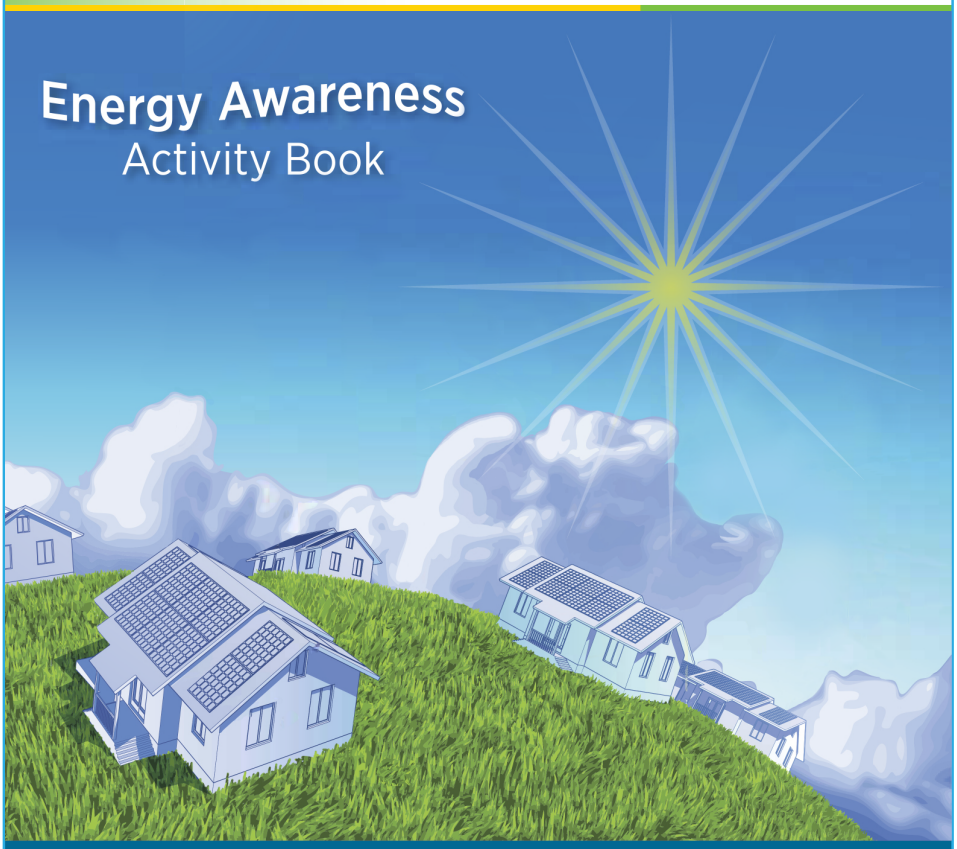
get current

switch on clean energy

Energy Awareness Activity Book



U.S. DEPARTMENT OF ENERGY

Energy Efficiency & Renewable Energy

get current switch on clean energy

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 Literacy: Energy Literacy is an understanding of the nature and role of energy in our lives and the ability to apply this understanding to answer questions and solve problems. This activity book helps you to answer questions and understand energy.

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.

Hydropower is one of the oldest power sources on the planet. Flowing water, directed through a dam or other structure, is used to spin a wheel or turbine to produce electricity or for mechanical tasks like grinding grain. Scientists and engineers are also working to develop new hydrokinetic technologies to produce electricity from the motion of waves, tides, and river or ocean currents.

