

EnergySmart Schools mean healthier learning environments and a healthier planet.

EnergySmart Schools

Energy Awareness Activity Book

GAMES! PUZZLES! FUN!



U.S. Department of Energy
**Energy Efficiency
and Renewable Energy**

Bringing you a prosperous future where energy
is clean, abundant, reliable, and affordable

BE PART OF THE
**CLEAN POWER
GENERATION**

Download copies of this Activity Book at: <http://www.eere.energy.gov/kids/games.html>





EnergySmart Schools

EVERYBODY NEEDS POWER.

But some of the ways we generate and use power can have a dramatic effect on the environment. This *Energy Awareness Activity Book* provides a number of clues and tips on how to make smart energy choices, save money, and reduce our impact on the environment. Before you begin, here are a few concepts to keep in mind.

Energy Efficiency: More than 90% of the energy we use comes from fossil fuels that are nonrenewable and cause pollution. One of the greatest energy resources we have at our fingertips is energy efficiency, or the energy that would otherwise be wasted. Choose the most energy-efficient equipment. Look for the ENERGY STAR® label.

Renewable Energy: Renewable energy does not pollute the environment and can be continually replenished. Here are some of the major renewable resources being used today:



Biomass is any organic material that can be burned or converted to ethanol or methane. Ethanol is used as a vehicle fuel, and methane is captured from decaying garbage and waste to produce energy.



Wind energy is used to turn the blades connected to a turbine to produce electricity. Many places have wind resources powerful and steady enough to harness.



Solar energy is the sun's radiant energy that can be absorbed, stored, and released by substances or converted directly into electricity using photovoltaic (PV) cells.



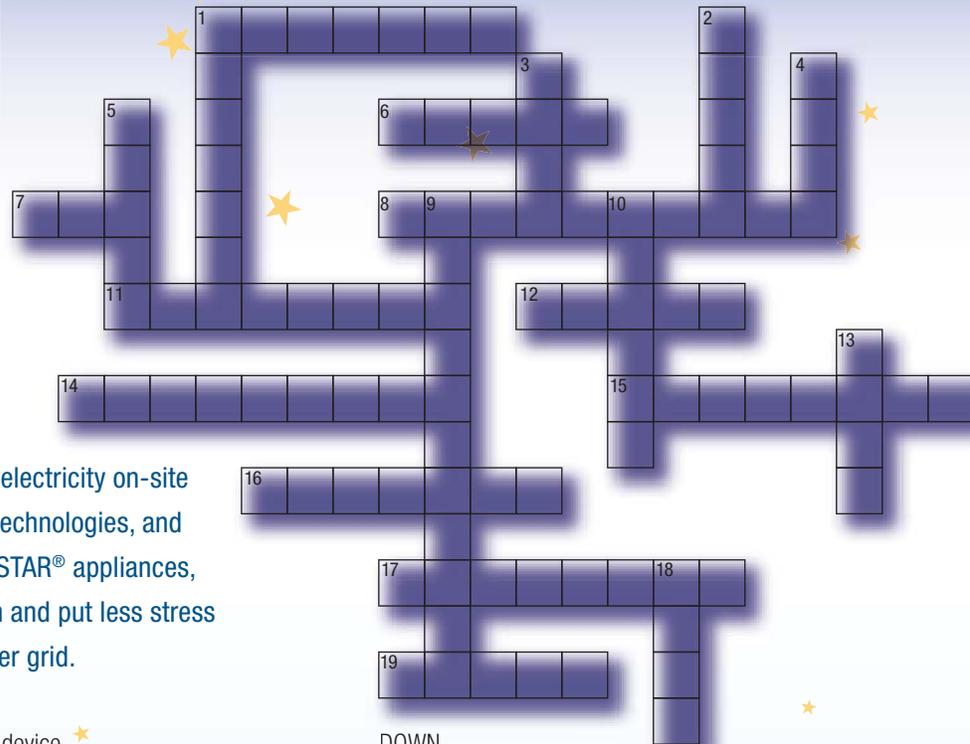
Geothermal energy is produced in the earth's core. Low-temperature geothermal can be used to heat and cool building interior spaces. High-temperature geothermal resources are recovered with wells or pipes deep underground and can be used to heat buildings or produce electricity.

