

Name: _____



ENERGY EXPERT PATCH

Junior Workbook

Consumers Energy

Count on Us

PROVIDING ENERGY EDUCATION TO STUDENTS IN THE COMMUNITIES
WE SERVE. THAT'S OUR PROMISE TO MICHIGAN.

For more great energy resources visit:
www.ConsumersEnergy.com/kids

Hey there Scouts!

Ready to earn your Energy Expert patch? This book will help you become an expert at:

Page 1- Electric Safety

Page 2 & 3- Natural Gas Safety

Page 4 & 5- Energy at Home

Page 6- Sources of Energy

Page 7- Energy Conservation

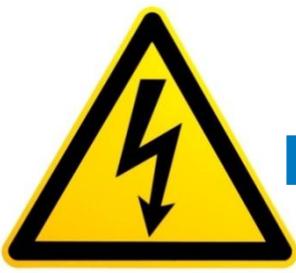
Page 8- Energy Audit

Page 9- Energy Pioneers

Leaders:

This book is designed to be completed as a group. Please visit www.ConsumersEnergy.com/scouts to download the leader guide that includes the answers to this book, talking points for discussion, and how to order your patches.

Questions? Feel free to email us at education@consumersenergy.com



ELECTRIC SAFETY

3 things can happen if you touch electricity, you can be:

1. _____ 2. _____ 3. _____

_____ allow electricity to flow.

Write down an example:

_____ stop the flow of electricity.

Write down an example:

TRUE or **FALSE** (circle the answer)

People are conductors of electricity

Pretend a jump rope is a downed power line. Act out with your troop how you should react, then draw it here.

Remember!

Electricity, people, water DON'T mix!

Look up for POWER LINES when climbing a tree or flying a kite

Stay away from downed power lines and call Consumers Energy right away (800) 477-5050

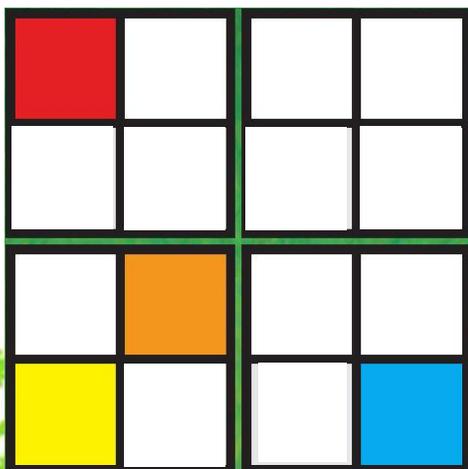
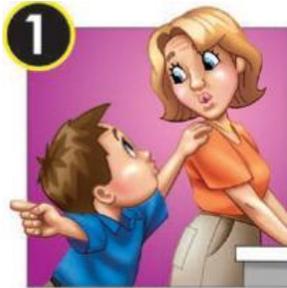
NATURAL GAS SAFETY

Natural gas smells like:



Take the Right Steps

Write the safety phrase under the right picture to learn how to react to a natural gas leak!



Utility Flag Sudoku

Color in the flags, so that each color flag only appears once in each row, column and box. (red, orange, yellow, blue)

The flags tell us what is underground!

Yellow = Natural Gas

Red = Electricity

Green = Sewer

Blue = Water

Orange = Cable/Telephone



Gone BANANAS! Activity

Fill in the answers with your pack.



