set to 120°F.

25

Dishwashers

What can you do to be *watt*smart?

- Only run dishwashers when full.
- Use the "air dry" or "no heat dry" settings.

26

Laundry

What can you do to be *watt*smart?

- Wash clothes in cold water.
- Clean the lint filter in the dryer with each load.
- Use a clothesline whenever possible.

27

Cooking

What can you do to be *watt*smart?

- Use a microwave oven when possible.

- Use lids to shorten **cooking** time.

28

The 3 Rs

What can you do to be *watt*smart?

- **Reduce**
  – use less of something.
- **Reuse**
  – use something again.
- **Recycle**
  – make something into another new thing.

29

Let's LINGO

Find the words on your LINGO board that match these definitions:

- A light that lasts 10 times longer than an incandescent. **CFL**
- Electricity consumed by an electronic device while it is turned off or in standby mode. **Phantom load**
- Using a toaster oven or microwave for **Cooking** is more energy-efficient than using the oven.
- Set this to 120°F for a comfortable shower. **Water heater**
- To use less of something. **Reduce**

30

What have we done today?

- **Learned** why energy is important.
- **Discussed** energy and where it comes from.

31

Engage

Review your **Be *watt*smart, Begin at home** booklet with your parent(s).

Complete the *Home Energy Worksheet* and return it to receive an energy-efficient nightlight.

Sign the *Thanks A "Watt" Card* and your teacher will mail it along with your worksheet and the teacher's *Program Evaluation*.

32

***YOU** can make a difference when you are **watt**smart!*

Visit **bewattsmart.com**
for more energy-saving ideas.

33

Be **watt**smart
Begin at home

Teacher Program Implementation Steps

1. Verify that you have received each of the following:
   - *Teacher Materials Folder*
     - Your **Be wattsmart, Begin at home** student booklet
     - Your **Be wattsmart, Begin at home** teacher guide
     - *Program Evaluation*
     - Sponsor *Thanks a "Watt!" Card*
     - Teacher Visa® gift card announcement
     - Self-addressed postage-paid envelope
     - Instructional posters
   - *Home Energy Worksheets* for you and your students
   - **Be wattsmart, Begin at home** student booklets
   - Set of *Parent Letters*
   - wattsmart nightlights (student incentive for returning the *Home Energy Worksheets*)

2. Distribute to each student a:
   - **Be wattsmart, Begin at home** booklet
   - *Home Energy Worksheet*
   - *Parent Letter*

3. Reward each student who returns a completed *Home Energy Worksheet* with a wattsmart nightlight.

4. Complete the *Program Evaluation* form.

5. Have each student sign the *Thanks a "Watt!" Card* to Pacific Power.

6. Mail in the self-addressed postage-paid envelope:
   - All completed *Home Energy Worksheets*
   - The *Thanks a "Watt!" Card*
   - The *Program Evaluation* form

To thank you for postmarking your envelope by December 4, 2015, you will receive a Visa gift card for classroom use.
80% return of registered students' *Home Energy Worksheets* **= $50**
50 – 79% return of registered students' *Home Energy Worksheets* **= $25**

For questions or additional information, please email Pat Swartzendruber at **pats@nef1.org**.

Dear Parent(s):

The **Be wattsmart, Begin at home** program assists teachers and students to learn about energy, discuss important energy topics and engage in energy efficiency actions now. Your child has participated in an assembly addressing natural resources, energy basics and energy efficiency. Your participation in this program will help you be wattsmart, enhance energy efficiency in your home and help save money on your utility bills. Here are three simple ways that you can help:

- Review this **Be wattsmart, Begin at home** booklet with your child.
- Assist your child with completing the activities on Page 7.
- Have your child return the **Home Energy Worksheet** to their teacher.

Thank you for being wattsmart and for your participation!

What's inside?

This booklet is divided into three sections that will help you:

1. Learn about sources of energy, how they get to your home and why they are important in your life.
2. Discuss wattsmart energy efficiency tips that will help you use energy wisely and save money.
3. Engage in energy efficiency by determining how energy can be saved in your home through a simple audit activity and the *Home Energy Worksheet*.

About Pacific Power

Based in Portland, Oregon, Pacific Power is one of the lowest-cost producers of electricity in the United States, providing more than 700,000 customers in Washington, Oregon and California with safe, reliable, efficient energy. In addition, it is the second-largest rate-regulated utility owner of renewable, wind-generated electricity in the U.S.

About National Energy Foundation

National Energy Foundation is a unique 501(c)3 nonprofit educational organization dedicated to the development, dissemination and implementation of supplementary educational materials and programs. These resources for education relate primarily to energy, water, natural resources, science, math, technology, conservation, energy efficiency and the environment.

What does it mean to be ***watt***smart?

- Being wattsmart is all about taking steps to save energy – which in turn can help you save money.
- Pacific Power's wattsmart programs and incentives can help customers become more energy efficient in their homes and businesses, and that's good for their wallets and the environment.

The importance of energy:

Energy is the ability to do work or produce change. Virtually everything we do or use at work and home uses energy.

- Heating and cooling systems
- Computers
- Electronic equipment such as gaming and entertainment systems and TVs
- Charging electronic tablets, music players and cell phones
- Appliances
- Lights
- Manufacturing
- Food storage and preparation
- Security systems

Where does energy come from?

Our energy comes from natural resources. There are two general categories of natural resources – nonrenewable and renewable. A nonrenewable resource is not capable of being renewed, replaced or takes a very long time to replace. A renewable resource is capable of being renewed or replaced.

PRIMARY NATURAL RESOURCES are used to convert energy into electricity. They can be either nonrenewable or renewable.

Nonrenewable examples are:

Coal is the most abundant nonrenewable energy source in the world. There is an estimated 129 year supply remaining.

Oil can be both refined and unrefined. Refined oil is transformed into petroleum products and unrefined oil remains as crude oil.

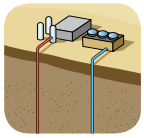
Natural Gas is usually captured alongside oil deposits and is a major source for electrical generation.

Uranium is the fuel most widely used by nuclear plants. Nuclear energy is the energy inside the nucleus (core) of the atom of uranium.

Renewable examples are:

Solar is energy from the sun.

Wind is energy from the wind captured by a group of wind turbines (generators).



Geothermal is energy derived from the heat of the earth.

Hydropower is energy from water that generates electricity.

SECONDARY ENERGY RESOURCES are created by using nonrenewable and renewable resources of energy.

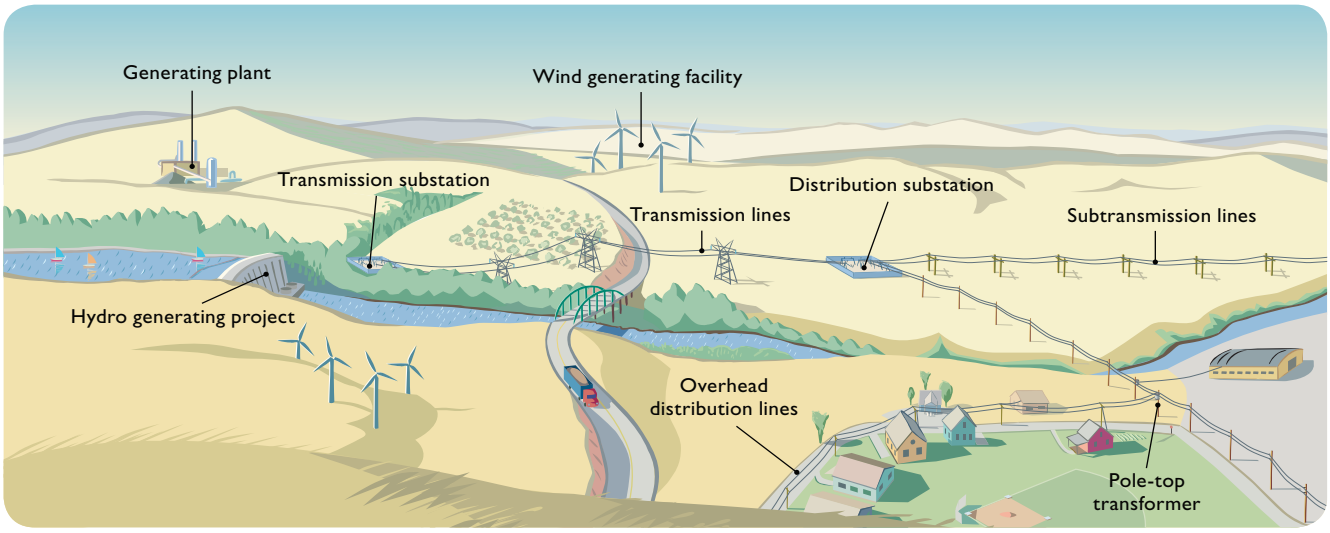
Electricity is the most abundant **secondary energy resource** used. It is the flow of electrical power or charge. It occurs in nature as lightning and static electricity. A generator uses energy resources to create mechanical energy that is then converted into electrical energy.

Energy efficiency

Energy efficiency is using less energy to accomplish the same amount of work – we call it being wattsmart. There are many technologies we can use today that decrease the amount of energy needed to do work. Good examples are ENERGY STAR® products and LED lighting.

You can save even more money if you start thinking about using energy wisely. Try turning off the lights when you leave the room, take shorter showers or turn off your electronics when you are not using them.

Using electricity



For more than 100 years, electricity has made our homes more comfortable and industries more productive. Today electricity is powering a world of electronics.

How is electricity generated? It begins with a fuel that heats water and turns it to steam. The steam drives the turbine that turns the generator motor to produce electricity.

How is electricity transmitted? Once the electricity is produced, the current flows from the generator to the power plant transformer where the voltage is increased to boost the flow of the electric current through the transmission lines. The transmission lines transport the electricity to Pacific Power's substations where the voltage is decreased. Power lines then carry the electricity from the substations to be used in our homes and businesses.

ELECTRICAL GENERATION

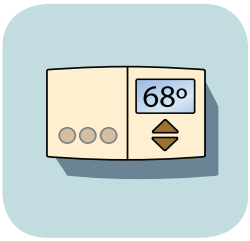
Energy resource	Pacific Power (2014 basic fuel mix)*	United States (U.S. EPA, 2013 data)
Coal	62.00%	39%
Natural gas	17.35%	27%
Renewables	15.32%	12%
Hydroelectric	6.33%	7%
Wind	8.09%	4%
Biomass	0.48%	1%
Geothermal	0.39%	--
Solar	0.03%	0%
Nuclear	0.00%	19%
Other/misc.	5.33%	3%
Total*	100%	100%

**This information is based on Federal Energy Regulatory Commission Form 1 data. The Pacific Power "basic fuel mix" is based on energy production and not resource capability, capacity or delivered energy. All or some of the renewable energy attributes associated with wind, biomass, geothermal and qualifying hydro facilities in Pacific Power's basic fuel mix may be: (a) used in future years to comply with renewable portfolio standards or other regulatory requirements, (b) sold to third parties in the form of renewable energy credits and/or other environmental commodities or (c) excluded from energy purchased. Pacific Power's basic fuel mix includes owned resources and purchases from third parties.*

wattsmart tips to lower your energy use and help save money

Saving energy happens in two ways. First, you can use less energy through wise behaviors that conserve energy. Second, you can install energy-efficient products, appliances and devices that use less energy to accomplish the same task. Let's talk about the following areas of your home that have the largest potential to save energy.

Home heating and cooling



- Install a programmable thermostat. Set your thermostat to 78°F or higher in the summer and 68°F or lower in the winter.
- Make sure your house is properly insulated. If you have less than 6 inches of insulation in your attic, you would benefit from adding more.
- You can save 10 percent or more on your energy bill by reducing the air leaks in your home with caulking and weather stripping.

- To help your furnace run more efficiently and cost-effectively, keep your air filters clean.
- For windows with direct sunlight, close your blinds in the summer to keep the heat out. Open blinds on winter days to let the warmth in.
- Small room fans are an energy-efficient alternative to air conditioning.
- Inspect and replace weather stripping and caulking in your home.
- For information about energy-saving programs and cash incentives, visit **bewattsmart.com**.

Water and water heating

- Check your faucets for leaks that can cost you hundreds of dollars each year.
- Install a water-efficient showerhead and save as much as $50 a year.
- Set the water heater at 120°F.
- Install faucet aerators to decrease water use.

Lighting

- Let the sun shine in. Use daylight and turn off lights near windows when possible.

- Replace your most used incandescent bulbs with CFLs (compact fluorescent light) or LEDs (light-emitting diodes) and save $5 to $8 per year per bulb. These bulbs use at least 75 percent less than incandescent bulbs and last much longer.
- Use lighting controls such as motion detectors and timers.
- Turn off lights when you leave the room.
- Always use the lowest wattage bulb that still gives you the light you need.
- Keep your light bulbs clean. It increases the amount of light from the bulb and reduces the need to turn on more lights.

