



5/9/2022

PACIFICORP’S COMMUNICATIONS, OUTREACH AND EDUCATION

WYOMING Program Year 2021 Activities

The Company uses earned media, customer communications, paid media, and program-specific media to communicate the value of energy efficiency and provide information regarding low-cost, no-cost energy efficiency measures. The Company endeavors to educate customers on the availability of technical assistance, services, and incentives with the overall goal of engaging customers in reducing their energy usage. The Company calls this multi-faceted campaign “Wattsmart” and shares a common theme: Rocky Mountain Power offers choices to help you save money and energy.

CUSTOMER COMMUNICATIONS

As part of the Company’s regular communications to its customers, newsletters are delivered to residential customers to promote energy efficiency tips, programs, and initiatives. Bill inserts and outer envelopes that feature energy efficiency messages are consistently used. The Company also uses its website and social media, such as Twitter and Facebook, to communicate and engage customers on energy efficiency offers and incentives.

Communication Source and Frequency

Table 1
Communication Source and Frequency

| Advertising Channel | Timing/Frequency | Spots/Impressions |
|--|------------------|---------------------------------------|
| TV | April - November | 480 spots |
| Radio | April - November | 780 spots |
| Digital display | April - November | 1,515,723 impressions 1,720 clicks |
| Pre-roll video | April - November | 596,783 impressions 2,855 clicks |
| Over-the-top ads on streaming services (OTT) | April - November | 146,977 impressions 138,377 clicks |
| Paid social ads | April - November | 858,006 impressions 4,071 clicks |



| Advertising Channel | Timing/Frequency | Spots/Impressions |
|---|---|-------------------|
| Newspaper ads | 4 times | 131,511 |
| Search engine marketing | April - November | 11,742 |
| Total paid advertising impressions | | 3,262,042 |
| Other Communications | Frequency of Message | |
| Twitter | Weekly tweets | |
| Facebook | Information and tips posted 3-4 times per month. Promoted posts and mobile ads are also used where appropriate. | |
| Connect residential newsletter | Newsletters are sent in customers' bills 2-3 times per year with energy efficiency information. | |
| Web: rockymountainpower.net/wattsmart and promotional URL Wattsmart.com link directly to the energy efficiency landing page. Once there, customers can self-select their state for specific programs and incentives. | | |

Wattsmart Campaign

In 2021, the Company introduced a new Wattsmart advertising campaign to inform and educate customers about the benefits energy efficiency. The campaign encourages customers to take meaningful actions to reduce energy use and lower their bills. The overall paid media plan objective is to effectively reach our customers through a multi-media mix that extends both reach and frequency. Tapping into all resources with consistent messaging has been the Company's approach and will continue to be refined.

Key strategies include:

Key strategies include:

- Execute an advertising campaign that features Wattsmart energy efficiency messaging and encourages customers to take meaningful actions to reduce energy use and lower bills.
- Educate customers on how Wattsmart rebates and cost-saving tools can help them turn a to-do item into a job well done.
- Promote low-cost actions to reduce energy use along with cash rebates for taking bigger steps to improve energy efficiency.

To reach residential customers, the Company used TV, radio, print, social and digital media. Advertising for business customers included radio, social and digital media.

PROGRAM-SPECIFIC COMMUNICATIONS

All energy efficiency program marketing and communications are under the Wattsmart umbrella to ensure a seamless transition from changing customer behavior to the actions they could take by participating in specific programs. Separate marketing activities administered by and specific to the programs ran in conjunction with the Wattsmart campaign.

Wattsmart Homes Program

Information on the Wattsmart Homes program is communicated to customers, retailers, and trade allies through a variety of channels, including newsletters, emails, direct mail, website and social media.

The program communications team supported the following initiatives in 2021:

1. Cooling campaign promoting rebates for target cooling measures such as ductless heat pumps and evaporative coolers.
2. Heating campaign promoting rebates for target heating measures such as dual fuel heat pumps, ductless heat pumps and supplemental ductless heat pumps.
3. Engine block heater controllers
4. Weather triggered emails
5. Smart thermostat instant rebates during the holidays and other calendar events.

Cooling and Heating Campaigns

In 2021, the heating and cooling campaigns utilized past customer participation, modeling, and mosaic data, to put in motion a highly targeted email and direct mail campaign promoting ductless heat pumps and evaporative coolers (cooling) and dual fuel heat pumps (heating). Messaging highlighted the energy and cost-saving benefits of the equipment and sent customers to content-rich landing pages for more information regarding rebate amounts and requirements.

Engine Block Heater Controllers

Engine block heater controllers were a new Wattsmart Homes program measure in 2021 which offered an exciting opportunity to reach audience segments who might not normally participate in energy-efficient programs. Specific Mosaic customer segments within Wyoming were identified and approximately 20,000 customers were reached through social and digital advertising as well as email driving them to a Wattsmart Homes landing page where they can learn more about engine block heater controllers and how to purchase with the use of an instant rebate coupon.

In addition to the segmentation analysis, advertising was also finely targeted to customers who own diesel trucks or have similarly aligned interests, jobs, or demographic associated with diesel trucks. The email campaign resulted in an average 23% open rate and Wyoming residents contributed to 2.3% of clicks through paid social ads.

Weather Event-Triggered Emails

In 2020, the Wattsmart Homes Program implemented a weather event-triggered email campaign promoting key priority measures during instances of extreme heatwaves or winter storms. Due to the campaign's success, the Program continued this campaign into 2021 with three deployments in Wyoming: February, July and December promoting ductless heat pumps, supplemental ductless heat pumps and dual fuel heat pumps. The email campaigns continued to see high open rates with an average 33% and 2,391 clicks to the measure-specific landing pages. Monitoring of inclement weather allows us to time measure messages with days or weeks that customers are most inclined to take advantage of an offer. This tactic will continue to be refined in 2022 and beyond.

Smart Thermostat Instant Rebate Promotions

Over a few specific holidays and Earth Day, the program team encouraged customers to purchase a new smart thermostat to take advantage of Wattsmart incentives and manufacturer discounts. With each promotion, past participation data was layered with customer mosaics to pinpoint the right customers with the highest propensity to purchase a smart thermostat. These are eligible customers who had not received an incentive or redeemed a Wattsmart instant rebate for a smart thermostat. The smart thermostat email campaigns collectively saw an average open rate of 29% and totaled over 8,848 clicks to the online instant coupon portal.

Table 3

Wattsmart Homes Communications

| Communications Channel | Impressions |
|-------------------------------|--------------------|
| Direct mail | 4,000 |
| Paid Social | 380,494 |
| Emails | 215,766 |

Home Energy Reports

Thousands of Home and Business Energy Reports were delivered to Wyoming customers in 2021.

Customer satisfaction and engagement with the Bidgely program demonstrated positive results. Residential email open rates averaged 27%, and email recipients also gave the email communications they received 81% “likes” via thumbs up and thumbs down voting buttons in the message. Business email open rates averaged 21%, and business customers gave the emails 63% “likes” through voting buttons.

Wattsmart Business Program

During 2021, communications reminded customers to inquire about incentives for LED lighting, HVAC, irrigation, and other energy efficiency measures. Radio, digital display and social media ads directed viewers to the Company’s website.¹ This was in addition to customer direct contact by Company project managers and regional business managers, trade ally partners, and content on the Company website and on Facebook.

Direct mail was also used in the spring to target irrigation customers and encourage energy-saving retrofits.

The program’s breakdown of impressions by media type is shown in Table 4.

Table 4
Impressions by Channel

| Communications Channel | 2021 impressions |
|-------------------------------|-------------------------|
| Digital Display | 3,617,122 |
| Social | 1,189,006 |
| Direct Mail | 537 |

Quarterly, the Company files its education and promotional materials used during that timeframe. To review all Company materials, see Docket No. 20000-264-EA-06.

¹ Wattsmart.com

2021

NEF

Be Wattsmart,
Begin at home
WYOMING

Program Report



Prepared for:

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Program Director

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March 10, 2022

Savings

Submit online at thinkenergy.org/WatSmart

Teacher ID:

Teacher Name:

Student First Name:

Home Energy Worksheet

Heating

1. Install and use a programmable or smart thermostat.
 Currently do Will do
 Neither

2. Check 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 or an evaporative cooling unit.
 Have done Will do
 Neither

6. Check 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. Participate in Rocky Mountain Power's Cool Keeper program.
 Currently do Will do
 Neither

Water heating

9. Set the water heater temperature to 120°F.
 Have done Will do
 Neither

10. Install a high-efficiency shower head.
 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 inefficient bulbs with 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 old freezers/refrigerators and/or dispose of them in an environmentally safe manner.
 Have done Will do
 Neither

17. Maintain refrigerator and freezer coils and check door seals regularly.
 Currently do Will do
 Neither

Electronics




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

Cooking

19. Use a microwave oven, toaster oven, slow cooker or outdoor grill instead of a conventional oven.
 Currently do Will do
 Neither

Get paid for being WatSmart

20. Visit Rocky Mountain Power at WatSmart.com for more energy saving tips and rebates.
 Have done Will do
 Neither

Home Energy Worksheets

– Returned: 539 –

– 54% –

- Online - 20.96%

- Paper - 79.04%

Participants



Students

– 1,203 –



Teachers

– 57 –



Schools

– 20 –

Table of Contents

| | |
|---|----------|
| Program Overview | 1 |
| Program Description | 1 |
| Building Collaborations | 1 |
| Program Registration | 2 |
| Program Implementation | 2 |
| Program Materials | 3 |
| Program Website | 4 |
| Program Accomplishments | 4 |
| | |
| Attachments | 5 |
| Fall 2021 Participating Schools | 5 |
| Program Promotions | 6 |
| Program Documents | 7 |
| <i>Teacher Evaluation</i> Compilation | 54 |
| <i>Home Energy Worksheet</i> (English) | 60 |
| <i>Home Energy Worksheet</i> (Spanish) | 61 |
| <i>Home Energy Worksheet</i> Summary – Rocky Mountain Power | 62 |
| Wise Energy Behaviors in Rocky Mountain Power Wyoming Homes | 65 |
| Sampling of <i>Thanks a “WATT” Cards</i> | 66 |

Program Overview

Program Description

“This is an engaging program that gets kids talking to parents about ways to conserve.”

“It’s easy to book, engaging for kids, and a nice supplement to reinforce some of our standards.”

“This is a very beneficial program that is engaging for students. They learn about ways to conserve natural resources.”

“This program is well developed and the students learn a lot.”

“It is worth giving up valuable classroom time for the educational and engaging program they offer.”

-2021 Wyoming Teacher Participants

The Be Wattsmart, Begin at home program is a collaborative partnership between Rocky Mountain Power and the National Energy Foundation (NEF). It encourages teachers, students and families to “Be Wattsmart” with their energy use. The program objective is to build energy awareness, throughout the school year, with an engaging presentation and energy efficiency curriculum. The program also expands enthusiasm to homes via Rocky Mountain Power branded curriculum, games and online resources.



Building Collaborations

“Thank you! Content just right for 4th graders.”

“The students enjoy this presentation every year. I am SO appreciative of the gift card!”

“I would tell other 4th grade teachers that this goes well with 4th Grade curriculum and standards.”

-2021 Wyoming Teacher Participants



The Be Wattsmart, Begin at home program provided energy efficiency content that was custom developed to support the Wyoming State Office of Education’s Core Curriculum for fourth grade. Teachers appreciated the collaborative efforts to align program components to their learning standards. Curriculum correlations were provided to teacher participants in the *Teacher Guide* delivered to each teacher prior to their presentation.

NEF utilized multiple strategies to support teacher and parent participants:

- Dedicated educational service representative
- *Parent Introduction Letter*
- Spanish documents – *Home Energy Worksheet* and *Parent Introduction Letter*
- Online and hard copy *Home Energy Worksheets*
- Changed title of the student guide to family guide to support the efforts of including families in the take home information.
- Amazon eGift Cards for teachers with a qualifying *Home Energy Worksheet* return

- “Tips and Tricks” teacher training
- Automated emails to communicate program details, including submission of the *Home Energy Worksheets* and progress toward the gift card
- Online virtual presentations and live presentations to support a variety of learning situations during the pandemic



CONTACT US:



Sarah Richards
 Educational Service Rep.
 800.616.8326 ext. 159
 sarah@nef1.org



Program Registration

NEF developed a postcard to promote the Be Wattsmart, Begin at home program to eligible new teachers and schools. Emails were also used to contact prior participating teachers.

Teachers were given three ways to enroll: calling or emailing the educational service representative, Sarah Richards or completing the registration online on the program website thinkenergy.org/wattsmart-wy/. After the registration was qualified, a series of email communications with teachers, were sent automatically by the program registration system.



Program Implementation

“It is absolutely worth it and the discussions are very engaging. The kids really enjoy it.”

“Thank you for your enthusiasm when you were here!”

“The program has great information and fun activities for the students.”

“Thank you so much for providing us with this opportunity to support students learning.”

-2021 Wyoming Teacher Participants

Implementation was quickly adapted to provide flexibility for different learning environments made necessary by COVID-19. NEF developed a “Presentation Toolbox” of options to help teachers provide the program to their students. Teachers were able to select from a prerecorded presentation which included a Kahoot! review game to measure students’ attainment of knowledge from the presentation. Prerecorded presentations were designed as a teacher directed program when Energy Educators were not given permission to visit a school due to the pandemic.

