ENERGY BINGO

ANSWERS

A Has seen a wind turbine

B Can name two fossil fuels

C Has never seen coal

D Uses a solar clothes dryer

E Has visited a power plant

F Can name two ways to save energy at home

G Uses a hand-operated can opener

H Can name two ways to increase a car's MPG

I Recycles aluminum cans

J Has seen geothermal energy

K Has seen a photovoltaic cell

L Can name two renewable energy sources

M Knows the cost of a kilowatt-hour of electricity

N Knows how natural gas is usually transported

O Knows which fuel is used in barbecue grills

P Knows how uranium atoms give off energy

A Student should share location.	**B** coal, petroleum, natural gas, propane	**C** (no answer needed)	**D** Students should be able to describe a clothes line.
E Students should describe plant or location of plant.	**F** turning off lights, insulation, saving water, etc.	**G** (no answer needed)	**H** tire pressure, maintenance, removing excess weight
I (no answer needed)	**J** Student should describe volcano, geyser, or hot spring.	**K** Student should list where: home, street light, calculator, etc.	**L** hydropower, solar, geothermal, wind, biomass
M 12.6 cents/kWh national average	**N** pipeline	**O** propane	**P** fission

SCIENCE OF ENERGY BINGO

ANSWERS

A. Knows what type of reaction releases thermal energy

B. Knows the form of energy that comes from the sun

C. Knows one way to store energy

D. Knows the form in which our bodies store energy

E. Knows the force responsible for the attraction between the Earth and nearby masses

F. Knows why rubbing your hands together makes them warm

G. Can name a form of kinetic energy

H. Has visited a thermal power plant

I. Knows where most energy on Earth originates

J. Knows what type of reaction absorbs thermal energy

K. Has used a radiant clothes dryer

L. Knows what form of energy is stored in most energy sources

M. Knows how an electric generator works

N. Knows what device turns energy from the sun directly into electricity

O. Can name a form of potential energy

P. Knows what energy can be transformed into

A exothermic	**B** radiant	**C** battery, chemical, in a spring, etc.	**D** chemical
E gravity	**F** motion energy is transformed into thermal energy through friction	**G** radiant, thermal, motion (kinetic), sound, electrical	**H** Anyone who has visited a nuclear, coal, natural gas power plant has visited a thermal power plant
I the sun	**J** endothermic	**K** Anyone who has hung wet clothes on a line outside has used a radiant clothes dryer	**L** chemical
M Coils of wire surround a magnet. The magnet(s) rotate inside the wire, inducing electric current in the wire. The coils can also rotate inside magnets.	**N** photovoltaic cell, PV cell	**O** chemical, nuclear, elastic, gravitational	**P** any other form of energy

RENEWABLE ENERGY BINGO

ANSWERS

A. Has been to a renewable power plant

B. Knows which state generates the most geothermal energy

C. Can name at least three renewable energy sources

D. Knows the percentage of electricity produced by renewable sources in the U.S.

E. Can name two types of biomass

F. Knows the source of energy that drives the water cycle

G. Can name two factors to consider when siting a wind farm

H. Has used a solar clothes dryer

I. Has seen a modern wind turbine

J. Knows the renewable source that produces the most energy in the U.S.

K. Knows the renewable source that produces the most electricity in the U.S.

L. Knows the cost per kilowatt-hour of electricity for residential customers

M. Knows how radiant energy travels through space

N. Can name two kinds of hydropower

O. Has used wind energy for transportation

P. Can name the device in a hydropower plant that captures the energy of flowing water

A ask for location/description	**B** California	**C** solar hydropower wind geothermal biomass	**D** 15% (14.89)
E wood, crops, manure, garbage, landfill gas, alcohol fuels, ethanol, and biodiesel	**F** Solar energy	**G** Wind speed, wind blocks,environmental impact, ability to transport electricity to population centers, etc.	**H** Anyone who has hung clothes to dry outside
I ask for location/description	**J** biomass	**K** hydropower	**L** The national average is $0.126 per kWh for residential customers
M in electromagnetic waves (or transverse waves)	**N** pumped storage or run of river hydroelectric power plant, tidal power, wave power, ocean thermal energy conservation	**O** sailboat sailboard etc.	**P** A turbine captures the energy of flowing water.

