

Watts On Your Mind

www.wattsnew.com

Dear Educator,

Meet Dr. Frank N. Stein. He's a mad scientist. Or, as he puts it, "When someone wastes energy, it really makes me mad!"

Students want to make a difference in the world, and this free educational kit, "Watts On Your Mind," will show them how using energy efficiently can help reduce air pollution. They will also be entertained by three characters from "Watts On Your Mind," an animated television special produced in association with the U.S. Environmental Protection Agency, Earth Share, and the Ad Council. Those characters are the mad scientist, Dr. Frank N. Stein; his assistant, Sigmund; and the monster they create. The group's adventures offer spirited demonstrations on how to use energy responsibly.

Students will learn that it's easy to avoid wasting energy. They can turn off the lights and appliances when leaving a room, close windows when the heat or air conditioning are on, use both sides of a piece of paper, unplug appliances when they go on vacation, turn off the television, and shut down computer games when they've finished with them. "You don't have to stumble around in the dark," says Dr. Frank N. Stein, "Just shut off the lights when you leave a room!" Those action steps, as well as important information about how we get energy, are incorporated into four activities each for students in grades 1-3 and grades 4-6.

As Dr. Frank N. Stein says, "By using only what we need and not wasting energy, we will burn less fossil fuel, which will reduce the amount of air pollution created and make the world a better and safer place to live for people and all other creatures, like monsters, big and small!"

We encourage you to share "Watts On Your Mind" with other teachers. Although Lifetime Learning Systems' materials are copyrighted, you have our permission to photocopy as many sets as needed for educational purposes.

We hope you and your students enjoy using this fun program to learn about the responsible, efficient use of energy.

We would appreciate it if you would take a moment to fill out and return the enclosed response card to ensure that you continue to receive free educational programs from Lifetime Learning Systems.

Sincerely,

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Forrest Stone
Editor in Chief
Lifetime Learning Systems®, Inc.



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2. Television is on, no one is watching. **Solution:** Turn off the television if no one is watching.
3. Sigmund is lingering in front of an open refrigerator. **Solution:** Know what you want before you open the refrigerator door, and close the door when you have the food you want.
4. Computer game flashes “Game Over”; nobody is using the computer anymore. **Solution:** Turn off your computer when you’re done using it.
5. A lamp is left on. **Solution:** Turn off lights when you’re done with them.
6. There is blank paper in the trash can. **Solution:** Use both sides of a piece of paper before you throw it away.

Follow-Up Activity:

Ask students to write and illustrate a short poem about the importance of keeping the air clean by not wasting energy. Post these in the classroom as reminders of how everyone can help keep our air healthy and clean!

Take-Home Activity

Grades 1-3

Make a Message

Art is an effective way for kids to express their ideas. The “Watts On Your Mind” characters inspire kids to create art to help them remember to save energy. Copy and distribute the templates. Students and their parents can design and create a switchplate cover to stick on a light switch cover at home, reminding the family to turn off the lights. Another template helps students create a refrigerator magnet that reminds them to decide what they want before opening the refrigerator door.

Activities

Grades 4-6

Activity One WATT DO YOU KNOW?

Dr. Frank N. Stein explains that the energy we use to light, cool, and heat our homes and run our appliances comes, generally, from burning fossil fuel. Burning too many fossil fuel can create air pollution. When we avoid wasting energy, less fossil fuel is burned, and this keeps the air cleaner. Energy waste is also reflected in household fuel bills; if you save energy, you also save money on your family’s fuel bills.

First, ask students for a definition of energy. They might equate “energy” with “electricity.” Explain that energy is the power or strength to make things happen. Elicit examples of energy use, and then ask students if they can think of examples of energy waste.

Distribute the activity sheet, and direct students’ attention to the section, “**Energy and Air Pollution.**” Make sure students understand that burning too many fossil fuels causes too many gases, like carbon dioxide, to get caught in the atmosphere, which results in

air pollution. Ask students if they are aware of air pollution in your area; does smog appear in your area? Is it hard to breathe in industrial areas, near factories?

Have students work independently on the exercise, in which they determine if each of six scenarios is a waste of energy or not. After they have completed the activity, go over the answers (below) in class.