In-person presentations were conducted with either one or two Energy Educators depending upon the schools’ pandemic protocols. NEF required all Energy Educators to be fully vaccinated, wear an N95 mask and take their temperature each morning to protect students and teachers.





Both presentations focused on important concepts, such as natural resources, electrical generation, the energy mix used by Rocky Mountain Power to generate electricity and tips for energy efficiency in the home. Energy Educators completed demonstrations of making a human electrical circuit, during which they taught key core curriculum concepts such as insulators and conductors of electricity and electrical generation. In-person assemblies included the review game, “Lingo” at designated points throughout the presentation.

To help students remember energy efficiency tips, students viewed “Caitlynn Power” video vignettes produced by PacifiCorp. The videos are a highlight for both teachers and

students. In addition, the Caitlynn Power videos were added to the program website where teachers could access them for further energy instruction and where students could access them to share with their families.

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



Program Materials

“I love the electrical generation poster to talk about alternative resources, I also will be looking at doing some of these hands on activities. I love how they are laid out and will help provide other activities.”

“We are using the posters to connect with the NGSS standards on Natural Resources.”

“Students think the lingo game is fun.”

-2021 Wyoming Teacher Participants

A *Parent Letter* was provided to explain the importance of Be Wattsmart, Begin at home. In addition, students were given a *Family Guide* and *Home Energy Worksheet* to share with their families. Students who returned their worksheet or completed a worksheet online, received an LED nightlight featuring the Rocky Mountain Power logo as a reward.

Educators were also given helpful energy educational materials. Each teacher participant was provided a custom Be Wattsmart, Begin at home folder. The folder contained a custom *Teacher Guide* with additional information and activities to supplement and continue energy education in the classroom. Also, in the folder were two NEF instructional posters.

A program *Implementation Steps Flier* assisted teachers in carrying out the program for students learning both at school and online. It also gave simple steps for successfully returning *Home Energy Worksheets* and the sponsor *Thanks a “Watt” Card* in the postage paid envelope. A *Rewarding Results Flier* gave information concerning the gift card teacher participants would receive for returning their student surveys. Educators received a \$50 gift card for an 80% return by the December 31, 2021 deadline.

Program Website

The Be Wattsmart, Begin at home program website, thinkenergy.org/wattsmart-wyl, served multiple purposes for participating teachers, students and families:

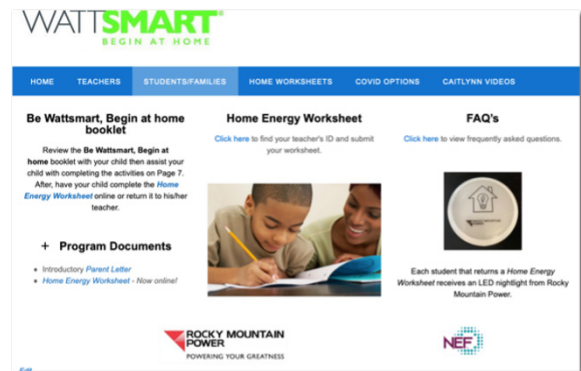
Teachers

- Program registration
- Dedicated educational service representative contact information
- Access to program presentations and documents
- Game and education page
- Links to additional resources



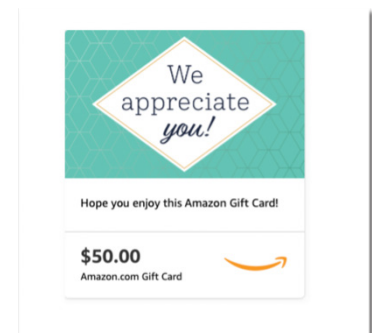
Students and Families

- Access to Caitlynn Power videos
- Access to the online *Home Energy Worksheets*
- Energy efficiency games
- Frequently asked questions about the program
- Parent program documents posted



Program Accomplishments

- 1,203 students and families reached
- 57 Wyoming teachers reached
- 20 Wyoming schools participated
- 31 Wyoming teachers returned packets
- 24 \$50 eGift cards delivered
- 7 \$25 eGift cards delivered



Attachments

Fall 2021 Participating Schools

| School Name | School Address | City | State | Zip |
|----------------------------|---------------------------|--------------|-------|-------|
| Paradise Valley Elementary | 22 Magnolia | Casper | WY | 82604 |
| Fort Casper Academy | 4100 West 38th Street | Casper | WY | 82604 |
| Crest Hill Elementary | 4445 South Poplar Street | Casper | WY | 82601 |
| Bar Nunn Elementary | 2050 Siebke Drive | Bar Nunn | WY | 82601 |
| Manor Heights | 3201 East 15th Street | Casper | WY | 82609 |
| Lincoln Elementary | 945 Jane Street | Casper | WY | 82601 |
| Linford Elementary | 120 South Johnson Street | Laramie | WY | 82070 |
| Verda James Elementary | 701 Carriage Lane | Casper | WY | 82609 |
| Spring Creek Elementary | 1203 Russell Street | Laramie | WY | 82070 |
| Rawlins Elementary | 1301 Darnley Road | Rawlins | WY | 82301 |
| Truman Elementary | 1055 West Teton Boulevard | Green River | WY | 82935 |
| Monroe Elementary | Monroe Avenue | Green River | WY | 82935 |
| Harrison Elementary | 1825 Alabama Street | Green River | WY | 82935 |
| Eastside Elementary | 305 G Street | Rock Springs | WY | 82901 |
| Clark Elementary School | 1248 Morse Lee Street | Evanston | WY | 82930 |
| Uinta Meadows Elementary | 90 Cheyenne Drive | Evanston | WY | 82930 |
| Aspen Elementary | 225 Broken Circle Drive | Evanston | WY | 82930 |
| North Elementary | 500 Cedar Street | Evanston | WY | 82930 |
| Oregon Trail Elementary | 6332 Buckboard Road | Casper | WY | 82604 |
| Pilot Butte Elementary | 1003 Summit Drive | Rock Springs | WY | 82901 |

Program Promotions



Wattsmart® is
ready for
you!

Enroll your fourth-grade science students in a free, engaging energy education program.

BE WATTSMART, BEGIN AT HOME



WATTSMART® BEGIN AT HOME

The Be Wattsmart, Begin at home program reinforces electricity learning standards in an engaging presentation. Participating teachers receive free energy education posters, activities and student materials as well as the chance to receive a Visa® gift card of up to \$50, depending on participation.

Presentations begin in fall 2021.

Reserve your classroom's spot today at

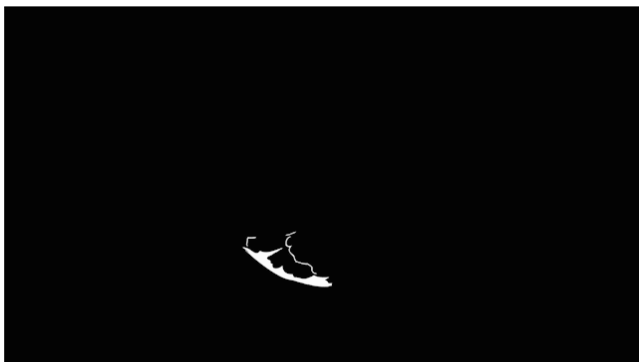
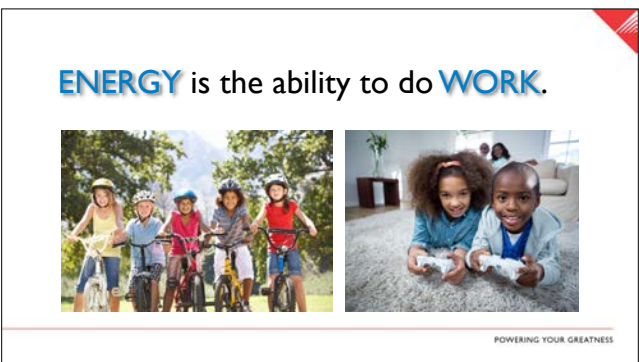
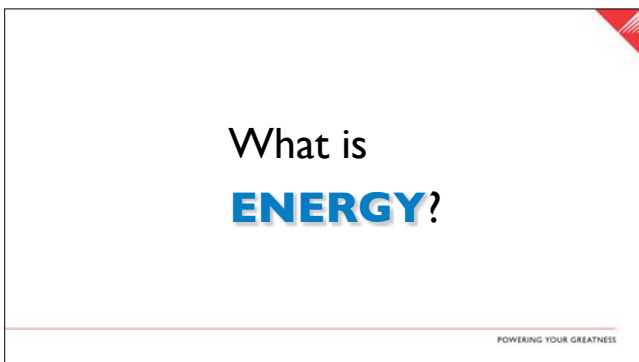
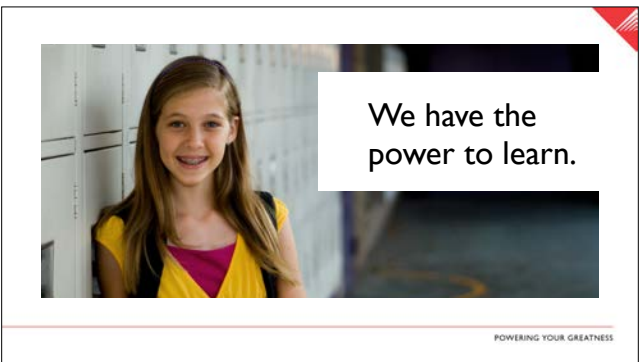
Wattsmart.com/begin

or email Sarah at sarah@nef1.org.



Program Documents

Keynote Presentation



Potential Energy



Kinetic Energy



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Natural Resources



Anything we use that comes from the earth or the sun

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Renewable Resources

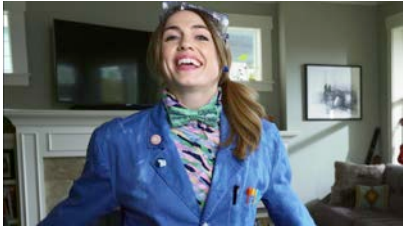


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Nonrenewable Resources



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It's time to
play Lingo!



energy

There are many
types of energy.



natural gas

The blue flame of
natural gas is a
nonrenewable
resource.

natural resource

Anything we use
that comes from
the earth makes
sense as a
natural resource.

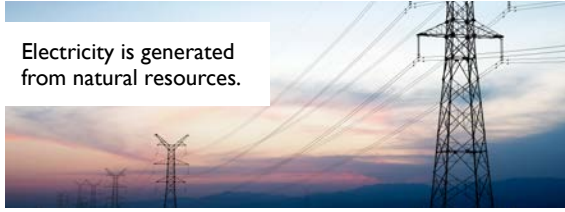


Electricity

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Electricity

Electricity is generated from natural resources.



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Rocky Mountain Power

Electric generation by energy source



Coal 51%



Renewables 22%



Natural gas 20%

Other sources 7%

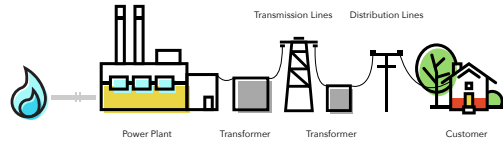
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How many people does it take to turn on a light bulb?



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Electric Generation



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Transforming Energy with Circuits



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What do we need?

An energy source

example: battery or wall outlet

A conductor to carry electrical energy


example: wire

A load to use the energy

example: light bulb

Open and Closed Circuits

Transforming Energy



Conductors
allow electricity to flow through them.

Insulators
resist the flow of electricity.


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It's time to play Lingo!



Renewable
R... naturally replaced.



Nonrenewable
N... or not at all.



Oil
...orce used to produce
... E. O...

Energy Efficiency

Using less energy to accomplish the same amount of work



Technology

+



Behaviors

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Caitlynn Power

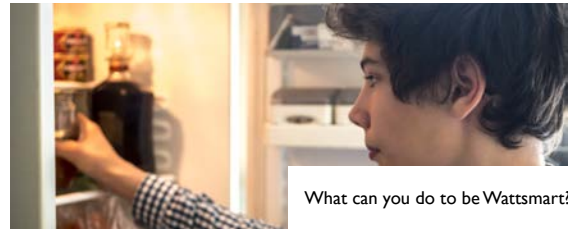
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Caitlynn Power

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Home Efficiencies



What can you do to be Wattsmart?

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Be the energy expert in your home.