Now that you have the basics, complete these activities to find out how to be EnergySmart at home and at school. Visit us at: www.energysmartschools.gov

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THINK OUTSIDE THE BOX



When we generate electricity on-site with solar or wind technologies, and save with ENERGY STAR® appliances, we reduce pollution and put less stress on the electric power grid.

ACROSS

1. An energy storage device
6. Producing the least pollution
7. Compact fluorescent lamps or bulbs
8. Energy produced by the internal heat of the earth
11. A natural material
12. Term for energy made from clean, renewable resources
14. Able to work well without wasting energy
15. Produce energy
16. Machine to create wind energy
17. One thousand units of electrical power
19. Power generated from moving water

DOWN

1. Organic matter which is available on a renewable basis
2. Energy that comes from water in vapor form
3. A unit of electrical power
4. Any material that can be burned to make energy
5. Electromagnetic energy transmitted from the sun
9. The energy of moving electrons
10. A supply of power
13. To prevent the waste or loss of energy
18. A lighting source designed to shine directly on a specific work area; an assignment



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CLEAN & GREEN

JOIN THE SEARCH FOR RENEWABLE AND EFFICIENT ENERGY!

U W B T C T N E I C I F F E T
W D E T I E C C C P L B L Z U
W I S A A Y F O O R I E N Z R
J R N W T L G W N O U E A E B
G B F D L H E R M S G O L N I
E Y U L O R E A E O E B S M N
O H E R V R S R R N A R R E E
T E L N O S D D I N E E V V R
H T G H T A Y Y I Z N Y A E F
E A R Y O H E A H E E S K K A
R R E J H S T W W F O S S I L
M E E S P S T A R R A L O S K
A N N S U Y B K I L O W A T T
L E L S E L E C T R I C I T Y
E G Q R E Y Y E C N E I C S W

- | | |
|-------------|--------------|
| BIOMASS | KILOWATT |
| CFL | PHOTOVOLTAIC |
| CLEAN | POWER |
| CONSERVE | RENEWABLE |
| EFFICIENT | RESOURCE |
| ELECTRICITY | SAVE |
| ENERGY | SCIENCE |
| FOSSIL | SOLAR |
| FUEL | STAR |
| GENERATE | SUSTAINABLE |
| GEOTHERMAL | TURBINE |
| GREEN | WATT |
| HYBRID | WEATHERIZE |
| HYDRO | WIND |
| HYDROGEN | |



ENERGY FACT: Wind turbines are available in a variety of sizes. The largest machine has propellers that span more than the length of a football field, stands 20 building stories high, and produces enough electricity to power 1,400 homes.