THINK OUTSIDE THE BOX

Energy Saving Tip

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. Energy produced by the internal heat of the Earth
10. A natural material
11. Term for energy made from clean, renewable resources
13. Able to work well without wasting energy
14. Produce energy
15. Machine to create wind energy
16. Light Emitting Diode
17. One thousand units of electrical power
19. Power generated from moving water

DOWN

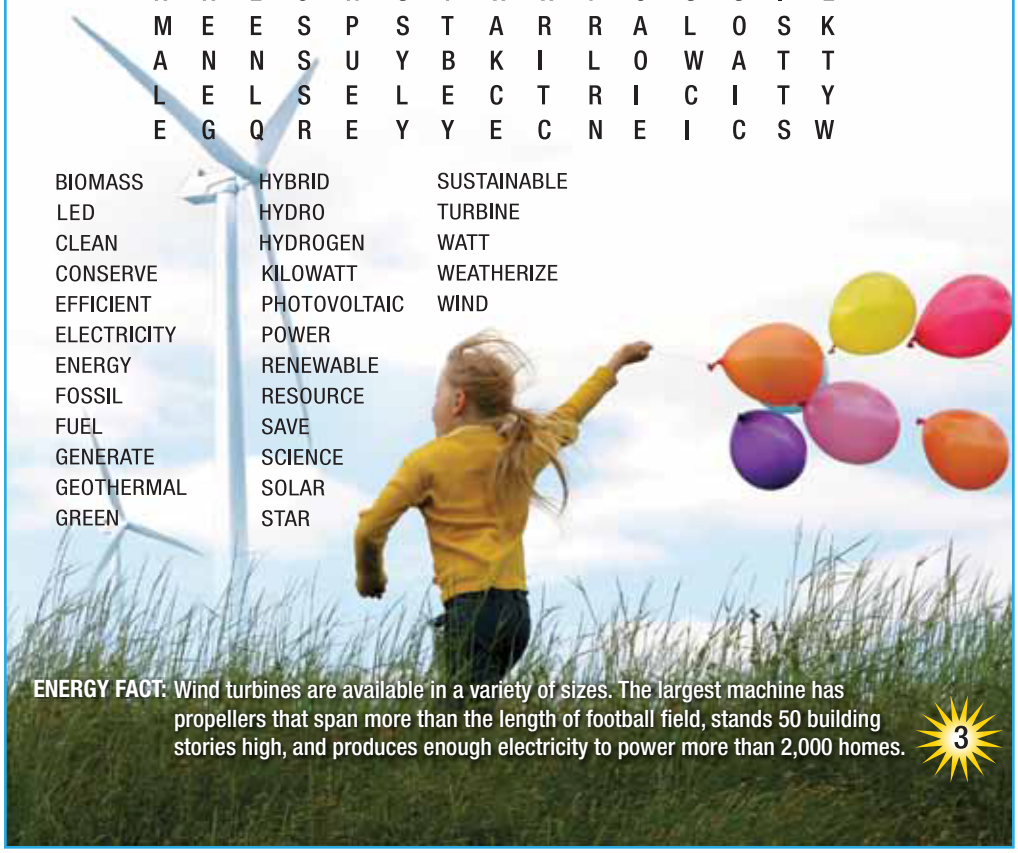
1. Organic matter which is available on a renewable basis
2. Energy that comes from water in vapor form
3. A unit of electrical power
4. Any material that can be burned to make energy
5. Electromagnetic energy transmitted from the Sun
8. The energy of moving electrons
9. A supply of power
12. To prevent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

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 L C P L B L Z U
W I S A A Y E O O R I E N Z R
J R N W T D 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