BIOMASS BINGO

ANSWERS

A. Can name two biomass fuels

B. Knows what anaerobic means

C. Can explain the difference between diesel and biodiesel

D. Knows two chemical elements present in all biofuels

E. Knows the energy transformation when ethanol is used in an internal combustion engine

F. Knows what percentage of total U.S. renewable energy needs come from biomass

G. Has used a form of biomass for cooking

H. Knows what biofuel was once used to light lamps and came from the ocean

I. Can point to something in this room that could be used as a biofuel

J. Knows what pure methane smells like

K. Knows a source of biomass in use for thousands of years

L. Has used a form of biomass for home heating

M. Knows what aerobic means

N. Knows what percentage of total U.S. energy need is met by biomass

O. Knows the chemical name for CH_4

P. Knows what the 85 in E85 stands for

A ethanol biodiesel	**B** the absence of oxygen	**C** Diesel is petroleum based. Biodiesel is a blend of diesel and biofuels.	**D** carbon and hydrogen
E chemical energy is transformed into: thermal, sound, and motion	**F** About 50%	**G** wood or charcoal cooking fire/ grill	**H** whale oil from blubber
I wood, paper, alcohol	**J** methane is odorless	**K** wood	**L** wood stove or fireplace ethanol fireplace insert
M requiring the presence of oxygen	**N** Around 5%	**O** methane	**P** The fuel is 85% ethanol, 15% gasoline.

CHANGE A LIGHT BINGO ANSWERS

A. Knows the average cost per kilowatt-hour of electricity for residential customers

B. Can name two renewable energy sources

C. Has an ENERGY STAR® appliance at home

D. Knows which energy source generates the most electricity in the U.S.

E. Can name two ways to save energy at home

F. Has taken the ENERGY STAR® change a light pledge

G. Knows the perfector/patent holder of the incandescent light bulb

H. Knows how electricity is generated

I. Can explain the concept of energy efficiency

J. Uses two CFLs at home

K. Can name two reasons to use an ENERGY STAR® CFL or LED

L. Knows the significance of the ENERGY STAR® rating on appliances

M. Knows what a lumen is

N. Knows how much energy an incandescent bulb converts to wasted heat

O. Knows a greenhouse gas produced by the burning of fossil fuels

P. Knows what CFL stands for

A $0.12 national average for residential customers	**B** biomass geothermal hydropower solar wind	**C** ask for description	**D** coal
E use a programmable thermostat, use CFLs or LEDs, adjust water temperature, winterization measures, etc.	**F** ask for when/results	**G** Thomas Edison	**H** Steam, water, or wind spins a turbine, spinning a generator, producing electricity, or through PV cells
I Energy efficiency reduces overall electricity consumption by using more efficient devices	**J** ask for location in home	**K** Reduce electricity consumption (save money), lasts longer, produces less heat	**L** Shows that the appliance meets energy efficiency guidelines
M indicates the amount of light emitted by a lamp	**N** 90%	**O** carbon dioxide	**P** Compact fluorescent light bulb