1. How do natural gas, electricity, water, cable and telephone get to your house?

2. What does the banana represent?

3. What do the spoon and knife represent?

4. What happened when you hit the spoon into the banana?

5. What happened when you dug into the banana with the knife?

6. What would happen if someone was digging and hit a natural gas pipe?

How can you avoid hitting a natural gas pipe? (circle the answer)

Call 811 / Call the police / You can't avoid it

How much does it cost? (circle the answer)

1 million dollars / FREE / 25 dollars

How long does it take? (circle the answer)

1 week / 1 year / 3 Days



ENERGY AT HOME

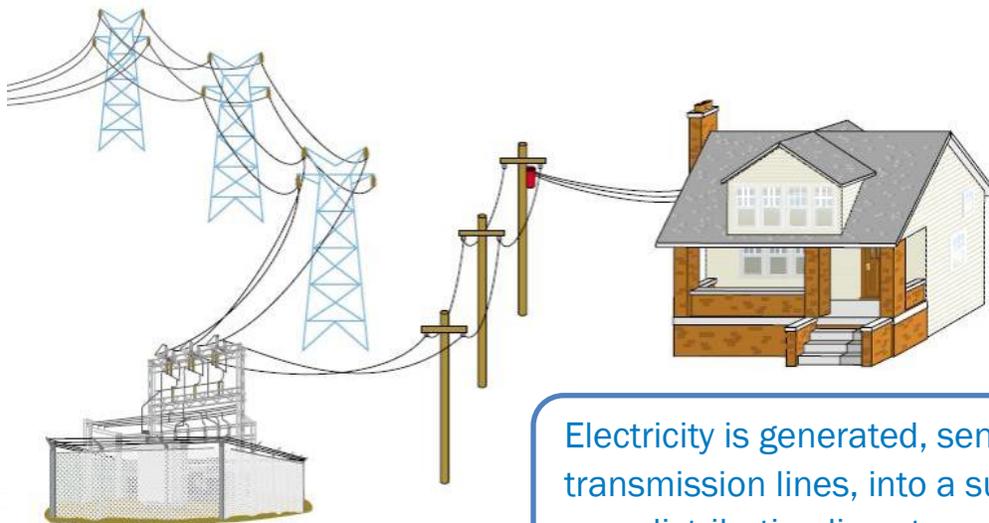
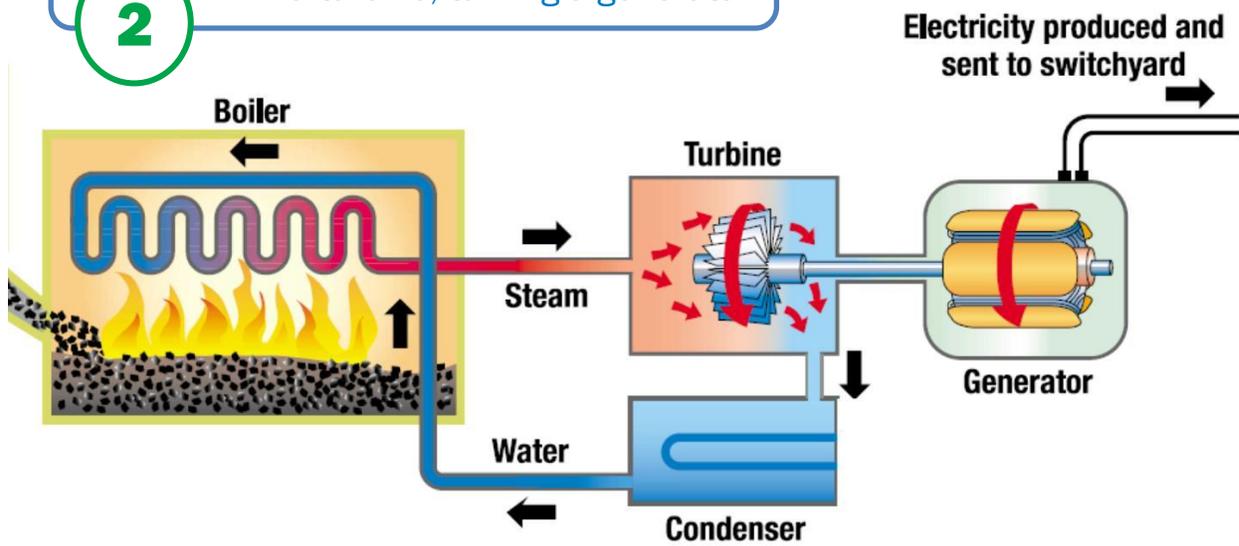
How DOES electricity get to your house?

