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Switch It!

Hands-On Lessons in Energy Conservation

Dear Educator:

Give your students the power to be energy smart with this fun and practical science program brought to you by Commerce Energy in partnership with Young Minds Inspired (YMI).

For nearly a decade, Commerce Energy has been providing families with peace of mind along with natural gas and electrical power, earning a trusted reputation as an innovative energy retailer by offering a wide range of energy choices to meet every consumer's energy needs.

Now Commerce Energy extends its longstanding commitment to energy conservation and the environment through this educational outreach program, which is designed to show first through fourth graders how an energy-saving switch in everyday behaviors can help save natural resources, and help families save on energy costs at the same time.

The **Switch It!** program includes classroom activities that guide students through a home energy inventory and challenge them to make energy conservation a family habit. In addition, there is a take-home handout for parents, packed with tips for reinforcing these lessons and for making smart energy choices themselves.

And to involve the whole Dallas-Fort Worth community in this outreach effort, the program invites students to enter the **Switch It! Student Billboard Contest** for a chance to see their energy conservation message posted on a real billboard and for your school to win a visit from football legend Chad Hennings. See inside for contest details, and note that entries must be postmarked no later than **Thursday, November 29, 2007.**

We urge you to share this valuable program with other teachers in your school. Although the materials are copyrighted, you have permission to reproduce them for educational purposes. Please return the enclosed reply card to let us know your opinion of the program. We depend on your feedback to continue providing free educational programs that make a real difference in the classroom.

Sincerely,

Dr. Dominic Kinsley
Editor in Chief



Join Chad Hennings in energy conservation.



YMI is the only company developing free, innovative classroom materials that is owned and directed by award-winning former teachers. Visit our website at www.ymiteacher.com to send feedback and download more free programs.

Target Audience

The **Switch It!** program is designed for use with first through fourth grade students as a supplement to the science curriculum. Extensions and modifications are provided to meet a wide range of student needs and abilities.

Standards Alignment

This program aligns with national curriculum standards for grades 1-4 in science, math, and language arts.

For details, please visit

www.yмитеacher.com/switchitstandards.html.

Program Objectives

The **Switch It!** program will help students:

- ✓ Recognize that electricity is a form of energy produced from natural resources.
- ✓ Realize that conserving electricity can help protect natural resources and lead to cleaner air.
- ✓ Learn about and practice a variety of simple energy conservation strategies.
- ✓ Apply math, chart-reading, and graphing skills to scientific inquiry.

Program Components

- ✓ This teacher's guide includes background information, presentation suggestions, answers for each classroom activity, and follow-up activities to enhance the learning experience.
- ✓ Three reproducible activity sheets.
- ✓ A wall poster for display in the classroom as a focal point for instruction and reminder of the program's goals.
- ✓ A pad of 30 take-home handouts inviting families to take control of energy use in their own households.
- ✓ A reply card for your comments. Please return this card to remain eligible to receive free YMI programs in the future.

Using the Program Components

1. Photocopy this teacher's guide and the reproducible activity sheets before displaying the poster in your classroom. Make a master copy of these program components to share with other teachers in your school. Make copies of the activity sheets for each student in your class.
2. Use the poster to introduce the program to your students, and keep it on display as a long-term reminder of the importance of energy conservation.
3. The program activities are designed for use in the order presented, but you may wish to adjust the order to fit your teaching style and your students' needs.
4. Conclude the program by distributing the take-home handout, encouraging students to share this information with their families.

1 Activity Energy Everywhere

This activity is designed to make students aware of the many ways we use electricity and guide them through a home electrical-power inventory to learn how much electricity they use every day.

Begin the activity by switching the classroom lights off and on. Ask students, "What causes the lights to go on?" Elicit the answer "electricity." Then, ask students, "Where does electricity come from?" To help students understand the delivery of electrical power, use the chalkboard or whiteboard to sketch the delivery system (transmission, distribution, metering). Visualize the system step-by-step, tracing backwards from the light in your classroom through the wiring and light switch to the power lines outside and on back to the electrical power plant.

Explain to students that all power plants use natural resources to generate electricity. That means every time we turn on a light or a television or a computer, we are using natural resources. And most of us are using more of those resources than we might suppose.