COAL BINGO

ANSWERS

A. Knows what type of rock coal is

B. Can explain the purpose of clean coal technology

C. Can name three of the top five coal producing states

D. Knows what is compressed over time to form coal

E. Knows the top two uses of coal

F. Can name two types of coal

G. Can name the country with the most coal reserves

H. Can name one of the two types of coal mining

I. Can name one of the factors leading to the formation of coal

J. Can name one advantage and one disadvantage of using coal

K. Knows how most coal is transported

L. Knows the form of energy stored in coal

M. Has seen a coal mine

N. Has never seen coal

O. Knows the element in coal that contributes to acid rain

P. Knows the greenhouse gas released when coal is burned

A Organic sedimentary	**B** Removes pollutants (sulfur, NOx) before, during, and after burning	**C** Wyoming, West Virginia, Pennsylvania, Illinois, Kentucky	**D** Peat
E Electricity generation Non-CHP(combined heat and power) Industry	**F** Anthracite Bituminous Subbituminous Lignite	**G** United States	**H** Surface mining Deep mining
I Time Heat Pressure Originates with stagnant water / swamp	**J** **Advantage:** energy density, supply, domestic **Disadvantage:** Pollution, greenhouse gases, mine safety	**K** Railroad car	**L** Chemical energy
M Ask for details	**N**	**O** Sulfur	**P** CO_2

ENERGY EFFICIENCY BINGO

ANSWERS

A. Can name two ways to increase a car's MPG

B. Can name three ways to save energy at home

C. Can name three ways to save energy at school

D. Has at least one ENERGY STAR® appliance at home

E. Knows the definition of *energy efficiency*

F. Knows the definition of *energy conservation*

G. Knows what an ENERGY STAR® label means

H. Knows what SEER is

I. Knows a type of bulb that uses one-quarter of the energy of incandescents

J. Knows where to find an EnergyGuide label

K. Can name two appliances that should be run only when fully loaded

L. Uses day lighting in the classroom instead of overhead lights

M. Sets this item differently at day and night and for the season

N. Knows the number one use of energy in the home

O. Has an energy conservation team at school

P. Knows whether energy is the first, second, or third highest expenditure in a school district (choose one)

A proper tire inflation, drive the speed limit, slow acceleration	**B** Switch to CFLs or LEDs, use a programmable thermostat, wash clothes in cold water, etc.	**C** Turn off computers/lights/ appliances when not in use, close doors and windows, etc.	**D** ask for location/description
E Using technologies to continue activities at the same level while using less energy	**F** Choosing to use less energy through alternative behaviors or actions	**G** The product meets energy efficiency requirements	**H** seasonal energy efficiency ratio of cooling output by power consumption
I CFL or LED	**J** On appliances and products for homes and business	**K** dishwasher and clothes washer	**L** ask for details
M programmable thermostat	**N** heating/cooling	**O** ask for description/details	**P** second, the first is personnel

HYDROPOWER BINGO

ANSWERS

A. Knows the percentage of U.S. electricity supplied by hydropower

B. Knows another name for the water cycle

C. Knows the process by which water becomes a gas in the water cycle

D. Knows the form of energy of the water stored in a reservoir

E. Can explain what a generator does

F. Knows the federal agency that regulates public hydropower dams

G. Can name the device in a hydropower plant that captures the energy of flowing water

H. Can name the energy source that supplies most of U.S. electricity

I. Knows the source of energy that drives the water cycle

J. Knows what energy source causes ocean waves

K. Can explain the force that produces tides in the ocean

L. Knows the three main parts of a hydropower plant

M. Knows the process by which water vapor becomes a liquid

N. Knows the state that produces the most hydropower

O. Can explain what a pumped storage facility does

P. Knows how many hydroelectric power plants there are in the U.S.

A 5-10% depending on amount of rainfall	**B** hydrologic cycle	**C** water becomes a gas through evaporation	**D** gravitational potential energy
E generator converts kinetic energy into electrical energy	**F** FERC Federal Energy Regulatory Commission	**G** a turbine captures the energy of flowing water	**H** natural gas produces about 34% of U.S. electricity coal produces about 31%
I solar energy drives the water cycle	**J** ocean waves are caused primarily by wind	**K** tides are formed by the gravitational pull of the moon	**L** reservoir, dam, and power plant
M condensation	**N** Washington State	**O** it has two reservoirs at different heights and circulates water between them	**P** about 2,200 hydroelectric power plants