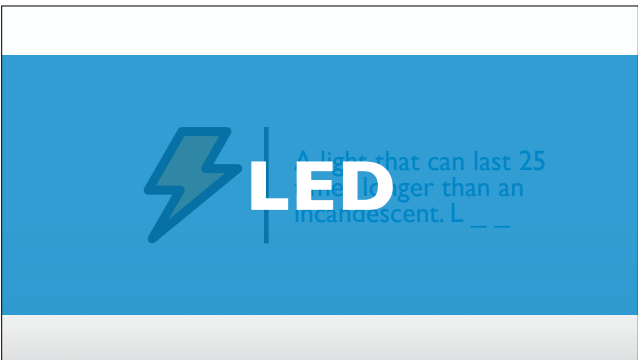
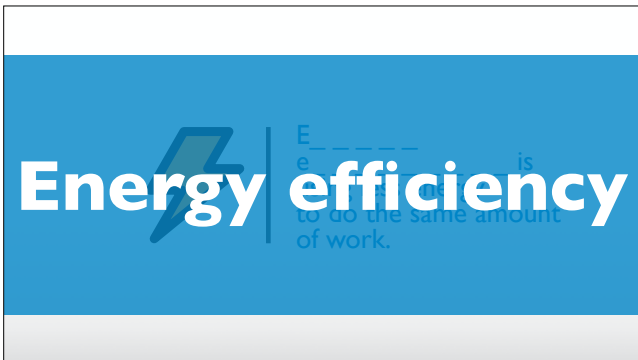
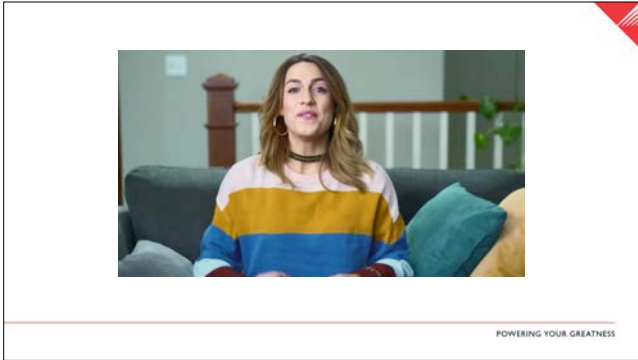


POWERING YOUR GREATNESS



Caitlynn Power

POWERING YOUR GREATNESS



Phantom Load

Electricity consumed by an electronic device in standby mode.

full load

Make sure you have a full load before starting your dishwasher.

water

Turn off the water when brushing your teeth.

What have we done today?



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

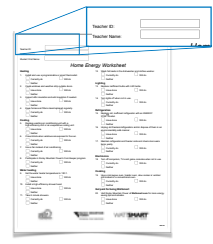
Engage in energy efficiency.

Review your **Be Wattsmart, Begin at home** booklet with your family.



Complete the

Home
Energy
Worksheet



Online Worksheet ThinkEnergy.org/Wattsmart/

Find Your Teacher ID

1 Find Your School 2 Find Your Teacher 3 Submit Your Form

Enter the keyword of your school's name. Example - Kennedy for John F Kennedy

School Name

Search for School

Don't know your Teacher ID? No problem. Use this tool to find your teacher ID



POWERING YOUR GREATNESS

Receive your very own Rocky Mountain Power LED nightlight.



POWERING YOUR GREATNESS



POWERING YOUR GREATNESS



YOU have
the *power* to
be WattSmart!

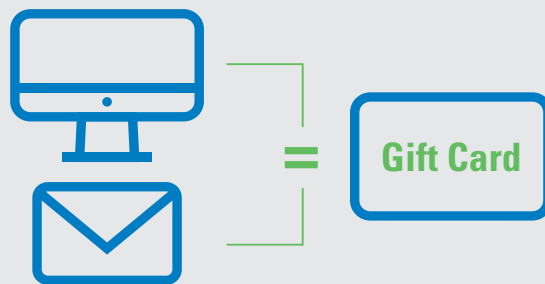
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POWERING YOUR GREATNESS

Implementation Steps for Presenter Option

- 1** Verify you have received:
- *Teacher Materials Folder* (notice your teacher ID in upper left corner)
 - Your **Be Wattsmart, Begin at home** *Teacher Guide*
 - *Home Energy Worksheets* (HEWs) for you and your students
 - **Be Wattsmart, Begin at home** family booklets
 - Set of *Parent Letters*
 - Wattsmart nightlights (student incentive for completing the HEW)

- 2** After the presentation, distribute to each student a:
- **Be Wattsmart, Begin at home** family booklet
 - HEW (Write your teacher ID on each worksheet before you send home.)
 - *Parent Letter*

- Final steps:
- 3**
- Reward students with a Wattsmart nightlight when they complete their worksheet on paper or online at thinkenergy.org/Wattsmart.
 - HEWs submitted online can be verified through the teacher portal (pas.nefl.org/teacher-portal) with your teacher ID.
 - Have each student sign the *Thank You Card* to Rocky Mountain Power.
 - Mail all completed paper HEWs and the *Thank You Card* in the postage paid envelope (found in your materials folder) by December 17, 2021.



Attention Teachers

Return your student *Home Energy Worksheets* (HEWs) and receive a **\$25 – \$50** Amazon eGift Card for classroom use, depending upon participation. Students may submit worksheets online or return the completed survey to you. See the *Implementation Steps* for additional HEW online information.

80% or greater return of registered students' HEW = \$50
50 – 79% return of registered students' HEW = \$25

Postmark due date:
December 17, 2021

Offer open only to teachers participating in Be Wattsmart, Begin at home. Certain restrictions may apply. Good while grant funding is in place. *Home Energy Worksheets* must be completed for eligibility. For more information, contact your Educational Service Representative.

ID - Megan Hirschi at megan@nef1.org
UT & WY - Sarah Richards at sarah@nef1.org



Family Guide



 **ROCKY MOUNTAIN
POWER**
POWERING YOUR GREATNESS

Dear Parents,

The **Be Wattsmart, Begin at home** program assists teachers and families to learn about energy, discuss important energy topics and engage in energy efficiency actions now. Your child has participated in a presentation 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 complete the **Home Energy Worksheet** (HEW) online at thinkenergy.org/Wattsmart or return it to your child's teacher.

Thank you for being Wattsmart and for your participation!

What's inside?

This booklet is divided into three sections that will give you the power to:

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 Rocky Mountain Power

Rocky Mountain Power is committed to the delivery of reliable electric service that's safe, low-cost and increasingly from clean, renewable resources. Serving more than 1 million customers in Utah, Idaho and Wyoming, the company is one of the lowest cost energy producers in the nation. Rocky Mountain Power is moving toward a sustainable energy future that includes increased use of solar, wind and other renewable resources; and provides customers with more choices to meet their energy needs.

About the National Energy Foundation

The National Energy Foundation (NEF) is a 501(c)(3) nonprofit organization, founded in 1976. It is dedicated to increasing energy literacy through the development, distribution and implementation of educational programs and materials. These resources relate primarily to energy, natural resources, energy efficiency, energy safety and the environment. Concepts are taught through science, math, art, technology and writing. NEF recognizes the importance of educating individuals about energy so they can make informed decisions about energy issues and use.

I have the *power* to be Wattsmart.

- Being Wattsmart is all about taking steps to save energy – which in turn can help you save money.
- You have the power to become more energy efficient. Rocky Mountain Power can help with Wattsmart programs and incentives for homes and businesses. Saving energy also saves money and is good for the environment.



I have the power to learn.

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
- 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. The United States has more coal reserves than any other country in the world, but the reserves are shrinking.



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).

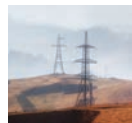


Geothermal is energy derived from the heat of the earth.



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 Rocky Mountain 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 Source | Rocky Mountain Power (2020 Basic Fuel Mix)* | United States (U.S. EPA, 2020 data) |
| Natural Gas | 19.5% | 40.3% |
| Coal | 51.4% | 19.3% |
| Nuclear | 0.00% | 19.7% |
| Petroleum | 0.00% | 37% |
| Other/misc. | 6.8% | .4% |
| Renewables (total) | 22.3% | 10.8% |
| Hydropower | 5.1% | 7.3% |
| Wind | 11.3% | 8.4% |
| Biomass | 0.4% | 1.4% |
| Solar | 5.2% | 2.3% |
| Geothermal | 0.3% | 0.4% |

*This information is based on Federal Energy Regulatory Commission Form 1 data. Rocky Mountain Power's "basic fuel mix" includes owned resources and purchases from third parties. It is based on energy production and not resource capability, capacity or delivered energy. All or some of the renewable energy attributes associated with wind, solar, biomass, geothermal and hydro facilities in the fuel mix may be: (a) used 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) not acquired. The 2020 fuel mix includes energy production associated with 157 megawatts of solar resources acquired through customer partnerships supported by a customer's purchase of 100% of renewable energy attributes generated by those solar resources.

I have the power to *discuss* energy use to 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 and appliances 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 or smart 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% 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 them on winter days to let the warmth in.
- Small room fans are an energy-efficient alternative to air-conditioning.
- For information about energy-saving programs and cash incentives, visit Wattsmart.com.



Water and water heating



- Check your faucets for leaks that can cost you hundreds of dollars each year.
- Install a water-efficient shower head and save money on your utility bills and more than 2,300 gallons of water per 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.
- Replace your incandescent bulbs with LEDs (light-emitting diodes) and save \$5 to \$8 per year per bulb. These bulbs use up to 80% less energy 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.



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 50% 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 cable boxes.
- Use advanced 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 approximately 40% less energy than conventional models and provides energy savings without sacrificing the features you want.
- Clean door gaskets with warm water or a detergent that leaves no residue.

Dishwashers

- Only run dishwashers when full and use the air-dry or no heat dry settings.
- ENERGY STAR® dishwashers use less energy than the federal minimum standard for energy consumption.
- Try running your dishwasher before 3 p.m. or after 8 p.m. to avoid peak demand.

Laundry

- Buy a moisture sensitive dryer that automatically shuts off when clothes are dry.
- Use a drying rack whenever possible.
- To avoid peak demand, wash and dry clothing before 3 p.m. or after 8 p.m. when possible.

Cooking

- Use a microwave oven, toaster oven or slow cooker instead of a conventional oven.
- Use the right size 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.



I have the power to *engage* in energy efficiency.

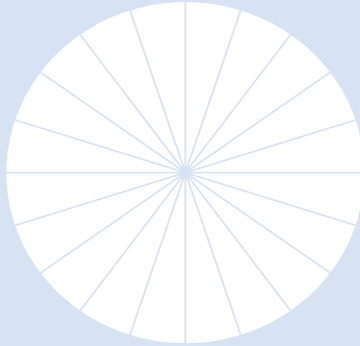
Parents, be Wattsmart and watch the energy savings add up.

An individual with a combined electric and heating fuel bill of \$2,500 per year could save 20% 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.

Your Home's Electricity Use

Most families in the U.S. use about 54% of their electricity for lighting and to power appliances and electronics, 32% to heat and cool their homes and 14% of their energy to heat water.

Choose three colors and create a pie chart with the percentages above. You may need to round each number. Each segment on the chart shows 5%.



Lighting, Appliances and Electronics

Heating Water

Heating and Cooling

(Source: eia.gov/todayinenergy/detail.php?id=36412, accessed April 2021)



Your Home's Electricity Use

Let's go on an energy scavenger hunt! Search for each item in your home.

I FOUND IT HERE.

| | |
|--|---|
|  Ceiling Fan |  Water-efficient Shower Head |
|  Door sweep under exterior doors |  Caulk, Foam Spray or Weather-stripping |
|  Dishes or Clothes Air-drying | |

I have the *power* to be Wattsmart.

Together with your parent(s), complete the separate *Home Energy Worksheet*. Return the completed *Home Energy Worksheet* to your teacher or submit it online at thinkenergy.org/Wattsmart to 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 Wattsmart.com. Congratulations to you and your family for making a difference.



WATTSMART®

BEGIN AT HOME



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WATTSMART®

BEGIN AT HOME



Table of Contents

STEM Connections 1

Activity: Pass the Sack 2

Activity: The Search for Energy 4

 Student Sheet: Data Table and Graph 6

Activity: A Bright Idea! 7

 Student Sheet: A Bright Idea. 9

Activity: The Art of Circuits 11

Activity: Shine a Light on History 13

Activity: Layered Lunch 15

Activity: How Do You Rate? 17

 Student Sheet: How Do You Rate? 19

Activity: Energy in Math 21

Activity: Be Wattsmart, Begin at home
Poster. 23

| STEM Connections | Science | | Technology | | Engineering | | | | Math | | | | | | | | |
|------------------------------------|--------------------|---|------------------------|----------------------------------|--------------------|---------------------|----------------|---|------------------------|---------------------|--------------------------|---------------------------------|------------------|------------------------|-------------|-------------------------------|------------------------------|
| | 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 |
| Activity | | | | | | | | | | | | | | | | | |
| Pass the Sack | | • | | • | | | | | | | | | | | | | |
| The Search for Energy | • | • | • | • | | | | | | | | | • | | | • | • |
| A Bright Idea! | • | • | • | • | • | • | • | • | • | • | • | • | • | | | | |
| The Art of Circuits | • | • | • | | | | • | | • | • | • | | | | | | • |
| Shine a Light on History | | • | • | • | | • | • | • | • | | • | | | | | | |
| Layered Lunch | • | | • | | | | | | | • | | | | | | | |
| How Do You Rate? | • | • | | • | | • | • | | | | • | • | | | • | | • |
| Energy in Math | | | | | | | | | | | | | • | • | • | • | |
| Be Wattsmart, Begin at home Poster | | • | | • | | | • | • | | | | | | | | | • |

Activity: Pass the Sack

Objective

Students will demonstrate the difference between renewable and nonrenewable resources and the need for conservation of resources.