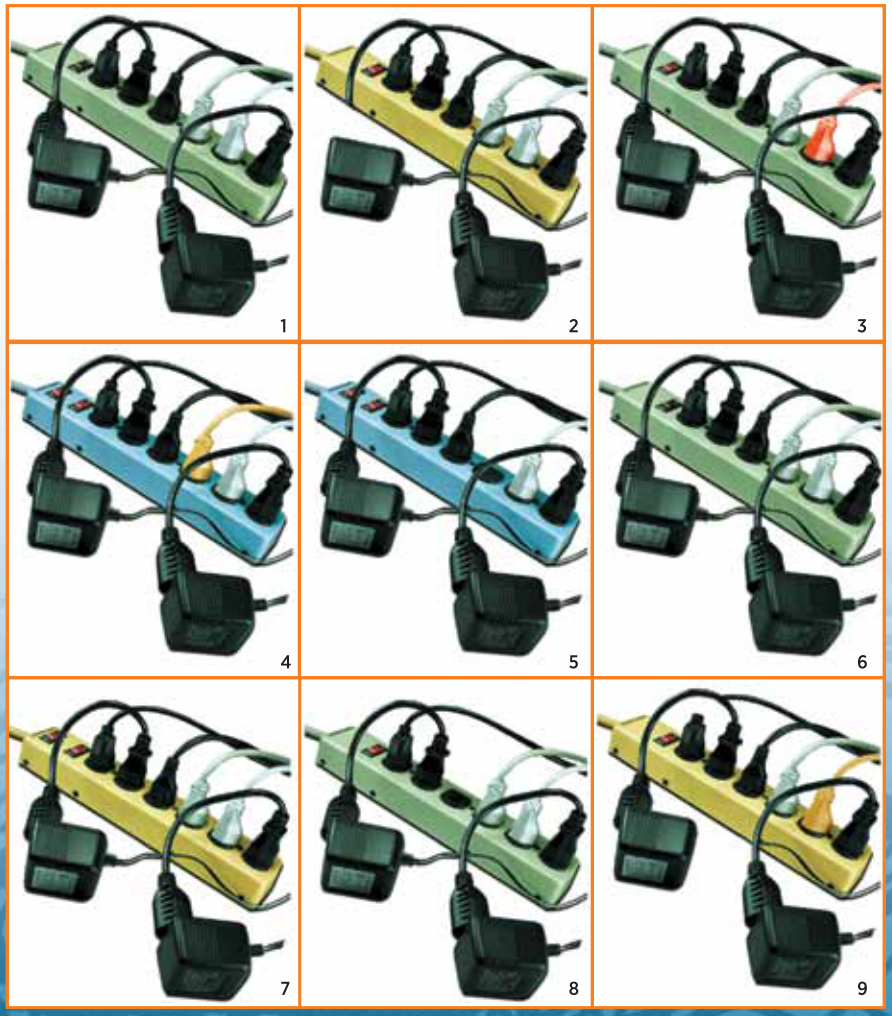
BIOMASS
LED
CLEAN
CONSERVE
EFFICIENT
ELECTRICITY
ENERGY
FOSSIL
FUEL
GENERATE
GEOTHERMAL
GREEN
HYBRID
HYDRO
HYDROGEN
KILOWATT
PHOTOVOLTAIC
POWER
RENEWABLE
RESOURCE
SAVE
SCIENCE
SOLAR
STAR
SUSTAINABLE
TURBINE
WATT
WEATHERIZE
WIND



ENERGY FACT: Wind turbines are available in a variety of sizes. The largest machine has propellers that span more than the length of football field, stands 50 building stories high, and produces enough electricity to power more than 2,000 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 a good LED bulb, we would save enough energy to light more than 2.3 million homes.