Distribute the activity sheet and tell students that they are going to find out how much electricity they could be using by "taking a roll" of all the electrical devices in their homes. Review Part 1 of the activity sheet and use electrical items in the classroom to show students how to fill in a number for each item on the chart. Point out the incandescent and fluorescent light bulbs pictured on the sheet and use examples to help students understand the difference. Then have students take the sheets home to conduct their electrical power inventories with a parent.

When they have completed their inventories, guide students through Part 2 of the activity, explaining that they will be creating pictographs to show how much electricity they could be using in their homes. (NOTE: Family A may have exactly the same number of lamps and appliances as Family B, but use more electricity if they run their appliances longer or don't turn off their lights.)

Point out to students that every item on the chart has a "light bulb" number next to it. Students should color in that number of light bulbs on the pictograph for each item they found in their homes. Students should color in as many light bulbs as are next to the item for each item they found in their homes. If they found more than one of an item in their homes, then color in another set of bulbs. (For example, students who have two TVs in their homes will color in a total of 16 light bulbs.) You may find it useful to take younger students through this process item by item, directing them to color in the specified number of light bulbs for each item. When you come to fluorescent light bulbs on the list, have students color in one light bulb for every three fluorescents in their homes. (You can round off the exact number, or have older students color in an appropriate fraction.) Have students color in the light bulbs column by column, so that all their pictographs can be compared at a glance.

Conclude the activity by having each student count up the total number of columns he or she has colored in. Compare totals to find out who has the potential of using the most electricity and who has the least. Have students identify items on the list that contribute to these differences. Each student should then total up all the columns colored in by all the students in your class. Explain that each light bulb represents the amount of electrical energy generated by 2 pounds of coal – each day – at a power plant. Then, show students the total amount of

these resources that they are using in their homes. It's likely to be a very large amount and should help students realize that, if each of them can save even a few light bulbs worth of electricity, the whole class can save a lot of these natural resources.

Extensions and Modifications

To enhance this lesson for older students, talk about some of the natural resources used to produce electricity. Explain that most power plants in the United States burn coal, oil, or natural gas to generate electricity. Nuclear power plants use the energy of atomic reactions. Some power plants use wind or water power, and there are even power plants that generate electricity using the steam released by geysers or by burning agricultural waste. In addition, some people generate their own electricity using solar power.

Follow up this discussion by helping students distinguish non-renewable sources of electrical power, like coal, oil, and natural gas, from renewable sources, like water, the wind, the sun, and agricultural waste. Students should recognize that our supply of non-renewable resources is limited and may eventually run out, while renewable resources offer a fairly constant source of power. They should also realize that many of the natural resources we rely on for electricity must be burned to produce energy and that by limiting our use of these resources through energy conservation we can help reduce air pollution as well.

Follow Up Activities

- ✓ Show younger students how to use the data they collected to create pictographs that show the number of televisions, video games, home computers, etc. in their households. Then encourage students to gather new data in class, by a show of hands, to make pictographs that show how many students have dogs, cats, fish, etc.
- ✓ Have older students use more sophisticated graphing techniques – bar graphs, pie charts, line graphs – to analyze the information they have gathered as a class (e.g., pie chart showing power per appliance, bar graph showing number of appliances).
- ✓ Have students look at electric bills with a parent to see how their retail electric provider measures the amount of electricity their families use each month and reports it on the bill. Suggest that students and their parents compare usage for different seasons and talk about what makes the electric bill go up and down.

2 Activity Switch It!

This activity is designed to make students aware of the connection between energy conservation and the environment as well as steps they can take to save energy every day.

Begin the activity by distributing the activity sheet and leading a discussion about the pictures. Make sure each student understands the ways to save electricity illustrated in Part 1. Define the phrase "energy conservation" and brainstorm other ideas to save energy at home, such as deciding what you want before opening the refrigerator door so you do not have to leave the door open for long periods of time while searching for a snack.

Assign the Energy Conservation Diary by explaining to students that they will keep track of how many energy saving actions they perform each day throughout the week. Demonstrate how students should write the corresponding letter of each action in the space next to the day of the week on which they did it and total the number of letters for each day.

When students return to class with their completed diaries, lead a discussion on energy conservation and how their actions helped protect the environment (and save money) during the week. Have students reference their diaries to discuss the days they used the least and the most energy.