Safety note: Burned out CFLs, which contain a small amount of mercury, should be disposed of properly. To locate a collection site in your area, or to learn what to do if a CFL breaks, visit **www.getenergysmart.org**.

Electronics

- Turn off your computer and game consoles when not in use.
- Home electronics are made to turn on and off many times. Always turn them off to save energy.
- Electronics with the ENERGY STAR® label use as much as 60 percent less energy while providing the same performance.
- Beware of phantom loads which continue to draw electricity when they are plugged in but not in use. Examples are telephone chargers, electronic games and television sets. Use power strips for household electronics. One button will turn off multiple appliances, which conserves electricity.

Refrigerators and freezers

- When looking to replace your old refrigerator, do so with an ENERGY STAR® model, which requires 40 percent less energy than conventional models and provides energy savings without sacrificing the features you want.
- The coils in the back or bottom of your refrigerator and freezer should be kept as clean as possible.
- Recycle old freezers and refrigerators. Pacific Power's *See ya later, refrigerator*® program will pick them up and give you $30. Call toll-free 866-899-5539 to schedule a pickup.

Dishwashers

- Only run dishwashers when full and use the "air dry" or "no heat dry" settings.
- ENERGY STAR® dishwashers use at least 41 percent less energy than the federal minimum standard for energy consumption.

Laundry

- Buy a moisture-sensitive dryer that automatically shuts off when clothes are dry.
- Use a clothesline whenever possible.

Cooking

- Use a microwave oven, toaster oven or crock pot instead of a conventional oven.
- Use the right-sized pan for the stove top element.
- Cover pans with lids to keep heat from escaping.

Reduce

- Use less.
- Purchase products with little packaging.

Reuse

- Use something again.
- Reuse a box or a grocery bag.

Recycle

- Make something into another new item.
- Participate in the recycling programs in your community.

Parents, be wattsmart and watch the energy savings add up.

An individual with a combined electric and heating fuel bill of $2,500 per year could save 20 percent or $42/month by using these and other energy efficiency tips. That is like getting a pay raise without having to work harder or longer.

The cost of lighting your home

Take a walk around your home with your family to learn about your lighting.

1. Count the types of bulbs in each room and record in Table 1; then total each column.
2. Transfer the total for each type of lighting into Column A on Table 2.

TABLE 1

Location	Incandescent	CFL	LED
Bedroom 1			
Bedroom 2			
Kitchen			
Dining room			
Living room			
Hallway			
Laundry room			
Family room			
Front porch			
Other			
TOTAL			

3. In Table 2, multiply the numbers in Column A by the given amounts in Column B. Place the answers in Column C.
4. Add the numbers in Column C to get the total approximate cost of electricity for lighting your home.
5. Discover how much money you will save if all the bulbs in your home were CFLs or LEDs. Add the numbers in Column A to get the total number of bulbs in your home. Transfer the total to both rows in Table 3, Column E as indicated by the arrows.

TABLE 2

	A	B	C
	Number of bulbs from Table 1	Annual cost of electricity for one bulb	Annual cost of electricity for lighting
Incandescent		× $3.60	
CFL		× $0.84	
LED		× $0.48	
TOTAL			

6. Multiply the total number of CFLs by the annual cost of electricity for one CFL provided in Column F and put your answer in Column G.
7. In the last row of Table 3, multiply the total number of LEDs in Column E by the annual cost of electricity for one LED bulb provided in Column F and put your answer in Column G.

   How do the amounts in Column G compare with your current total cost for lighting in Column C above?

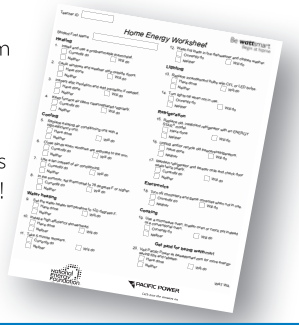
TABLE 3

	E	F	G
All CFLs		× $0.84	Annual cost of electricity with only CFLs
All LEDs		× $0.48	Annual cost of electricity with only LEDs

Cost figures are for an individual bulb (60-Watt incandescent), the lumens equivalent CFL (13-Watts) and LED (7-Watts) each used for 2 hours each day for 30 days. EEI Typical Bills and Rates Report, Winter 2015 (12 months ending 2014).

Be ***watt***smart – it's up to you

Together with your parent(s), complete the separate ***Home Energy Worksheet***. Return it to your classroom teacher and receive your wattsmart nightlight. You may find you are already practicing ways to be energy efficient, but there is always room to do more.



Challenge yourself and your family to commit to practice energy efficiency by making wise energy choices and being wattsmart. You will not only help extend the life of our natural resources, but save money, too!

For other energy-saving ideas and incentives, visit **bewattsmart.com**. Congratulations to you and your family for making a difference.

Be *watt*smart

Begin at home

National Energy Foundation
cultivating energy literacy

bewattsmart.com

PACIFIC POWER
Let's turn the answers on.

wattsmart is registered in U.S. Patent and Trademark Office.

Be *watt*smart
Begin at home

TEACHER GUIDE

National Energy Foundation
cultivating energy literacy

PACIFIC POWER
Let's turn the answers on.

Welcome to Be ***watt***smart, Begin at home

This program teaches the importance of energy and assists students and their families in saving energy in their homes. For teachers, **Be *watt*smart, Begin at home** reinforces important electrical concepts from your curriculum.

This *Teacher Guide* was designed to supplement program instruction. A variety of tools have been provided to allow you to format **Be *watt*smart, Begin at home** to meet your instructional needs. These tools include:

- General guidelines and activity suggestions
- Classroom activities to further the impact of lessons
- Additional fun and interesting activities for students
- Activities containing STEM-related curriculum for your classroom

Table of Contents

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STEM Correlations

STEM education is an approach to teaching and learning that integrates the content and skills of science, technology, engineering and mathematics. Some of the skills include: problem-solving, innovation, invention, inquiry, logical reasoning, critical thinking, technological literacy, communication tools, research tools, design and modeling, data analysis and probability, collaboration and real world connection. This chart correlates *Teacher Guid*e activities to STEM skills and behaviors.

	Science				**Technology**				**Engineering**					**Math**			
Activity	Science as Inquiry	Energy Sources, Forms and Transformations	Science and Technology	Personal and Social Perspectives	Productivity Tools	Communication Tools	Research Tools	Problem-Solving and Decision-Making Tools	Historical Perspective	Design and Modeling	Invention and Innovation	Test Design and Troubleshooting	Use and Maintain	Numbers and Operations	Measurement	Data Analysis and Probability	Connection to the Real World
Conservation Cookie	X			X										X	X	X	X
Pass the Sack	X	X		X													
Energy Ticket	X	X		X				X						X	X	X	X
The Search for Energy	X	X	X	X										X		X	X
Where Do Fossil Fuels Come From?	X	X	X					X						X	X		
Energy for Electricity	X	X	X	X			X										
Insulation Tests	X	X	X	X			X	X		X	X	X	X	X	X	X	X
How Bright Is Your Light?	X	X	X				X		X					X		X	X
Energy in Math														X		X	X

Section One:
Energy Efficiency

Objective: Identify and explain types of natural resources, conservation and energy efficiency.

Vocabulary:

Natural resource: A material source of wealth, such as timber, fresh water or a mineral deposit that occurs in a natural state and has economic value.

Renewable resource: A natural resource that is capable of being renewed or is replaceable such as energy from the sun or wind.

Nonrenewable resource: A natural resource that is not capable of being renewed, replaced or takes a very long time to replace, such as fossil fuels.

Fossil fuel: A combustible material created naturally beneath the earth's surface over a long period of time, from the remains of plants and animals. Examples include coal, natural gas and oil.

Conservation: The protection, preservation, management, or restoration of wildlife and of natural resources such as forests, soil and water.

Energy efficiency: Managing the consumption of energy through the use of technologies and wise behaviors.

Classroom Activities:

- "Conservation Cookie"
- "Pass the Sack"
- "Energy Tickets"
- "The Search for Energy"

Energy Challenge

Discussion idea: Embodied energy in a glass of milk

Objective: Trace the energy and resources needed to make a common product.

Review the steps that it takes to produce a glass of milk and bring it to the consumer.

- Feeding and raising a cow
- Milking a cow
- Packaging
- Refrigeration
- Transportation of milk (dairy to warehouses to store to home)

Discuss with your class:

1. What natural resources go into making and transporting a glass of milk?
2. The energy used to make and transport a product is called **embodied energy**.
3. What embodied energy sources are involved in producing and transporting milk?
4. How can understanding embodied energy in our daily lives encourage us to be energy efficient?

Conservation Cookie

Objective:
To demonstrate the results of conservation of a resource.

Pre-activity discussion:
- What is conservation?
- Why is conservation so important?

Materials:
- Two cookies (or other food item) for each person
- One watch or clock with a second hand for timing
- Computer or graph paper to graph results

STEM Connection
Science
- Science as Inquiry
- Personal and Social Perspectives

Math
- Numbers and Operations
- Measurement
- Data Analysis and Probability
- Connection to the Real World

Procedure:
1. Tell students that this is the first of two rounds. In each round, they will be eating a cookie, which represents our natural resources. They are to stand at their desk and you say to eat the cookie as they normally would, then when the cookie has been completely swallowed, sit down. The activity will work better if you ask students NOT to put the entire cookie in their mouth at one time, to take at least two bites!
2. Give each student a cookie, with instructions not to eat it until you say. Start the watch and tell the students to eat the cookie as they would normally eat it. At 30 second intervals, count the number of students standing and record this data.
3. Individually or as a class, graph this data using a line graph.
4. Tell students they will now practice conservation with a second cookie. To represent conservation, students will only take a bite from their cookie when you say "BITE." Just as before, they will stand, take bites the same size they took last time, and sit after the entire cookie has been swallowed.
5. Pass out a second cookie to each student.
6. Start the watch and have everyone take a "BITE" and then wait 30 seconds. Record the number of students standing and again say "BITE." Repeat this procedure until almost everyone has finished his or her second cookie.
7. On the same graph used for the first cookie, add a second line graph for the conservation cookie.

Discussion:
- Compare the two graphs. If desired, have students calculate the slope of each graph from 0 to 30 seconds and from 30 seconds to 1 minute. How do the slopes vary over time and between graphs? What does a change in slope represent?
- Discuss the term "conservation" and its effects on our natural resources. Can we control how rapidly we use water or energy by conserving it? Water and energy are some of the most important things we use in our lives. If they are used up quickly, and all at once, we will not have enough left for the future.

Pass the Sack

Objective:
To demonstrate the difference between renewable and nonrenewable resources and the need for conservation of resources.

Materials:
- Two different kinds of candy or other objects students find desirable
- Sack to hold candy, such as a gallon size plastic bag

STEM Connection
Science
- Science as Inquiry
- Energy Sources, Forms and Transformations
- Personal and Social Perspectives

Procedure:
1. Count out enough candy so that there is one piece per student (some of each type of candy – perhaps less of one so it will run out faster). Put it in the sack or bag. Save the remaining candy. If you have a very polite class, count enough candy for half of the class. You want the candy to run out before everyone gets some!
2. Tell students you will be demonstrating how resources get used over time by playing "Pass the Sack." Show students the sack and tell them when they get the sack, they should take some energy and pass the sack to the person next to them.
3. Before passing the sack to the first student, review renewable and nonrenewable resources. Have students give examples of each as you hand the sack to a student.
4. While this discussion is taking place, allow students to pass around the bag of candy without any rules about how many pieces students may take. Occasionally, add four or five pieces of one of the types of candy you are using. (This will be your renewable resource.) The sack will be empty before it reaches all the students.
5. Ask students that did not get any candy how they might obtain energy from other students. What if each student represented a country? How do countries obtain resources? Trade? Barter (trade for goods)? Buy (trade for currency)? Invade and take (go to war)? What effect did the availability of candy have on relationships between students? What effect might the availability of natural resources have on the relationship among nations, provinces, states, people, standards of living and quality of life?
6. Explain how our resources are like the candy. Which type was the nonrenewable? How could you tell? (No more was added to the bag once it was being passed around.) Which type was renewable? How could you tell? (It was added to the bag periodically.)
7. Point out that resources have limits just like the candy. Emphasize that many resources, such as fossil fuels, are nonrenewable and are being consumed faster than they are being replaced by nature. Discuss the fact that it would be more difficult for students to eat the candy if they had to search the room to find it instead of just taking it from the sack. Energy companies must seek resource deposits and obtain rights to drill or mine for them, they do not just magically appear. Point out that natural gas, coal and oil companies are looking harder for more resources as supplies dwindle.
8. Now plan to pass out the remaining candy. Should rules be established? Do oil, coal, and natural gas companies have rules (regulations) that they must follow to find resources? Should there be rules and regulations on how much oil, coal and natural gas people use? How would students get resources if they could not leave their desks? How do the class's social decisions influence the availability of candy?