1

Coal is mined out of the ground, and sent on trains and boats to a power plant

2

Coal is burned to make steam, which turns a turbine, turning a generator



3

Electricity is generated, sent through transmission lines, into a substation, then over distribution lines to your house!

Electricity is measured in kilowatt-hours (kWh) by

a _____ on your home.



_____ are the new way energy companies will measure your energy use, plus they will notify the energy company whenever you have an outage. Now *that's* smart energy!

How Much Does it Cost?

Electricity costs money. Being energy efficient can help the environment and save your family money!

Use this formula to calculate how much devices in your home cost.

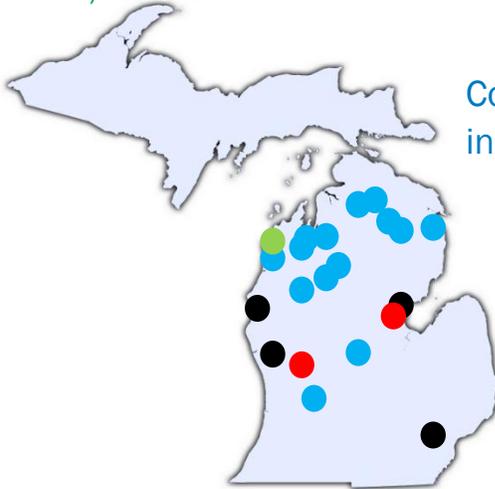
Device	Watts	Hours Used	Kwh	Price per Kwh	Cost per day Kwh x price	Cost per year
TV	130	4	$\frac{130 \times 4}{1,000} = 0.52$	\$0.10	$0.52 \times 0.10 = \$0.05$	$\$0.05 \times 365 = \18.25
Laptop	220	6	$\frac{220 \times 6}{1,000}$	\$0.10	$1.32 \times 0.10 =$	
Cell Phone Charger	3	24		\$0.10		
You Choose!				\$0.10		

How can you use these devices differently to help save energy?

SOURCES OF ENERGY

_____ energy sources are fossil fuels like coal, oil, and natural gas.

_____ energy sources can be reused like wind, water, and solar.



Consumers Energy has many power plants in Michigan that use different sources of energy.

- Hydro Power Plant
- Wind Farm
- Natural Gas Power Plant
- Coal Power Plant

★ Where do you live? Mark it on this map with a star.

TYPES OF FUEL WORDSEARCH

Coal	Natural Gas	Nuclear	Oil	Sun	Water	Wind													
C	U	P	X	E	M	F	A	V	P	L	Q	M	Y	L	K	D	F	B	E
P	L	X	V	G	A	L	U	C	M	W	I	L	X	C	T	I	S	Z	P
W	C	V	Y	I	W	S	Z	L	E	S	A	L	O	S	V	I	S	D	P
A	U	M	E	I	N	S	X	G	P	E	B	M	A	X	T	N	U	M	O
W	N	Y	S	U	A	I	C	R	C	U	M	S	I	L	A	P	N	E	M
M	L	Z	H	C	T	Q	I	P	T	J	L	F	M	T	D	A	R	W	X
P	M	Y	V	O	U	V	I	O	F	P	L	V	X	S	T	E	Y	Q	L
S	O	I	Y	X	R	M	W	A	T	E	R	A	N	K	L	T	U	D	P
J	G	A	Q	P	A	B	S	G	I	K	R	M	V	P	L	R	Y	U	Z
A	F	M	E	I	L	W	A	T	R	I	L	P	D	I	V	M	K	W	Q
I	W	P	O	X	G	X	D	J	E	Y	Z	U	K	R	S	S	C	O	X
G	R	E	U	U	A	Y	C	G	I	H	A	O	R	M	H	Q	A	L	N
T	Y	J	H	P	S	K	I	I	E	F	Y	I	B	O	L	U	O	U	T
E	I	R	R	M	B	M	L	P	C	B	E	L	M	T	Y	R	L	T	U
L	P	K	D	E	N	C	E	T	U	Y	H	E	E	P	R	F	D	R	E
R	G	L	F	U	E	A	B	E	Q	J	L	W	Z	N	I	O	R	U	D
U	B	W	B	M	R	D	L	C	Z	E	A	S	C	F	P	Y	E	I	F
M	W	I	D	N	T	U	S	M	S	S	E	P	C	O	A	L	T	G	J
O	I	Q	I	K	I	P	Z	R	U	V	E	I	R	W	D	P	Y	V	T
T	N	J	W	G	L	Q	A	F	F	P	M	O	W	Z	L	Y	W	R	R
R	D	Z	S	D	W	I	N	U	C	L	E	A	R	Q	P	M	P	C	E
E	M	C	R	C	Q	B	E	H	C	S	A	R	F	A	E	G	V	M	H