Help students calculate their individual energy saving scores and use the drawing space and scoring guidelines provided in Part 2 to sketch a tree that represents their personal conservation efforts for the week. Finally, help students add up the total number of energy saving actions the whole class recorded for the week and draw an appropriately scaled tree on the chalkboard or whiteboard to symbolize their collective energy conservation effort.

Conclude class with a discussion on how saving energy helps make the air cleaner. Emphasize that conserving and using different kinds of energy helps contribute to clearer skies.

Extensions and Modifications

Explain to older students that unplugging appliances such as toasters, electric toothbrushes, and CD players when they are not in use is another way to save energy. When they are turned off but still plugged in, these appliances go into stand-by mode, using energy to maintain certain settings such as time and date features. You can “unplug” a device by turning the power strip off rather than by pulling the plug from the wall.

Follow Up Activities

- ✦ Have younger students complete the sentence “I promise to conserve energy by...” Encourage students to share their responses with the class.
- ✦ Have older students list three ways they plan to conserve energy in the future or write a short paragraph explaining the most important thing they learned about energy conservation.

3 Activity Energize Your Community

This activity invites students to use their creativity to share their knowledge about energy conservation with their community.

Introduce this activity by talking with students about the messages they have seen on highway billboards. In addition to advertisements, many will have seen public service messages that warn about the risks of starting a forest fire, encourage drivers not to litter, and remind passengers to buckle up. Point out to students that the program poster, featuring Chad Hennings, is another example of a public service message. Tell students that in this activity they are going to create their own billboards encouraging people in their community to save energy and promote cleaner air in the **Switch It! Student Billboard Contest**.

Pass out copies of the activity sheet and read the introduction together. Explain that the **Switch It! Student Billboard Contest** is a chance for students to

grades 1-4 in the Dallas-Fort Worth area to educate their community about the importance of energy conservation. Students who enter the contest have the chance to win **free Clear Choice clean energy for one year for their household**, plus see their ideas posted on a real highway billboard.

Divide the class into small groups so that students can brainstorm ideas for their billboards. Remind them that billboards combine words and pictures to send a message, and that the message must be short and clear, so that people can understand it quickly as they drive by.

Have students finish this activity at home, trying their ideas out with their parents and other family members before completing their drawings. Then help students fill in the identification information requested on the entry form, including a parent/guardian signature. Collect all entries, fold the identification information under so it's not visible, and mail them in a single package . . . to Commerce Energy, 222 West Las Colinas Blvd., Suite 950-E, Irving, TX 75039. **Entries must be postmarked no later than Thursday, November 29, 2007.** Questions? Contact Linda Ames, Corporate Communications Manager, by telephone at 714-259-2539 or by email at lames@commerceenergy.com.

The Switch It! Student Billboard Contest Official Rules

1. The Switch It! Student Billboard Contest (the “Contest”) is intended for educational participation and should be entered within a school context. The Contest is open to all students in the Dallas-Fort Worth DMA enrolled in grades 1-4 as of Thursday, November 29, 2007. There is no purchase or payment necessary. Employees of Commerce Energy, and Young Minds Inspired and members of immediate families of each are not eligible to participate in the Contest. No entries will be accepted without a completed copy of the Official Entry Form. Each student may enter only once. Attempts to submit more than one entry will be grounds for disqualification by Commerce Energy.
2. To enter the Contest, students must create their own original design for a highway billboard that promotes energy conservation. Student designs must be drawn on the Official Entry Form with all requested student identification information, including a parent's or guardian's signature, provided. The omission of student identification information may make an entry invalid. Entries must be the original work of contestants, must not infringe upon third-party rights, nor previously have won awards, nor been published.
3. By participating, entrants agree to be bound by these official rules and the decisions of Commerce Energy, which shall be final in all respects. By participating in the Contest and/or by accepting any prize that they may win, entrants agree to release Commerce Energy, its parent and subsidiary; each of their respective officers, directors, agents, representatives, and employees; and each of these companies and individuals' respective successors, representatives, and assigns from any and all actions, claims, injury, loss, or damage arising in any manner, directly or indirectly, from participation in the Contest and/or acceptance or use of the prize.
4. Entrants agree that they will not retain any rights to their entries. All entries automatically become the exclusive property of Commerce Energy and will not be returned. Entry constitutes permission to

Commerce Energy for use of all entries for publication and promotional, advertising and trade purposes, and for use of winners' photographs, names, likeness, biographical data, city and state of residence, and entry materials without further compensation, except where prohibited by law.