Answers:

1. **No Waste.** It’s a good idea to unplug appliances if you won’t be using them for a while, because appliances that are plugged in still conduct a small amount of energy even if they aren’t turned on.
2. **No Waste.** As long as you’ve been watching the television, it’s not a waste of energy. And it’s a responsible energy move to switch off the television when you’re done watching it!
3. **Waste.** It takes 10 times more energy to make a new piece of paper than it does to use up the second side. Using up a piece of paper completely—on both sides—is a responsible use of energy.
4. **Waste.** It’s not a good idea to leave the refrigerator door open longer than necessary, because then more energy is needed to make the inside of the refrigerator cool again. It’s better to know what you want before you open the door, and close the door once you’ve retrieved what you want.
5. **No Waste.** You’ve used what you needed, and then responsibly shut the game off when it was over.

Follow-Up Activity:

After completing this activity, hand out the take-home exercise that lists the action steps students can take to use energy more responsibly. Suggest to students that they keep an energy journal for a week, describing the ways they make an effort to use energy wisely.

Students can also research and report on air pollution throughout the world and the effect it has on different ecosystems.

Activity Two WATT’S WRONG WITH THIS PICTURE?

In this activity, Dr. Frank N. Stein asks students to find examples of energy waste in his mad scientist’s castle.

Before starting this activity, engage students in a discussion of responsible energy use. Ask: How often do students think about using energy wisely on a day-to-day basis? Do they worry about long-term consequences of air pollution? Explain that when fossil fuels are burned, carbon dioxide is released into the atmosphere. Too much carbon dioxide in the atmosphere causes the Earth to trap heat from the sun, which causes air pollution and can even cause climate change. Smog is one example of how air pollution manifests itself. Let students know that they can, individually and cumulatively, make a huge difference by using energy carefully at home and at school. Turning off lights when one leaves a room may seem like a small step, but even small steps do add up!

Distribute the activity sheets, and direct students to locate five examples of energy waste in the picture, which are listed below. After circling each example, students should write out and then discuss responsible solutions to each scenario.



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Examples of energy waste found in the picture:

1. Air conditioner is on with window open. **Solution:** Close the window, or turn off the air conditioner.
2. Television is on, no one is watching. **Solution:** Turn off the television if no one is watching.
3. Sigmund is lingering in front of an open refrigerator. **Solution:** Know what you want before you open the refrigerator door, and close the door when you have the food you want.
4. Computer game flashes "Game Over"; nobody is using the computer anymore. **Solution:** Turn off your computer when you're done using it.
5. A lamp is left on. **Solution:** Turn off lights when you're done with them.
6. There is blank paper in the trash can. **Solution:** Use both sides of a piece of paper before you throw it away.

Follow-Up Activity:

Independently or in groups, have students choose an "energy waste" scenario to research more thoroughly. For example, what impact is there on the Earth and on their family's energy bill if a window is left open for an hour—or more—while the air conditioner is running? Students can discuss their findings in class.

Activity Three WATT'S YOUR MESSAGE?

In this activity, the monster suggests telling the world about why it's important to not waste energy. Sigmund wonders if the world will listen. The monster then points out, "A monster might get their attention."

He makes an excellent point. Successful advertising campaigns grab people's attention with thought-provoking messages and creative methods of delivering a message.

Review with students the benefits of energy efficiency and explain that they will each create an ad campaign to teach their peers about the connection between energy waste and air pollution. Discuss the various ways in which messages can be conveyed to a large group of people:

Posters should be large and colorful and immediately convey a message.

TV commercials involve action and need a beginning, middle, and end. Students can make a storyboard for a commercial, and even videotape or act out the commercial in class.

Print advertisements can have more text than a poster and should have a catchy headline and an interesting picture. A successful print ad should make clear to its readers exactly what they should know and do after having read the ad.

Before they launch their ad campaign, students are asked to consider the following:

1. Who is your audience?
2. What is your message?
3. Why is your message important?
4. How will you communicate your message?

Have students share and fine-tune their answers in class before they begin working on their ads.

Students might want to use the "Watts On Your Mind" characters to help spread their messages about responsible energy use.

Follow-Up Activity:

Ask students to find and bring in examples of advertisements that convey a message rather than sell a product. Students can analyze each ad for its effectiveness and decide which ad they feel best conveys its message, and which ads they feel they could improve upon—then, have them go ahead and improve them!