HYDROGEN BINGO

ANSWERS

A. Knows the atomic number of hydrogen

B. Knows the percentage of U.S. energy consumption supplied by renewables

C. Knows the process that produces energy in the sun's core

D. Can define energy carrier

E. Knows what a fuel cell is

F. Can define distributed generation

G. Knows a process that separates water into hydrogen and oxygen

H. Knows the number of neutrons in a hydrogen atom

I. Knows in what form energy from the sun travels to the Earth

J. Can name four renewable energy sources

K. Knows the percentage of U.S. energy consumption supplied by fossil fuels

L. Knows the top energy carrier used in the U.S.

M. Knows the U.S. percentage of world population

N. Can name four nonrenewable energy sources

O. Knows the U.S. percentage of world energy consumption

P. Can name two ways hydrogen is used today

A the atomic number for hydrogen is 1	**B** renewables supply about 10 percent of U.S. energy consumption	**C** FUSION of hydrogen into helium produces energy in the sun's core	**D** a system or substance that moves energy from one place to another
E a device that uses chemical reaction to produce electricity - a battery	**F** distributed generation is electricity produced near the site of the consumer	**G** ELECTROLYSIS separates water into hydrogen and oxygen	**H** no neutrons in a simple hydrogen atom (deuterium and tritium isotopes have neutrons)
I energy from the sun travels to Earth in the form of radiant energy	**J** renewables: solar, wind, hydropower, biomass, geothermal	**K** fossil fuels supply about 81 percent of total U.S. consumption	**L** electricity is the top energy carrier in the U.S.
M the U.S. contains a little more than 4 percent of total world population	**N** nonrenewables: petroleum, natural gas, propane, coal, uranium	**O** the U.S. accounts for about 18 percent of total world energy consumption	**P** used by industry for refining, treating metals, and processing foods; to fuel small hydrogen fuel cells to produce electricity; hydrogen fueled vehicles

NUCLEAR ENERGY BINGO ANSWERS

A. Knows the atomic mass of the uranium isotope used in nuclear power plants

B. Knows the name of the process that releases energy in a nuclear power plant

C. Knows the percentage of electricity produced by nuclear power in the U.S.

D. Knows how much CO_2 is produced by nuclear power plants

E. Can name at least one other use for nuclear energy

F. Has visited a nuclear power plant

G. Knows how many nuclear reactors are operating in the U.S.

H. Knows the country that generates the most electricity from nuclear power

I. Can name the country that generates the highest percentage of its electricity from nuclear energy

J. Knows where nuclear waste is currently stored in the U.S.

K. Can name something in our everyday lives that exposes us to radiation

L. Knows the name of the part of the nuclear power plant where thermal energy is released

M. Knows the atomic number of uranium

N. Knows what uranium is processed into for use as nuclear fuel

O. Knows the name of an acceptable on-site storage method for spent fuel

P. Can name at least one part of the nuclear fuel cycle

A U-235	**B** fission	**C** 19.89%	**D** 0
E weaponry medicine	**F** ask for location/description	**G** 99 reactors 61 plants	**H** U.S.
I France (77.6%)	**J** on-site at reactors	**K** air travel, foods, medical technologies, smoke alarms, ceramics, clocks, etc.	**L** reactor
M 92	**N** ceramic pellet	**O** spent fuel pool or dry cask storage	**P** mining, milling, refining, conversion, enrichment generation