5. All entries must be mailed in a single package to Commerce Energy, 222 West Las Colinas Blvd., Suite 950-E, Irving, TX 75039 and must be postmarked no later than Thursday, November 29, 2007 and received by December 7, 2007. Late entries will not be considered for judging. Commerce Energy, is not responsible for any lost, misdirected, or delayed entries. All materials, including originals, are sent at the risk of the sender.
6. Winners will be notified by mail and will be required to have a parent or guardian sign and return an Affidavit of Eligibility and Release. Contest is void where prohibited or restricted by law. All federal, state, and local laws and regulations apply. All federal, state, and local taxes are the responsibility of prize winners. All prizes will be awarded.
7. All entries will be judged on the following criteria: Creativity/Originality (60%); Effective communication of energy conservation message (20%); Artistic skill (10%); Adherence to contest rules (10%). The judging panel will be comprised of marketing, communications, and education professionals who are under the supervision of Commerce Energy. All decisions of the judging panel are final on all aspects of the Contest. One winner will be selected from all entries received. The winner will be notified on or before December 20, 2007.
8. The Grand Prize Winner will receive free Clear Choice clean energy for one year for his/her household and an autographed picture taken with former Dallas football star Chad Hennings. Five runners-up will each receive a package of two energy-saving light bulbs and four free movie tickets.
9. Prizes are not transferable. No substitution of prizes allowed. Prize winners will be published on CommerceEnergy.com. To receive the list of winners, send a self-addressed, stamped envelope to Attn: Switch It! Winner's List, Commerce Energy, 222 West Las Colinas Blvd., Suite 950-E, Irving, TX 75039, by January 31, 2008.

Online Resources

- ✦ **Commerce Energy**
www.CommerceEnergy.com
- ✦ **U.S. Department of Energy**
www.energy.gov/index.htm
- ✦ **Energy Kid's Page-Energy Information Administration**
www.eia.doe.gov/kids/index.html
- ✦ **American Wind Energy Association**
www.awea.org/
- ✦ **Energy Quest**
www.energyquest.ca.gov/index.html
- ✦ **Energy Star**
www.energystar.gov/

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Energy Everywhere



Switch It! Tip

Did you know that the Energy Star Label saves you energy and money? A typical household equipped with Energy Star products can reduce its yearly energy bills by about \$400. Look for the Energy Star Label the next time you shop for an appliance. Go to www.energy-star.gov for more information on the Energy Star Label.

Energy is everywhere. Although you can't always see it, energy is in our homes, our schools, and ourselves, making sure we have the power to do it all, from riding a bike to playing video games.

Energy comes in different forms. One form of energy – electricity – “energizes” our televisions, computers, lights, and hair dryers. Every appliance in your home uses electricity to make it work.

Part 1

How much electricity do you use in your home? To find out, start by “taking a roll” of all the things you have that use electric power. Walk through your home with an adult or parent and look for the items on this chart. For each item, tell how many you have in your home by writing that number in the space provided. Be sure to count every light bulb and keep separate counts for incandescent and fluorescent light bulbs. Use the blank spaces to add electric powered items that are not on the chart already.

