

The Power

in Education




Missouri PSC Smart Grid Conference

November 29, 2011

Our Future Generation



City of Columbia

- **Municipal Population of 110,000**
 - **Significantly tied to education**
 - **University of Missouri**
 - **Columbia College**
 - **Stephens College**
 - **Full Service City**
 - **Transportation (Airport, Rail Spur)**
 - **Water, Wastewater, Solid Waste Services**
 - **Electricity**
- 

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 - **MUNICIPAL ELECTRIC UTILITY**

Columbia Water and Light

- **Municipally owned utility,**
- **Governed by City Council,**
- **Providing programs that reflect the community we serve**



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CWL Educational Programming

SCHOOL PARTNERSHIP PROGRAMS

- Energy Efficiency Calendar Contest
- Saturday Science
- Energy Challenge / Energy Choices

DIRECT CUSTOMER PROGRAMS

- Cable Channel 'Conservation Tips'
- Adult Education Programs
 - DIY Weatherization Class*
 - Energy 'Hat' Certification Series*

Columbia

WATER

We don't

need magic

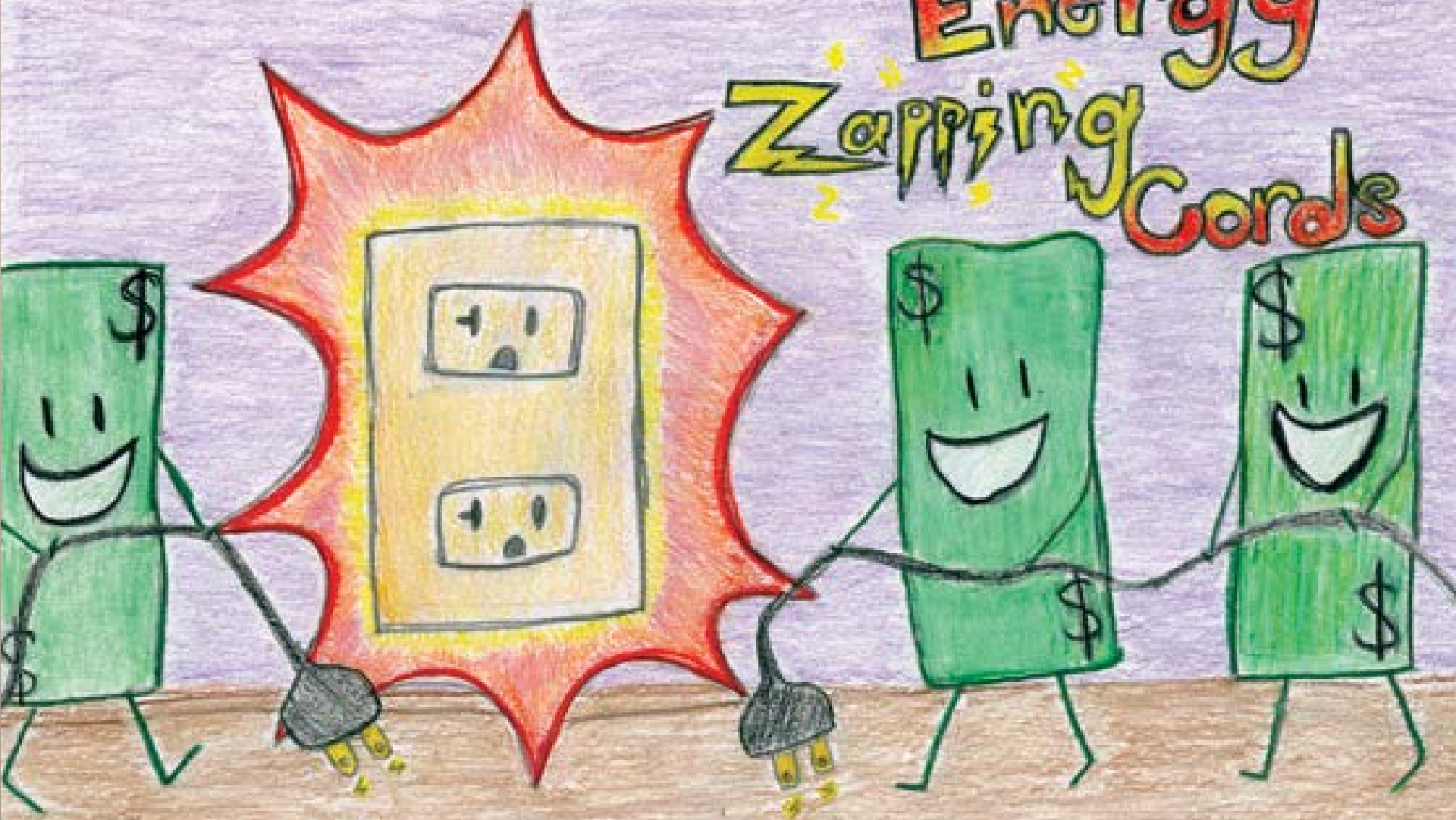
to get us

through the

night we just need
Columbia Water & Light.



Energy Zapping Cords



Don't Leave Cords Plugged in!

SATURDAY SCIENCE Hands On Activity



SATURDAY SCIENCE Topic Related to Business



SATURDAY SCIENCE ~ 100 students each year



ENERGY CHOICES

- ❖ Teaches 7th grade science students how to measure energy used in their home shower and what it cost
- Reaches 1300 students annually
- Takes two class periods:
 - Introductory Presentation
 - Lab with simulated shower
- Involves 12 – 15 utility staff to teach lab

ENERGY CHOICES Introductory Presentation



ENERGY CHOICES – Introductory Presentation



ENERGY CHOICES – Lab BTU Demonstration



ENERGY CHOICES Lab Worksheet



Name _____

ENERGY AND YOUR SHOWER

How much energy do you use in your shower? How much does it cost?