1 = 

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

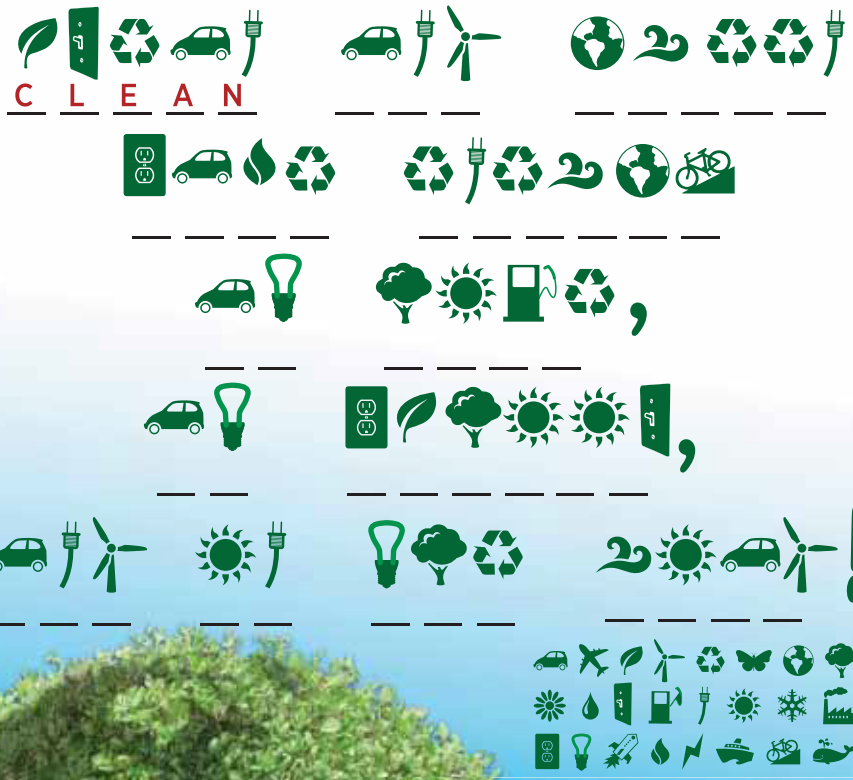
	7			4	2		5	
	4			8			7	
	9			5			6	
7					9			2
	5	6			4	3		9
		4			5			7
5			3				9	
3				6		8		
4			5					6

ENERGY FACT: "LED" stands for "light-emitting diode." LED bulbs use less than 1/4 the energy and can last 25 times longer than incandescent bulbs. Remember – turn off unnecessary lighting! When buying bulbs, look for an LED bulb with wattage that is no more than one-quarter of the incandescent you're replacing.

DON'T BE CLUELESS

ABOUT ENERGY EFFICIENCY

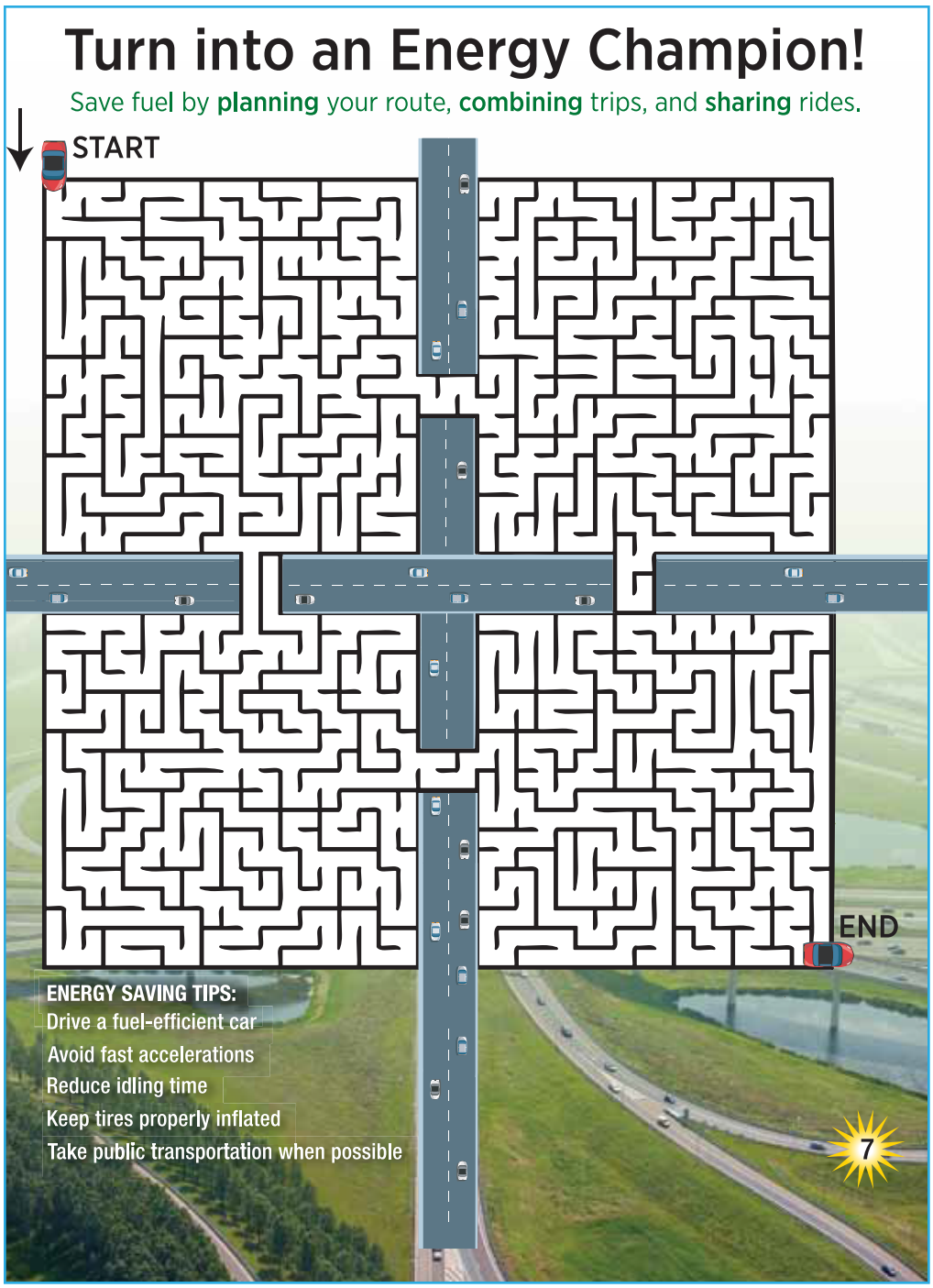
Break the code and get the message!