Energy Tickets

Objective:
See how energy decisions affect our standard of living and our quality of life. This will help students realize how important it is to use energy efficiently.

Materials needed:
- Energy Tickets – 25 per student
- Box to collect tickets (toll box)

STEM Connection
Science
- Science as Inquiry
- Energy Sources, Forms and Transformations
- Personal and Social Perspectives

Technology
- Problem-Solving and Decision-Making Tools

Math
- Numbers and Operations
- Measurement
- Data Analysis and Probability
- Connection to the Real World

Procedure:
1. Before class begins, copy a page of tickets from the master on Page 8 for each student. Alternatively, you may use preprinted tickets available from retail stores.
2. Introduce the game to the students by listing several places the students use energy in the school, for example, in the classroom: lights, computers and heaters.
3. Provide each student with 25 Energy Tickets, and instruct them to write their name on all of their Energy Tickets.
4. Every time a student uses energy, have them write how the Energy Ticket was used on the back and put the ticket in the toll box. If they use heated water, it will cost two tickets, because they are using both energy and water. It also costs two tickets if they waste energy unnecessarily. For example, leaving lights or a computer on when not in use wastes energy.
5. Keep a record of how many tickets the students have left each day.
6. Optional: look at how the tickets were used, and create a graph of tickets used for different categories (sharpening pencils or using computers, for example) out of the tickets deposited in the box.

Discussion:
- What would happen if there was a real energy shortage in the community and families were issued a certain number of Energy Tickets?
- What if after they used them, all of their electricity and gas were shut off?
- What would they do to adjust their use of energy?
- What are other alternate sources of energy?

Language Arts Connection:
- Quick write – Describe one thing you could do to reduce your personal energy usage.
- Creative writing – Write a story about life after our nonrenewable energy sources are gone.

ENERGY TICKET This ticket allows one energy use. __________ student name	ENERGY TICKET This ticket allows one energy use. __________ student name	ENERGY TICKET This ticket allows one energy use. __________ student name	ENERGY TICKET This ticket allows one energy use. __________ student name	ENERGY TICKET This ticket allows one energy use. __________ student name
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The Search for Energy

Objective:
To learn the difference between renewable and nonrenewable resources.

Materials needed:
- About 1/4 cup seed beads (solar energy)
- Colored beads in the following proportions: 84 percent black beads (about 250 beads) for coal; 16 percent red (about 50 beads) for uranium; 2 percent white (about 7 beads) for natural gas; 1 percent blue (about 4 beads) for oil. These proportions approximately reflect the nonrenewable energy reserves in the U.S.
- Optional: large bed sheet or tarp to place beads on for easy cleanup

STEM Connection
Science
- Science as Inquiry
- Energy Sources, Forms and Transformations
- Science and Technology
- Personal and Social Perspectives

Math
- Numbers and Operations
- Data Analysis and Probability
- Connection to the Real World

Procedure:
1. Divide the class into five equal groups. Each group will be a company going after a particular resource. The beads represent reserves of the various energy resources. Have students gather in a large circle around the sheet or other area where you will place the beads.
2. Scatter the large beads plus a spoonful of "solar" beads on the sheet so they are well spread out. Explain that this exercise shows how the amount of available resources changes over time. You may want to designate certain places as protected areas, where the resources are off limits to protect the environment.
3. Tell students you will do several trials, and look to see how the types of available resources change after each trial. Tell each group that they will have 30 seconds to pick up as many beads possible of their color, then you will stop and look at how things are changing. It is NOT a race! After checking for understanding, start timing.
4. After 30 seconds, have the groups stop and count the beads they have gathered. Record the results in a data table. If some groups have collected all of their available resource, point out that the resource is now depleted and they are unemployed. You can allow the students to join another group. Collect the beads students picked up in the first trial.
5. Scatter another spoonful of solar energy, helping students realize that since solar is a renewable resource, there is the same amount of it each time you look, whereas the fossil fuels are being depleted. Repeat the search period so students can get more beads.
6. Stop after 30 seconds and have the group count and record the beads collected again. Note that there are fewer fossil fuels found in the second round. Students have to look harder to find what is left. The solar count is slowly but surely catching up with the fossil fuels. Repeat with additional trials as needed.
7. Create a multi-line graph of the number of beads collected each trial. This can be done by individual students or as a class. Note that the nonrenewable resources decrease until they are depleted but the solar increases steadily.

Discussion:
- Why does the solar line differ from the others? Why does it go up rather than down?
- How do improvements in technology affect the extraction of resources from the earth?
- How do improvements in technology affect our usage of renewable resources?
- In the real world, can we extract ALL of one resource? Why do some deposits go unused?

Section Two:
Resources You Can Use Efficiently

Objective:
To discuss and identify various resources students use every day.

Vocabulary:
Electricity: The flow of electric charge used as power.

Green energy: Electricity produced by renewable energy sources that are nonpolluting, or that pollute very little.

Natural gas: A fossil fuel that is a mixture of gases occurring in underground deposits.

Classroom activities:
- "Where Do Fossil Fuels Come From?"
- "Energy for Electricity"
- "Electrical Generation Poster"

Energy challenge

Discussion idea:
What natural resources can you save by recycling?

Optional activity:
1. Have students keep track of each paper product that they use during one day with tally marks.
2. Compare amounts of paper used by students in the class. Ask students if they were surprised by the amount of paper they used.
3. Based on their usage of paper in one day, have students estimate how much paper they would use in a week, a month and a year.
4. Discuss the difference between reducing, reusing and recycling
   - Reduce – to use less of something
   - Reuse – using something again
   - Recycle – making something into another new item
5. Brainstorm several ways that paper use can be reduced, that paper can be reused, and how paper can be recycled in your community.
6. Tell students that recycling 1 ton of paper saves:
   - Enough energy to power the average American home for six months.
   - 7,000 gallons of water
   - 3.3 cubic yards of landfill space
   - 1 metric ton of carbon equivalent (MTCE).

   (EPA, 2014)

Where Do Fossil Fuels Come From?

Objective:
This activity investigates the production of natural gas and oil from ancient life. This activity models this process.

Materials Per Student Group:
- A clear container to represent the ocean
- Sand or dirt
- Baking soda "plankton"
- Vinegar (20 percent) and water (80 percent) "ocean" mixture
- Cup or scoop
- Safety goggles

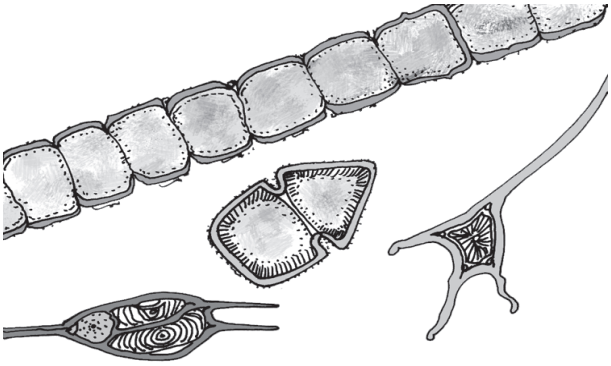
NOTE: You may do this as a demonstration, or have students do it in small groups.

STEM Connection
Science
- Science as Inquiry
- Energy Sources, Forms and Transformations
- Science and Technology

Technology
- Problem-Solving and Decision-Making Tools

Math
- Numbers and Operations
- Measurement

Procedure:
1. Explain to students that you will be showing them a model of how oil and natural gas form in the ocean. A very similar process takes place on land with plants to form coal.
2. Have students wear safety goggles to avoid splashing vinegar water in their eyes. It is harmless, but uncomfortable.
3. Have students sprinkle a small amount of sand to cover the bottom of the container. The ocean floor is covered with sediments, and the sand represents these sediments.
4. Next, have students sprinkle "plankton" over the sand, liberally covering the bottom of the container. This represents plankton (microscopic life plant and animal-like creatures called protists) that have died and settled down to the bottom of the ocean.
5. Explain that over time, sediments are deposited on the ocean floor. Students should completely cover the plankton with sand. (You can gently push the sand around with your hands to simulate the pressure and weight the overlaying sediments have on the plankton.)
6. The ocean has water in it, so pour some of the vinegar/water (ocean mixture) into the container. Bubbles and foam begin to appear. You can see the bubbles bursting and can hear the gas being released to the air. Point out that this is a sign of a chemical change.



Discussion:
- Discuss with students that natural gas in the ocean is produced much in the same way as you have modeled, but that the process takes MANY years. In the ocean the plankton is buried under miles and miles of sediments which caused the weight of those sediments to "cook" the plankton under high temperature and pressure. The heat and pressure changes the plankton into oil and natural gas. Natural gas floats on top of the oil produced.
- Discuss how this model is different from real life. The gas produced in the experiment is carbon dioxide rather than natural gas, and since our container is open, the gas escapes into the air. In the ocean, there are usually impermeable layers that keep natural gas and oil trapped beneath the surface until we drill down and release it.

Energy for Electricity

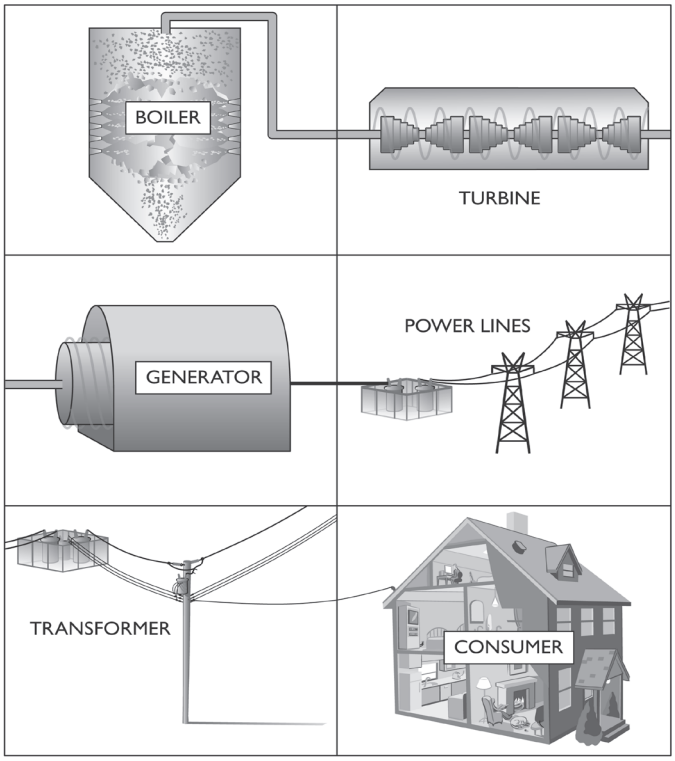
Objective:
Trace the flow of energy from a natural resource to electricity in our homes.