Curriculum Focus

Science
Social Studies

Materials

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

Key Vocabulary

Nonrenewable resource
Renewable resource

Next Generation Science Correlations

4-ETS1 – 2
4-ESS3 – 1-2
4-ESS3.A
5-ETS1 – 2
5-ETS1 – 1
5-ESS3 – 1
MS-ESS3 – 4
MS-ESS3.A



Introduction

Statistical research confirms world consumption of natural resources is increasing every year. Continued population growth ensures that demand will continue to increase for renewable and nonrenewable energy resources necessary to maintain our way of life. This creates problems for future availability of nonrenewable resources. Nonrenewable resources are just that, resources that cannot be renewed. For example, a resource used at our present rate might last about 100 years. Factor in population growth and increasing reliance on technology, and that resource may last only 79 years.

In this activity, two different types of candy (or other objects students would like) will represent resources. One type of candy will represent renewable resources and the other will represent nonrenewable resources.



Procedure

1. Before class, count out enough candy so there is one piece per student (some of each type of candy, with 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 contents to run out before everyone gets candy!**
2. Tell students you will demonstrate how resources get used over time by playing “Pass the Sack.” Show students the sack and explain that 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** type 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 who 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? Do they trade, barter (trade for goods), buy (trade for currency), invade and take or 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 periodically to renew it.)
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.
8. Point out that renewable resources also have limitations. They may not generate electricity as reliably as nonrenewable sources. The amount of energy produced may vary with weather and location.
9. Plan how to pass out the remaining candy.



Discussion

- Should rules be established to determine how the candy is distributed?
- Do oil, coal and natural gas companies have rules/regulations that must be followed to find resources?
- Should there be rules and regulations on how much oil, coal and natural gas people use?
- How do the class' social decisions influence the availability of candy?



To Know and Do More

Go to [eia.gov/kids](https://www.eia.gov/kids) to access games, tips and facts for kids to learn about renewable energy and energy efficiency.

Discuss whether or not it is possible to run out of a renewable resource. Wood and fresh water are examples of renewable resources that can be used faster than nature can replace them.

Activity: The Search for Energy

Objective

Students will learn the difference between renewable and nonrenewable resources.

Curriculum Focus

Math
Science
Social Studies

Materials

- 1/2 bag popcorn or other small item to represent solar energy
- Small pieces of ripped paper to represent approximate U.S. nonrenewable energy reserves
 - 164 black - coal
 - 22 red - uranium
 - 8 green - natural gas
 - 2 blue - oil
- Large sheet or tarp to place paper and popcorn on for easy clean up (optional)
- Copies of "Data Table and Graph"

Key Vocabulary

Nonrenewable resources
Renewable resources

Next Generation Science Correlations

4-ESS3-1
4-ESS3.A
5-ESS3 - 1
MS-PS1 - 2
MS-LS2 - 1
MS-ESS3.A



Introduction

Fossil fuels are extremely useful energy sources. Our society has adopted them because they can be readily available and economical. In the early part of the 20th century, a fledgling solar industry took root but was ultimately displaced by less expensive energy sources such as fossil fuels. Today some fossil fuels are harder to find and increasingly more costly. The sun, on the other hand, is just as plentiful as it was 100 years ago. It is a renewable resource that could become our most widely used source of energy.

The following activity is a simulation game in which students learn the difference between renewable and nonrenewable resources. The game reflects society's use and exhaustion of nonrenewable fuels and the eventual transition to renewable technologies.



Procedure

1. Divide the class into five equal groups. Each group represents a company going after a particular resource (coal, uranium, natural gas, oil or the sun). The paper and popcorn represent reserves of the various energy resources. Pass out copies of the student sheet "Data Table and Graph" to each group or have students create their own data tables on paper.
2. Have students gather in a large circle. Scatter the papers plus a handful of "solar" popcorn so they are spread out in the center of the circle. You can do this on a sheet for easier clean up. Explain that this exercise demonstrates how the availability of 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 resources that are available change after each trial. Tell each group that they will have 30 seconds to pick up as many papers or popcorn as they can of their assigned type. Start timing.

After 30 seconds have the groups stop and count the items they have gathered. Have each group announce their results to the class and record every count in their data table. If some groups have collected all of their available resource, point out that the resource is now depleted and they are unemployed.
4. Scatter another handful of “solar energy,” helping students realize that since the sun is a renewable resource, there is the same amount of it each time you look, whereas the nonrenewable fuels are being depleted. Repeat the search period so students can get more papers or popcorn.
5. Stop after 30 seconds and have the group count and record the papers and popcorn collected again. Note that there are fewer nonrenewable fuels found in the second round. Students have to look harder to find what is left. The solar count is slowly catching up with the nonrenewable fuels. Repeat with additional trials as needed.
6. Have groups create a bar chart or, for more advanced students, a multiline graph of the number of papers and popcorn collected each trial.



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 a resource? Why do some deposits go unused?



To Know and Do More

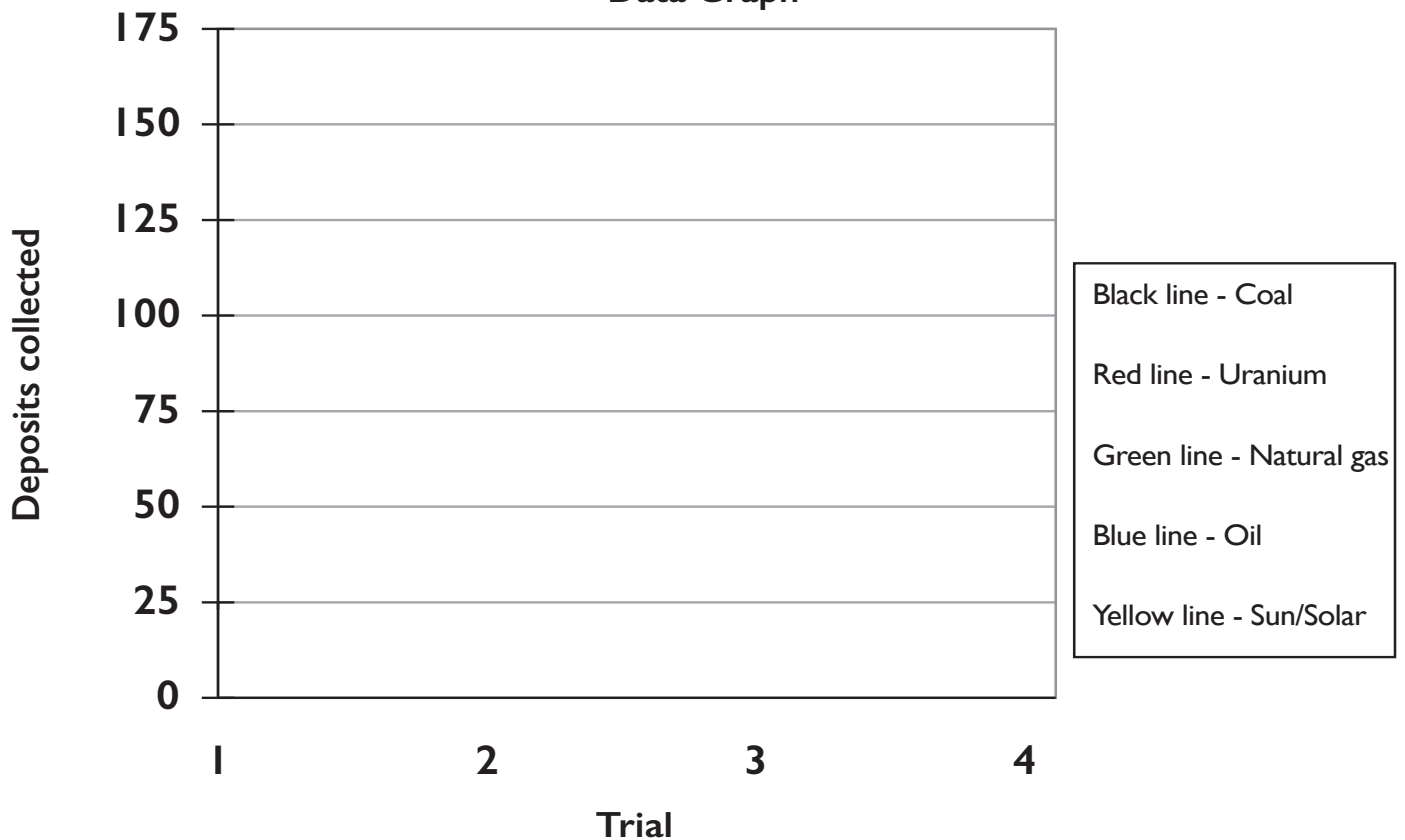
Add wind and water to the activity. Lead a discussion to be sure the students understand why you continued adding more sun, wind and/or water after each trial, but did not add more of the other papers. As a class, come up with a general outline of how to more effectively manage the resources that are available to us.

Student Sheet: Data Table and Graph

Data Table

| Search Period | Coal (Black) | Uranium (Red) | Natural Gas (Green) | Oil (Blue) | Sun/Solar (Popcorn) |
|---------------|--------------|---------------|---------------------|------------|---------------------|
| 1 | | | | | |
| 2 | | | | | |
| 3 | | | | | |
| 4 | | | | | |
| Totals | | | | | |

Data Graph



Activity: A Bright Idea!

Objective

Students will study an example of potential energy converted to energy in the forms of heat and light.

Curriculum Focus

Science

Materials

- Several general purpose C dry cell batteries
- A string of holiday lights, cut apart and stripped at the ends or small bulbs and sockets with wires
- Battery operated toy and batteries
- Small flashlight bulbs and sockets
- Copies of "A Bright Idea!"

Key Vocabulary

chemical energy, circuit, closed circuit, current, electrode, electrolyte, kinetic energy, open circuit, parallel circuit, potential energy, radiant energy, series circuit, thermal energy, transformation, voltage

Next Generation

Science Correlations

4-ETS1 – 1-2
4-PS3 – 2-4
4-ESS3 – 1
5-PS1.B
5-ESS3 – 1
5-ESS3.C
MS-PS3 – 3
MS-PS3.B
MS-LS2 – 1
MS-ESS3.A



Introduction

Alessandro Volta, an Italian physicist, made the first battery in 1799. Volta placed two different metal electrodes in an electrolyte solution (a chemical mixture which will conduct an electrical current). The chemical reaction caused an electromotive force. A common misconception is that batteries store electrical energy. This is not really true. Batteries convert chemical energy to electrical energy. They store chemical energy that can be released during a chemical reaction. An electric current can be produced before by using metals or carbons that have different chemical properties and an acid or base that will allow the movement of electrical charges.



Procedure

1. Demonstrate a battery operated toy with and without the battery. Explain that energy is the ability to do work or cause change, such as moving the toy or powering a light bulb.
2. Discuss:
 - How do we know the energy from the battery is working?
 - What kind of energy is the toy giving off? (possible answers include kinetic energy, mechanical, light, sound and heat)
 - The battery converts chemicals (chemical energy) to electricity (electrical energy) and the toy converts electricity to many possible forms of energy, including mechanical energy, heat (thermal energy), light and sound.
3. Have students use the materials provided to experiment with simple circuits by following the guided inquiry activity on the student sheet. As the students do the activity, have them note the light and heat energy given off.
4. Give students examples of types of potential and kinetic energy.

Kinetic energy: a person riding a bike, a fire in a woodburning stove, a person running

Potential energy: a lump of coal, a sandwich, a rock at the top of a hill



Discussion

Write the word choices on the board. Read the statements to the students and have them fill in the blanks using the words.

1. A battery converts chemical energy into _____ energy.
2. Electricity is a form of _____ energy.
3. The light bulb converts electrical energy into _____ and _____ energy.
4. A battery contains _____ energy.

Word choices:

potential electrical heat kinetic light

Answers:

1. electrical 2. kinetic 3. light, heat 4. potential



To Know and Do More

Ask students if they believe batteries are important to our way of life today. Have students make a list of all the items they used yesterday that contained a battery. Their list might include:

| | |
|------------|-----------------------|
| Wristwatch | Tablet |
| Automobile | Video game controller |
| Cell phone | TV remote control |

To continue this, have students add to the list all of the items they can think of that use batteries. Are your students surprised at how many items today depend on batteries to operate and how many battery operated items they depend on daily?



Career Awareness Activity

Search the internet for a company that produces batteries. Discover the various job opportunities and careers within that company. Your list might include: scientists, chemists, research analysts, accountants, purchasing agents and administrative assistants.

Student Sheet: A Bright Idea!

Alessandro Volta, an Italian physicist, made the first battery in 1799. Volta put sheets of two different types of metal in a jar of water with a chemical that could carry electricity (an electrolyte). The chemical reaction between the electrolyte and the metal plates caused electrons to move when the plates were connected with a wire. The flow of electrons moving in a wire is called an electric current or electricity.

Using one battery and one light, make the bulb light up. Congratulations, you have made an electrical circuit!

1. What did you do to get the light to come on and complete the circuit? How was it touching the battery?

2. What do you have to do to make the light bulb turn off and then back on?

3. What do you think the electrical terms "open circuit" and "closed circuit" mean?

4. How do you think a light switch works?

5. What type and form of energy is in the battery?

6. The battery's energy was transformed into what other forms of energy?

Using one battery, try to light up two lights.