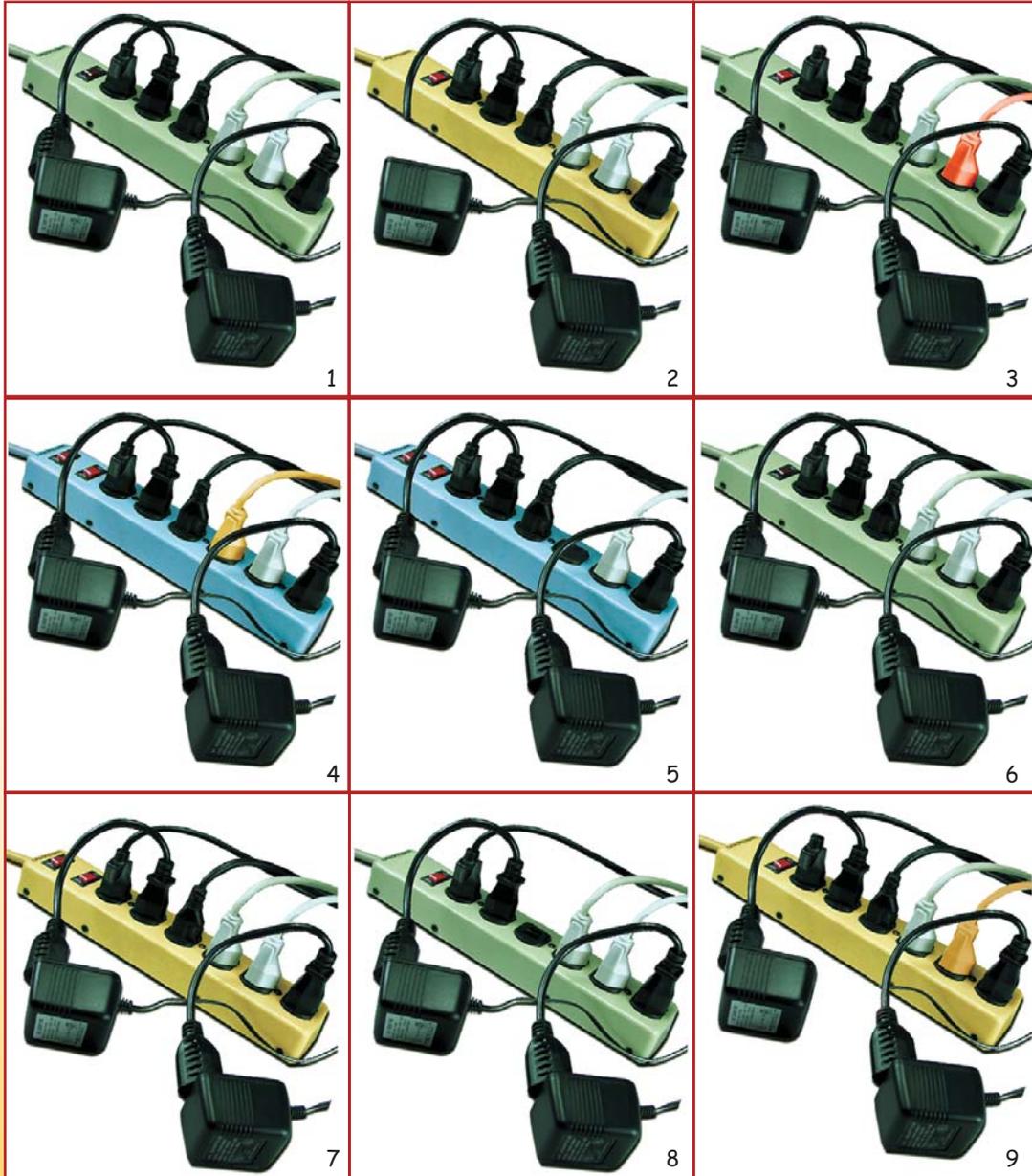




Find the two that match. Discover the savings.

Plug your devices and chargers into a power strip and turn them all off at once.

Unplug that energy drain!



ENERGY FACT: Use power strips to switch off TVs, game systems, home theater equipment, and stereos when you're not using them. Even when you think these products are turned off, together, their "standby" consumption can be equivalent to that of a 75 or 100 watt light bulb running continuously.