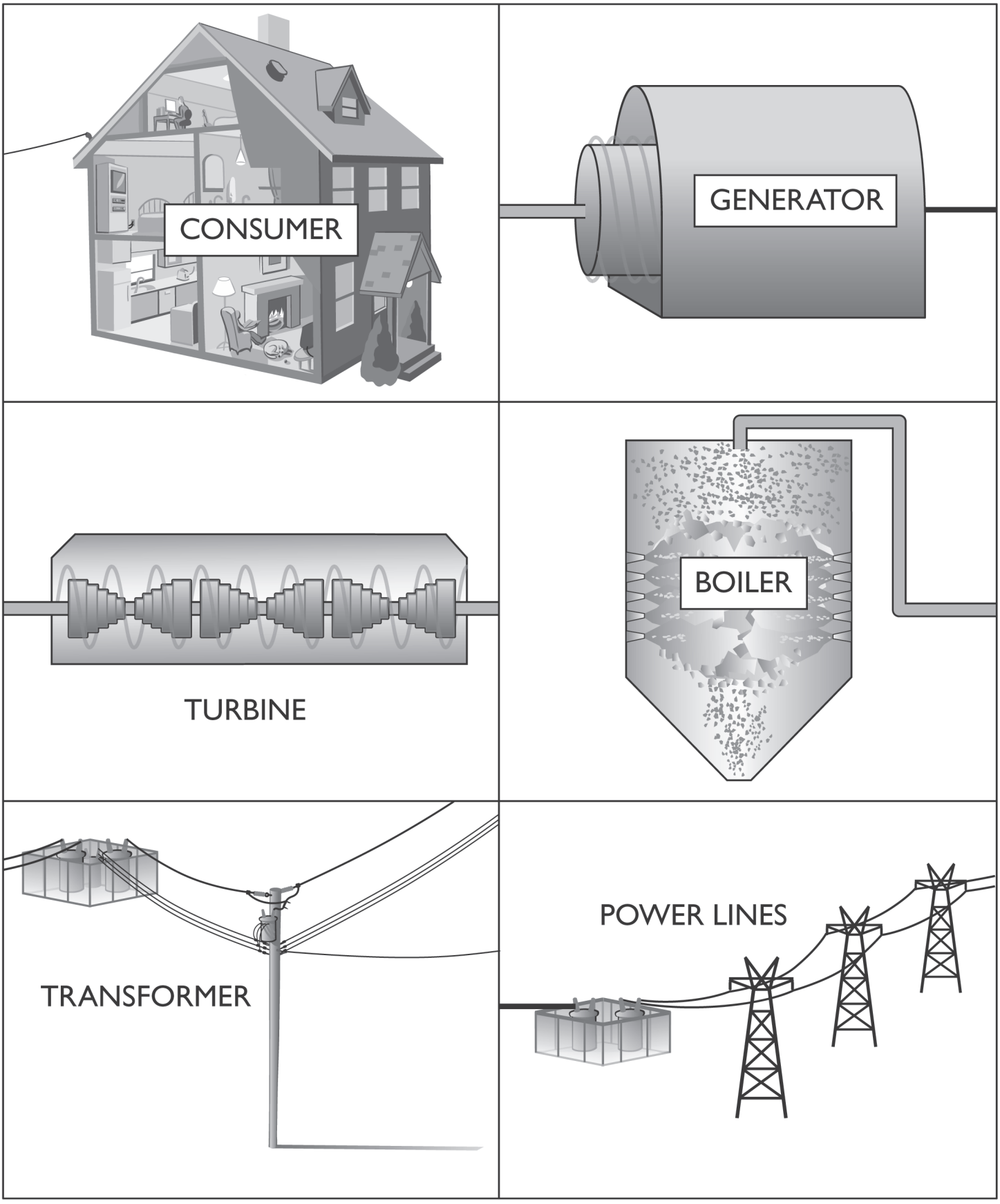
STEM Connection
Science
- Science as Inquiry
- Energy Sources, Forms and Transformations
- Science and Technology
- Personal and Social Perspectives

Technology
- Research Tools

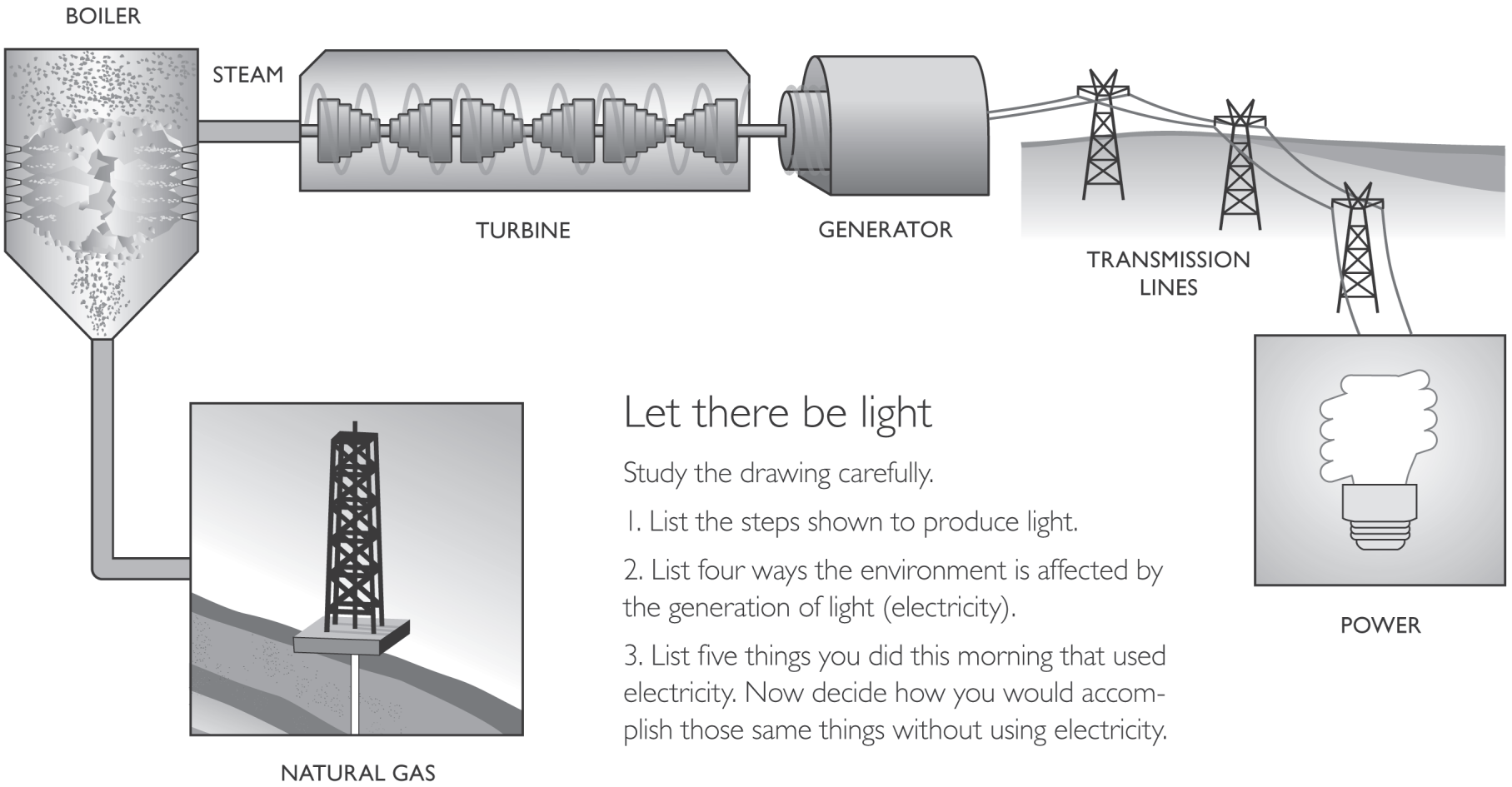
Procedure:
1. Ask students how their lives would be different without electricity. Where does electricity come from?
2. Pass out a copy of the "Electrical Generation Puzzle" found on the following page. Have students cut each part of the puzzle (transformer, turbine, generator, boiler, power lines and consumer) into separate pieces. Then, have them take a few minutes to put the puzzle pieces in order from the first to the last step of the process of electrical generation.
3. Go through each puzzle piece, explaining the process of each step:
   - Boiler – converts chemical energy from fuel (fossil fuels, biomass, hydrogen) to thermal energy, changing water to steam
   - Turbine – turned by steam, converting thermal energy to mechanical energy
   - Generator – turned by turbine, rotating coil of wire in a magnetic field, converts mechanical energy to electrical energy
   - Power lines – transmit electrical energy at several thousand volts
   - Transformer – step-up transformers along the power lines increase voltage periodically; step-down transformers on poles or in yards reduce the voltage to a safe level for use
   - Consumer – converts electrical energy into many forms to run lighting and appliances

Completed puzzle for teacher reference





Electrical Generation



Let there be light

Study the drawing carefully.

1. List the steps shown to produce light.

2. List four ways the environment is affected by the generation of light (electricity).

3. List five things you did this morning that used electricity. Now decide how you would accomplish those same things without using electricity.

Section Three:
Be ***watt***smart, Begin at home

Objective:
To apply the principles of energy efficiency at home by changing habits.

Vocabulary:
Shell: The floors, windows, doors, walls and roof of a building that form a barrier between the indoor and outdoor environment.

Convection: Heat transfer in a gas or liquid by currents that circulate from one region to another. Convection works because heated fluids or gases expand, and since they are less dense, rise through the cooler materials around them.

Conduction: Heat transfer in a solid or liquid without any motion or flow of matter in the material. Heat is transferred by the motion of molecules and electrons. Higher speed particles from the warmer areas collide with slower ones from the cooler areas, causing a transfer of energy to the slower particles.

Radiation: Heat transfer between objects via electromagnetic waves. Photons traveling at the speed of light transfer the heat energy, so the objects do not have to be in contact with each other for heat to be transferred. Radiation can travel through space.

Insulation: A barrier that minimizes the transfer of heat energy from one material to another by reducing the effects of conduction, convection and/or radiation.

Classroom activities:
- "Insulation Tests"
- "How Bright Is Your Light?"
- "Energy in Math"
- "Be wattsmart, Begin at home Poster"

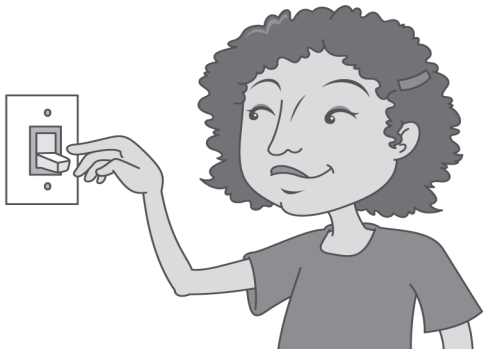
Energy Challenge

Discussion:
- What changes does your school need to make to be energy efficient?

Optional activity:
- Have students tour the school building to fill out the following checklist:

	Yes	No
1. Are outside doors weather stripped?	____	____
2. Are windows caulked to prevent air leaks?	____	____
3. Are lights turned off when no one needs them?	____	____
4. Is electrical equipment turned off when not in use?	____	____
5. Are faucets in bathrooms and kitchen areas free of leaks?	____	____

Discussion idea:
- In which of the five areas does your school need the most improvement? How could students assist in making a change?



Insulation Tests

Objective:
To demonstrate the different types of materials that can be used for insulation.

Materials:
- Thermometer
- Graduated cylinder or measuring cup
- Large jug of water
- Large board or tray
- Baby food jars with lids (one for each material being tested)
- Insulation materials to test: gloves, socks of different materials, other types of clothing, plastic foam, paper, aluminum foil, leaves, etc.

STEM Connection
Science
- Science as Inquiry
- Energy Sources, Forms and Transformations
- Science and Technology
- Personal and Social Perspectives

Technology
- Research Tools
- Problem-Solving and Decision Making Tools

Engineering
- Design and Modeling
- Invention and Innovation
- Test Design and Troubleshooting
- Use and Maintain

Math
- Numbers and Operations
- Measurement
- Data Analysis and Probability
- Connection to the Real World

Procedure:
1. On a piece of paper, list all of the materials being tested.
2. Using the jug of water, fill each jar with 120 mL (1/2 cup) of water.
3. Measure the temperature of the water in each jar to make sure they are the same, then put on the lids.
4. Wrap all but one of the jars with the materials being tested. Label the unwrapped jar "control".
5. Place each jar on the large board or tray.
6. Carry the board or tray outside and leave it there.
7. Create a data table to record the beginning and ending temperature of the water in each jar.
8. After a pre-determined amount of time has passed, measure the new temperature of each jar and record the ending temperatures in the data table.
9. Calculate the change in temperature for each jar and add it to the data table. Graph the temperature change for each jar in a bar graph.

Discussion:
- What materials made the best/worst insulators?
- Could you use these to keep your home warm in the winter or cool in the summer?
- What materials are used in homes for insulation? (fiberglass, blown-in insulation, polyurethane foam, etc.)
- What do good insulating materials have in common? How does insulation work? (They have large pore spaces that block conduction of heat through surfaces.)

Language arts connection:
Quick write – Based on the information in your data table, give recommendations for insulating a tree house.

How Bright Is Your Light?

Objective:
To demonstrate which lighting sources are the most energy efficient.

Materials:
- Various light bulbs (incandescent, CFL and LED)
- Lamp or light socket
- Thermometer

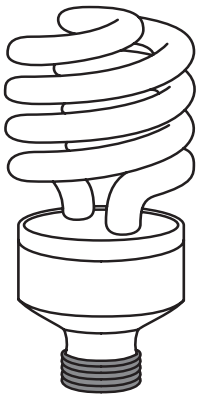
STEM Connection
Science
- Science as Inquiry
- Energy Sources, Forms and Transformations
- Science and Technology

Technology
- Research Tools

Engineering
- Historical Perspective

Math
- Numbers and Operations
- Data Analysis and Probability
- Connection to the Real World

Procedure:
1. Ask students what electrical item is used most often in any building and can also account for a lot of wasted energy (lights).
2. Put each light bulb in the lamp and leave it on for 5 minutes. Hold a thermometer at a distance from, not touching, the bulbs. Record the temperatures. Which bulb produces the most heat?