1. Sketch how the wires are connected to the battery when you light two lights.

2. Are the lights the same brightness as when you lit only one or are they dimmer?

3. A series circuit has only one path that electrons can follow as they are pushed from one side of the battery to the other. A parallel circuit has more than one path and the electrons can go more than one way to get from one end of the battery to the other. Which type of circuit did you make and draw?

4. Experiment with multiple batteries connected together, placing the positive end of one battery touching the negative end of another battery. What effect does the number of batteries have on the brightness of the bulbs?

5. If you leave the battery connected to a bulb long enough, you will feel the wire and the ends of the battery getting warm. What do you think is causing this?

6. Can that heat be useful? Can it be dangerous? Give an example to prove your point.

7. Wash your hands when you are finished.

Activity: The Art of Circuits

Objective

Students will learn about conservation of energy and energy transfer by experimenting with electrical circuits.

Curriculum Focus

Science
Social Studies
Language Arts
Art

Materials

- Playdough® or homemade salt dough
- 9V batteries
- 9V battery clips with red and black cables
- 2V LED miniature light bulbs
- Insulating material: cardboard, packaging plastic or dough made from sugar, not salt (optional)

Key Vocabulary

Energy transfer
Electric current
LED (light-emitting diode)
Electric circuit
Insulator
Conductor

Next Generation Science Correlations

4-PS3 - 2
4-PS3 - 4
4-PS3.A-B, D
4-ETS1 - 1
4-ETS1.A
5-ETS1 - 1
5-ETS1.A
MS-PS3 - 3
MS-PS3.A-B
MS-ETS1 - 1
MS-ETS1.A



Introduction

Materials that allow a flow of electric current to pass through them more easily are called conductors. Aluminum, silver, copper and water are examples. Insulators block the flow of electricity. Nonmetallic materials, such as rubber, plastic, wood, cloth and dry air are insulators. An electrical circuit is a path of conductors through which electric current flows. Energy can be transferred from place to place by electric current.

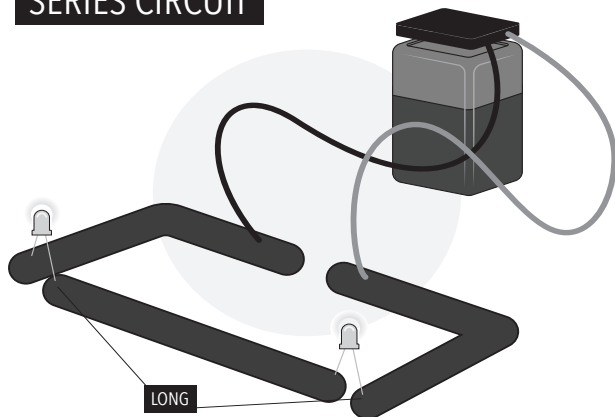
In this activity, students will use salt dough, which is a conductor, to design circuits which will transfer electrical energy. If they are successful, the electricity will be transformed to light and heat energy in a miniature LED bulb.



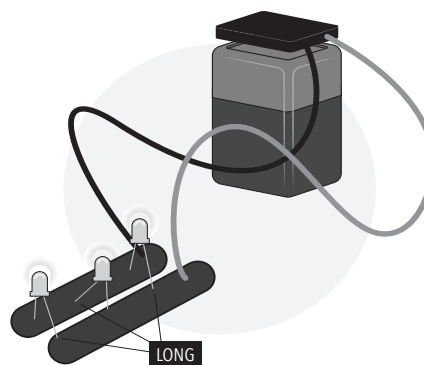
Procedure

1. Introduce students to their materials:
 - a. Attach the battery to a battery clip with red and black cables. The red lead is the positive terminal and the black lead is the negative terminal.
 - b. Examine the LED bulb. Two wires (or legs) extend from the bulb. The longer wire is the positive side of the LED and the short wire is the negative side. The LED should only be connected to dough, never directly to the battery terminals, which will cause the bulb to burn out.
2. Tell students that electricity can only go through the circuits they will create in one way. The positive terminal of the battery (red lead on battery clip) must be nearest a positive (long) leg of the LED. A battery pushes electricity around the circuit through the positive leg and out the negative (short) leg, then repeating through the next positive leg (if there is more than one LED in the circuit).
3. Explain that electricity will take the path of least resistance. It is easier for electricity to travel through the dough than through the LED. If two pieces of dough are touching, the LED will not light.
4. Challenge students to design a simple circuit like the ones on the next page.

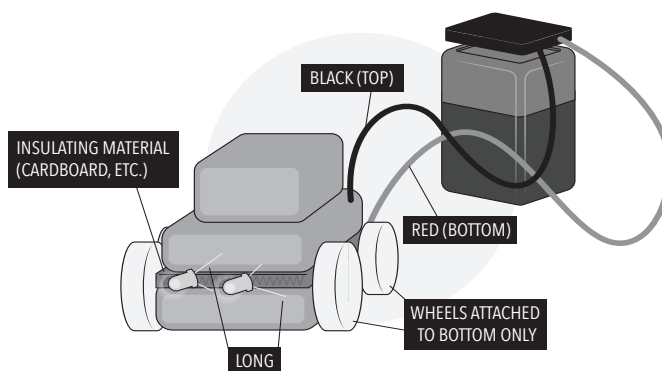
SERIES CIRCUIT



PARALLEL CIRCUIT



If time allows, have students create a circuit work of art like the one below. Since the conductive dough cannot touch, use insulating material between layers.



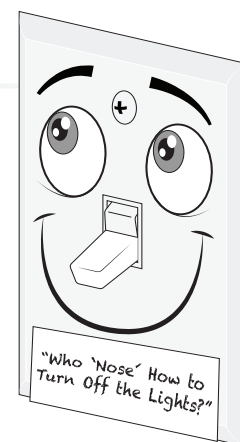
Discussion

- How does your dough circuit light the LED compared to the circuits at your home?
- In a series circuit with multiple LEDs, what happens to the brightness of the LEDs that are further from the battery? Why?



To Know and Do More

When a light switch is off, the electrical pathway to a bulb is not complete and electricity cannot flow to light that bulb. When you flip the switch on, you close the circuit and the light turns on. If light is not needed, it is important not to waste the natural resources used to generate the electrical power that is being transformed to light. Have students create characters without noses to put over light switches at school or home. The art should help remind them to turn lights off!



Activity: Shine a Light on History

Objective

Students will gather details and make inferences from text to explain historical events related to electricity. They will use their knowledge to write information text to support an opinion.

Curriculum Focus

Language Arts
Social Studies
Science

Materials per student group

- Index cards

Key Vocabulary

LED (light-emitting diode)
Incandescent bulb
Filament
Electric meter
Inference
Persuasive
Lumen
Watt

Next Generation Science Correlations

4-PS3 - 2
4-PS3.A-B
MS-PS3 - 3



Introduction

Thomas Edison and Nick Holonyak are two famous lighting inventors. They both made major contributions that changed the way people lived. Thomas Edison patented the incandescent bulb in the late 1870s. Since that time, people have enjoyed the convenience of using electricity for light. Nick Holonyak created the first practical, visible spectrum LED which revamped lighting as we know it.

In this activity, students will research the contributions of these two inventors. They will gather details to form an opinion about which man was more influential in history.



Procedure

1. Give students time to research the famous inventors Thomas Edison and Nick Holonyak. They can use the internet or other sources to find important information.
2. Have students fill out the index cards for each inventor. Using that information, they should decide which inventor was more influential in history and write a persuasive paragraph with details from their research to support their opinion.
3. Challenge students to practice reciting their paragraph and then present it to another student(s) in an attempt to change a differing opinion.



Discussion

- What kinds of light bulbs are used in your home? How do they affect the way you live and work?
- What do you think the next great electrical invention will be?
- Thomas Edison said, "Genius is one percent inspiration and ninety-nine percent perspiration." What did he mean? How does his quote apply to you?



To Know and Do More

A light bulb package has a lighting facts label that contains different numbers.

- The light output in lumens.
- The power used by the bulbs, measured in Watts. The higher the wattage, the more energy the bulb uses.
- A measure of how warm or cool the light from that bulbs looks, measured in Kelvin (K). Low numbers are warmer light hues (orange or yellow). High numbers are cooler hues (blue or green).

When buying new bulbs, we should shop by lumens, not wattage. We save energy by finding bulbs with the lumens we need, then choosing the lowest wattage possible for that number of lumens.

| Lighting Facts <small>per bulb</small> | |
|--|------------------------------------|
| Brightness | 800 lumens |
| Estimated Yearly Energy Cost \$1.08 Based on 3 hrs/day, 11¢/kWh Cost depends on rates and use | |
| Life | Based on 3 hrs/day 23 years |
| Light Appearance | |
| | |
| Energy Used | 9 Watts |

Activity: Layered Lunch

Objective

Students will understand that natural gas deposits are trapped and held by certain types of geologic formations.

Curriculum Focus

Science
Art

Materials

- Slices of bread
- Almond butter or other thick spread (e.g. cream cheese)
- Honey
- Plastic wrap or wax paper
- Plastic knife

Key Vocabulary

Permeable
Impermeable
Source rock

Next Generation Science Correlations

4-ETS1 - 1
4-ETS1.A
5-ETS1 - 1
5-ETS1.A
MS-LS4 - 1
MS-LS4.A
MS-ESS1 - 4
MS-ESS1.C
MS-ETS1 - 4
MS-ETS1.B



Introduction

How do we find natural gas? Try this activity to get an idea of the type of rock formations and characteristics geologists look for when locating natural gas deposits.

As natural gas molecules form, they migrate from shale “source rock” into more porous areas such as sandstone. Porous or permeable layers are much like a sponge with little pockets throughout the rock. The natural gas continues to move to either the earth’s surface (where it escapes into the atmosphere) or it is trapped when nonporous or impermeable rock layers block its path.



Procedure

Using bread, almond butter and honey, create some edible models of rock layers. (In place of almond butter you could use peanut butter, Nutella or even thick frosting depending on allergies within the classroom.)

1. Spread thick layers of almond butter then honey on a slice of bread. Top it with another slice of bread.
2. Make a second sandwich just like the first, or gently cut the sandwich in half.
3. Put one sandwich (or one half) with the almond butter layer above the honey and the other sandwich (or other half) with the honey on top of the almond butter.
4. Next spread a thick layer of only honey on a slice of bread, adding another slice on top.
5. Cover your sandwiches with wax paper or plastic wrap and gently press down on them for about three seconds, representing millions of years of pressure.
6. Cut the sandwiches in half and observe what has happened.



Discussion

1. What do you think the honey represents?
2. Which layer do you think represents porous rock?
3. Which layer is the nonporous rock?
4. Did the honey seep into both slices of bread? Why or why not?
5. What do you predict would happen with a sandwich made with only almond butter?
6. How might the ingredients you used affect your results?
7. Draw the layers of your sandwich and use colored pencils or crayons to distinguish the different layers and write labels for each layer that includes: impermeable, permeable, natural gas, nonporous rock and porous rock.

Answers

The honey represented natural gas or a fossil fuel. The bread was the porous rock where the honey or natural gas gets into the little pockets or air spaces. Almond butter acted like a nonporous rock layer blocking the honey from seeping into the slice of bread above the almond butter. The results may be different depending on your ingredients: denser bread allows less seepage, creamier almond butter may be less impermeable or thicker honey may not fill the little pockets as easily.



To Know and Do More

Assign students to further investigate how natural gas is trapped in rock formations. Have them draw pictures of a formation and the trapping of oil and natural gas in the earth.

Visit a natural history museum and look for prehistoric life forms and rock formations.

Activity: How Do You Rate?

Objective

Students will conduct a home survey to determine how they can use energy more efficiently by changing their habits and improving conditions and thereby improve the environment in which they live.

Curriculum Focus

Language Arts
Science
Social Studies

Materials

- Copies of “How Do You Rate?”

Key Vocabulary

Conservation
Efficiency
Environment
Natural resources
Quality of life

Next Generation Science Correlations

4-ESS3 – 1
5-ESS3 – 1
5-ESS3.C
MS-LS2 – 1
MS-ESS3 – 3
MS-ESS3.A



Introduction

We use natural resources every day. Sometimes we use them just as they come from earth or the atmosphere. At other times we alter their makeup to fit our needs. For instance, we use the sun just as it is to dry clothes, but we use photovoltaic cells to capture the sun’s energy and convert it to electricity, a secondary energy source. We use coal just as it comes to us from the earth to make electricity, or we use coal to provide coke for steel manufacturing. Many natural resources we use every day are nonrenewable, once we use them they are gone. Others are renewable, they can be replaced through natural and/or human processes.

It is responsible to use all resources efficiently and wisely. When we do, we reduce energy use, save money and preserve the environment. Making wise decisions today will have a positive impact on our future.

Imagine the difference we could make if we all used energy more efficiently. We would conserve natural resources for the future and enjoy better air quality and a better life. Each one of us can truly make a difference. All it takes is knowledge and action.



Procedure

Using energy efficiently and conserving our natural resources are responsible and easy actions that students can take today to show they respect the environment and have a desire to protect and preserve it.