Do the Math!

If every American home replaced just one light bulb with an ENERGY STAR® qualified bulb, we would save enough energy to light more than 3 million homes for a year.



Fit 1 - 9 in each 3x3 square, row and column. No repeats!

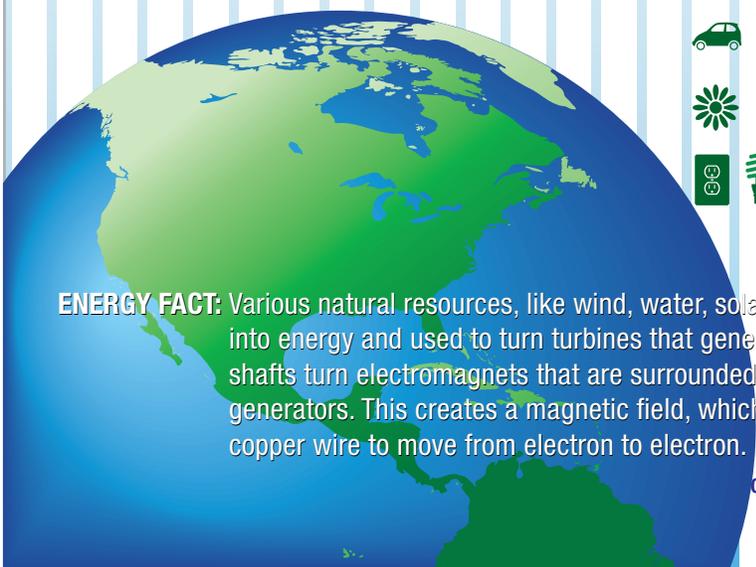
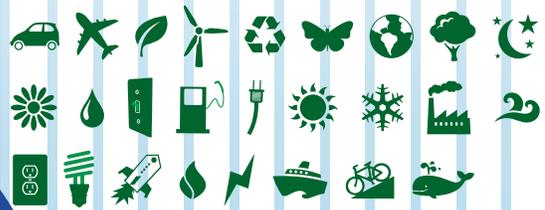
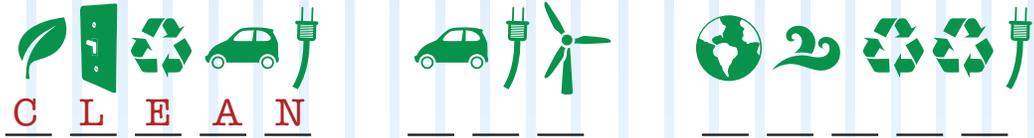
	7			4	2		5	
	4			8			7	
	9			5			6	
7					9			2
	5	6			4	3		9
		4			5			7
5			3				9	
3				6		8		
4			5					6