3. Not all light sources are created equal. Some are much more energy efficient than others. The least efficient light bulbs are incandescents. These bulbs were invented by Thomas Edison and have changed very little in the last 100 years. Incandescent bulbs get very hot when they are turned on because about 90 percent of the energy that goes into an incandescent bulb is given off as heat instead of light.

By contrast, the compact fluorescent light, or CFL, uses 75 percent less energy because it gives off less heat. A CFL can last up to 10 times longer. LED bulbs are even more efficient, using 75 – 85 percent less energy than traditional incandescent bulbs and can last 20 times longer.

Discussion:
- Does your family use energy-efficient CFLs or LEDs? How can heat from an incandescent bulb cause further energy waste during the summer?

Energy in Math

STEM Connection

Math

- Numbers and Operations
- Data Analysis and Probability
- Connection to the Real World

1. Jessie saved more energy than Michael. Michael saved more energy than Maggie. Maggie saved less energy than Jessie. Karen saved more energy than Jessie. List the kids' names in order of how much energy they saved, least to most:

   ☐ Jessie, Karen, Maggie, Michael
   ☐ Maggie, Michael, Jessie, Karen
   ☐ Michael, Jessie, Maggie, Karen
   ☐ Maggie, Karen, Michael, Jessie

2. The Maher family used 57,000 gallons of water a year, costing them $525 to heat it. Estimate how much money they would save in a year if they cut their hot water use by 30,820 gallons.

   ☐ $100
   ☐ $240
   ☐ $284
   ☐ $525

3. If each person in a house uses a 60-Watt bulb in their bedroom 4 hours a day, and there are three people living there, how many Watts will be used a day to light their room?

   ☐ 20 Watts
   ☐ 240 Watts
   ☐ 650 Watts
   ☐ 720 Watts

4. For every 10 degrees the water heater setting is turned down, you can save 6 percent of the energy used. If Charles turns his water heater down by 15 degrees, about what percent savings in energy will he save?

   ☐ 6%
   ☐ 9%
   ☐ 12%
   ☐ 15%

Energy in Math - Answer Key

1. Jessie saved more energy than Michael. Michael saved more energy than Maggie. Maggie saved less energy than Jessie. Karen saved more energy than Jessie. List the kids' names in order of how much energy they saved, least to most:

   ☐ Jessie, Karen, Maggie, Michael
   ■ Maggie, Michael, Jessie, Karen
   ☐ Michael, Jessie, Maggie, Karen
   ☐ Maggie, Karen, Michael, Jessie

2. The Maher family used 57,000 gallons of water a year, costing them $525 to heat it. Estimate how much money they would save in a year if they cut their hot water use by 30,820 gallons.

   ☐ $100
   ☐ $240
   ■ $284
   ☐ $525

3. If each person in a house uses a 60-Watt bulb in their bedroom 4 hours a day, and there are three people living there, how many Watts will be used a day to light their room?

   ☐ 20 Watts
   ☐ 240 Watts
   ☐ 650 Watts
   ■ 720 Watts

4. For every 10 degrees the water heater setting is turned down, you can save 6 percent of the energy used. If Charles turns his water heater down by 15 degrees, about what percent savings in energy will he save?

   ☐ 6%
   ■ 9%
   ☐ 12%
   ☐ 15%

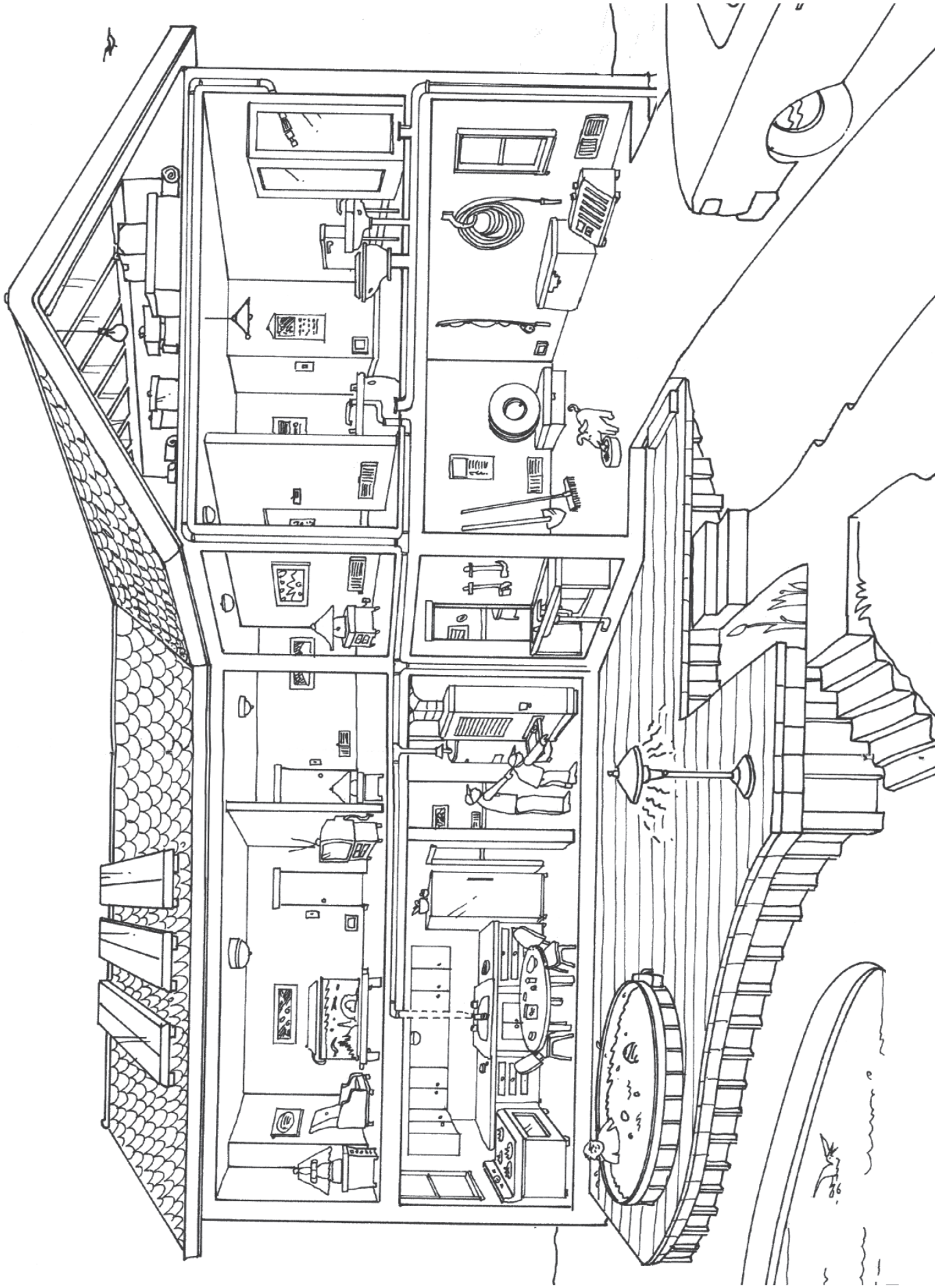
Be ***watt***smart, Begin at home Poster

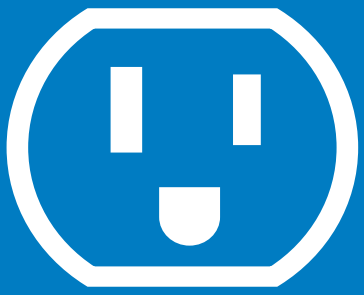
Materials:
- House poster found on the following page
- Colored markers or pens

Instructions:
- Add or color the items below. You may want to do different items each day as you cover different topics: electricity, natural gas, water, etc.
- Add a bicycle.
- Add some recycling bins in the garage.
- Add some trees to shade the house.
- Add a ceiling or floor fan to the home for cooling.
- Put a blue star (for ENERGY STAR® products) on the refrigerator, television and furnace.
- Color the energy-efficient shower head.
- Color all items that use electricity, yellow.
- Color the thermostat brown.
- Color the furnace filter that is being changed, orange.
- Draw a purple water drop next to all items in the house that use water.

Language Arts Connection:
Quick write – Write a brief description of the things your family has done to improve the energy efficiency of your home. Add items that you will encourage your family to do in the future.

Social Studies Connection:
- Choose one natural resource used for energy and create a T-chart or Venn diagram comparing the positive and negative effects of the use of this resource on the physical environment.
- The more efficient your home is, the smaller your carbon footprint. Your carbon footprint is the total amount of carbon dioxide (CO_2) and other greenhouse gases you generate annually. The lower your footprint, the better!





Be ***watt***smart

Begin at home

National Energy Foundation
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bewattsmart.com

PACIFIC POWER

Let's turn the answers on.

Lingo Card

L	I	N	G	O
Water Heater	Natural Gas	Natural Resource	Incandescent	Reduce
Reuse	Phantom Load	Oil	Coal	ENERGY STAR®
Renewable	Energy	Be ***watt***smart Begin at home	Turn It Off!	Uranium
Energy Efficiency	CFL	Recycle	68 Degrees	Embodied Energy
Cooking	78 Degrees	Solar	Thermostat	Electricity

http://print-bingo.com

L	I	N	G	O
Reuse	Natural Gas	Phantom Load	CFL	78 Degrees
Cooking	Electricity	Renewable	Recycle	68 Degrees
Natural Resource	Water Heater	Be ***watt***smart Begin at home	ENERGY STAR®	Nonrenewable
Embodied Energy	Coal	Energy Efficiency	Heating	Incandescent
Thermostat	Reduce	Oil	Solar	Uranium

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L	I	N	G	O
Coal	Natural Gas	Solar	Turn It Off!	Renewable
Water Heater	Nonrenewable	Phantom Load	Electricity	Reuse
Energy	Oil	Be ***watt***smart Begin at home	68 Degrees	Cooking
Thermostat	Incandescent	Recycle	Uranium	Natural Resource
Reduce	78 Degrees	Embodied Energy	CFL	Energy Efficiency

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L	I	N	G	O
Natural Resource	Water Heater	Natural Gas	Thermostat	78 Degrees
Turn It Off!	Reduce	Oil	Embodied Energy	Cooking
Phantom Load	ENERGY STAR®	Be ***watt***smart Begin at home	Uranium	Recycle
Energy	CFL	68 Degrees	Energy Efficiency	Heating
Electricity	Renewable	Incandescent	Reuse	Solar

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Be ***watt***smart, Begin at home				**Teacher Guide Activities**								
Essential Academic Learning Requirements		**Washington Grades 4 - 5 Correlations**	**Grades**	Energy Challenge - Embodied Energy	Conservation Cookie	Pass the Sack	Energy Ticket	The Search for Energy	Energy Challenge- Recycling	Where do Fossil Fuels Come From?	Energy for Electricity	Energy Challenge- Energy Efficient Changes
Science		**Topic**		p.3	p.4	p.5	p.6	p.8	p.9	p.10	p.11	p.14
EALR 1	**Systems (SYS)**	Complex Systems	4 5	SYS C	SYS C,D	SYS C,D		SYS C,D			SYS C,D	SYS C,D
EALR 2	**Inquiry (INQ)**	Investigations	4 5		INQ A-I	INQ A-I	INQ A-I	INQ A-I	INQ A-I	INQ A-I	INQ A-I	INQ A-I
EALR 3	**Application (APP)**	Different Technologies	4 5	APP A, APP G			APP A, APP G	APP A, APP G			APP A, APP G	APP A, APP G
EALR 4	**Physical (PS), Earth (ES), Life (LS)**	Energy, Earth History and Ecosystems	4 5	LS2 B			PS3 A			ES3 B	PS3 A	
Social Studies												
EALR 1	**Civics**	Rights and Responsibilities	4 5						1.4.1			
EALR 2	**Economics**	Needs and Wants	4	2.1.1	2.1.1	2.1.1		2.1.1				
Math												
Common Core	Operations and Algebraic Thinking, Number and Operations in Base Ten, Measurement and Data		4		4.OA.A.1, 4.MD.A.2			4.OA.A.1, 4.NBT.B.4-5, 4.MD.A.2				4.MD.A.2
			5		5.G.A.2		5.G.A.2	5.G.A.2				5.G.A.2
Language Arts												
Common Core	Informational Text, Speaking and Listening, Writing		4	SL.4.1	SL.4.1	SL.4.1	SL.4.1, W.4.3	SL.4.1	SL.4.1	SL.4.1	SL.4.1, W.4.3	SL.4.1
			5	SL.5.1	SL.5.1	SL.5.1	SL.5.1, W.4.3	SL.5.1	SL.5.1	SL.5.1	SL.5.1, W.4.3	SL.5.1