Take-Home Activity

Grades 4-6

Watt Will We Do?

The characters from "Watts On Your Mind" offer advice on responsible use of energy. This activity sheet can be posted at home. Kids can show off all they've learned by taking a quick quiz with their parents on the high cost of wasting energy, both to the environment and to the family finances.

Quiz answers: 1 - b; 2 - d; 3 - a; 4 - d; 5 - b

For Further Reading

Grades 1-3

Morgan, Sally and Harlow, Rosie. *Energy and Power (Young Discoverers)*. Larousse Kingfisher Chambers, 1995.

Morgan, Sally and Harlow, Rosie. *Pollution and Waste (Young Discoverers)*. Larousse Kingfisher Chambers, 1995.

White, Larry. *Energy: Simple Experiments for Young Scientists*. The Millbrook Press, 1996.

Grades 4-6

Ardley, Neil. *Science Book of Energy*. Harcourt Brace Jovanovich, 1992.

Holmes, Anita. *I Can Save The Earth*. Julian Messner, 1993.

Miller, Christina G. and Berry, Louise A. *Air Alert: Rescuing the Earth's Atmosphere*. Atheneum Books, 1996.





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Program Objectives

This program demonstrates to kids how easy it is to use energy more efficiently, and helps them understand the link between wasting energy and air pollution.

Students will learn:

- what energy is and where it comes from;
- why it's important to use energy responsibly;
- how wasting energy contributes to air pollution;
- action steps that will reduce energy waste, help the environment, and save money on their family's energy bills;
- that they don't have to make major lifestyle changes or sacrifices to use energy more wisely.

Program Components

- Four dual-sided, reproducible activity masters for use in the classroom, with three in-class activities and one take-home activity for grades 1-3; and three activities and one take-home activity for grades 4-6
- Four-page teacher's guide
- Full-color wall poster to remind students of the important themes of "Watts On Your Mind"
- A teacher response card to complete and return in order to receive more free educational programs

Activities

Grades 1-3

Activity One POWER YOUR WAY THROUGH!

This activity defines "energy" for students: energy is the strength or power to do something. As a class, discuss what energy is and look for examples of energy at work in your classroom. Ask students if they know where energy comes from, and then distribute the activity sheet. Read the worksheet together as a class and discuss fossil fuels: what they are, where they come from, how we turn them into energy. Then, students can work on the maze independently. By completing the maze, kids learn the basics about the origins of fossil fuel energy, how it gets to a power plant, is converted to energy, and finally ends up powering things like appliances, televisions, and heating systems in the castle of the mad scientist, Dr. Frank N. Stein—and in kids' own homes.

Write the key vocabulary words below on the board, and ask students to use them in sentences about energy use.

Key vocabulary words:

coal - a type of fossil fuel

energy - the strength or power to do something; energy comes from fuel

fossil fuel - fuel formed from the remains of plants and animals from long ago

fossils - the remains or traces of plants and animals from long ago

natural gas - a type of fossil fuel

oil - a type of fossil fuel

Follow-Up Activity:

How does your town power up? Contact your local power company and find out if they offer tours or materials for elementary school students. Some power companies even offer in-school programs with puppet shows and skits.

Activity Two HOW TO USE ENERGY

The three characters from "Watts On Your Mind" teach students that wasting energy can create air pollution.

Part I

Ask students to think about what happens when they sit by a campfire. Elicit the idea that it becomes hard to breathe if smoke from the campfire blows their way. Explain to students that burning too many fossil fuels creates similar conditions in the air we all breathe. Distribute the activity sheet, and read Part I together as a class. This section outlines specific action steps, appropriate to this age group, that can be taken to reduce energy waste and help improve our air. Students can think about other ideas they have to save energy; they may know of some already, or they might want to take this activity sheet home and work together with their parents to think of other action steps!

Students may be concerned that they are wasting too much energy but not be sure what the difference is between using energy wisely and wasting energy. As a class, go over each action step, and discuss ways students can think of to easily incorporate each action step into their daily routine. In discussing each action step, highlight the difference between responsible and irresponsible energy use. For example, food is kept in the refrigerator, which is not a waste of energy. But when someone stands in front of an open refrigerator trying to decide what to eat, that is a waste of energy because it takes lots of energy to cool the inside of your refrigerator again after it's been open.

