

Take the Energy Action Challenge

Grades: 9-12

Topic: Energy Efficiency and Conservation

Owner: National Energy Foundation

This educational material is brought to you by the U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy.

Objective

The student will be able to suggest ways to conserve energy and resources.

Curriculum Focus

Science

Materials

Copies of the *Energy Action Challenge*, *Waste Not—Want Not*, and *Ten Ways to Save the Earth*

Take the Energy Action Challenge

INTRODUCTION

The *Energy Action Challenge* is a five-step method for successful changing wasteful energy behaviors. The idea is that students and teachers take the challenge, implement little changes in their homes, schools, and workplaces, then share the challenge with others to produce a snowball effect.

Turning off one light bulb or lowering the thermostat two degrees in the winter may not seem like significant acts, but when added to the same actions in 300 other homes, the results are significant.

PROCEDURE

1. Make copies of the *Energy Action Challenge* and the other handouts for each of your students or obtain a class set of Challenge booklets from National Energy Foundation (see contacts in the Teacher Background section). The booklets include the other handouts and a Challenge pledge form and a sheet to calculate the savings from implementing proposed changes.
2. Before passing the Challenge out to your students, complete sections 1 and 2 yourself.
3. Provide students with the Challenge and have them complete it at home. For students who do not work, have them answer the questions for their classrooms at school.
4. Discuss the results of the surveys. How did the students do? What are some ways that they have found to save energy and resources in their homes and workplaces? Students may have questions about how some of the practices in the Challenge save energy. Discuss their questions.
5. Distribute and discuss the handouts, *Waste Not—Want Not* and *Ten Ways to Save the Earth*. Why is recycling such a valuable method for conserving energy? What other environmental benefits do we get by practicing conservation? What actions will students implement?

EXTENSION ACTIVITIES

1. Have students produce a survey from some of the Challenge questions and survey other students, family members, and/or

community members. Have students work in groups to tabulate the data and produce a report on what conservation measures people in your community are implementing and areas that could be improved.

2. Have students develop an energy audit checklist to use in a tour around the school, for use in an Energy Walkabout.

STUDENT ACTIVITY SHEET

TAKE THE ENERGY ACTION CHALLENGE

PART I—ASSESSMENT

Check out your work place and home and answer the following questions. Discuss the questions about your home with your family and let them help with the answers.

Saving energy is important. Further discuss with your family the questions with a “No” answer. What changes would be needed to answer “Yes” to those questions? Leave unanswered any questions that do not pertain to your home.

Yes No At work

- 1. Are outside doors weather-stripped?
- 2. Are windows free of cracks?
- 3. Are windows caulked to prevent air leaks?
- 4. Are drapes or blinds closed during nonwork hours to keep heat in or out?
- 5. Are lights turned off when no one needs them?
- 6. Are light fixtures, skylights, and windows clean?
- 7. Are radios and computers turned off when not in use and during nonwork hours?
- 8. Are faucets in lavatories and kitchen areas free of leaks?
- 9. Does your work have a recycling program for aluminum, paper, tin, glass, and plastic?
- 10. Is the backside of papers used for scratch paper?
- 11. Are cracks and joints around the windows, doors, stairways, pipes, and electrical wires caulked?
- 12. Are windows free of cracks?
- 13. Are furnace and air conditioner filters clean?
- 14. Is the thermostat for heating set at 68 °F (20 °C) or lower?
- 15. Is the thermostat for air conditioning set at 78 °F (25.6 °C) or higher?
- 16. Is the heat turned down at night?
- 17. Are vents, radiators, and cold air returns clear of blockage from furniture, draperies, or other items?
- 18. Is the water heater temperature set at 120 °F (48.8 °C) or less, or 140 °F (60 °C) if you have a dishwasher?
- 19. Are the lights turned off when no one needs them?

At home

- 20. Are energy-efficient fluorescent lights being used where possible?
- 21. Are light bulbs kept clean?
- 22. Are washer and dryer used only with full loads?
- 23. Are clothes washed with cold water whenever possible?
- 24. Is the dryer lint cleaned after every use?
- 25. Are drapes or shutters closed to keep heat in or out?
- 26. Are televisions, radios, stereos, and other equipment turned off when not in use?
- 27. Is the refrigerator opened and closed quickly?
- 28. Are all the faucets and toilet tanks free of leaks?
- 29. Are quick showers taken instead of baths?
- 30. Is there a flow restrictor device or aerator on the shower and sink faucets?
- 31. Are toilets low-flow, or have water displacement devices been installed?
- 32. Are carpools used for work and family activities?
- 33. Do family members walk or ride a bike when possible?
- 34. Do family members schedule errands so one trip accommodates everyone?
- 35. Are aluminum, plastic, paper, steel, and glass recycled?
- 36. Are rechargeable batteries purchased for household use?
- 37. Is the dishwasher run with full loads?
- 38. Are dishes washed in the dishwasher allowed to air dry?
- 39. Are my vehicle tires properly inflated so they will last longer?
- 40. Do I use alternative or public transportation when possible?
- 41. Do I turn off the water while I'm brushing my teeth?
- 42. Do I hang up my clothes after wearing them to minimize laundering?
- 43. Do I dress appropriately for existing weather conditions?
- 44. Do I use an adapter instead of batteries when possible?
- 45. Do I use rechargeable batteries?
- 46. Do I write on both sides of my notebook paper?
- 47. Do I use the reverse side of work papers for scratch paper?
- 48. Am I careful with pens, pencils, and supplies so I don't lose them and so they will last longer?
- 49. Do I avoid using plastic disposable items when possible?