Be ***watt***smart, Begin at home				**Teacher Guide Activities**				**Student Activities**		**Posters**	
Essential Academic Learning Requirements		**Washington Grades 4 - 5 Correlations**	**Grades**	Insulation Tests	How Bright is Your Light?	Energy in Math	Be **watt**smart, Begin at home	Presentation Information	Student Booklet	Bright Ways to Save Energy Poster	Electrical Generation Poster
Science		**Topic**		p.15	p.16	p. 17	p. 19				
EALR 1	**Systems (SYS)**	Complex Systems	4 5	SYS C,D	SYS C,D		SYS C,D				
EALR 2	**Inquiry (INQ)**	Investigations	4 5	INQ A-I	INQ A-I		INQ A-I		INQ A-I	INQ A-I	INQ A-I
EALR 3	**Application (APP)**	Different Technologies	4 5	APP A, APP E-G	APP A, APP G	APP A, APP G	APP A, APP G	APP A, APP G	APP A, APP G	APP A, APP G	APP A, APP G
EALR 4	**Physical (PS), Earth (ES), Life (LS)**	Energy, Earth History and Ecosystems	4 5	PS3 A-C	PS3 A-C		PS3 A	PS3 A,E	PS3 A-C	PS3 A	PS3 A
Social Studies											
EALR 1	**Civics**	Rights and Responsibilities	4 5								
EALR 2	**Economics**	Needs and Wants	4					2.1.1	2.1.1	2.1.1	
Math											
Common Core	Operations and Algebraic Thinking, Number and Operations in Base Ten, Measurement and Data		4	4.OA.A.1, 4.MD.A.2	4.MD.A.2	4.OA.A.3, 4.NBT.B.4-5			4.NBT.B.5		
			5	5.G.A.2	5.G.A.2	5.NBT.B.5			5.NBT.B.5		
Language Arts											
Common Core	Informational Text, Speaking and Listening, Writing		4	SL.4.1, W.4.3	SL.4.1		W.4.3	RI.4.6	RI.4.6	RI.4.6	RI.4.6
			5	SL.5.1, W.4.3	SL.5.1		W.4.3	RI.5.6	RI.5.6	RI.5.6	RI.5.6

Be *watt*smart
Begin at home

Dear Parent(s):

Today your child participated in the **Be wattsmart, Begin at home** program sponsored by Pacific Power. In this engaging presentaion, your student learned key concepts of his or her science curriculum as well as important ways to be more efficient with energy use at home.

As part of the **Be wattsmart, Begin at home** program, your child received a:

- **Be wattsmart, Begin at home** booklet
- *Home Energy Worksheet*

Please take a moment to read through this informative booklet with your student. Then, fill out the *Home Energy Worksheet* and return it to your child's teacher. To thank you, Pacific Power will provide your student with a wattsmart nightlight.

We appreciate your efforts to reinforce important **Be wattsmart, Begin at home** energy knowledge and efficiency actions in your home!

PACIFIC POWER

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cultivating energy literacy

Program Evaluation

Teacher Name: _____

School: _____

Sponsor: Pacific Power

In an effort to improve our program, we would like your assessment of Be ***watt***smart, Begin at home. Please take a few minutes to fill out this evaluation form. Upon completion, please return the form in the postage-paid envelope along with the student *Home Energy Worksheets* you collected and the sponsor *Thanks a "Watt"! Card*.

Please mark the box that best describes your opinion.

	Strongly Agree	Agree	Disagree	Strongly Disagree
The materials were attractive and easy to use.	☐	☐	☐	☐
The materials and activities were well received by students.	☐	☐	☐	☐
The materials were clearly written and well organized.	☐	☐	☐	☐
Students indicated that their parents supported the program.	☐	☐	☐	☐
Presenters were able to keep students engaged and attentive.	☐	☐	☐	☐

If you had the opportunity would you conduct this program again? ☐ Yes ☐ No

Would you recommend this program to other colleagues? ☐ Yes ☐ No

In my opinion, the thing students liked best about the materials/program was:

One thing I would change would be:

WAT WA

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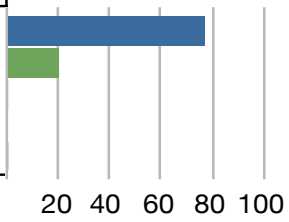
PACIFIC POWER
Let's turn the answers on.

***Watt*smart Pacific Power program**
Program Evaluation Summary Report

PACIFIC POWER
bewattsmart.com

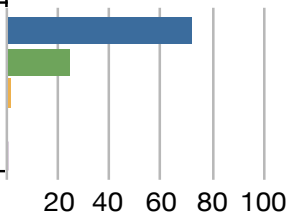
Materials were attractive and easy to use.

Response	Frequency	Percent
Strongly agree	75	77.3%
Agree	20	20.6%
Disagree	1	1.0%
Strongly disagree	0	0.0%
No response	1	1.0%



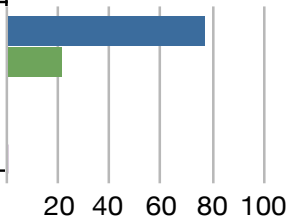
Materials and activities were well received by students.

Response	Frequency	Percent
Strongly agree	70	72.2%
Agree	24	24.7%
Disagree	2	2.1%
Strongly disagree	0	0.0%
No response	1	1.0%



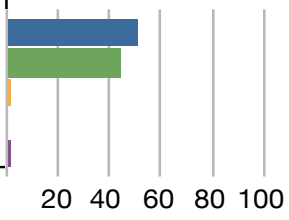
Materials were clearly written and well organized.

Response	Frequency	Percent
Strongly agree	75	77.3%
Agree	21	21.6%
Disagree	0	0.0%
Strongly disagree	0	0.0%
No response	1	1.0%



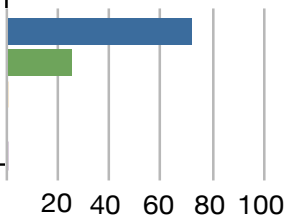
Students indicated that their parents supported the program.

Response	Frequency	Percent
Strongly agree	50	51.5%
Agree	43	44.3%
Disagree	2	2.1%
Strongly disagree	0	0.0%
No response	2	2.1%



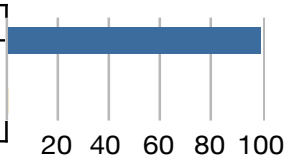
Presenters were able to keep students engaged and attentive.

Response	Frequency	Percent
Strongly agree	70	72.2%
Agree	25	25.8%
Disagree	1	1.0%
Strongly disagree	0	0.0%
No response	1	1.0%



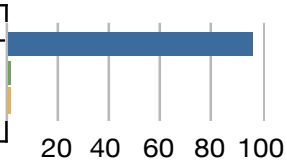
If you had the opportunity, would you conduct this program again?

Response	Frequency	Percent
Yes	96	99.0%
No	0	0.0%
No response	1	1.0%



Would you recommend this program to other colleagues?

Response	Frequency	Percent
Yes	93	95.9%
No	2	2.1%
No response	2	2.1%



In my opinion, the thing the students liked best about the materials/program was:

All the hands on material, It kept them very engaged.
Being able to interact.
Everything was appropriate for my students, very engaging.
Getting the children involved was fantastic!
Great job !
Hands on activities.
Hands on demonstrations. Lingo
Hands on/ interactive activities, bingo, closed/ open circuit circle using students.
I was connected to curriculum we are currently studying.
In my opinion, students enjoyed the demonstration, where they were up and showing how electrical current needs a closed circuit.
Interactive activities, acting out the circuit.
Interactive and engaging lesson. Night lights.
Interactive lesson on closed circuit the transfer of energy demonstration.
Interactive lesson on closed circuit. The light bulb nightlight. Lingo.
Interactive lingo and the human models using the students to help.
Interactive participation.
Learning about how electricity is conducted.
Learning about the different ways we get power to our school and homes.
Learning about the ways we get power to our school and homes.
Learning how they could save power.
Learning how they could save power.
Lingo
Lingo
Lingo
Lingo and the two demonstrations! Also, getting the night light.
lingo board
Lingo is a great little interactive piece.
Making connections to our electricity science unit.
Making the open/closed circuit with their class mates. They also enjoyed the videos.
Playing lingo and making the human circuit.
Playing lingo and making the human circuit.
Playing lingo and making the human circuit.
Playing lingo, learning about electricity, they love the nightlight.
Presenters were more animated this year!
Sorry I could not find my thank you card. Talking with my students they enjoyed the presentation. Thank you from my class. Mrs. Smith
Student engagement in presentation.
Student engagement in presentation.
Student engagement.
Student participation.
Students liked the hands on demonstrations and the lingo cards.
Students liked the interactive activities where they got to get up and help.
Students loved the brochure, night light and big posters.
Students loved the hands on activities with the instructors and the bingo game.
The "hands on" demonstrations.
The "human circuit."
The activities where students got to participate were their favorite.
The activities where they got to get up and be a part of the demonstration.
The activities! Plus how it related to our electric circuits unit we are teaching.
The activity!! The group activity of sharing electricity.
The bingo, but a prize would be great too for the winner.
The chance to try to get lingo made them listen carefully.
The circuit activity.
The circuit demonstration with the energy stick.
The closed circuit activity with holding hands and receiving the night lights after returning the surveys.
The demonstrations and nightlight.
The demonstrations and watching classmates participate or participating in them.
The demonstrations especially those who got to participate. Also, they enjoyed the Lingo cards.
The electricity chain with the lighted element.

In my opinion, the thing the students liked best about the materials/program was:

The energy bars. Students enjoyed watch the bar light up when the circuit was closed.
The engagement with lingo!
The hands on activities and some lingo.
The hands on experiments making the light go on when they completed the circuit.
The hands on/ interactive parts, such as making a circuit.
The hands-pn experiences.
The human circuit and lingo.
The instructors kept the student's engaged. All students were respectful and involved with the materials and presentation- very good job.
The interactive activity with the open/closed circuits when the light turned on. Students seemed to stay engaged with the Lingo game!
The interactive lingo cards and the students were engaged.
The interactive parts of the presentation.
The interactive parts where students were part of demonstrations.
The interactive portions because they are able to make the connections when they do it vs. just listening to it. The entire program is wonderful.
The lingo game and the human circuit.
The lingo game- receiving the night light!
The Lingo was engaging. The energy stick- wow!
The night light reward for the survey.
The night lights. The family interaction. The human circle making a complete circuit. The entire thing!!!
The open circuit/ closed circuit activity seemed to get the most conversation in the day. Second was the fine husband/wife combination to lead the class.
The physical activity with materials done by students, gift card, the bingo, clear and easy to follow power point.
The presentation and the night light.
The presentation manual or the different energy plants.
The presentation.
The student led demonstration.
The students always love when their peers get to help out during an activity- like the human circuit!
The students liked the demonstrations and the night light incentive the best.
The students liked the part of the program that showed a complete circuit. They also liked LINGO.
The students love the hands on activities.
The surprise element of having visitors helped keep students engaged.
They love how it connects to the science unit we just finished.
They loved being conductors with the light wand. I was very neat to see the energy flow through.
They loved the participation that the presentation allowed. The Lingo game, vocal participation and current flow activity were all very fun and engaging.
They really liked the presentations and loved looking at and discussing the items in the posters.
This gives our kids an opportunity to see how they can conserve electricity.

In the future, one thing I would change would be:

A presentation again in spring when we teach electric circuits. Thanks.
Adding more turn and talks and manipulatives.
Don't tell people to unplug desktop computers. The internal battery needs to get changed.
Don't tell people to unplug desktop computers. The internal battery needs to get changed.
Even more student involvement during the presentation!
Giving students some "turn and talk" time.
Great info, but very lengthy presentation for 4th graders.
Having the presentation later in the year after our Electric Circuits unit. We are happy to have it though!
I honestly would not change anything. The presenters and the lesson have been very engaging and the students remember the content when we act to our electrical circuits kit.
I would add more student movement.
I would bring the pencils for the students.
I would change the location or time, so that the lunch set up time doesn't conflict with the presentation.
I would have each class attend separately for a smaller group presentation.
I would like to conduct this presentation in smaller groups so that more students would have the opportunity to participate in the hands on activities we did 4 classes but I think next we should do two presentations for 2 classes each.
I would like to have the presentation in the spring time.
I would like to have the program available in spring too.
I'd change it so that there would be 3 or more energy sticks so that all the kids could link up if they wanted.
Incorporate a brain break activity in between the presentation. Standing up and jumping jacks.
Interactive activités that all students could engage in.
It works- keep it going!!
Length of presentation.
Make lightbulb stickers for the day of the presentation to reward SLINGO and start up the conversation with parents it advertises too...But really its perfect!
Making it more kid friendly presentation.
More activities?
More opportunity for student discussion.
Nothing! I was very interested in the presentation.
Perhaps presenters could talk louder or me mic'ed- students in the back had difficulty hearing.
Please bring a sample of lightbulbs that are efficient.
Print the Spanish version on the back of the English survey.
Provide an opportunity or two for students to discuss briefly with their neighbors what has been covered. These can be short 30 second to one minute breaks to allow the students a break and time to process.
Same of the vocabulary is way over their heads.
The presentation was slightly long and students started to get antsy.
The visual presentation didn't engage students a bit dry!
When the presenters showed the human conductor chain, I would have had 2 chains one on each side of the group, so that all kids could see better and stay engaged.