Part 2

Answers: b, d, and e are examples of energy waste.

Follow-Up Activity:

Students can make "energy journals" that illustrate each action step for using energy wisely, and then spend about a week making an effort to incorporate the steps into their own routines. They can keep track of their progress in the journals they've made.

Activity Three WHAT'S WRONG WITH THIS PICTURE?

In this humorous illustration of Dr. Frank N. Stein's laboratory, students will locate instances of energy waste.

If it's been more than a day since the class completed Activities One and Two, you may want to review the energy action steps with your students. Then, distribute the activity sheets, and ask students to circle each lapse in energy efficiency. Lead the class in a discussion of solutions to each problem.

Students can identify three of the following examples of energy waste:

1. Air conditioner is on with window open. **Solution:** Close the window, or turn off the air conditioner.



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Activity 2
Grades 4-6

WATT'S WRONG WITH THIS PICTURE?

There are some big wastes of energy in this picture! Come with me, my educated friend, and find where perfectly good energy is being wasted!

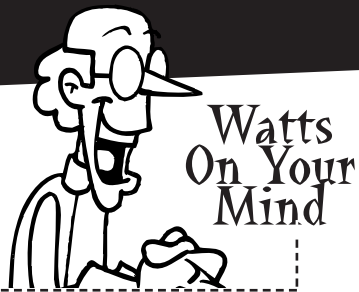


Circle five examples of wasting energy in this picture. Then, write a sentence for each situation, describing how you would correct it.

And then let us know how we can turn these **wrongs** into **rights**!



1. _____
2. _____
3. _____
4. _____
5. _____



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Activity 3
Grades 1-3

WHAT'S WRONG WITH THIS PICTURE?

Is energy being wasted in the home of Dr. Frank N. Stein?

Now that you know
how to use energy
wisely, circle three
places in this picture
where energy is **not**
being used wisely.





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WATT'S YOUR MESSAGE?

We should tell the world!



Tell the world what?



The importance of not
wasting energy.



But will the world
listen?



A monster might get
their attention!



After all, energy waste creates extra
air pollution, and we all need to
breathe clean air!

Help spread the word about the importance
of not wasting energy!
Create your own advertising campaign to
tell kids around school why it's important to
use energy wisely.

Who's your audience?

Who will see these ads and learn from them?

What's your message?

What do you want people to learn from your ad?

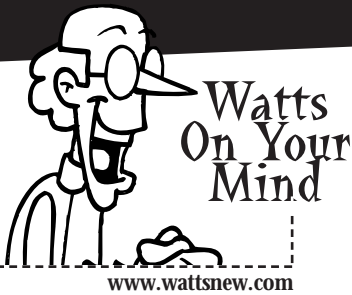
Why is it important?

In other words, "So what?"

How will you communicate your message?

Will you make a poster? A TV or radio commercial? What's the
best way to communicate what you want people to know?

Now that you have planned your advertisement, switch on your
creative energy and get to it!



HOW TO USE ENERGY

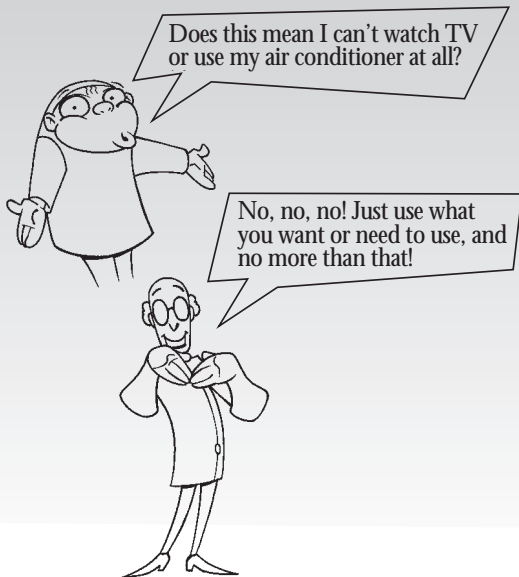
Part 1

Think of what happens when you're sitting by a campfire. If the wind blows the smoke from the campfire in your direction, it becomes a little hard to breathe. The air feels and smells smoky. Fossil fuels are burned to make the energy we need. But if too many fossil fuels are burned, that causes air pollution. Just like the smoke from a campfire, burning too many fossil fuels makes our air hard to breathe. That's the bad news. The good news is that you can help make the air cleaner by **not wasting energy**.

