BRIGHT KIDS

Teacher Guide

National Energy Foundation®
cultivating energy literacy

Consumers Energy
Count on Us®

TEACHER GUIDE

Welcome to Bright Kids!

This unique, hands-on program teaches the importance of energy, natural resources and caring for our environment.

The program includes a *Bright Kids Kit* of energy-saving products, packaged with *Installation Instructions* for each student in your class. With this kit, students will learn that changing habits and installing products can be the easiest way to be energy efficient.

The *Teacher Guide* is designed to facilitate program instruction. Please review the materials before beginning. A variety of tools have been provided to allow you to format Bright Kids to meet your instructional needs. These tools include:

- Program *Steps for Success* providing a step-by-step guide to completion of Bright Kids, including detailed instructions for the *Home Energy Worksheet* (HEW)
- Classroom discussion and activity suggestions, including engaging worksheets and puzzles for students

Introduction

Before beginning the program, please be sure you have read all of the information on the *Steps for Success*.

In an effort to meet today's educational standards, these materials have been developed for this custom program. The lessons are correlated to the National Science Standards and National Social Studies Standards, as well as your state standards. These correlations are available online on your program website.

In the event that a student is not able to install an item found in the *Bright Kids Kit*, please encourage them to give it to someone who will benefit from using it. Students should fill out the HEW for all items in the kit, whether used in their home or someone else's.

For questions, comments or information regarding this program or materials found in the kits, visit your program website.

Thank you for your participation in Bright Kids.

Enjoy!

IMPORTANT NOTE

Please be sure each person receiving a *Bright Kids Kit* completes the HEW or submits the answers online.

Teacher Background

Energy comes from the earth's natural resources. Natural resources are anything we use that comes from the earth or our sun. All of the things we use every day to meet our wants and needs are provided through the use of natural resources, which are either renewable or nonrenewable.

Renewable resources are materials that are replaced naturally within a fairly short period of time. Renewable resources include the sun, wind, water, plants and animals. Nonrenewable resources exist in fixed amounts within the earth and once they are used up, they are gone. Nonrenewable resources include minerals and fossil fuels like coal, oil and natural gas.

Energy is the ability to do work or produce a change. Derived from natural resources, energy lights, heats and cools our homes, schools and factories. It powers the machines of industry and transportation. The clothing we wear, the food we eat, the buildings in which we live and work and even the systems we use to

communicate, are all dependent on energy. We tend to take energy for granted, but its importance should not be overlooked because nothing happens without energy.

Electricity is a secondary energy source that is generated from primary resources, some renewable (e.g., solar power) and some nonrenewable (e.g., natural gas). Electricity is unique as it is energy in transit.

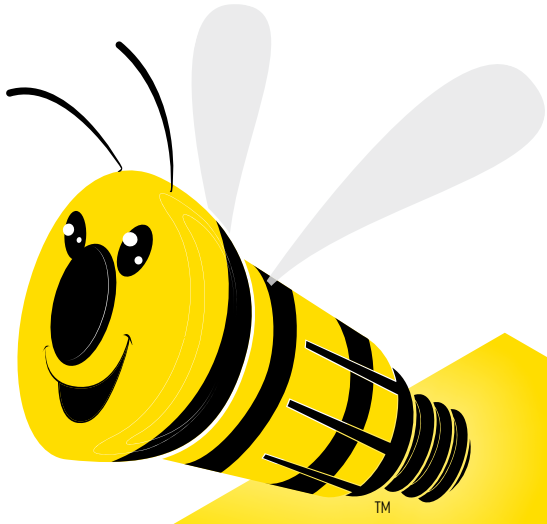
Look at how electricity is generated using natural gas as the primary energy resource:

- Natural gas is burned to heat water in a boiler and convert it to steam.
- The steam goes through a turbine, turning its blades. The shaft of the turbine is connected to a generator which makes electricity.
- Voltage is increased at substations to boost the electrical flow as it travels miles through transmission lines, then the electricity is transmitted to homes, schools and communities.
- The electricity goes through a transformer to decrease voltage before the electrical current enters a building.

An electrical circuit is a complete path on which an electric current travels. Our homes have wires throughout, which are located behind the walls, that connect electrical switches and outlets. When you flip a switch or plug something into an outlet, you complete a circuit and electricity flows through the wires. For example, a light bulb consumes the electricity from a circuit and converts it into work, heat and light.

We can all make a difference by being **energy efficient** and, in doing so, conserving our natural resources. Ways we can make a difference and conserve our natural resources include:

- Replace any incandescent light bulbs in your home with LED bulbs.
- Change a regular night light to an electroluminescent night light.
- Turn off lights when they are not needed.
- Turn off TVs, video games and computers when not in use.
- Place *Turn It Off Stickers* on items as daily reminders.