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.

Turn into an Energy Champion!

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



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 LED bulb prevents 50 pounds of carbon dioxide from being emitted into the atmosphere each year from power plants.**

Watt a Difference!

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

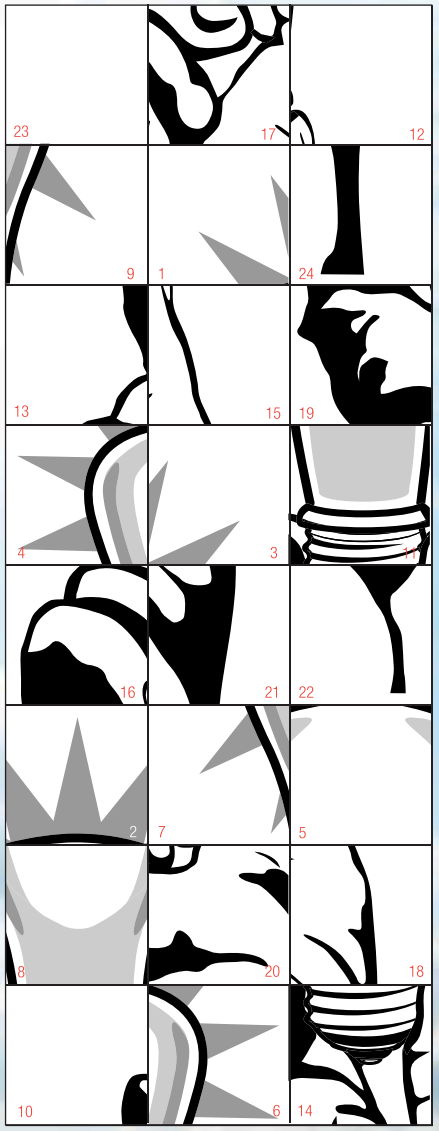
ENERGY FACT:

Even when equipment is off, it still drains some energy in standby mode.