ENERGY FACT: Compact fluorescent bulbs use about 1/4 the energy and can last 10 times as long as incandescent bulbs. Remember – turn off unnecessary lighting! When buying bulbs, look for a CFL bulb whose wattage is about one-quarter of the incandescent you're replacing.



DON'T BE CLUELESS ABOUT ENERGY EFFICIENCY

Break the code and get the message!

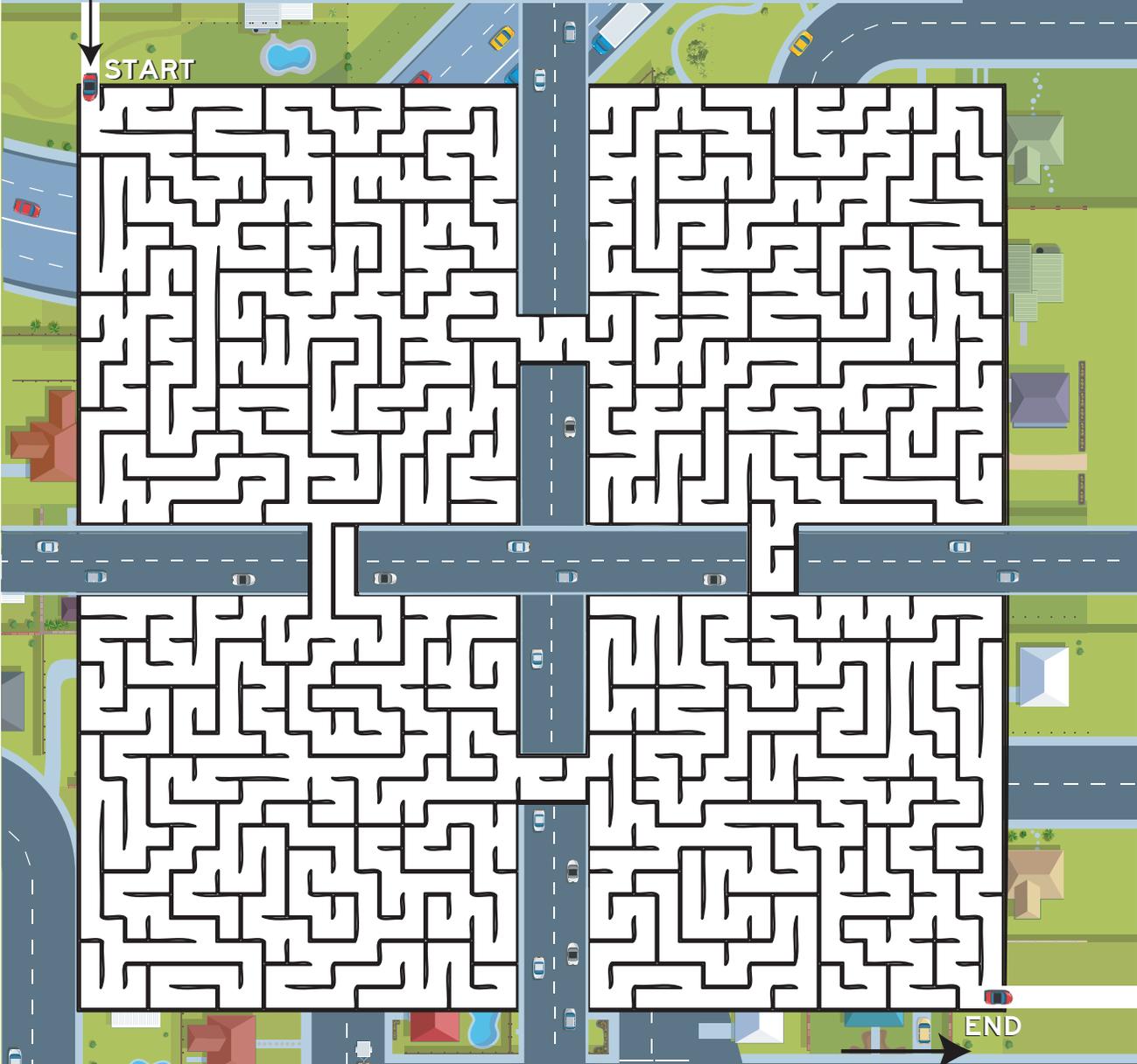


ENERGY FACT: Various natural resources, like wind, water, solar, and biomass, can be converted into energy and used to turn turbines that generate electricity. The spinning turbine shafts turn electromagnets that are surrounded by heavy coils of copper wire inside generators. This creates a magnetic field, which causes the electrical charge in the copper wire to move from electron to electron.

...s.go /sol tion :

Turn Into an Energy Champion!

Save fuel by planning your route, combining trips, and sharing rides.



ENERGY SAVING TIPS: Drive a fuel-efficient car
Avoid fast accelerations
Reduce idling time
Keep tires properly inflated
Take public transportation when possible



Make the Connection!

Efficiency = Savings!

- | | |
|---------------------------|--|
| CLEAN 1 | a MONITOR SETTING |
| GREEN 2 | b UPDATE WITH EFFICIENT EQUIPMENT |
| RESOURCE 3 | c PRODUCE POWER |
| OFF-PEAK 4 | d HEALTHY, EFFICIENT, SUSTAINABLE |
| GENERATE 5 | e INSULATE AND PREVENT AIR LEAKS |
| ALTERNATIVE FUEL 6 | f PRODUCE MORE WORK WITH LESS ENERGY |
| BIOMASS 7 | g RENEWABLE ENERGY RESOURCES |
| EFFICIENT 8 | h ORGANIC MATTER TO PRODUCE ENERGY |
| WEATHERIZE 9 | i INEFFICIENT LIGHT BULB |
| FOSSIL FUEL 10 | j EFFICIENT VEHICLE WITH ADVANCED TECHNOLOGY |
| INCANDESCENT 11 | k HYDROGEN AND ETHANOL |
| RETROFIT 12 | l A NATURAL MATERIAL |
| HYBRID 13 | m A UNIT OF ELECTRICAL POWER |
| WATT 14 | n COAL, OIL, AND GAS |
| SLEEP 15 | o TIME OF LOWER ENERGY DEMAND |

ENERGY FACT: Replacing one incandescent light bulb with an energy-saving compact fluorescent bulb prevents 1,000 pounds of carbon dioxide from being emitted into the atmosphere from power plants.