1. Pass out “How Do You Rate?” Discuss the actions that may apply to the school (e.g., windows and doors have weather-stripping; drapes or blinds are open on cold, sunny days and closed on hot days; thermostats are adjusted at night; lawns are only watered early or late in the day). As you discuss each action, write a T for true or F for false on the board to see how the school rates. What can the students do to improve energy use at school?
2. Decide on several actions the students can take at school to help save energy and protect the environment. One action might be to use both sides of their paper and then recycle. If a room is empty during lunch or at other times, they can be sure lights are turned off and computers are on sleep mode.
3. Have the students take the survey home and complete it with their parent’s or guardian’s help. Explain to students that it is important to record their true energy use and not mark what they think they should be doing.
4. How did the students’ homes rate? Discuss the results of the home survey. Help students to become enthusiastic about conserving natural resources and using energy more efficiently.

5. Prepare a graph to show the results of the energy efficiency survey. Which efficiency tips are already practiced by most students? Which were least used? Graph the number of students marking true for each item.
6. Find the mean, median, mode and range of the data on the home survey.



Discussion

Discuss the benefits of energy conservation. How will our energy use impact our future? Compare the benefits and possible inconveniences and their correlation to our quality of life.



To Know and Do More

Why do you think people do not practice all of the energy efficiency tips on the survey? Are there false assumptions that affect people's behavior? (Believing that turning things on and off uses more energy than leaving them on, for example.)

Discuss how people in other geographic areas and cultures would rate. Does everyone have a car, dishwasher or an air conditioner?



Career Awareness Activity

Have the students think of some careers that could have a big impact on your community's energy usage. Some areas to consider: teachers impact energy usage through education and by example; utility workers impact energy through education and incentives; government regulators have an influence through restrictions and rewards, such as financial benefits or tax breaks.

Student Sheet: How Do You Rate?

How energy efficient is the building you live in? Together with your parents or guardians, answer the following questions to rate your home or apartment.

Circle T if the statement is true, F if the statement is false or NA if the statement does not apply to your living situation.

Heating and Cooling

| | | | |
|---|--------|---|--------|
| Windows and doors have good weather-stripping. | T F NA | Ducts are insulated in unheated/uncooled areas. | T F NA |
| Window coverings are open on cold, sunny days and closed on hot days. | T F NA | Garage is insulated. | T F NA |
| Window coverings are closed at night when heat is on. | T F NA | Air filters on furnace and air conditioner are cleaned and changed regularly. | T F NA |
| Thermostat is set at 68 F (20 C) or lower in winter. | T F NA | Thermostat is adjusted at night. | T F NA |
| Air-conditioning is set at 78 F (26 C) or higher in summer. | T F NA | Fireplace damper is closed when fireplace is not in use. | T F NA |

Water

| | | | |
|---|--------|---|--------|
| A pitcher of water is kept in the refrigerator for drinking. | T F NA | Hot water heater is set at 120 F (49 C). | T F NA |
| Faucets and toilets do not leak. | T F NA | <ul style="list-style-type: none"> If someone in your household has a compromised immune system, consult your physician. | |
| Showers and faucets are fitted with energy-efficient shower heads and aerators. | T F NA | Hot water pipes from water heater are insulated. | T F NA |
| Showers last no longer than 5 minutes. | T F NA | If located in an unheated area, hot water heater is wrapped in an insulation blanket. | T F NA |
| Toilets are low flow, or tanks use water displacement devices. | T F NA | Broom, not hose, is used to clean driveways and sidewalks. | T F NA |
| | | Faucet is shut off while brushing teeth and shaving. | T F NA |

Appliances

| | | | |
|---|--------|--|--------|
| Dishwasher is usually run with a full load. | T F NA | Clothes dryer is usually run with a full load. | T F NA |
| Automatic air-dry is used with the dishwasher. | T F NA | Clothes are often hung up to dry. | T F NA |
| Washing machine is usually run with a full load. | T F NA | Refrigerator is set no lower than 37 F (3 C). | T F NA |
| Cold water is used in washing machine most of the time and is always used for rinses. | T F NA | Lids are usually put on pots when boiling water. | T F NA |
| | | Oven is preheated for only 10 minutes (if at all). | T F NA |

Lighting

| | | | |
|--|--------|--|--------|
| Lights are turned off when not in use. | T F NA | Light bulbs are kept dusted and clean. | T F NA |
| LED bulbs are used in at least one room. | T F NA | Sunlight is used whenever possible. | T F NA |
| Security and decorative lighting is powered by solar energy. | T F NA | | |

Trash

| | | | |
|--|--------|---|--------|
| Glass, cans and newspapers are recycled. | T F NA | Overpackaged products are usually avoided. | T F NA |
| Plastic is separated and recycled. | T F NA | Reusable bags are used for groceries, or bags are recycled. | T F NA |
| Old clothes are often given to charities, secondhand clothing stores, etc. | T F NA | Rechargeable batteries are used when possible. | T F NA |
| Food scraps and organic waste are composted. | T F NA | Food is often bought in bulk. | T F NA |
| | | Products made of recycled materials are favored. | T F NA |

Transportation

| | | | |
|--|--------|---|--------|
| Car is properly tuned and tires properly inflated. | T F NA | Public transportation is used when possible. | T F NA |
| Family drivers obey speed limit on the highway. | T F NA | Family members often walk or ride a bike for short trips. | T F NA |
| Family drives an electric vehicle. | T F NA | Kids and parents carpool when possible. | T F NA |

Yard and Workshop

| | | | |
|--|--------|---|--------|
| Lawns are watered early or late in the day. | T F NA | Cutting edges on tools are kept sharp. | T F NA |
| Grass is mowed to a height of 2 to 3 inches (5 to 8 cm). | T F NA | Electrical tools are maintained and gas equipment is kept tuned and serviced. | T F NA |
| Hand tools like pruners and clippers (rather than power tools) are used whenever possible. | T F NA | | |

Score 1 point for True, 0 points for False and 0 points for Not Applicable (NA).

Total Points: _____

Discuss the results of this survey with your family.
What can you and your family do to raise your score?

Activity: Energy in Math

Objective

Students will interpret and evaluate numerical expressions as they solve word problems.

Materials

- Copies of the questions found in the “To Know and Do More” section
- Individual white boards (optional)

Key Vocabulary

Watt

Common Core Correlations

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



Introduction:

In this activity, students will complete the problem set found on the bottom of page 22 within an allotted time (10 minutes). Students will solve the mathematical problems making connections to real world situations.



Procedure:

- Instruct students on the importance of learning to solve real world problems using their math skills. You may want to review some steps to solving word problems before beginning the first problem. The following questions might be useful to review:
 - Can you draw something to help you?
 - What can you draw?
 - What conclusions can you make from your drawing?
- Copy the questions on the “To Know and Do More” section on page 22 and pass it out to students. Make sure to remove answers on the bottom of the page.
- Model the problem.

Have a pair of students work at the board while the others work independently or in pairs at their seats.

As students work, circulate. Reiterate the questions above. After several minutes, have the demonstrating students receive and respond to feedback and questions from their peers if necessary.
- Calculate to solve and write a statement.

Give everyone 2 minutes to finish work on that question, sharing their work and thinking with a peer. All should write their equations and statements of the answer:
- Assess the solution for reasonableness.

Give students 1 to 2 minutes to assess and explain the reasonableness of their solution.



Discussion/Debrief

The student debrief is intended to invite reflection and active processing of the total lesson experience.

Invite students to review their solutions for the problem set. They should check work by comparing answers with a partner before going over answers as a class. Look for misconceptions or misunderstandings that can be addressed. Then guide students in a conversation to debrief the problem set and process the lesson.

Any combination of the questions below may be used to lead the discussion.

- What did you notice about this word problem?
- What is different in the problem?
- What are we trying to find out?
- How can we represent this part of the story? (draw, write a number; use manipulatives)
- What would help us organize our thinking and our work? (answers may vary: draw it out, act it out, write an equation, etc.)
- What strategies can we use to solve this problem?



To Know and Do More

Have your students turn in their worksheet showing their work to solve each problem. This will help you to assess your students' understanding of the math concepts presented in the lesson.

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 own bedroom 4 hours a day, and there are three people living there, how many Watts will be used a day to light the bedrooms?
 - 20 Watts
 - 240 Watts
 - 650 Watts
 - 720 Watts
4. For every 10 degrees the water heater setting is turned down, you can save 6% 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%

Answers: 1. Maggie, Michael, Jessie, Karen; 2. \$284; 3. 720 Watts; 4. 9%

Activity: Be Wattsmart, Begin at home Poster

Objective

Students will make their own energy-efficient choices that can be practiced at home to help future societies.

The students will also learn how they can be part of the solution to save energy and natural resources.

Materials

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

Key Vocabulary

Carbon footprint
Recycle
Energy efficient

Common Core Correlations

Energy Sources, Forms and Transformation
Personal and Social Perspectives
Research Tools
Problem-solving and Decision-making Tools
Connection to the Real World



Introduction:

This is a fun project for students to create after they have studied energy, energy efficiency and renewable and nonrenewable resources. Using the poster, students will add or color the items listed below to create a house that is eco-friendly and energy efficient. You can help your students answer questions about what types of energy they can use and how it will work in the house to create efficiency and save energy.



Procedure:

- Add or color the items listed below. You may want to do different items each day as you cover different topics: electricity, natural gas, water; etc.
 - Add a bicycle.
 - Add small recycling bins where appropriate.
 - Add 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 television and furnace.
 - Color the energy-efficient shower head red.
 - Color all items that use electricity yellow.
 - Find and circle the smart thermostat.
 - Color the furnace filter that is being changed orange.
 - Draw a purple water drop next to all items in the house that use water.



To Know and Do More

- Have each student write a brief description of the things their family has done to improve energy efficiency at home. Have your students add any items that will encourage their families to be energy efficient in the future.
- Choose a natural resource used for energy and create a Venn diagram comparing the positive and negative effects of the use of this resource on the physical environment.

Lingo Card

| L | I | N | G | O |
|-------------------|--------------|-----------------------------|----------------------------------|-----------------|
| Water | Natural Gas | Natural Resource | Incandescent | Reduce |
| Full Load | Phantom Load | Oil | Coal | ENERGY STAR® |
| Renewable | Energy | Be Wattsmart, Begin at home | Turn It Off | Uranium |
| Energy Efficiency | LED | Recycle | 68 Degrees | Embodied Energy |
| Cooking | 78 Degrees | Solar | Programmable or Smart Thermostat | Electricity |

| L | I | N | G | O |
|----------------------------------|-------------|-----------------------------|--------------|--------------|
| Full Load | Natural Gas | Phantom Load | LED | 78 Degrees |
| Cooking | Electricity | Renewable | Recycle | 68 Degrees |
| Natural Resource | Water | Be Wattsmart, Begin at home | ENERGY STAR® | Nonrenewable |
| Embodied Energy | Coal | Energy Efficiency | Heating | Incandescent |
| Programmable or Smart Thermostat | Reduce | Oil | Solar | Uranium |

| L | I | N | G | O |
|----------------------------------|--------------|-----------------------------|-------------|-------------------|
| Coal | Natural Gas | Solar | Turn It Off | Renewable |
| Water | Nonrenewable | Phantom Load | Electricity | Full Load |
| Energy | Oil | Be Wattsmart, Begin at home | 68 Degrees | Cooking |
| Programmable or Smart Thermostat | Incandescent | Recycle | Uranium | Natural Resource |
| Reduce | 78 Degrees | Embodied Energy | LED | Energy Efficiency |

| L | I | N | G | O |
|------------------|--------------|-----------------------------|----------------------------------|------------|
| Natural Resource | Water | Natural Gas | Programmable or Smart Thermostat | 78 Degrees |
| Turn It Off | Reduce | Oil | Embodied Energy | Cooking |
| Phantom Load | ENERGY STAR® | Be Wattsmart, Begin at home | Uranium | Recycle |
| Energy | LED | 68 Degrees | Energy Efficiency | Heating |
| Electricity | Renewable | Incandescent | Full Load | Solar |

Dear Parents,

Today your child participated in the **Be Wattsmart, Begin at home** program sponsored by Rocky Mountain Power. In this engaging presentation, your child learned key science curriculum concepts 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* (HEW)

Please take a moment to read through this informative booklet with your child. Then, fill out the HEW in one of two ways:

- Visit thinkenergy.org/Wattsmart and complete the online worksheet. You will need to enter the teacher ID found on the paper worksheet. If you do not have the teacher ID, you can find it by searching for the teacher's name on the website.
- or
- Fill out the paper worksheet and return it to your child's teacher. To thank you, Rocky Mountain Power will provide your child with a Wattsmart nightlight.

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



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UT, ID, WY

Estimados padres,

Su hijo ha participado en el programa **Sea Wattsmart, Empieza en casa**, patrocinado por Rocky Mountain Power. En esta presentación atractiva, su hijo aprendió conceptos claves de su plan de estudios de ciencias, así como formas importantes para ser más eficiente con el uso de energía en el hogar.