Teacher ID

Be *watt*smart
Begin at home

Home Energy Worksheet

Student First Name

Heating

1. Install and use a programmable thermostat.
   - ☐ Currently do ☐ Will do
   - ☐ Neither
2. Caulk windows and weather strip outside doors.
   - ☐ Have done ☐ Will do
   - ☐ Neither
3. Inspect attic insulation and add insulation if needed.
   - ☐ Have done ☐ Will do
   - ☐ Neither
4. Keep furnace air filters clean/replaced regularly.
   - ☐ Currently do ☐ Will do
   - ☐ Neither

Cooling

5. Replace existing air conditioning unit with a high-efficiency unit.
   - ☐ Have done ☐ Will do
   - ☐ Neither
6. Close blinds when windows are exposed to the sun.
   - ☐ Currently do ☐ Will do
   - ☐ Neither
7. Use a fan instead of air conditioning.
   - ☐ Currently do ☐ Will do
   - ☐ Neither
8. In the summer, set thermostat to 78 degrees F or higher.
   - ☐ Currently do ☐ Will do
   - ☐ Neither

Water heating

9. Set the water heater temperature to 120 degrees F.
   - ☐ Have done ☐ Will do
   - ☐ Neither
10. Install a high-efficiency showerhead.
    - ☐ Have done ☐ Will do
    - ☐ Neither
11. Take 5 minute showers.
    - ☐ Currently do ☐ Will do
    - ☐ Neither
12. Wash full loads in the dishwasher and clothes washer.
    - ☐ Currently do ☐ Will do
    - ☐ Neither

Lighting

13. Replace incandescent bulbs with CFL or LED bulbs.
    - ☐ Have done ☐ Will do
    - ☐ Neither
14. Turn lights off when not in use.
    - ☐ Currently do ☐ Will do
    - ☐ Neither

Refrigeration

15. Replace old, inefficient refrigerator with an ENERGY STAR® model.
    - ☐ Have done ☐ Will do
    - ☐ Neither
16. Unplug and/or recycle old freezers/refrigerators.
    - ☐ Have done ☐ Will do
    - ☐ Neither
17. Maintain refrigerator and freezer coils and check door seals twice yearly.
    - ☐ Currently do ☐ Will do
    - ☐ Neither

Electronics

18. Turn off computers and game consoles when not in use.
    - ☐ Currently do ☐ Will do
    - ☐ Neither

Cooking

19. Use a microwave oven, toaster oven or crock pot instead of a conventional oven.
    - ☐ Currently do ☐ Will do
    - ☐ Neither

Get paid for being *watt*smart

20. Visit Pacific Power at *bewattsmart.com* for more energy-saving tips and rebates.
    - ☐ Have done ☐ Will do
    - ☐ Neither

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Let's turn the answers on.

Ser ***watt***smart
Empieza en casa

Profesor(a) Nombre _____

Hoja de Trabajo de Energía en el Hogar

Del Estudiante _____

Calefacción

1. Instalar y usar un termostato programable.
   ☐ Lo hago ☐ Lo haré ☐ Ninguno
2. Calafatear ventanas e instalar burletes en el exterior de puertas.
   ☐ Lo he hecho ☐ Lo haré ☐ Ninguno
3. Inspeccionar el aislamiento del ático y agregar aislamiento si es necesario.
   ☐ Lo he hecho ☐ Lo haré ☐ Ninguno
4. Mantener los filtros de aire de la calefacción limpios/ reemplezados regularmente.
   ☐ Lo hago ☐ Lo haré ☐ Ninguno

Enfriamiento

5. Reemplazar la unidad de aire acondicionado existente por una unidad de alta eficiencia.
   ☐ Lo he hecho ☐ Lo haré ☐ Ninguno
6. Cerrar las persianas cuando las ventanas están expuestas al sol.
   ☐ Lo hago ☐ Lo haré ☐ Ninguno
7. Usar un ventilador en lugar del aire acondicionado.
   ☐ Lo hago ☐ Lo haré ☐ Ninguno
8. En el verano, ajustar el termostato a 78 grados o más.
   ☐ Lo hago ☐ Lo haré ☐ Ninguno

Calentadores de agua

9. Programar el calentador de agua a 120 grados F.
   ☐ Lo he hecho ☐ Lo haré ☐ Ninguno
10. Instalar una cabezal de ducha de alta eficiencia.
    ☐ Lo he hecho ☐ Lo haré ☐ Ninguno
11. Tomar duchas de 5 minutos.
    ☐ Lo hago ☐ Lo haré ☐ Ninguno
12. Lavar cargas llenas en los lavaplatos y las lavadoras de ropa.
    ☐ Lo hago ☐ Lo haré ☐ Ninguno

Iluminación

13. Reemplazar los focos incandescentes con focos CFL o LED.
    ☐ Lo he hecho ☐ Lo haré ☐ Ninguno
14. Apagar las luces cuando no estén en uso.
    ☐ Lo hago ☐ Lo haré ☐ Ninguno

Refrigerador

15. Reemplazar refrigerador antiguo e ineficiente con un modelo de ENERGY STAR®.
    ☐ Lo he hecho ☐ Lo haré ☐ Ninguno
16. Desenchufar y/o reciclar congeladores/refrigeradores antiguos.
    ☐ Lo he hecho ☐ Lo haré ☐ Ninguno
17. Mantener las bobinas del refrigerador y del congelador y chequear el sello de las puertas dos veces al año.
    ☐ Lo hago ☐ Lo haré ☐ Ninguno

Aparatos Electrónicos

18. Apagar computadoras y consolas de juegos cuando no estén en uso.
    ☐ Lo hago ☐ Lo haré ☐ Ninguno

Cocinar

19. Usar horno microonda, horno eléctrico u olla de cocimiento lento en lugar del horno convencional.
    ☐ Lo hago ☐ Lo haré ☐ Ninguno

Reciba paga siendo *watt*smart

20. Visite Pacific Power en bewattsmart.com para obtener más consejos y rebajas de ahorro de energía.
    ☐ Lo he hecho ☐ Lo haré ☐ Ninguno

National Energy Foundation
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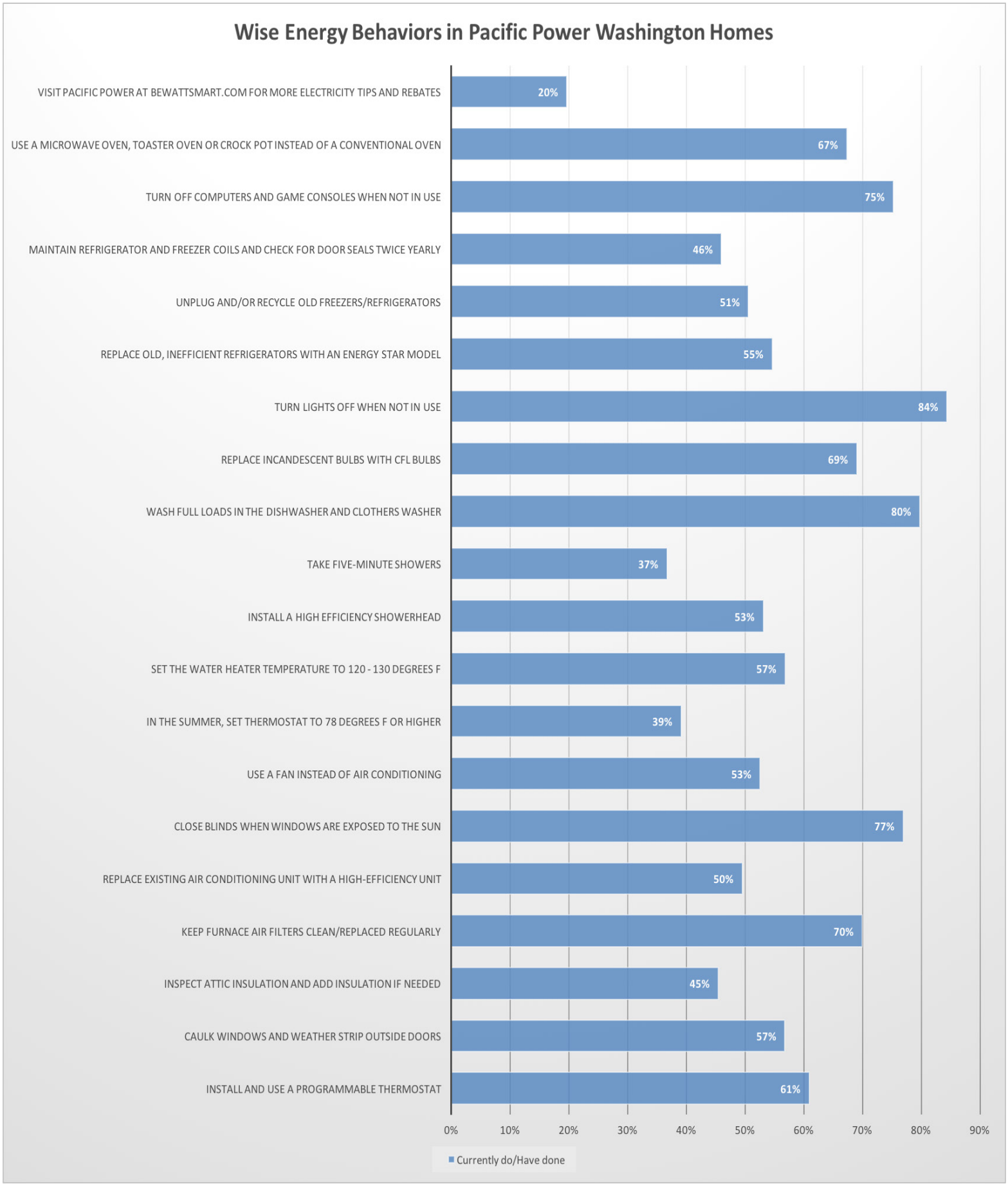
PACIFIC POWER
Hagamos brillar las soluciones.