- 50. Do I keep my closet doors closed so the space is not unnecessarily heated?
- 51. Do I use natural light when possible, saving electricity?

If you answered only 23 or fewer questions "yes," you are not practicing energy efficiency. It's time to change. If you answered 35 or more questions "yes," you are energy conscious; it will be easy to improve even more. If you answered 47 or more questions "yes," pat yourself on the back. You are on your way to accomplishing the Challenge!

PART II—CHECK IT OUT

Discuss energy and natural resource use with your coworkers and family. Are they concerned about the environment? Would they be willing to change habits and behavior that would result in positive effects on the environment? Discuss the following questions with the people at work and home.

Energy Questions at Work

1. Are evergreen shrubs and trees planted as windbreaks around the north side of the building? _____ Could more be planted? _____ How many? _____
2. Are leaf-shedding trees planted on the south and west side for summer shade and winter sun? _____ Could more be planted? _____ How many? _____
3. A draft meter can be made by taping a long piece of plastic food wrap to a pencil. Hold the meter by the edges of doors, windows, switch plates, light fixtures, exhaust fans, and other places where air leaks may occur. If the plastic moves, there is an air leak. How many leaks were found? _____
4. How many cracked windows are there in the building? _____
5. How many windows do not have window coverings that can be used to keep heat in or out? _____
6. Are electronic thermostats set for less heating and cooling during nonwork hours? ____ If not, are thermostats manually adjusted for less heating or cooling during nonwork hours? _____ Who is responsible for the adjustments? _____
7. How many unoccupied rooms had lights on? _____ How many computers were on that were not in use? _____ How many TVs, radios, or other electronic equipment were on that were not being used? _____ Were light bulbs, light fixtures, skylights, and windows clean? _____ How often are they cleaned? _____
8. Is heat-producing equipment in kitchen or cafeteria areas located away from cooling equipment? _____
9. Is the water temperature at 120 °F (48.8 °C) or lower? _____
10. Are recycling bins available for aluminum? _____ paper? _____ plastic? _____ other? _____

11. Are employees encouraged to write on both sides of paper? _____
12. Is the backside of papers used for scratch paper? _____
13. Are washable or disposable utensils used in the cafeteria/break room? _____

Energy Questions at Home

1. Are deciduous (leaf-shedding) trees planted on the south and west sides of our home for summer shade and winter sun?
2. Are the exterior walls and roof a light color to help keep the house warm in the winter and cool in the summer?
3. Is the insulation in the attic sufficient for our climate?
4. Construct a draft meter like the one used at work and check for leaks in the home. How many leaks were found?
5. Is a storm door on each exterior door?
6. Is the fireplace flue/damper kept closed when not in use?
7. Do we have a glass fireplace screen? _____ Is it kept closed when the fireplace isn't in use? _____
8. At what temperature do we set the thermostat for winter? _____ For summer? _____ Do we adjust the night-time heating and cooling temperature? _____
9. What is the temperature of the hot water? _____
10. Are hot water pipes insulated in unheated portions of the house? _____
11. Does everyone make a conscious effort to turn the lights or electronic equipment off when they leave a room? _____
12. How many incandescent light bulbs do we have in our home? _____ How many energy-efficient fluorescent lamps do we have in our home? _____
13. Do we adjust the drapes to let heat in or out during the day or night, or seasonally? _____
14. Does everyone open and close the refrigerator quickly? _____
15. Do we air dry dishes washed in the dishwasher? _____
16. Does everyone take quick showers instead of baths? _____
17. Do we ride bikes, car pool, or use public transportation when possible? _____

PART III—PLAN OF ACTION

Now that you are aware of area where your home and workplace are conserving energy, and where there are some things that can be improved, it is time to plan what could realistically be done to help save energy and resources.

Periodic Procedures

Save energy all year. List five or more procedures that could be completed periodically at home and five or more that could be completed at work. For instance, install weather stripping on outside doors, caulk windows, door jambs etc., or adjust the temperature on the water heater.