Como parte del programa de **Sea Wattsmart, Empieza en casa**, su hijo recibirá:

- El folleto de **Sea Wattsmart, Empieza en casa**
- *Verificación de Energía Doméstica*

Tome un momento para leer el folleto informativo con su hijo. Luego, complete la *Verificación de Energía Doméstica* de una de estas maneras:

- Visite thinkenergy.org/Wattsmart para completar el formulario en línea. Necesitará entrar el número de identificación de su profesor que se encuentra en el formulario de papel. Si no tiene la identificación del maestro, puede encontrarla buscando por el nombre del maestro en el sitio web.
 - o
- Complete el formulario y devuélvalo al profesor de su hijo. Para agradecerle, Rocky Mountain Power le proporcionará a su hijo una luz de noche.

Apreciamos sus esfuerzos para reforzar la importancia del **Sea Wattsmart, Empieza en casa** de la energía y los acciones eficientes en el hogar.

WATTSMART
BEGIN AT HOME

**National
Energy
Foundation**
cultivating energy literacy

**ROCKY MOUNTAIN
POWER**
POWERING YOUR GREATNESS

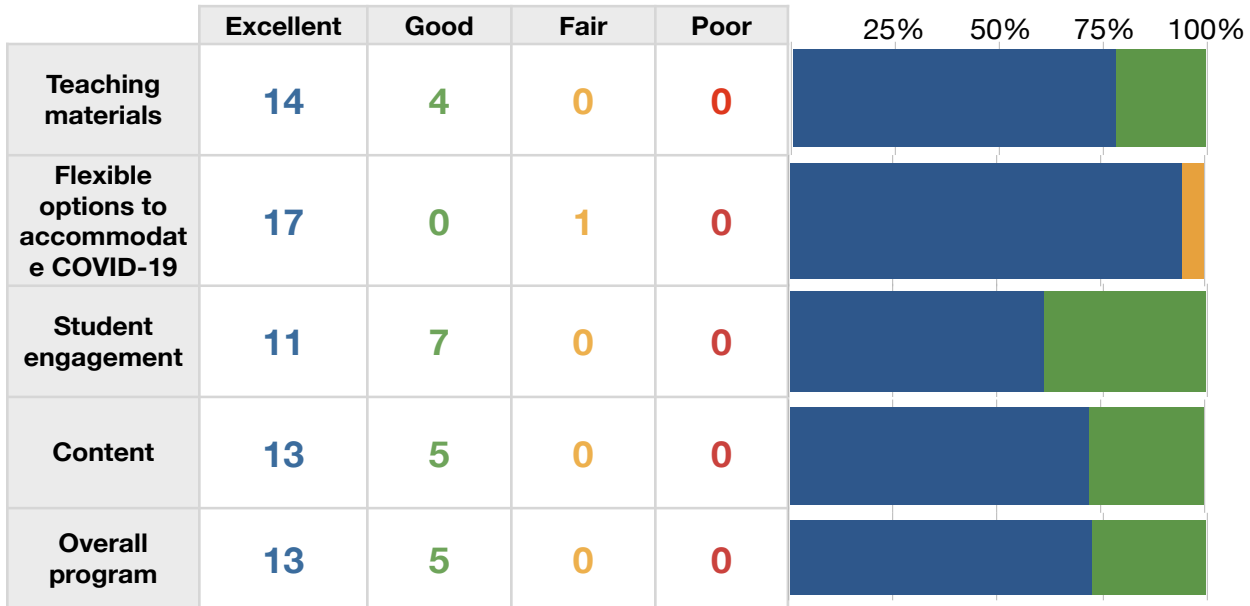
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UT, ID, WY

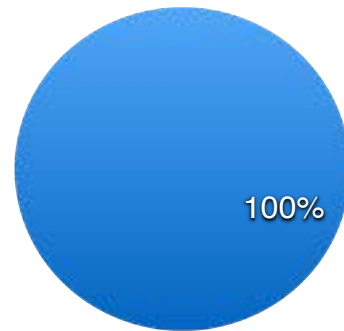
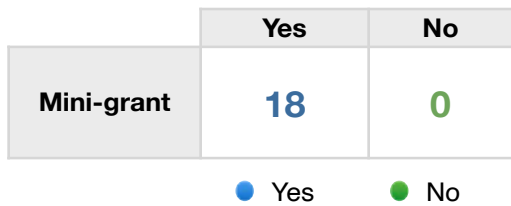
Wattsmart Rocky Mountain Power Wyoming program

Program Evaluation Summary

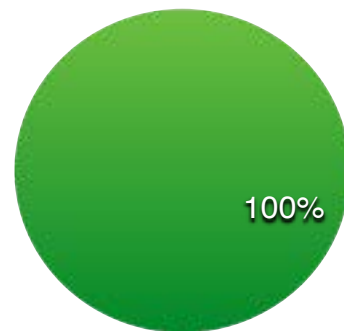
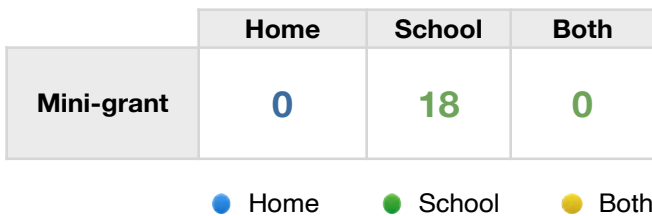
Impressions of the program from 18 educators.



Was the educational mini-grant a good incentive to participate in the program?



Where did your students participate with the presentation?



Please share your experience or feedback on the electronic/online learning you used.

| |
|--|
| Easy to use. |
| Everything went smoothly |
| I liked the video as we could pause and discuss |
| Students love the online video and game and they can learn at the same time. |
| The video was helpful. |

What additional activities did you or will you use from the Teacher Guide?

| |
|--|
| Activities that reinforce the concepts of circuits and renewable vs non |
| Good enough. |
| I haven't had a chance to look at the activities in the Teacher Guide. |
| I love the electrical generation poster to talk about alternative resources, I also will be looking at doing some of these hands on activities. I love how they are laid out and will help provide other activities. |
| I plan to use these teacher guides when we review this content with students during our science study. |
| random discussions about electricity usage and referral to the content they taught |
| We are using the posters to connect with the NGSS standards on Natural Resources |

What would you tell other teachers about the program?

| |
|---|
| Do it! |
| Excellent resource for energy content |
| Great intro to energy! |
| Great program. |
| I would tell other 4th grade teachers that this goes well with 4th Grade curriculum and standards. |
| It is a great introduction for students on energy and renewable and nonrenewable resources. When we began our study on these topics students have some great schema to draw from build their knowledge. |
| It is absolutely worth it and the discussions are very engaging. The kids really enjoy it |
| It is worth giving up valuable classroom time for the educational and engaging program they offer. |
| It's easy to book, engaging for kids, and a nice supplement to reinforce some of our standards |
| Our students enjoyed it. |
| Students think the lingo game is fun. |
| The program has great information and fun activities for the students. |
| This is a great program to teach children about conservation. |
| This is an engaging program that gets kids talking to parents about ways to conserve. |
| This program is a fun way for students to learn about energy! |

What would you like us to tell the program sponsor about the program?

Most students like the motivation of the night light to bring the survey back.

Thank you for your enthusiasm when you were here!

Thank you so much for providing us with this opportunity to support students learning.

Thank you so much!!!! This has tied in so well with what we do in class

Thank you! Content just right for 4th graders

The program has some important information for our students to know.

The students enjoy this presentation every year. I am SO appreciative of the gift card!

The students really enjoyed the presentation!

This is a very beneficial program that is engaging for students. They learn about ways to conserve natural resources.

We love when you guys can come in- in person!

Additional comments and recommendations:

I know the program has changed due to Covid-19, but it's just not nearly as interactive as it used to be, and that's what we enjoyed about it so much. It's just so sad that such a great program has been so drastically impacted.

Really fun and engaging! My kids really enjoyed it.

Thank you so much!

Thank you!

Thanks for providing the program options during Covid.

This program is well developed and the students learn a lot.

We really enjoyed the presentation! The students loved it!

Home Energy Worksheet (English)

Submit online at
thinkenergy.org/Wattsmart

Teacher ID:

Teacher Name:

Student First Name:

Home Energy Worksheet

Heating

1. Install and use a programmable or smart 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 or an evaporative cooling 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. Participate in Rocky Mountain Power's Cool Keeper program.
 Currently do Will do
 Neither

Water heating

9. Set the water heater temperature to 120 F.
 Have done Will do
 Neither
10. Install a high-efficiency shower head.
 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 inefficient bulbs with 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 old freezers/refrigerators and/or dispose of them in an environmentally safe manner.
 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, TVs and game consoles when not in use.
 Currently do Will do
 Neither

Cooking

19. Use a microwave oven, toaster oven, slow cooker or outdoor grill instead of a conventional oven.
 Currently do Will do
 Neither

Get paid for being Wattsmart

20. Visit Rocky Mountain Power at **Wattsmart.com** for more energy saving tips and rebates.
 Have done Will do
 Neither



Home Energy Worksheet (Spanish)

Enviar en línea a
thinkenergy.org/Wattsmart

Identificación del profesor(a):

Nombre del profesor(a):

Primer nombre del estudiante:

Verificación de Energía Doméstica

Calefacción

1. Instalar y usar un termostato programable o termostato inteligente.
 Lo hago Lo haré
 Ninguno
2. Calafatear ventanas e instalar burletes en el exterior de las 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/reemplazarlos regularmente.
 Lo hago Lo haré
 Ninguno

Enfriamiento

5. Reemplazar la unidad de aire acondicionado existente por una unidad de alta eficiencia o un enfriador evaporativo.
 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. Participar en el programa "Cool Keeper" de Rocky Mountain Power.
 Lo hago Lo haré
 Ninguno

Calentadores de agua

9. Programar el calentador de agua a 120 F.
 Lo he hecho Lo haré
 Ninguno
10. Instalar un 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 ineficientes con focos LED.
 Lo he hecho Lo haré
 Ninguno
14. Apagar las luces cuando no estén en uso.
 Lo hago Lo haré
 Ninguno

Refrigerador

15. Reemplazar el refrigerador viejo e ineficiente con un modelo de ENERGY STAR®.
 Lo he hecho Lo haré
 Ninguno
16. Desenchufar refrigeradores/congeladores viejos y/o desecharlos de una manera ambientalmente segura.
 Lo he hecho Lo haré
 Ninguno
17. Mantener las bobinas del refrigerador y del congelador e inspeccionar el sello de las puertas dos veces al año.
 Lo hago Lo haré
 Ninguno

Electrónicos

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

Cocinar

19. Usar un horno microonda, un horno eléctrico, un olla de cocimiento lento o una parrilla al aire libre en lugar del horno convencional.
 Lo hago Lo haré
 Ninguno

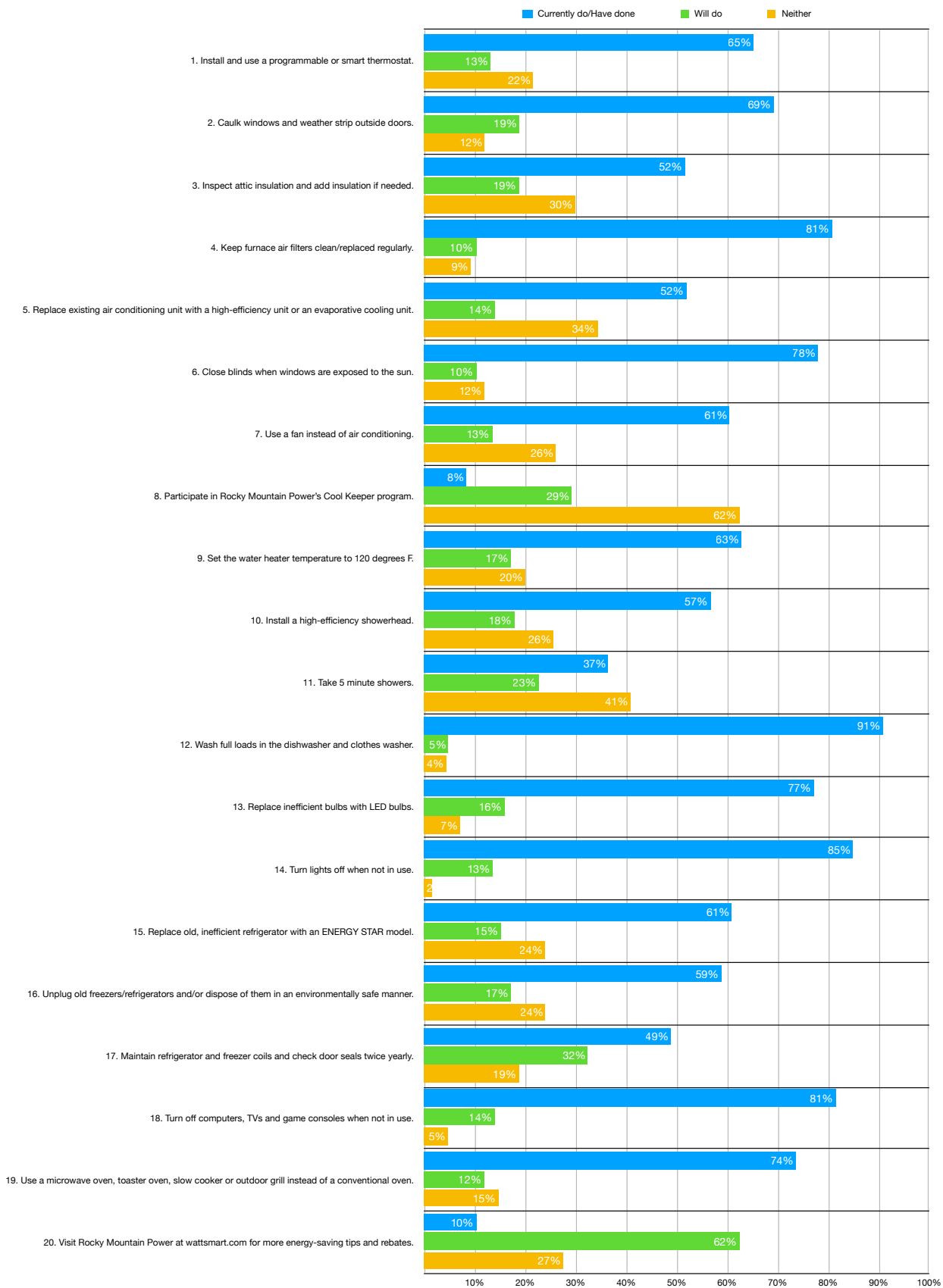
Reciba paga siendo Wattsmart

20. Visite Rocky Mountain Power en Wattsmart.com para obtener más consejos y rebajas de ahorro de energía.
 Lo he hecho Lo haré
 Ninguno