Literacy Connection

Use these literacy activities to enhance learning after your Bright Kids presentation.

1. Direct students to create a watercolor picture of the sun shining down on the earth. Have them include at least three natural resources in their painting; the sun plus two others such as water, wind, plants, animals, coal, oil or minerals. Have students share their paintings with the class and tell about the natural resources they included. Display the artwork in the classroom or the hallway.
2. Review with students that energy is the ability to do work. Have students write a short story about a time they had energy and the ability to do work. Discuss with students various activities they might have done, such as playing soccer, doing homework, mowing the lawn, cleaning their room, playing baseball, helping with the dishes, setting the table or dusting the furniture. Tell students they will be writing a nonfiction story about energy. Have students share their stories with the class. You could also make a class book of the stories for the students to read and enjoy.
3. Review with students the various ways electricity is used, such as lights, computers, TV, video games, refrigerator, dishwasher, washer and dryer. Collect some old magazines and have students work in groups of three or four to cut out pictures of items that use electricity. Give each group a poster board and have them glue the pictures onto the poster board to make a collage. Have students share their electricity collages with the class.
4. Review with the class various ways we can be energy efficient with electricity in order to conserve our natural resources. These are found on the last two pages of the book. Have students work in groups of three or four to make an energy efficiency poster. Give each group a poster board and one of the ideas listed in the book about being energy efficient. Using markers or crayons, have students illustrate their energy efficiency poster. Have students share posters with the class. Have students share their posters with other classes or display the posters in the school.

Stuffed Suns

Objective:

Students will identify several ways the sun's energy benefits us.

Materials Needed:

- 18" x 36" pieces of butcher paper or newsprint
- Crayons, poster paint or markers
- Staples and stapler
- Old newspaper
- String

Pre-activity Discussion:

Discuss the sources of energy that we receive directly or indirectly from the sun. (You may want to write these on chart paper or the whiteboard as students mention them.) Examples could include coal, oil (gasoline), water, wind, natural gas, food and wood. Explain that fossil fuels (coal, oil and natural gas) come from plants and marine animals that have been buried for millions of years. The weight from the layers of mud and sand created pressure and heat that changed the plants and marine animals into fossil fuels.

Procedure:

1. Give each student an 18" x 36" piece of butcher paper or newsprint. (You can construct smaller suns if desired.)
2. Instruct students to fold the paper in half and paint or color a large sun on both front and back of the fold. Encourage students to be creative! To provide students with math practice, instruct some to make suns with eight points, some with 10 points and some with 12 or 15 points. Suggest that they make half of their points long and half of them short.
3. Direct students to print some of the different ways we get energy from the sun on the points.
4. Cut the suns out and staple around two-thirds of the edge.
5. Stuff with old newspapers and finish stapling the edges.
6. Decorate the room with the stuffed suns.

Check for Understanding:

Have students share their suns in small groups and discuss the ways we get energy from the sun that they printed on the points.

To Know and Do More:

After you have decorated the room with your beautiful suns, have the students sing the verse to the right to the tune of "Row, Row, Row Your Boat." Try a round or add a second verse.

Oh, we love the sun
With all its shining rays.
It gives us light and energy
In many different ways.

Sun Fun Words
Activity Sheet

The sun is our ultimate energy source! Finish the sentences with these sun fun words.

1. The light of the sun is called sun _____.
2. The first day of the week is Sun _____.
3. A tall plant with a big yellow flower is a sun _____.
4. When your skin is red and hurts, you have a sun _____.
5. An ice cream treat is called a sun _____.
6. A beautiful red and orange sky in the evening is called a sun _____.
7. A ray of sunlight is called a sun _____.
8. A clock that tells time with shadows is a sun _____.
9. When the sun peaks over the horizon in the morning it is called sun _____.
10. Lotion you put on to prevent a sunburn is called sun _____.

Word Bank:

sun**dial**	sun**flower**	sun**shine**	sun**dae**	sun**beam**
sun**rise**	sun**screen**	Sun**day**	sun**set**	sun**burn**

Renewable and Nonrenewable Resources

Objective:
Students will learn the difference between renewable and nonrenewable resources.

Materials Needed:
- An "Energy Resources" activity page per student

Pre-activity Discussion:

Discuss the needs of all people: air, water, food and shelter. Our environment provides for our needs through natural resources. Discuss what a natural resource is and list various natural resources. (A natural resource is the sun and anything that comes from the earth.)