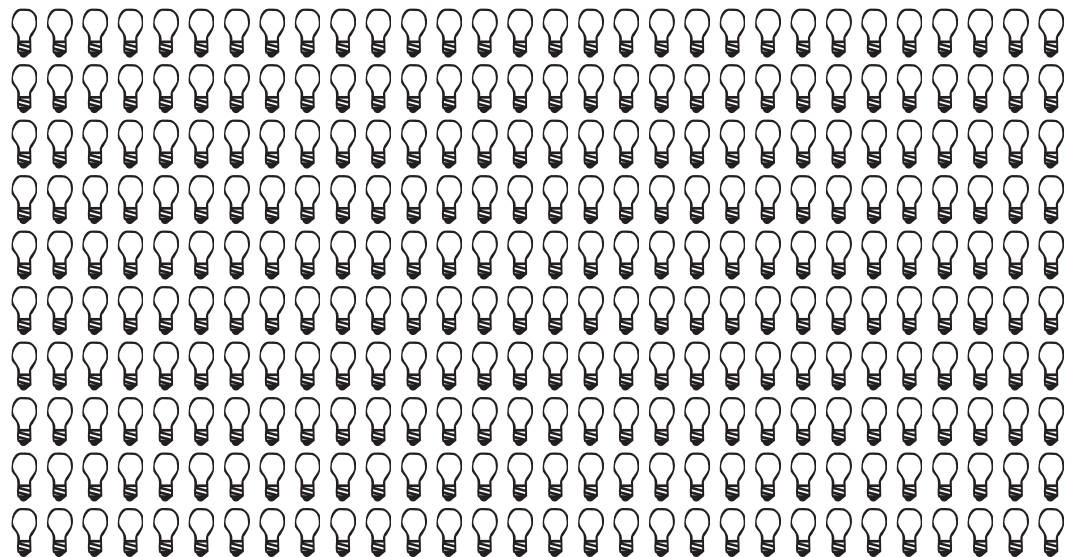
How Many?	Electrical Items	How Many?	Electrical Items
	Kitchen		Work and Play
	Coffeemaker 3		CD Player 12
	Dishwasher 7		Clock 1
	Microwave 4		Computer & Printer 3
	Refrigerator 14		DVD Player 1
	Stove 11		Television 8
	Toaster 1		Video Game 1
	Bath and Laundry		Comfort
	Clothes Dryer 13		Ceiling Fan 3
	Hair Dryer 15		Central Air Conditioning 26
	Iron 1		Dehumidifier 23
	Washing Machine 2		Space Heater 14
	Water Heater 23		Window Air Conditioner 23
Light Bulbs			
	Incandescent 3		Fluorescent 1
Other Items			

Note: Energy measurements based on industry estimates.



Part 2

Now create a pictograph to show how much electricity your family could be using. Look at the light bulb number next to each item you found at home. Color in that number of light bulbs here, working from column to column. If you have more than one of an item, repeat the steps and color in that number of light bulbs. When you've finished, compare pictographs with your classmates. Whose family uses the most electricity? Whose uses the least? Why?



Switch It!

Switching off the lights when you leave a room or closing the door behind you when you go out to play saves energy. Saving energy makes the air cleaner. Clean air helps trees to grow big and strong.

Part 1

Look at the pictures below. Each shows a child doing something to save energy. What can you do to save energy?

Every day this week, try to do at least one of the energy-saving actions shown below. Use this Energy Conservation Diary to record your actions. Every day, write the letters corresponding to all the actions you do in the space provided. Then count up the total number of letters and write that number in the "Total for Day" space. At the end of the week, add up your daily totals.



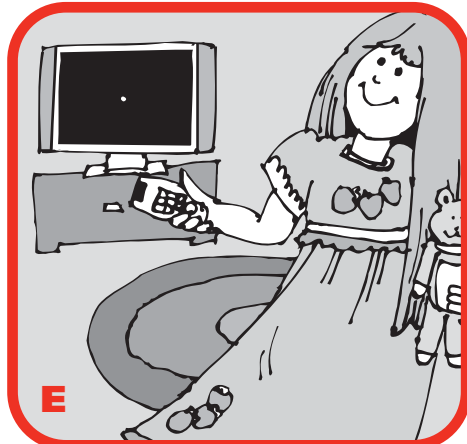
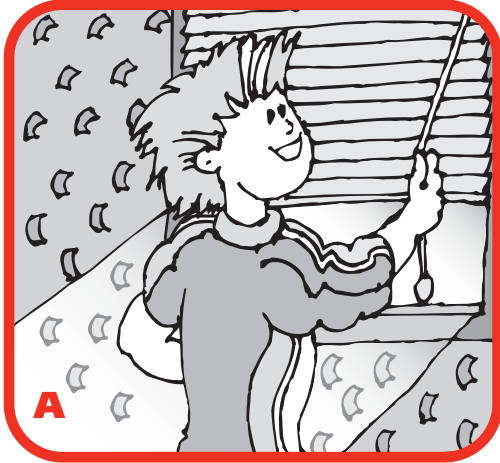
Activity

2

Switch It! Tip

By switching to wind-generated electricity you can take care of your family and contribute to cleaner skies. Visit www.CommerceEnergy.com to learn more about Commerce Energy's Clear Choice Clean Energy Program.