8



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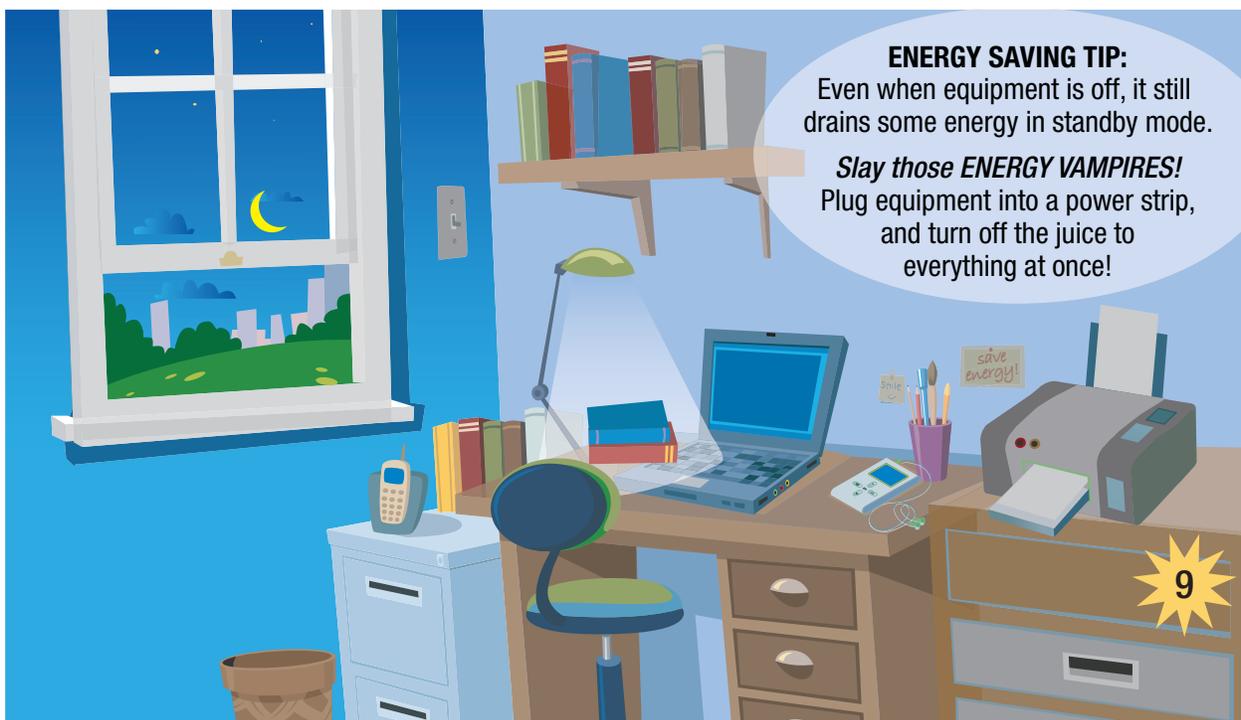
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WATT a Difference!

Find the energy-smart improvements.
The changes are as clear as night and day.