1. How much did the water get heated?

(Temp Increase = Temp (°F) Shower Water – Temp (°F) Incoming Water)

Shower Temperature _____ °F

Cold Temperature – _____ °F

Calculate \Rightarrow = _____ °F Use this answer in Sec 3 below

2. How much water was used (in pounds of water)?

(Weight (lbs) = Flow Rate (Gal per Min) X Density (lbs per gal) X Time of Shower (Min))

Flow Rate _____ Gallons per Minute
Water Density (Pounds per Gal) X 8.3 Pounds per Gallon

Calculate \Rightarrow = _____ Pounds per Minute

Time of Shower (minutes) X _____ Minutes

Calculate \Rightarrow = _____ Use this answer in Sec 3 below

ENERGY CHOICES

2. How much water was used (in pounds of water)?

(Weight (lbs) = Flow Rate (Gal per Min) X Density (lbs per gal) X Time of Shower (Min))

Flow Rate				Gallons per Minute
Water Density (Pounds per Gal)	X	<u>8.3</u>		Pounds per Gallon
Calculate	→	=		Pounds per Minute
Time of Shower (minutes)	X			Minutes
Calculate	→	=		Use this answer in Sec 3 below

3. Energy used to heat the shower water (in British Thermal Units (BTU))

(BTU = Temperature Increase X Pounds of Water)

Temperature Increase				°F (Your answer in Section 1 above)
Weight of Water	X			Pounds (Your answer in Section 2 above)
Calculate	→	=		BTUs of energy used for the shower

4. Electric Energy needed to heat Shower Water - (Kilowatt Hours, KWH)

(KWH = BTU X 3412)

Amount of Heat needed				BTUs (Your answer from Section 3 above)
Conversion Factor	÷	<u>3412</u>		BTU per KWH
Calculate	→	=		KWH

ENERGY CHOICES — Lab Shower Measurement



Customer Direct Programs – BOC



CONSERVATION TIPS



ADULT EDUCATION



EDUCATIONAL CONSIDERATIONS

Utilities, as well as the nation, needs smart consumers

Schools are by far the most effective way of creating smart energy customers

Utilities should be much more involved in curriculum development at the state level

Educational programming in schools require a long term vision

EMPOWER PLANTS