Here's what you can do to help!

- ★ Turn off the lights when you leave a room.
- ★ Turn off the computer if you won't be using it for a while.
- ★ Use paper more than once. If the back is blank, use that. Making new paper uses ten times more energy than printing another copy on the back of a used sheet.
- ★ Turn off the television and VCR when not in use.
- ★ Don't stand in front of the refrigerator with the door open. Decide what you want before you open the door.
- ★ Shut down computer games when you are finished using them.
- ★ Unplug appliances like the toaster oven and television when you leave the house for a few days.
- ★ If the air conditioner is on in the summer, keep the windows closed. If you feel too cold, turn off the air conditioner.
- ★ When the heat is on in the winter, keep the windows closed. If you feel too hot, lower the heat.

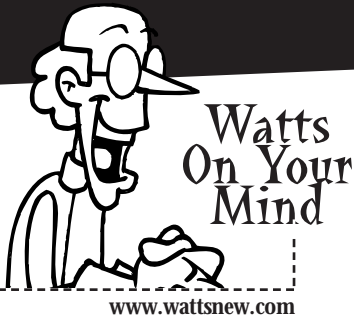
Can you think of other ideas?



Part 2

Put an "x" next to each example of energy use that is **not wasteful**.

- a. Watching TV ____
- b. Throwing away a blank piece of paper ____
- c. Playing a computer game ____
- d. Opening a window for cool air when the heater is on ____
- e. Keeping the kitchen light on all night ____
- f. Vacuuming the carpet ____



POWER YOUR WAY THROUGH!

ENERGY

is the **strength** or **power** to do something.

Light bulbs need energy to light up.
Your television needs energy to turn on.

Your refrigerator uses energy to keep your food cold.

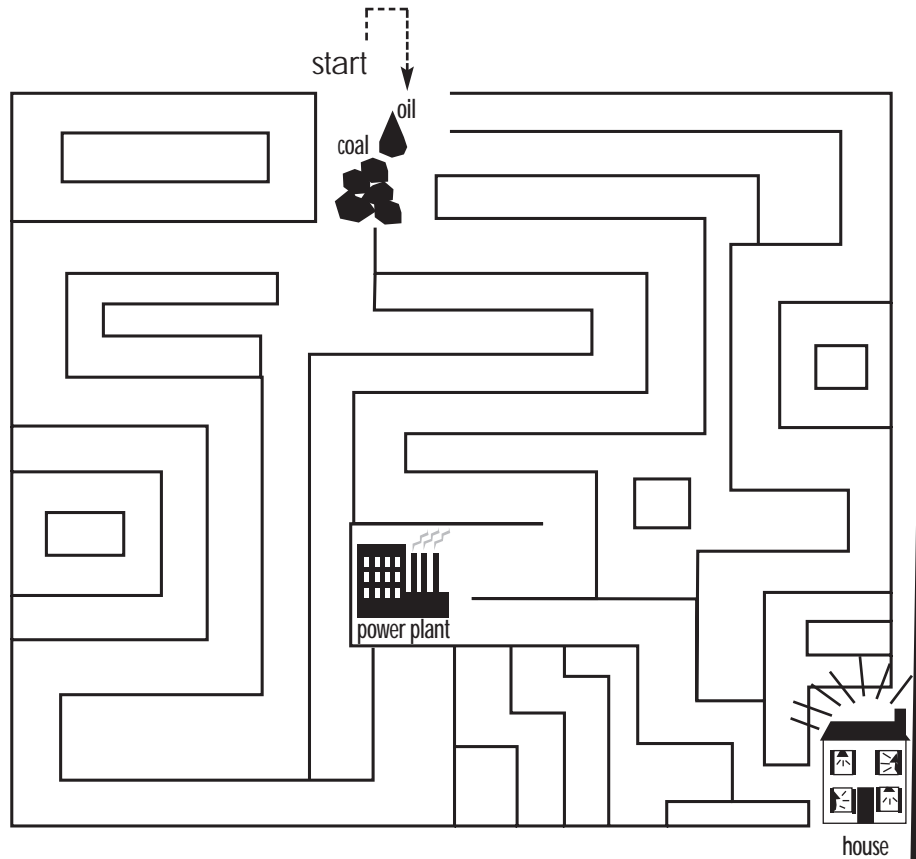
Your oven uses energy to cook your food.