Wise Energy Behaviors in Pacific Power Washington Homes

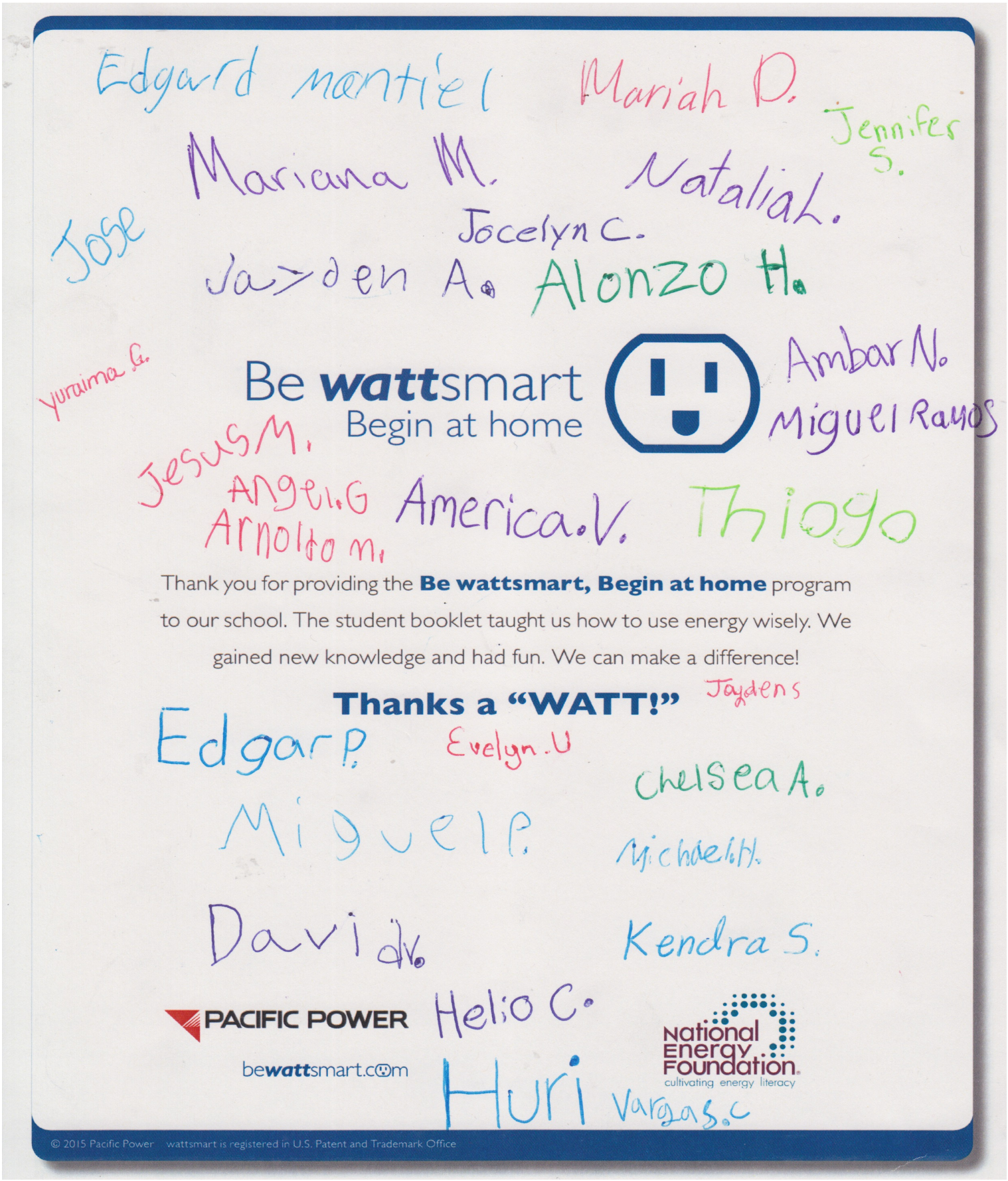


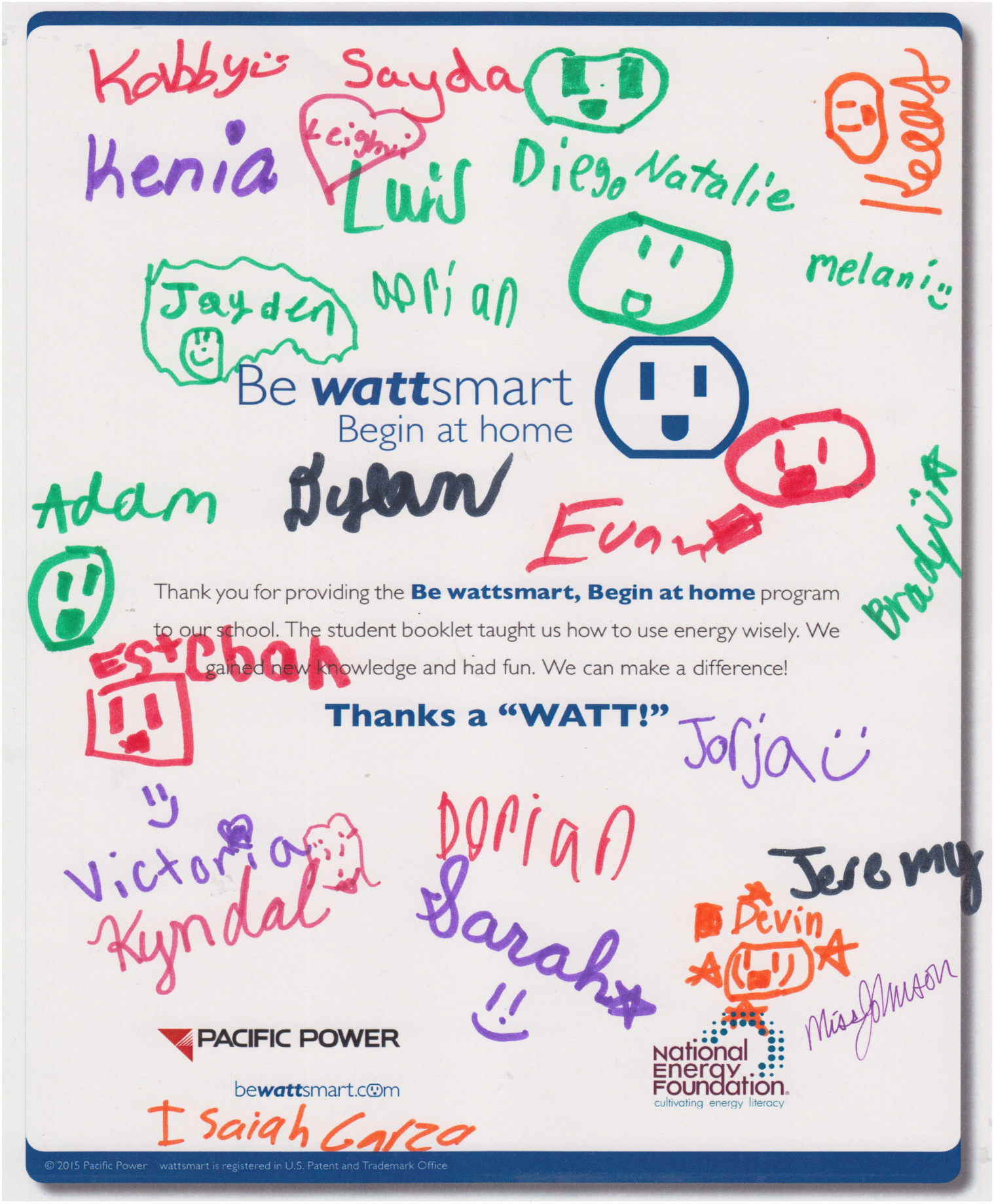
Home Energy Worksheet Summary – Pacific Power

WattSmart Education Program
Home Energy Worksheet Summary - Pacific Power

Energy Efficient Activity	Currently do /Have done	Will do	Neither
Install and use a programmable thermostat	61%	16%	23%
Caulk windows and weather strip outside doors	57%	25%	18%
Inspect attic insulation and add insulation if needed	45%	22%	32%
Keep furnace air filters clean/replaced regularly	70%	16%	14%
Replace existing air conditioning unit with a high-efficiency unit	50%	22%	29%
Close blinds when windows are exposed to the sun	77%	11%	12%
Use a fan instead of air conditioning	53%	19%	29%
In the summer, set thermostat to 78 degrees F or higher	39%	24%	37%
Set the water heater temperature to 120 - 130 degrees F	57%	21%	22%
Install a high efficiency showerhead	53%	23%	24%
Take five-minute showers	37%	30%	34%
Wash full loads in the dishwasher and clothers washer	80%	9%	11%
Replace incandescent bulbs with CFL bulbs	69%	21%	10%
Turn lights off when not in use	84%	12%	4%
Replace old, inefficient refrigerators with an ENERGY STAR model	55%	22%	23%
Unplug and/or recycle old freezers/refrigerators	51%	21%	29%
Maintain refrigerator and freezer coils and check for door seals twice yearly	46%	37%	17%
Turn off computers and game consoles when not in use	75%	17%	8%
Use a microwave oven, toaster oven or crock pot instead of a conventional oven	67%	16%	16%
Visit Pacific Power at bewattsmart.com for more electricity tips and rebates	20%	63%	17%

Sampling of *Thanks a "WATT" Cards*




Kobby
Sayda
Kenia
Luis
Diego
Natalie
Jayden
Dorian
melani
Be wattsmart
Begin at home
Adam
Dylan
Evan
Thank you for providing the Be wattsmart, Begin at home program to our school. The student booklet taught us how to use energy wisely. We gained new knowledge and had fun. We can make a difference!
Thanks a "WATT!"
Jorja
Victoria
Kyndal
Dorian
Sarah
Jeremy
Devin
PACIFIC POWER
bewattsmart.com
National Energy Foundation
cultivating energy literacy
Isaiah Garza
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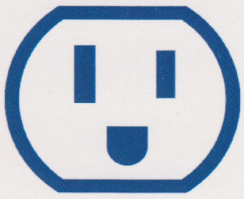
Dear Pacific Power,

Thanks a watt! Our class learned a lot about energy consumption and how to save energy!

Sincerely,
Krueger

Be **watt**smart
Begin at home



Thank you for providing the **Be wattsmart, Begin at home** program to our school. The student booklet taught us how to use energy wisely. We gained new knowledge and had fun. We can make a difference!

Thanks a "WATT!"

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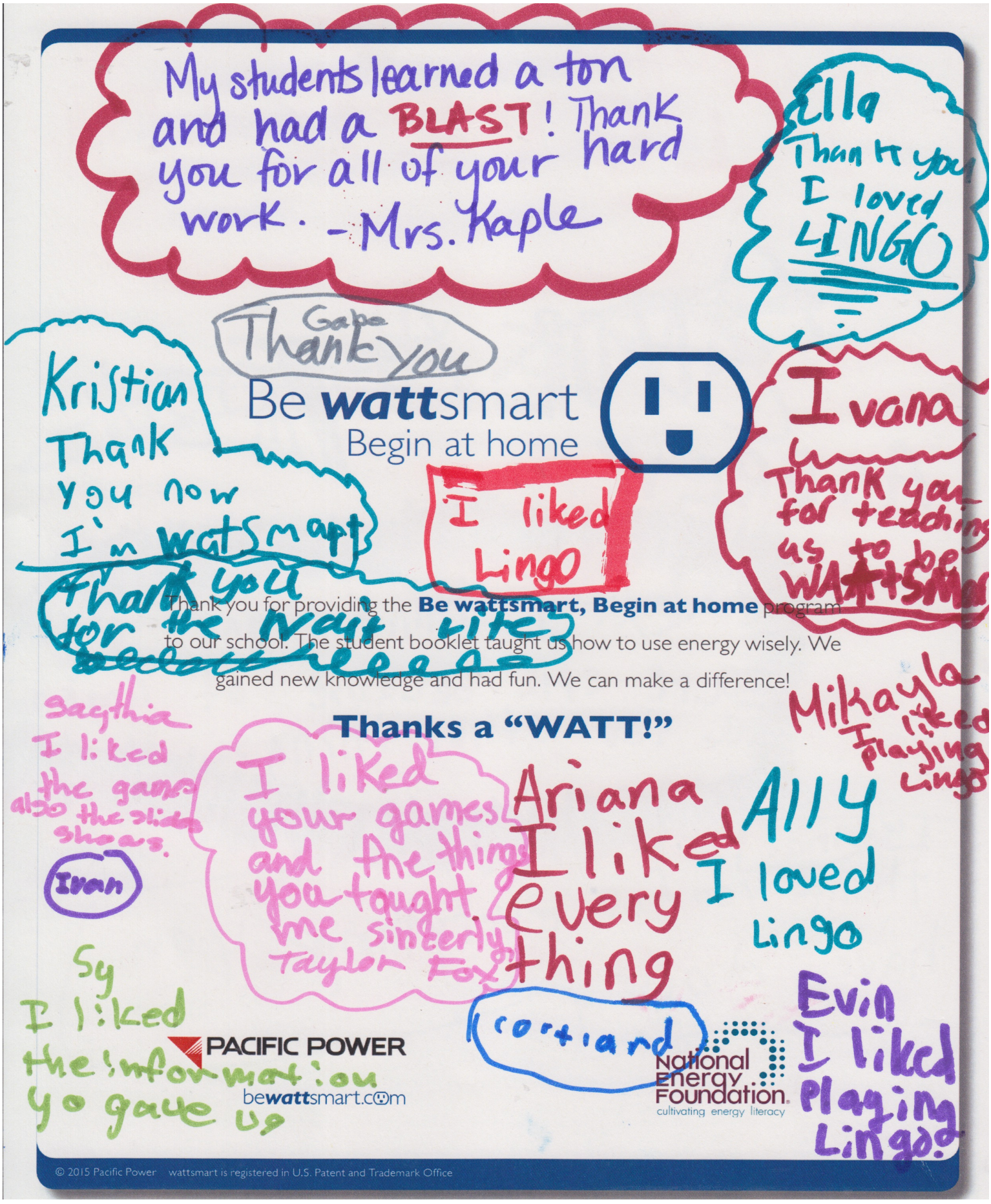
My students learned a ton and had a BLAST! Thank you for all of your hard work. -Mrs. Kaple
Ella
Thank you I loved LINGO
Gabe
Thank you
Be wattsmart
Begin at home
Kristian
Thank you now I'm wattsmart
I liked Lingo
Ivana
Thank you for teaching us to be WATTSMART
Thank you for the wattsmart tips
Thank you for providing the Be wattsmart, Begin at home program to our school. The student booklet taught us how to use energy wisely. We gained new knowledge and had fun. We can make a difference!
Thanks a "WATT!"
Sagthia
I liked the games also the slide shows.
Ivan
I liked your games and the things you taught me sincerly Taylor Fox
Ariana
I liked every thing
Ally
I loved Lingo
Mikayla
I liked playing Lingo
Sy
I liked the information you gave us
cortland
Evin
I liked Playing Lingo!
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