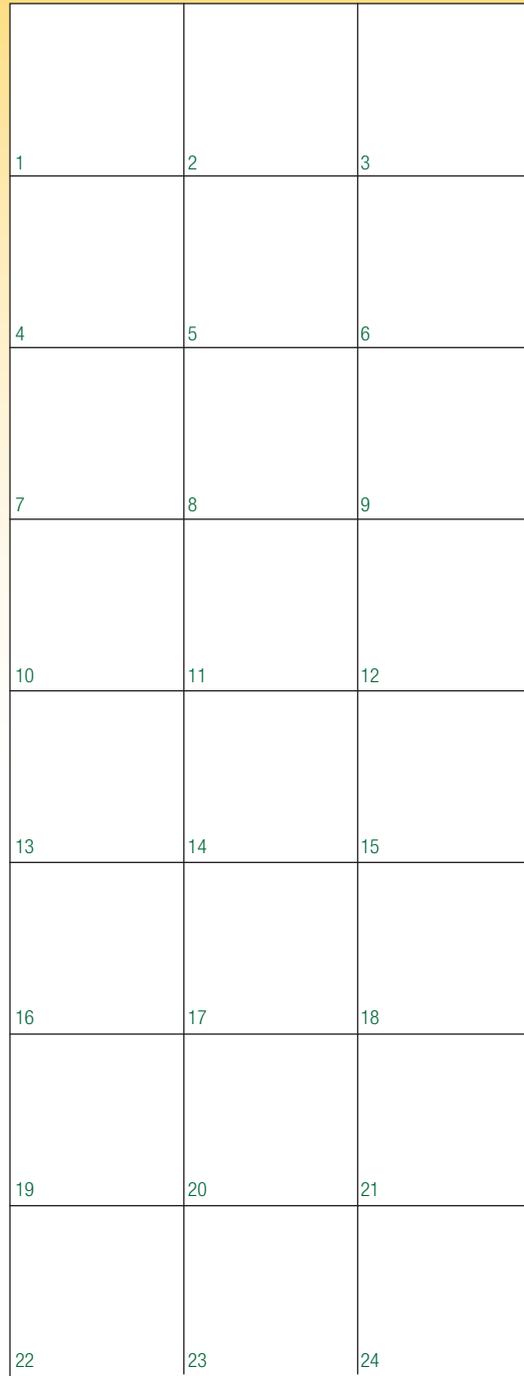
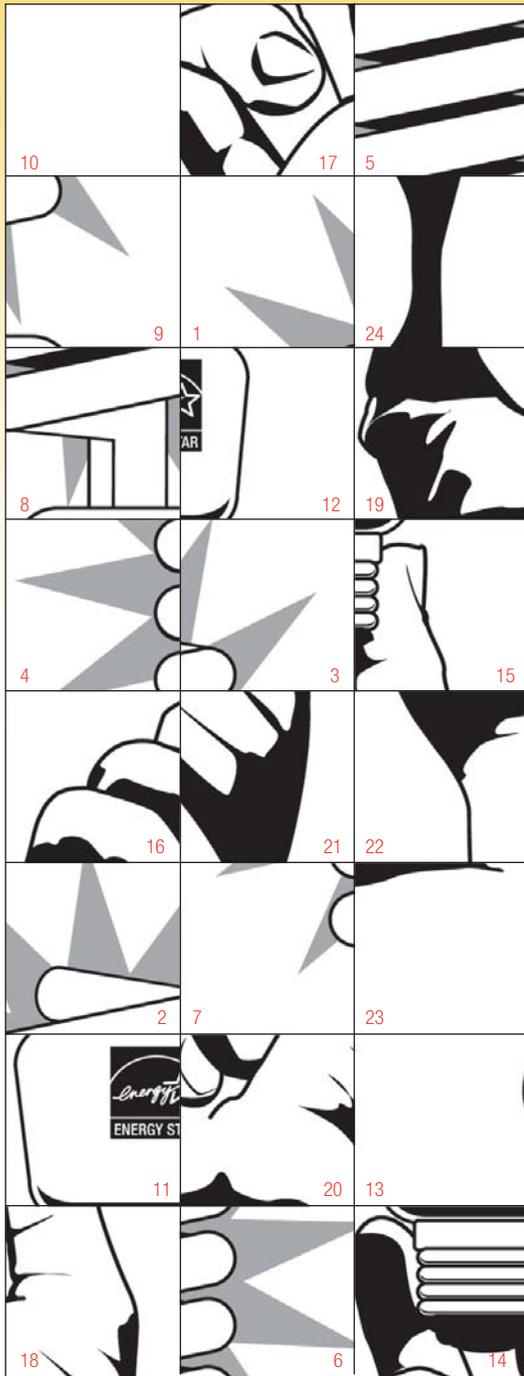
ENERGY SAVING TIP:
Even when equipment is off, it still drains some energy in standby mode.
Slay those ENERGY VAMPIRES!
Plug equipment into a power strip, and turn off the juice to everything at once!

9



A Bright IDEA!

Redraw the squares and REVEAL THE ENERGY SAVINGS!

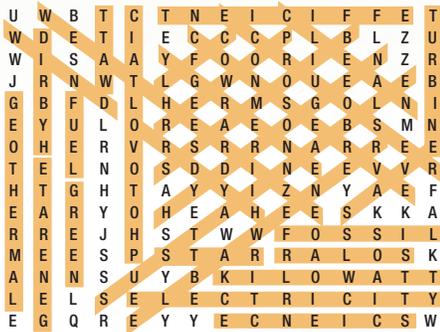


Puzzle Solutions

Page 2: Think Outside the Box



Page 3: Clean & Green



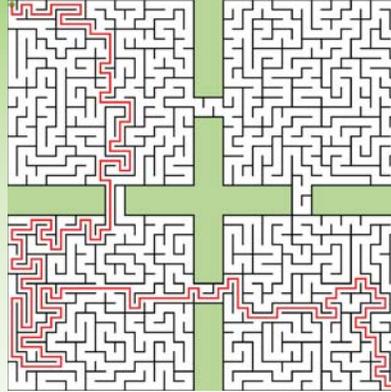
Page 4: Unplug That Energy Drain:
#1 & #6 match

Page 5: Do The Math!

6	7	3		4	2	9	5	8
	4	5	9	8	6	2	7	3
8	9	2	7	5	3	4	6	
7	8		6	3	9	5	4	2
2	5	6	8	7	4	3		9
9	3	4	2		5	6	8	7
5	6	8	3	2		7	9	4
3		9	4	6	7	8	2	5
4	2	7	5	9	8		3	6

Page 6: Don't Be Clueless About Energy Efficiency:
Clean and Green
Save Energy At Home,
At School, And On The Road.