ENERGY CONSERVATION

Energy Efficiency uses _____
to help people use less energy.

Energy Conservation is when people change
their _____ to help lower their use of energy.

Make an Energy Conservation Pledge!

- A pledge is a promise to change your behavior.
- Make a promise that will help conserve energy.
- Make your pledge official by turning it into a poster that you can display.

Try using these materials to make it look great!

- Large foam poster board
- Markers
- Stickers
- Colored paper, tape and ribbon
- Glitter
- Pictures

I pledge to conserve energy by:

SIGNATURE: _____

DATE: _____

Think about places you could put your poster so you will remember your pledge and where others could learn from it. Write down where you will hang your poster: _____

What kind of pictures could you draw on your poster? _____



ENERGY AUDIT

Using what you've learned about energy efficiency and conservation make a plan to perform an energy audit for a library or school in your area. Here are some suggestions to get started.

- Do some research on different energy efficiency options for common trouble areas such as windows, lighting, or heating and cooling. Some good places to start are www.energystar.gov or www.eia.doe.gov. Consumers Energy also can provide you with ideas at www.ConsumersEnergy.com/eeprograms.
- Visit www.myfootprint.org (cost \$1) or <http://www.earthday.org/footprint-calculator> (\$free) to determine your ecological footprint. These websites have you take a quiz about your energy and consumption habits and compare them to people all around the world. Your footprint is broken down into different categories including energy, transportation, food, and goods and services.
- Once you are prepared, contact a school or library and ask if you can perform an energy audit for them. Visit our lesson plan page at www.ConsumersEnergy.com/teachers and click on *Lesson Plans* and then *Saving Energy at School* to help you develop good questions to ask and areas of the building to evaluate.

ENERGY PIONEERS

Are they Isabella Karle, Marie Curie, or Zan Lombardo?

Read the stories, then research to see which name matches the scientist's description.



I was born in 1921 in Detroit, Michigan. I earned my PhD at the University of Michigan in 1943. I married and worked with another scientist, and we won the Nobel Prize for working with x-rays in 1985. I contributed over 200 research papers to the development of x-ray crystallography, the method for determining how atoms are arranged in a crystal. I was also one of the first people to successfully use the method of calculating x-rays. I am still alive today.

My name is:

I am a current art teacher in Pennsylvania. I worked with my students at Balley Forge Middle School in Pennsylvania to make one energy efficient habit for an entire month. Then I helped my students make a giant mural to show how they helped the environment. The National Energy Foundation awarded me in 2006 for inspiring students to be energy efficient and make a difference in their community.

My name is:

I discovered the mysterious element radium in 1895. It opened the door to deep changes in the way scientists think about matter and energy. I had to secretly study to become a scientist because for many years it was illegal for women to go to University in my country, Poland. I worked really hard to raise enough money to move to Paris to get my Masters in Physics and Mathematics. I was the first woman to win a Nobel Prize in 1903.

My name is:

If you had to pick one topic on energy to study, what would it be?