Plug equipment into a power strip, and turn off all the juice at once!

A Bright IDEA!

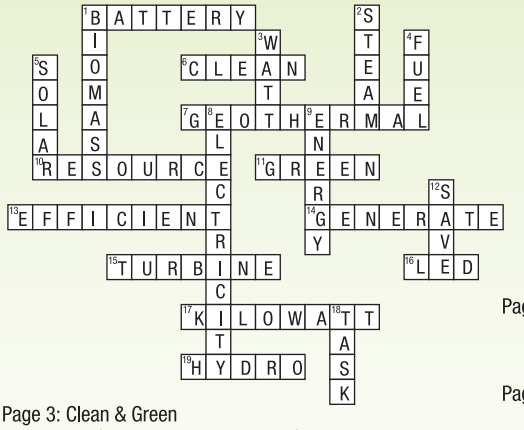
Redraw the squares and REVEAL THE ENERGY SAVINGS!



1	2	3
4	5	6
7	8	9
10	11	12
13	14	15
16	17	18
19	20	21
22	23	24

Puzzle Solutions

Page 2: Think Outside the Box



Page 3: Clean & Green

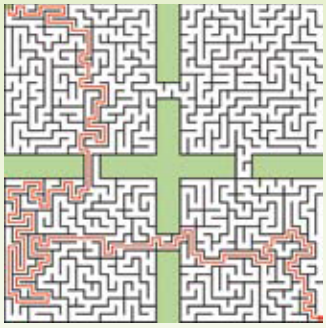
Page 4: Unplug That Energy Drain:
#1 & #6 match

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!

Energy Literacy Principles

1. Energy is a physical quantity that follows precise natural laws.

2. Physical processes on Earth are the result of energy flow through the Earth system.

3. Biological processes depend on energy flow through the Earth system.

4. Various sources of energy can be used to power human activities, and often this energy must be transferred from source to destination.

5. Energy decisions are influenced by economic, political, environmental, and social factors.

6. The amount of energy used by human society depends on many factors.

7. The quality of life of individuals and societies is affected by energy choices.

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).

Bioenergy – 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 kilowatt hours (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.

Energy Literacy – An understanding of the nature and role of energy in our lives and the ability to apply this understanding to answer questions and solve problems.

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 underground 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 surface of the Earth.

Hydrogen – A colorless, orderless, high flammable gaseous element. The lightest of all gasses and the most abundant element in the universe.

Hydropower – Energy that comes from moving water, including water from rivers or reservoirs flowing through dams, ditches or canals.

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

Lumen – A unit of measurement for the amount of light emitted by a light bulb. The number of lumens a bulb emits indicates the amount of light it emits.

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

Nuclear Energy – Energy that comes from splitting atoms or 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.

Renewable Energy – Energy obtained from sources that are virtually inexhaustible (defined in terms of comparison to the lifetime of the Sun) and replenish naturally over small time scales relative to the human life span.

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

Sustainable – Able to be maintained at a steady level without exhausting natural resources or causing severe ecological damage, as in a behavior or practice.

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 fas, 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!

Climate and Energy Awareness Network Activities for Kids
www.cleanet.org

U.S. Department of Energy Office of Energy Efficiency and Renewable Energy
www.energy.gov/kids

Energy Educations Activities
www.eere.energy.gov/education/lessonplans/

Energy Literacy Fundamental Principles and Essential Concepts
www.eere.energy.gov/energyliteracy

Energy Information Administration "Energy Kids"
www.eia.gov/kids/

Energy Star® Kids
www.energystar.gov/kids

get current

switch on clean energy

Switching on clean energy technologies means strengthening the economy while protecting the environment.

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

1000 Independence Ave. S.W., (EE-61)
Washington, DC 20585

STAY CURRENT ON CLEAN ENERGY!
Check out **www.energy.gov/kids**

Printed on recycled paper with soy-based ink.