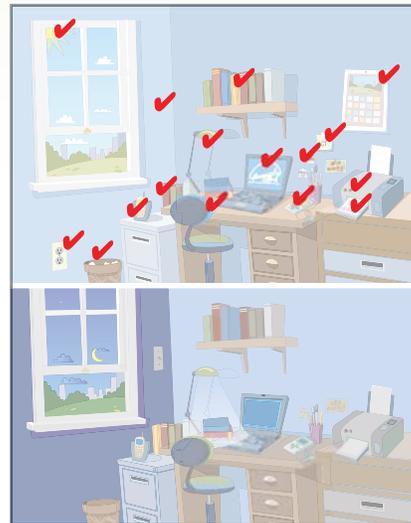
Page 7: Turn Into an Energy Champion!



Page 8: Make the Connection!

- 1, G; 2, D; 3, L; 4, O; 5, C; 6, K; 7, H; 8, F;
- 9, E; 10, N; 11, I; 12, B; 13, J; 14, M; 15, A;

Page 9: WATT a Difference!



Page 10:
A Bright Idea!



What You Need to Know

Alternative-Fuel Vehicle (AFV) - A vehicle designed to operate on an alternative fuel (e.g., compressed natural gas, methane blend, electricity).

Biomass - Any organic (plant or animal) material which is available on a renewable basis.

Energy - The ability to do work or the ability to move an object. Electrical energy is usually measured in kilowatthours (kWh), while heat energy is usually measured in British thermal units (Btu).

Energy Efficiency - Activities aimed at reducing the energy used by substituting technically more advanced equipment, typically without affecting the services provided.

Ethanol - A colorless liquid that burns to produce water and carbon dioxide. The vapor forms an explosive mixture with air and may be used as a fuel in internal combustion engines.

Fossil Fuels - Fuels (coal, oil, natural gas, etc.) that result from the compression of ancient plant and animal life formed over millions of years.

Generator - A device that turns mechanical energy into electrical energy. The mechanical energy is sometimes provided by an engine or turbine.

Geothermal Energy - Heat energy that is produced by natural processes inside the earth. It can be taken from hot springs, and reservoirs of hot water deep below the ground.

Hydrogen - A colorless, odorless, highly flammable gaseous element. The lightest of all gases and the most abundant element in the universe.

Hydropower - Energy that comes from moving water.

Kilowatt - A unit of power, usually used for electric power or to energy consumption (use). A kilowatt equals 1000 watts.

Nonrenewable - Fuels that cannot be easily made or "renewed"; oil, natural gas, and coal.

Nuclear Energy - Energy that comes from splitting atoms of radioactive materials, such as uranium.

Petroleum - Refers to crude oil or the refined products obtained from the processing of crude oil (gasoline, diesel fuel, heating oil, etc.).

Photovoltaic Cells - A device, usually made from silicon, which converts some of the energy from light (radiant energy) into electrical energy.

Power - The rate at which energy is transferred. Electrical energy is usually measured in watts.

Radioactive Waste - Materials left over from making nuclear energy. Radioactive waste can harm people and the environment if it is not stored safely.

Solar Energy - Radiant energy of the sun that is converted into other forms of energy, such as heat or electricity.

Turbine - A device whose blades, turned by a force like wind, water, or high pressure steam, has its mechanical energy converted into electricity by a generator.

Waste Energy - Municipal solid waste, landfill gas, methane, digester gas, paper pellets, sludge waste, solid byproducts, tires, agricultural byproducts, and straw used as fuel.

Wind - The term given to any natural movement of air in the atmosphere; a renewable source of energy used to turn turbines to generate electricity.

Cool Web Sites!

Check out these Web sites to save money for your school.

Alliance to Save Energy Green Schools
www.ase.org/greenschools

California Energy Commission's Bright Schools
www.energy.ca.gov/efficiency/brightschools

ENERGY STAR® for Schools
www.energystar.gov

Energy Quest
www.energyquest.ca.gov/

Florida Solar Energy Center
www.fsec.ucf.edu

National Energy Education Development
www.need.org

National Energy Foundation
www.nef1.org

U. S. Green Building Council
www.buildgreenschools.org

12



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