Energy Conservation Diary		
Day	Energy Saving Action	Total for Day
Monday		
Tuesday		
Wednesday		
Thursday		
Friday		
Total for Week		



Part 2

Your efforts as an energy conservation watchdog have helped this seedling grow. Use the scoring key to draw a tree as tall as the total number of energy-saving actions you took this week.

31-40: Congratulations! You're a Switch It! champion.

20-30: Good job! Just a few more energy-saving switches and you'll hit the top.

10-19: You're on your way to conserving energy. Keep going!

0-9: Try again next week. Plan now to make a switch to saving energy every day.



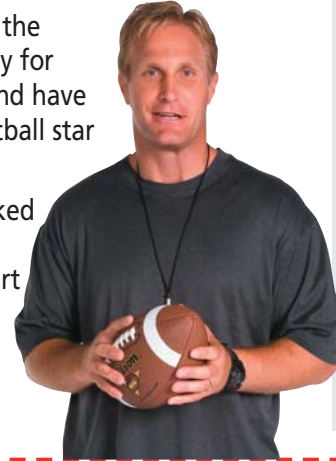
Energize Your Community

Now you are an expert on how to save energy and help create cleaner air. Help football star Chad Hennings spread the word about the importance of energy conservation in your community. Design a **Switch It!** billboard to encourage more people to switch off their energy wasting habits and switch on to a cleaner environment.

Draw your idea on the blank billboard and fill out this entry form. Then ask your teacher to enter your drawing in the **Switch It! Student Billboard Contest**.

Who knows? You could win the Grand Prize — free electricity for your household for a year and have your picture taken with football star Chad Hennings!

All entries must be postmarked no later than **Thursday, November 29, 2007**, so start drawing today. See the Official Rules for details, and good luck!



Activity

3

Switch It! Tip

Did you know that switching energy suppliers can be a first step in controlling home energy costs? Visit www.CommerceEnergy.com to learn more about the many choices Commerce Energy offers to help you save money on your energy bill.

Switch It! Student Billboard Contest Official Entry Form

1.800.ELECTRIC



commerce
energy™

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Student Name: _____

Student Grade: _____

Teacher's Name: _____

Teacher's E-mail: _____

School Name: _____

School Address: _____

School Phone: _____

Parent's/Guardian's Signature: _____



Switch It!