Make a large T chart on chart paper or the whiteboard listing renewable on one side and nonrenewable on the other side. Review with students what renewable means (naturally replaced). Review what nonrenewable means (not naturally replaced). As students name a natural resource, discuss if it would be renewable or nonrenewable and put it on the correct side of the T chart.

renewable	nonrenewable
sun	coal
wind	oil
water	natural gas
plants/animals	minerals

Discuss the concept of scarcity. How can resources become scarce? (overuse, natural changes such as drought) How can we avoid scarcity? (finding new ways to do things, using resources more efficiently)

Procedure:

1. Tell students they are going to discover a message that is written in secret code.
2. Direct students to look carefully at the math problems, some are addition and some are subtraction. After they solve the problem, they should look at the code key to find out which letter to use to solve the puzzle.
3. Give students time to solve the puzzle.

Check for Understanding:

When students have finished, discuss the message they discovered.

To Know and Do More:

Have students work in pairs or groups to create a message written in secret code.

Energy Resources

Below is a message that is written in a secret code. Solve the addition and subtraction problems and then use the Code Key to discover which fossil fuels provide us with energy. The first one is done for you.

11 +8 19	7 +14	4 +10		15 +8	8 -7	11 +9	13 -8	6 +12		5 -4	6 +8	8 -4		
S		—,						—,						
16 +7	15 -6	5 +9	19 -15		6 -5	14 +4	13 -8		12 +8	14 +11	21 -5	12 -7	13 +6	
7 +8	10 -4		12 +6	19 -14	20 -6	4 +1	24 -1	22 -21	1 +1	18 -6	11 -6			
12 +6	14 -9	11 +8	8 +7	6 +15	9 +9	11 -8	15 -10	11 +8						

Code Key

1 = A	5 = E	9 = I	13 = M	17 = Q	21 = U	25 = Y
2 = B	6 = F	10 = J	14 = N	18 = R	22 = V	26 = Z
3 = C	7 = G	11 = K	15 = O	19 = S	23 = W	
4 = D	8 = H	12 = L	16 = P	20 = T	24 = X	

I Can Make a Difference

Objective:
Students will understand that when we all make small changes, they add up to gigantic changes.

Materials Needed:
- One empty plastic bottle

Pre-activity Discussion:

Ask students to name some human-made products we use everyday that are made using our natural resources. These might include paper, plastic, aluminum, metal, fabrics, cardboard, etc. Tell students we are going to talk about the 3 Rs: reduce, reuse, recycle.

- Reduce: To use less of something
  Examples of things to reduce are electricity and water.
- Reuse: To use something again
  Examples of things to reuse are bags, water bottles and clothing.
- Recycle: To make something into another new thing
  Examples of things to recycle are paper, glass, plastic and aluminum cans.

When we reduce, reuse and recycle we save the energy that is needed to make new things.

Procedure:

1. Show students the empty plastic bottle. Tell them the energy saved by recycling 10 plastic bottles could power a laptop for more than 25 hours.
   (Source: *epa.gov/recycle/frequent-questions-recycling#recydling101*, accessed April 2022)
2. Ask students if they recycle at home. Discuss recycling at school. If your school does not recycle, see what your class could do to get it started.
3. Discuss with students how that bottle can be reused. For example, they could cut it open and use it to hold crayons or pencils. They could make a piggy bank, a bird feeder or a planter.

Check for Understanding:

Students should understand they can make a difference! Have students write down one way they can make a small change. Remind them that the small changes add up to gigantic changes. When we take care of our environment, we are helping our community.

To Know and Do More:

Set up an energy saving club at school.

Have students estimate how many bottles their household throws away each week. Then ask students to figure out how many hours those bottles, if recycled, could power their laptops.

Have students create math word problems around recycling to trade and solve.

An example could be:

- If you recycled 20 plastic bottles, the energy saved could power a laptop for how many hours? (50 hours)

Reduction and Reuse Activity Ideas:

Recycling is good. But reusing items, or not creating waste in the first place, are even better. Here are some ideas for reduction and reuse.

- Make a flower pot out of plastic containers from such things as butter, margarine, yogurt or cottage cheese. Fill it with soil and plant a seed in it.
- Make a bird feeder out of a milk carton taped to a hanger.
- Donate old clothing or other items to help those in need.
- Purchase food and other items with less packaging.

For a homework project, have students bring in a project made from reused items. Give out certificates to each child for originality, silliest, most colorful, etc. Give everyone who participates an award.

A Garbage Survey

List the items that can be reduced, reused or recycled from a day's worth of garbage.