Home Energy Worksheet Summary – Rocky Mountain Power

| Energy Efficient Activity | Currently do/Have done | Will do | Neither |
|---|------------------------|---------|---------|
| 1. Install and use a programmable or smart thermostat. | 65% | 13% | 22% |
| 2. Caulk windows and weather strip outside doors. | 69% | 19% | 12% |
| 3. Inspect attic insulation and add insulation if needed. | 52% | 19% | 30% |
| 4. Keep furnace air filters clean/replaced regularly. | 81% | 10% | 9% |
| 5. Replace existing air conditioning unit with a high-efficiency unit or an evaporative cooling unit. | 52% | 14% | 34% |
| 6. Close blinds when windows are exposed to the sun. | 78% | 10% | 12% |
| 7. Use a fan instead of air conditioning. | 61% | 13% | 26% |
| 8. Participate in Rocky Mountain Power's Cool Keeper program. | 8% | 29% | 62% |
| 9. Set the water heater temperature to 120 degrees F. | 63% | 17% | 20% |
| 10. Install a high-efficiency showerhead. | 57% | 18% | 26% |
| 11. Take 5 minute showers. | 37% | 23% | 41% |
| 12. Wash full loads in the dishwasher and clothes washer. | 91% | 5% | 4% |
| 13. Replace inefficient bulbs with LED bulbs. | 77% | 16% | 7% |
| 14. Turn lights off when not in use. | 85% | 13% | 2% |
| 15. Replace old, inefficient refrigerator with an ENERGY STAR model. | 61% | 15% | 24% |
| 16. Unplug old freezers/refrigerators and/or dispose of them in an environmentally safe manner. | 59% | 17% | 24% |
| 17. Maintain refrigerator and freezer coils and check door seals twice yearly. | 49% | 32% | 19% |
| 18. Turn off computers, TVs and game consoles when not in use. | 81% | 14% | 5% |
| 19. Use a microwave oven, toaster oven, slow cooker or outdoor grill instead of a conventional oven. | 74% | 12% | 15% |
| 20. Visit Rocky Mountain Power at wattsmart.com for more energy-saving tips and rebates. | 10% | 62% | 27% |

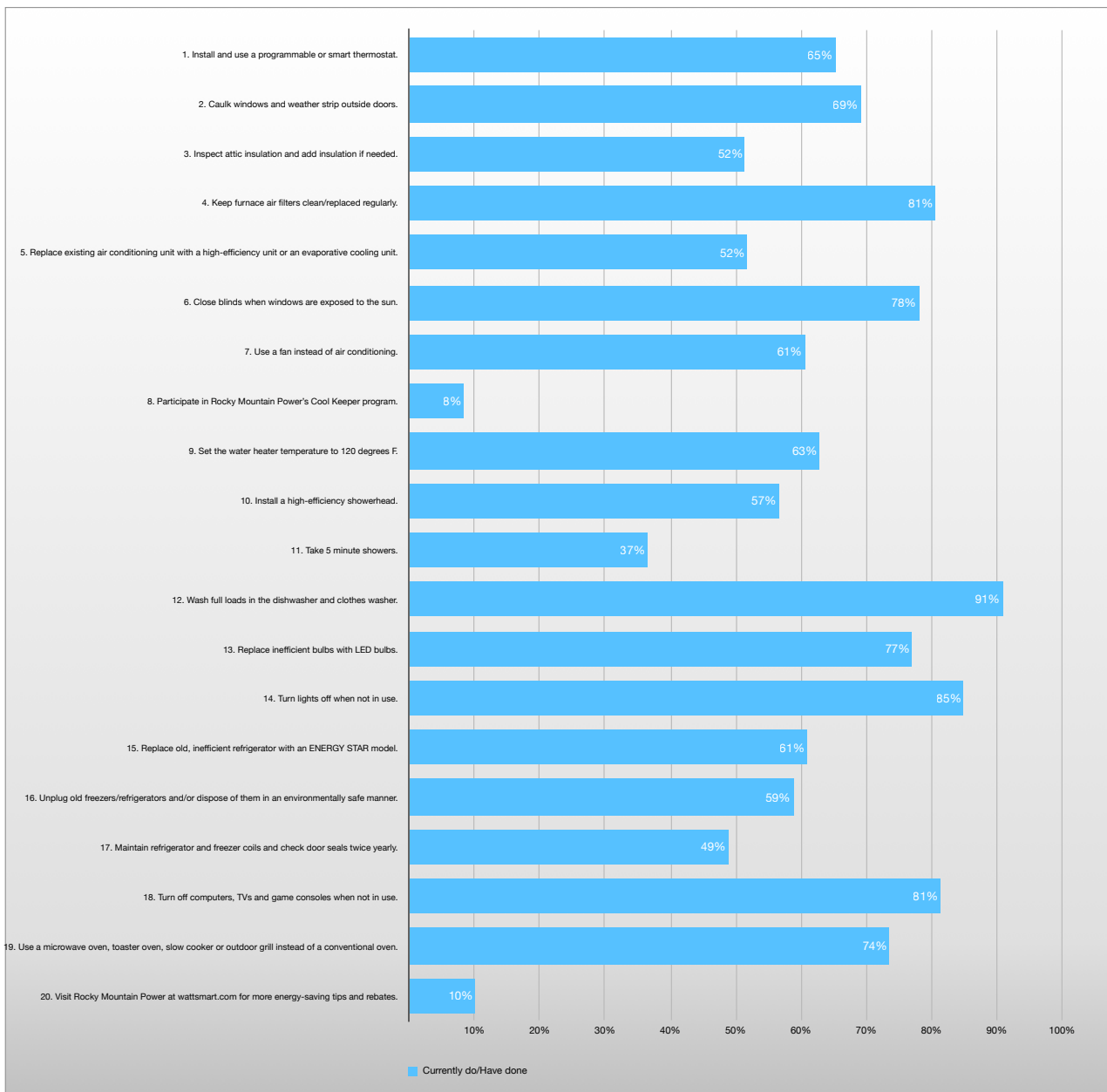


Data Numbers

| Energy Efficient Activity | Currently do/Have done | Will do | Neither | Total Responses |
|---|------------------------|---------|---------|-----------------|
| 1. Install and use a programmable or smart thermostat. | 347 | 70 | 115 | 532 |
| 2. Caulk windows and weather strip outside doors. | 367 | 100 | 64 | 531 |
| 3. Inspect attic insulation and add insulation if needed. | 271 | 98 | 157 | 526 |
| 4. Keep furnace air filters clean/replaced regularly. | 429 | 54 | 49 | 532 |
| 5. Replace existing air conditioning unit with a high-efficiency unit or an evaporative cooling unit. | 272 | 73 | 180 | 525 |
| 6. Close blinds when windows are exposed to the sun. | 415 | 54 | 63 | 532 |
| 7. Use a fan instead of air conditioning. | 322 | 71 | 139 | 532 |
| 8. Participate in Rocky Mountain Power's Cool Keeper program. | 44 | 153 | 326 | 523 |
| 9. Set the water heater temperature to 120 degrees F. | 330 | 90 | 105 | 525 |
| 10. Install a high-efficiency showerhead. | 300 | 94 | 136 | 530 |
| 11. Take 5 minute showers. | 194 | 120 | 217 | 531 |
| 12. Wash full loads in the dishwasher and clothes washer. | 485 | 26 | 23 | 534 |
| 13. Replace inefficient bulbs with LED bulbs. | 410 | 84 | 38 | 532 |
| 14. Turn lights off when not in use. | 447 | 71 | 8 | 526 |
| 15. Replace old, inefficient refrigerator with an ENERGY STAR model. | 323 | 80 | 127 | 530 |
| 16. Unplug old freezers/refrigerators and/or dispose of them in an environmentally safe manner. | 312 | 91 | 128 | 531 |
| 17. Maintain refrigerator and freezer coils and check door seals twice yearly. | 259 | 172 | 99 | 530 |
| 18. Turn off computers, TVs and game consoles when not in use. | 433 | 74 | 25 | 532 |
| 19. Use a microwave oven, toaster oven, slow cooker or outdoor grill instead of a conventional oven. | 393 | 63 | 78 | 534 |
| 20. Visit Rocky Mountain Power at wattsmart.com for more energy-saving tips and rebates. | 54 | 331 | 146 | 531 |

Wise Energy Behaviors in Rocky Mountain Power Wyoming Homes

Wise Energy Behaviors in Rocky Mountain Power Wyoming Homes



Sampling of Thanks a "WATT" Cards



Lizzie

Handwritten orange and blue scribbles

Writer

Hailee

dye
Thank you

Thanks

a "Watt!"

Handwritten pink scribbles

Handwritten blue scribbles

Turner
Olivet

Nova

Trennady.T

Thank you for providing the **Be Wattsmart, Begin at home**

program to our school. We learned how to make a difference, use energy

wisely and had fun doing it.

Thank you!
Mrs. Johnson's
class

Emma

Handwritten blue scribbles

10 Hon

Handwritten blue scribbles

WATTSMART®
BEGIN AT HOME

Abbey

teddy

Drake

Tayelyn

Handwritten pink scribbles

Levi



Kaice

Handwritten black scribbles

Lily
Hay
Mia

alicia
Mason

Max. E. #
malayla
Jace Ball
Bayron T.



Max

Thanks a "Watt!"

Russell
Calvin

Simon

Thank you for providing the **Be Wattsmart, Begin at home** program to our school. We learned how to make a difference, use energy wisely and had fun doing it.

Sarah

Ava

LOGAN

Thank you very much!

It's a quality program.
Rave
Mrs. Haya

WATTSMART
BEGIN AT HOME

Lincoln

Olivia

Bensan

Rebecca



Lola

Eli W



graham Lillian

Payson

Hallie

Thanks

Rachel
Gwynn
We appreciate you!!

Eli N

a "Watt!"

Risleigh

Iren

Thank you for providing the **Be Wattsmart, Begin at home** program to our school. We learned how to make a difference, use energy wisely and had fun doing it.

Lexi

stetzen

WATTSMART
BEGIN AT HOME

Sofie

Will
Harlow
Morgan
wes

Calvin

Berkley

Akeric + M
Jordan

Brock



faith e.

Alex
Greysan

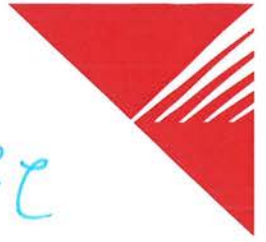


Rachel

Brynlie B

Dylan

Embrey
Oaklee



Parker #1
Mason
Kyson
Paige
Thanks
a "Watt!"
Cole Peyton

Julie #13

Thank you for providing the **Be Wattsmart, Begin at home** program to our school. We learned how to make a difference, use energy wisely and had fun doing it.

Allie

Hunter

Ivy
WATTSMART
BEGIN AT HOME

Kayden

Brynlie

Thank you so much. The student talked about your activities #17 for days.

Hudson

Braxton

Sapphire!!

Kelson
Carson

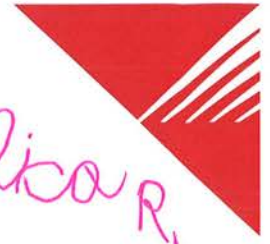
Mrs. Brogan



Tracen

EMMA!

angelica R.



Bentley

Remington

Aidan Kautz

Bertram

Thanks

Mason

a "Watt!"

Challenge

Sargent Hallie

Thank you for providing the **Be Wattsmart, Begin at home** program to our school. We learned how to make a difference, use energy wisely and had fun doing it.

Kathryn

Jose

Stryder

chloe
McCall

Julian

WATTSMART
BEGIN AT HOME

Mrs. Johansson

Ella

Emily

Pyper

Lydia

Brooklyn



Karlee H.



Skylar