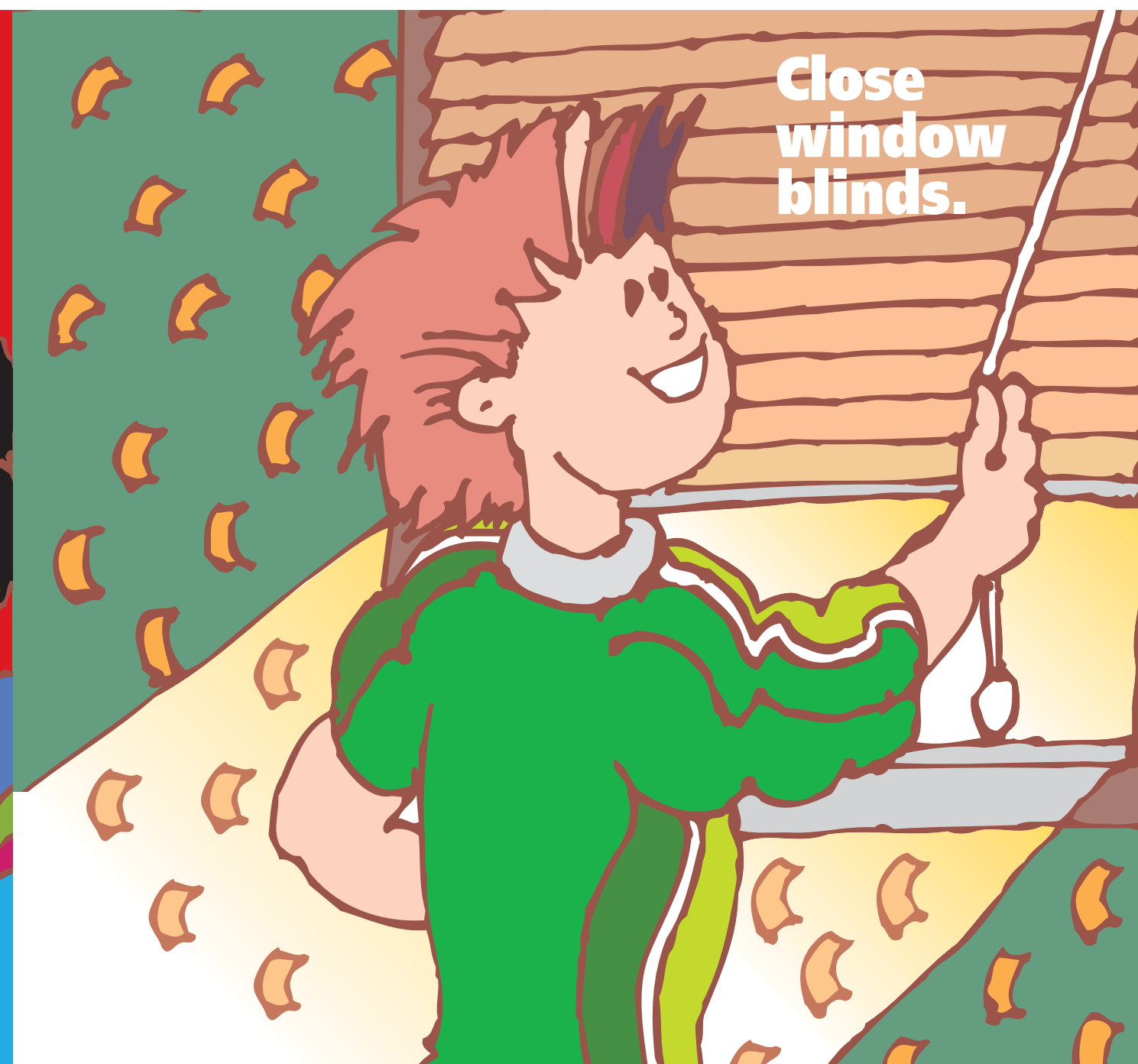
Team up to save energy in your community.



Close the door.