OIL AND NATURAL GAS BINGO

ANSWERS

A. Knows the main component of natural gas

B. Can name a state that is a top 5 producer of petroleum

C. Knows what percentage of oil used in the U.S. that is imported

D. Knows how natural gas is measured

E. Knows two ways to increase a car's MPG

F. Knows what percentage of U.S. electricity is generated by natural gas

G. Knows the type of rock most petroleum is found in

H. Knows two industrial products that use natural gas as a feedstock

I. Knows what percentage of total energy is supplied by petroleum

J. Used petroleum to get to the school today

K. Knows two uses of natural gas in the home

L. Knows the two types of atoms found in oil and natural gas molecules

M. Has seen crude oil

N. Knows the method refineries use to separate crude oil into useful products

O. Knows how natural gas is transported

P. Knows what OPEC stands for

A methane	**B** Texas, North Dakota, California, Alaska, Oklahoma	**C** about 51%	**D** cubic feet
E proper tire inflation, regular oil change, don't keep extra weight in their car, etc.	**F** 34.0%	**G** sedimentary	**H** fertilizer, ink, glue, paint, plastic, insect repellent, synthetic rubber, man made fabrics, etc.
I 37.0%	**J** ask for description/details	**K** hot water heating, cooking, clothes dryer, fireplace	**L** hydrogen, carbon
M ask for description/details	**N** fractional distillation	**O** pipeline	**P** Organization of Petroleum Exporting Counties

SOLAR ENERGY BINGO

ANSWERS

A. Has used a solar clothes dryer

B. Knows the average conversion efficiency of PV cells

C. Knows the nuclear process in the sun's core

D. Knows how radiant energy travels through space

E. Can explain how solar energy drives the water cycle

F. Has used a photovoltaic cell

G. Rides in a solar collector

H. Can explain how solar energy produces wind

I. Knows how plants convert solar energy into chemical energy

J. Uses passive solar energy at home

K. Has seen a solar water heater

L. Has cooked food in a solar oven

M. Can name two advantages of solar energy

N. Knows the energy conversion that a PV cell performs

O. Can explain why dark clothes make you hotter in the sun

P. Owns solar protection equipment

A Has hung clothes outside to dry	**B** 13-30%	**C** Fusion	**D** In electromagnetic waves (or transverse waves)
E Sun evaporates water in lakes and oceans, water vapor rises and becomes clouds, rains to replenish	**F** ask for location/description	**G** Car without tinted windows is a solar collector-like a greenhouse	**H** Sun heats the Earth's surface unevenly-hot air rises and cooler air moves in
I Photosynthesis	**J** Allows sun to enter through windows for light and heat-has materials that retain het (masonry, tile, etc.)	**K** ask for location/description	**L** ask for description
M Solar energy systems do not produce air pollutants or carbon dioxide, minimal impact on environment, sun's energy is free	**N** radiant energy to electrical energy	**O** Dark colors absorb more radiant energy and turn it into thermal energy	**P** Sun screen, sunglasses, etc.

WIND ENERGY BINGO

ANSWERS

A. Has used wind energy for transportation

B. Knows the average cost per residential kilowatt-hour of electricity

C. Can name two renewable energy sources other than wind

D. Can explain how wind is formed

E. Knows what an anemometer does

F. Can name two forms of energy

G. Can name two factors to consider when siting a wind farm

H. Knows how electricity is generated by a wind turbine

I. Has seen a modern wind turbine

J. Knows how wind speed is measured

K. Has experienced the wind tunnel effect

L. Knows the energy efficiency of a wind turbine

M. Can name two uses of windmills

N. Can name two myths many people believe about wind turbines

O. Has been to a power plant

P. Knows what a gear box does

A Sailboat Sailboard etc.	**B** $0.127 national average for residential customers	**C** biomass geothermal hydropower solar	**D** The sun heats Earth's land and water surfaces differently. Warm air rises, cool air moves in.
E measures wind speed	**F** potential, elastic, chemical, gravitational, nuclear, radiant, thermal, sound, motion, light, electrical	**G** wind speed, and consistency, environment (land and animals), public opinion, access to grid	**H** Turbine spins a shaft, which spins a generator producing electricity
I ask for location/description	**J** meters per second, with anemometer	**K** ask for details	**L** The Betz Limit is 59% for wind, today's wind turbines are about 25-45% efficient.
M Grind grain, pump water, generate electricity, etc.	**N** Noisy, unpredictable, expensive, kills birds, interferes with TV and communication signals, etc.	**O** ask for location/description	**P** Connects low-speed shaft to high-speed shaft and increases the rotational speeds to produce electricity