Food _____

Paper _____

Aluminum _____

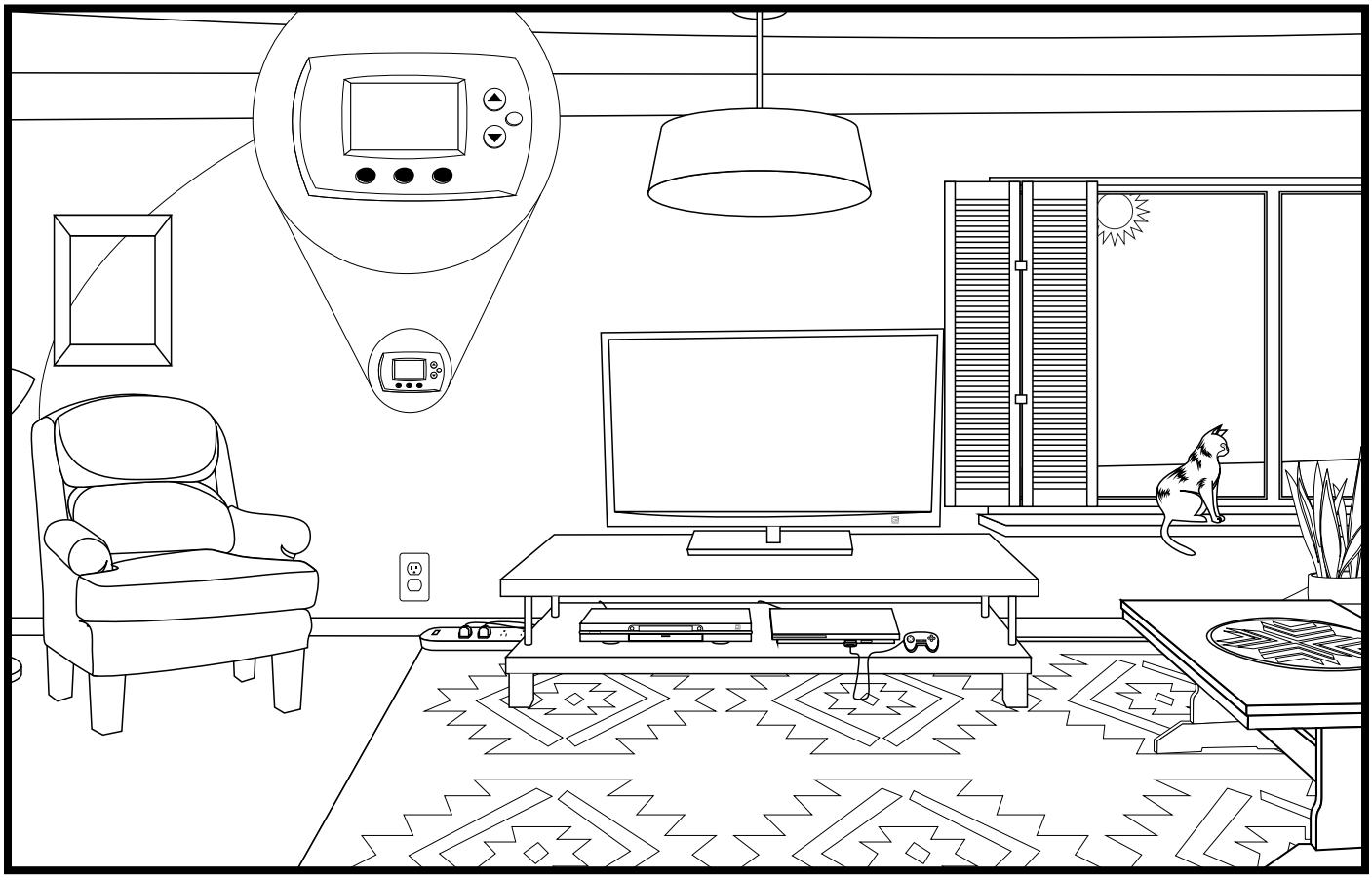
Glass _____

Plastic _____

Other waste _____

Creative Coloring

Click on the picture to download a creative coloring page that will demonstrate your energy knowledge!



1. Draw an LED bulb in the ceiling light.
2. Draw a plug and cord to show that an adult plugged in the advanced power strip.
3. Draw a parent or guardian holding the outlet gasket.
4. Make it look cold outside the window.
5. Draw yourself in the picture dressed in warm clothes for winter. Dress the cat in warm clothes too!
6. Write an energy efficient setting in the thermostat for winter.
7. Add a picture to the frame of your favorite energy efficiency device from your kit.
8. Draw a news show on the TV of someone making a difference by saving energy.

Activity Page Answers

Sun Fun Words Activity

1. sunshine	2. Sunday	3. sunflower	4. sunburn	5. sundae
6. sunset	7. sunbeam	8. sundial	9. sunrise	10. sunscreen

Energy Resources

19	21	14			23	1	20	5	18		1	14	4				
S	u	n,			w	a	t	e	r		a	n	d				
23	9	14	4		1	18	5		20	25	16	5	19				
w	i	n	d		a	r	e		t	y	p	e	s				
15	6		18	5	14	5	23	1	2	12	5						
o	f		r	e	n	e	w	a	b	l	e						
18	5	19	15	21	18	3	5	19									
r	e	s	o	u	r	c	e	s									

National Energy Foundation®
cultivating energy literacy

Consumers Energy
Count on Us®