At home

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

At work

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

Daily Procedures

List five or more energy-saving procedures you could do at home and five more you could do at work daily to modify your behavior. For instance, turn off the lights if you are the last one out of a room, write on both sides of the paper, etc.

At home

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

At work

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

Try to implement these changes for 30 days, then compare your electricity, water, and gas bills to

the previous month or the same month last year. See how many kWh you can save by doing simple things.

Say you save only 100 kWh per month. Not a big difference, huh? But multiply it by 12 months, and you have 1200. Now multiply that by the number of people in your class...your school...your town...it starts to really add up!

STUDENT READING SHEET

WASTE NOT, WANT NOT

Think About This

“To waste, to destroy our natural resources, to skin and exhaust the land instead of using it so as to increase its usefulness, will result in undermining, in the days of our children, the very prosperity which we ought by right to hand down to them amplified and developed.” —Theodore Roosevelt, Message to U.S. Congress, December 3, 1907

- It takes 20 times more energy to make an aluminum can from new materials than from recycled materials.
- Making an aluminum can from recycled materials creates 95% less air pollution than making it from raw materials.
- For every ton (2,000 pounds [908 kilograms]) of paper we recycle, we save 7,000 gallons (26,495 liters) of water from requiring chemical treatment.
- Half the garbage thrown out each day could be recycled. That is enough to fill a football stadium from the playing field to the top row of spectator seats.
- More than 4 million tons (3.632 million metric tons) of office paper is discarded every year, enough to build a 12-foot (3.7 meters) high wall of paper from the Atlantic to the Pacific Ocean.
- The junk mail delivered to households every day could produce enough energy to heat 250,000 homes for one day.
- More than 4 million plastic bottles are used every hour, but only one out of four is recycled.
- Making glass out of recycled materials cuts air pollution by 14% to 20%.
- Every year, enough energy is saved by recycling steel to supply Los Angeles with nearly a decade’s worth of electricity.
- For every \$1,000 of fast-food sales, 200 pounds (90.8 kilograms) of trash is created.
- Microwaves use around 50% less energy than conventional ovens. However, for large items like turkeys, microwaving would be less efficient than a conventional oven.
- As much as 90% of the energy consumed by washing machines goes to heating the water.
- Dust on a light bulb or dirt on a glass fixture can reduce the light it gives off by 10% and make it seem that you need a brighter, higher wattage light.
- A quart (0.946 L) of motor oil can pollute 250,000 gallons (946,250 L) of water.
- The world will need twice the raw materials in 2010 to maintain the same level of oil use that we consume today, and that will require discovering as much oil in the next 20 years as has been found in all of history.



STUDENT READING SHEET

TEN WAYS TO SAVE THE EARTH

- Turn down your water heater. For every 10 degrees, you save 6% of the energy used. The recommended setting is 120 °F (48.8 °C) or 140 °F (60 °C) if you have a dishwasher.
- Put a filled plastic bottle in your toilet tank. You can save between 3,000 and 5,000 gallons (11,000 and 19,000 liters) of water a year. (Don't use a brick! Bricks can dissolve and clog up the water system.)
- Keep your car's tires properly inflated. You will increase gas efficiency by up to 5%. About 50% of cars have underinflated tires. If they were all inflated properly, we could save up to 2 billion gallons (7.57 billion liters) of gasoline a year and prevent up to 40 billion pounds (18.16 billion kilograms) of carbon dioxide—the primary “greenhouse gas” from entering the atmosphere.
- Eliminate waste before you buy. Packaging waste accounts for about one-third of all the garbage sent to landfills. For a start, buy eggs in cardboard—not styrofoam—cartons and buy beverages in recyclable containers. Glass and aluminum are recyclable, but not all plastics are, so look for the recycling symbol.
- Recycle cans, glass, and paper. The energy saved from one recycled aluminum can will operate a television set for three hours.
- Replace a regular incandescent light bulb with a compact fluorescent light lamp. It uses a quarter of the energy and will last 10 times longer. And it will keep a half-ton of carbon dioxide out of the atmosphere over the life of the bulb.
- Buy rechargeable batteries for household use. Two billion disposable batteries are used every year and 75% of them contain mercury, a highly toxic substance that can leak from landfills into soil and ground water.
- Set the blades higher on your lawn mower. Forget the manicured look and cut the grass two to three inches high. This encourages the roots to grow deeper and helps retain moisture in the soil, requiring less water.
- Take your own shopping bags to the store with you. It takes a 15-year-old tree to provide 700 grocery bags, and grocery shoppers use billions of bags every year.
- Install low-flow faucet aerators and shower heads. A family of four can save 17,000 gallons (64,000 L) of water a year.

