Name: _____

ENERGY EXPERT PATCH

Cadette Workbook

Consumers Energy
Count on Us

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

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Hey there Scouts!

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

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

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ELECTRIC SAFETY

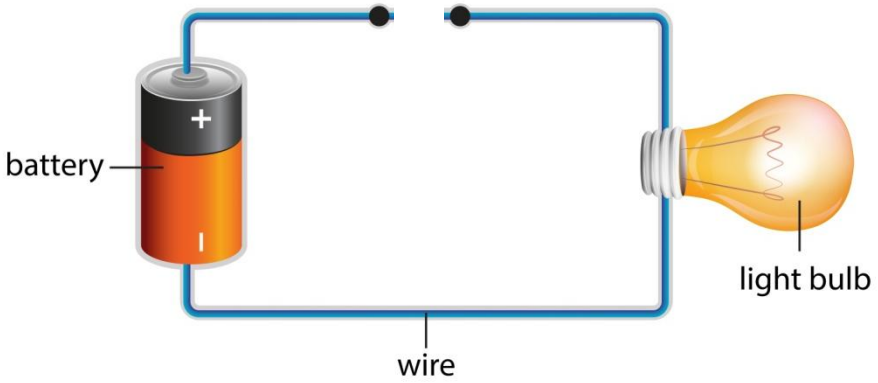
_____ are materials that carry electricity from one place to another.

_____ are materials that stop the flow of electricity.

EXPERIMENT!

Test materials with an adult to see if they are a conductor or an insulator of electricity.

STEP 1 – Build an electric circuit. One side should have 1 wire connecting the light bulb and battery. The other side should have 2 wires. Touch the 2 wires together to close the circuit, and the light bulb lights up!



STEP 2 – Choose your first material to test and touch the 2 wires to either side of the material. Does the light bulb light up? Write your results below.

RESULTS

Material	Did the light bulb light up?	Is this material a conductor or an insulator?

TRUE or FALSE (circle your answer)

People are conductors of electricity.

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NATURAL GAS SAFETY

Natural gas smells like:

_____.

Conduct a Safety Survey!

Ask family, friends and neighbors if you can interview them about being safe around natural gas. Write down their answers below.

Question 1: What are the little colored utility flags in the ground for?
Person 1 –

Person 2 –

Person 3 -

Question 2: Why do we have to call 811 for MISS DIG before we dig?
Person 1 –

Person 2 –

Person 3 -

Question 3: Why is natural gas dangerous if it gets out of the pipes?
Person 1 –

Person 2 –

Person 3 -

Question 4: What should we do if we smell natural gas?
Person 1 –

Person 2 –

Person 3 –

ENERGY AT HOME

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 x 0.10=$0.05	$0.05 x 365=$18.25
Laptop	220	6	$\frac{220 \times 6}{1{,}000}$	$0.10	1.32 x 0.10=	
Cell Phone Charger	3	24		$0.10		
You Choose!				$0.10		

What's one thing you can do starting today to save energy?

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Learn to Read an Energy Bill

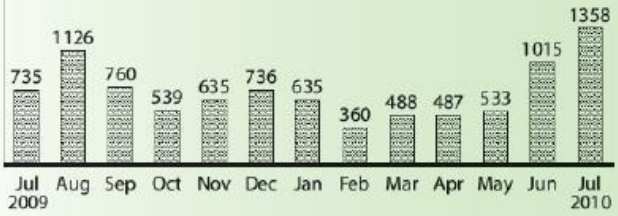
It might not sound like fun, but knowing how to read your energy bill is very important, to save money and know whether or not you are an energy hog!

Electric Residential Service
Rate: 1000S

Kilowatt-hours used: 1358 KWH
Meter reading: 27714 - 29072 (actual)

Meter Number: 44261576 POD: 0000001472109

Electric Power Supply Charges		
KWH-Energy First	600 @ 0.070923	$42.55
KWH-Energy Next	758 @ 0.130992	$99.29
Power Supply Cost Recovery	1358 @ 0.000520-	$0.71-
Renewable Energy		$2.50
Electric Delivery Charges		
System Access		$6.00
Elec Distribution	1358 @ 0.027489	$37.33
Other Surcharges *		$4.79
Energy Optimization	1358 @ 0.001430	$1.94
Securitization	1358 @ 0.001327	$1.80
Securitization Tax	1358 @ 0.000629	$0.85
Total Electric		**$196.34**



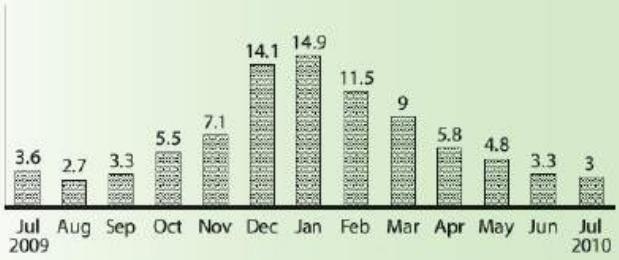
July Electric use	1358 KWH
Electric use per day	44 KWH
Electric cost per day	$6.33

Gas Residential Service
Rate: 250

Thousand cubic feet used: 3.0 MCF
Meter reading: 7207 - 7237 (actual)

Meter Number: 8528536 POD: 0000001472110
Differential: 30 Constant: 0.1 Correction factor: 1.00000

Gas Charges		
Customer Charge		$10.50
Gas Distribution	3.0 @ 2.428900	$7.29
Energy Optimization	3.0 @ 0.172200	$0.52
Gas Cost Recovery	3.0 @ 6.993400	$20.98
Total Gas		**$39.29**



July Gas use	3.0 MCF
Gas use per day	0.097 MCF
Gas cost per day	$1.27

How long is the billing period?

How many total kilowatt-hours were used in this billing period?

What unit is natural gas measured in?

How much money would you save on this bill if you used 4 kWh less per day?

Monthly Cost $196.34 = $_____ per kWh
Monthly kWh 1358

40 kWh x 31 days =_____ x $_____ per kWh =$_____ new monthly cost

Old monthly cost – new monthly cost = $$$ Saved

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SOURCES OF ENERGY

Read this story out loud.

Pretend Michigan is going through an energy crisis. There's not enough electricity to power all of the homes, businesses, or manufacturing plants, and power outages are happening everywhere. Consumers Energy has decided to build a new power plant in order to provide more electricity. But they don't know what fuel they should use. Do they use renewable, which is good for the environment, but not reliable? Or do they use non-renewable, which makes a lot of electricity at a low cost, but is not as good for the environment?

It's up to you to decide! Pick an energy source and write down why you think it is the best option.

I think the best energy source would be _____.

This source of energy is (circle one) renewable / non-renewable.

List some benefits of using this source:

1. _____
2. _____
3. _____

List some problems with using this source:

1. _____
2. _____
3. _____

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ENERGY CAREERS

Match the right career with the work they like to do.

Engineer	I like working on the computer and solving problems.
Customer Service Representative	I like writing and talking in front of groups of people.
Executive Communications	I like to design things, and I'm good at math.
Information Technology (IT)	I like to talk to people and help solve problems.
Electric Lineworker	I like to be outside, ride in vans, and help people.
Forestry	I like to walk, work independently and meet new people.
Natural Gas Worker	I like to work with trees and help the environment.
Meter Reader	I like to be outside, climb high and ride in trucks.

Interview an Energy Professional

Ask your professional these questions to learn what it's like to work in energy!

Name:_____ Company:_____

What is your job description?

What are your responsibilities?

What type of training and education did you need?

What kind of tools or equipment do you use?

What do you like best about your job?