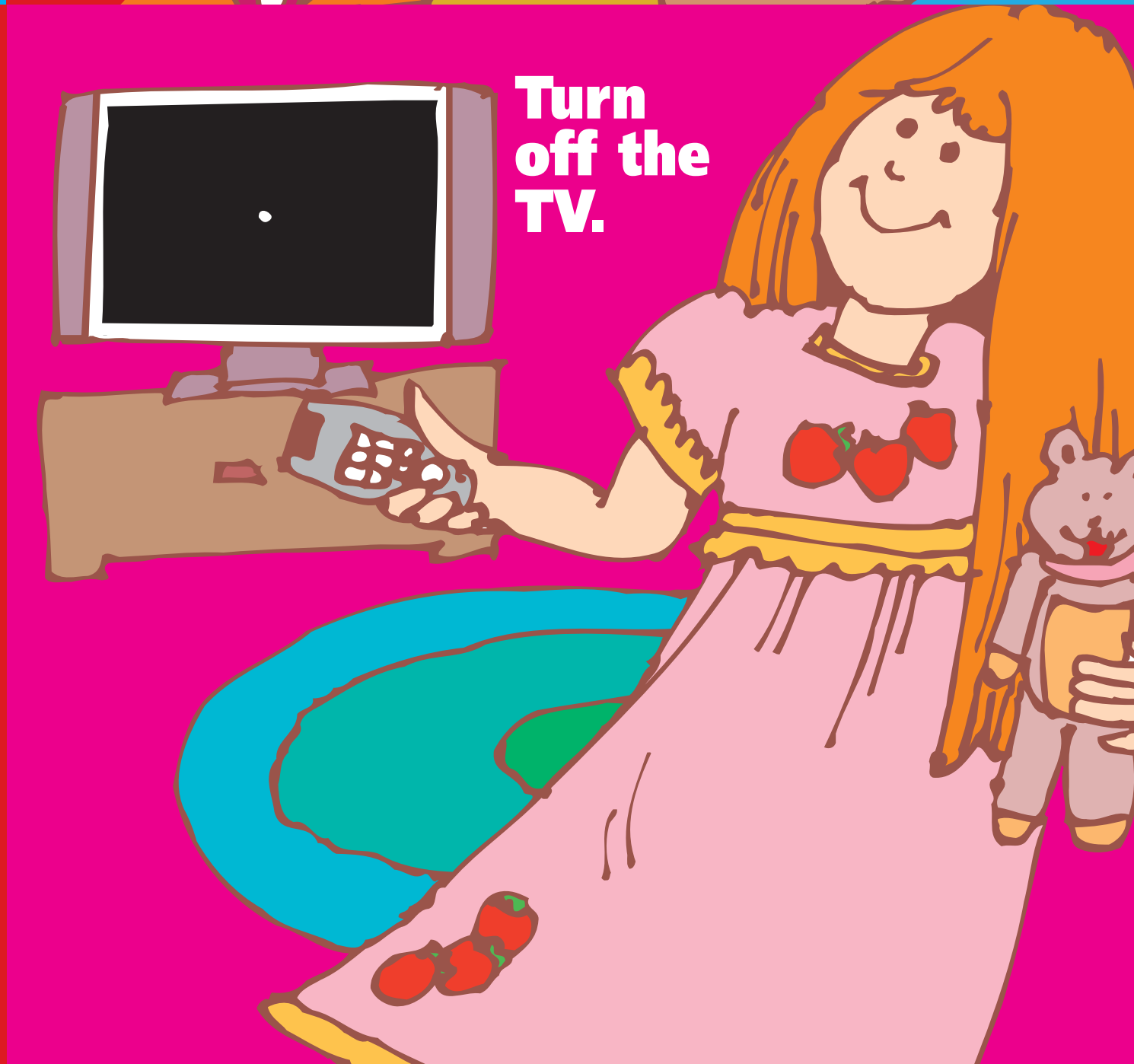
Use fluorescent bulbs.



Close window blinds.



Turn out the lights.



Turn off the TV.



Use an extra blanket.



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Join Chad Hennings in energy conservation.



A Message for Parents

Commerce Energy, an independent U.S. electricity and natural gas marketing company serving the Dallas-Fort Worth area, cares about families and the environment. That's why Commerce Energy has partnered with the curriculum experts at Young Minds Inspired (YMI) to create **Switch It!**, an educational program designed to teach your child about energy use and conservation.

Through this practical hands-on program, children explore what energy is, where it comes from, and how smart energy use leads to cleaner air and a better environment. They are also encouraged to practice several useful suggestions for saving energy and reducing energy costs in their homes.

We invite you to share this exciting learning experience with your child. Take control of energy use in your own household by following these simple energy saving suggestions:

- ✦ Unplug appliances and battery chargers when they are not in use.
- ✦ Swap incandescent light bulbs for compact fluorescent lights.
- ✦ Make sure your home is well insulated and that windows and vents are tightly sealed.
- ✦ Use task lighting, like desk lamps and under-cabinet lighting, instead of bright overhead lights.
- ✦ Choose showers over baths, which tend to use more hot water.
- ✦ Purchase energy-efficient appliances.

With your child, use the **Switch It!** Checklist on the back to review other simple energy savings tips and see how well your household is saving energy!

Visit the Commerce Energy website at **www.CommerceEnergy.com** for more energy saving tips. While you're there, check out the variety of energy choices we offer. You might even find ways to save money.



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Switch It! Checklist

Take control of energy use in your household by following these simple energy saving tips. Place a check by each tip you implement in your household.

- Unplug appliances and battery chargers when they are not in use.
- Swap incandescent light bulbs for compact fluorescent lights.
- Make sure your home is well insulated and that windows and vents are tightly sealed.
- Use task lighting, like desk lamps and under-cabinet lighting, instead of bright overhead lights.
- Choose showers over baths, which tend to use more hot water.
- Purchase energy-efficient appliances.
- Close the door behind you as you leave your home.
- Turn out the lights when leaving a room.
- Close the window blinds to keep rooms cool.
- Use an extra blanket to stay warm.



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Switch It! Checklist

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