Where does energy come from?

Surprise! Some types of energy come from dinosaurs! Dinosaurs died a long time ago. Over many years, dinosaurs and other animals and plants turned into **fossils**. The fossils turned into **oil**, **coal**, and **natural gas**, which are also called **fossil fuel**. Fossil fuels are burned and turned into energy, which is used to make things work!

This maze shows you how we get energy. Energy starts with fossil fuels. The fossil fuel goes to a power plant, where it is turned into the energy we use for power at home and at school. ←

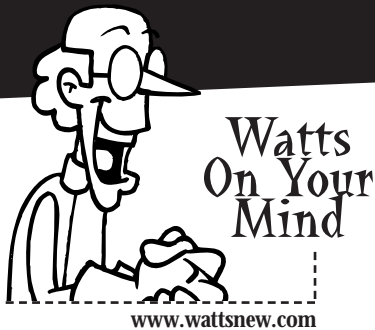
The mad scientist will be really mad if his castle doesn't have any lights. Follow the maze, and help the castle get the energy it needs to light up!



Words to know

coal energy fossil fuel
fossils natural gas oil

Energy
Your body needs a different kind of energy to move and think. That energy comes from the food you eat. When you eat healthy food, your body stores up energy to make you strong!



WATT DO YOU KNOW?

What is Energy?

Dr. Frank N. Stein explains it all for you:

Energy makes things happen. But energy doesn't just flow into our homes by magic. **Fossil fuels**, like oil, natural gas, and coal, are burned at power plants and in homes to make some of the energy we use every day. When you flip a light switch from off to on, energy flows from a power plant through a series of wires to your light bulb, and creates the light you need.



When we burn fossil fuels, gases are released into Earth's atmosphere, like smoke billowing from a smokestack. By not wasting energy, we burn fewer fossil fuels and create less air pollution!

The Earth is then a better, safer place to live for all of us who breathe. And your parents can save money on their energy bills, too!

Which of these situations do you think shows a waste of energy? Explain why or why not.

- Your family is going on vacation for a few days. Before you leave, your parents unplug the toaster, coffee maker, and TV.
 Waste Why? _____
 No Waste _____
- You've spent the evening wrapped up in watching a great movie on TV. Now it's over, you're tired, so you switch off the TV and go to bed.
 Waste Why? _____
 No Waste _____
- You print out your birthday wish list, and realize you forgot to add new sneakers, a skateboard, and a pony to the list. You throw out the copy you've just printed out, make your corrections on the computer, and print out a new list.
 Waste Why? _____
 No Waste _____
- You're hungry, but you're not sure what you want to eat. You stand idly in front of the open refrigerator, hunting around inside for something yummy, occasionally dipping a fork into a bowl full of leftovers.
 Waste Why? _____
 No Waste _____
- You've been playing for over an hour, and you've just gotten an all-time high score on your favorite computer game. You're pretty impressed with yourself, and then you figure you'd better stop playing while you're ahead. You turn off the computer and run off to find your best bud to brag about your electronic victory.
 Waste Why? _____
 No Waste _____

Energy and Air Pollution

Fossil fuels (oil, natural gas, coal) are burned at power plants and in homes. This creates the energy which lights up our lives every day. When fossil fuels are burned, gases are released into the Earth's atmosphere; if too many of these gases find their way into the atmosphere, our air becomes polluted. So by only using the energy we need, and not wasting energy, we can reduce the amount of air pollution, and we can all breathe easier!

DID YOU KNOW:

...that it's a waste of energy to leave a toaster plugged in when it's not in use?



Here's how that happens. Appliances like televisions and toasters draw a small current even when they're switched off. So it's a good idea to unplug them if you're not going to use them for a few days. The Department of Energy tells us that about 20% of the energy you use at home powers electrical appliances like televisions, VCRs, stereos, coffee makers, toasters, and microwave ovens—even when they're not turned on. That's a big part of your parents' energy bill, and you don't want it to be any bigger.