The Power

in Education

Missouri PSC Smart Grid Conference

November 29, 2011

Our Future Generation

City of Columbia

- Municipal Population of 110,000
- Significantly to ties 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

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CWL Educational Programming

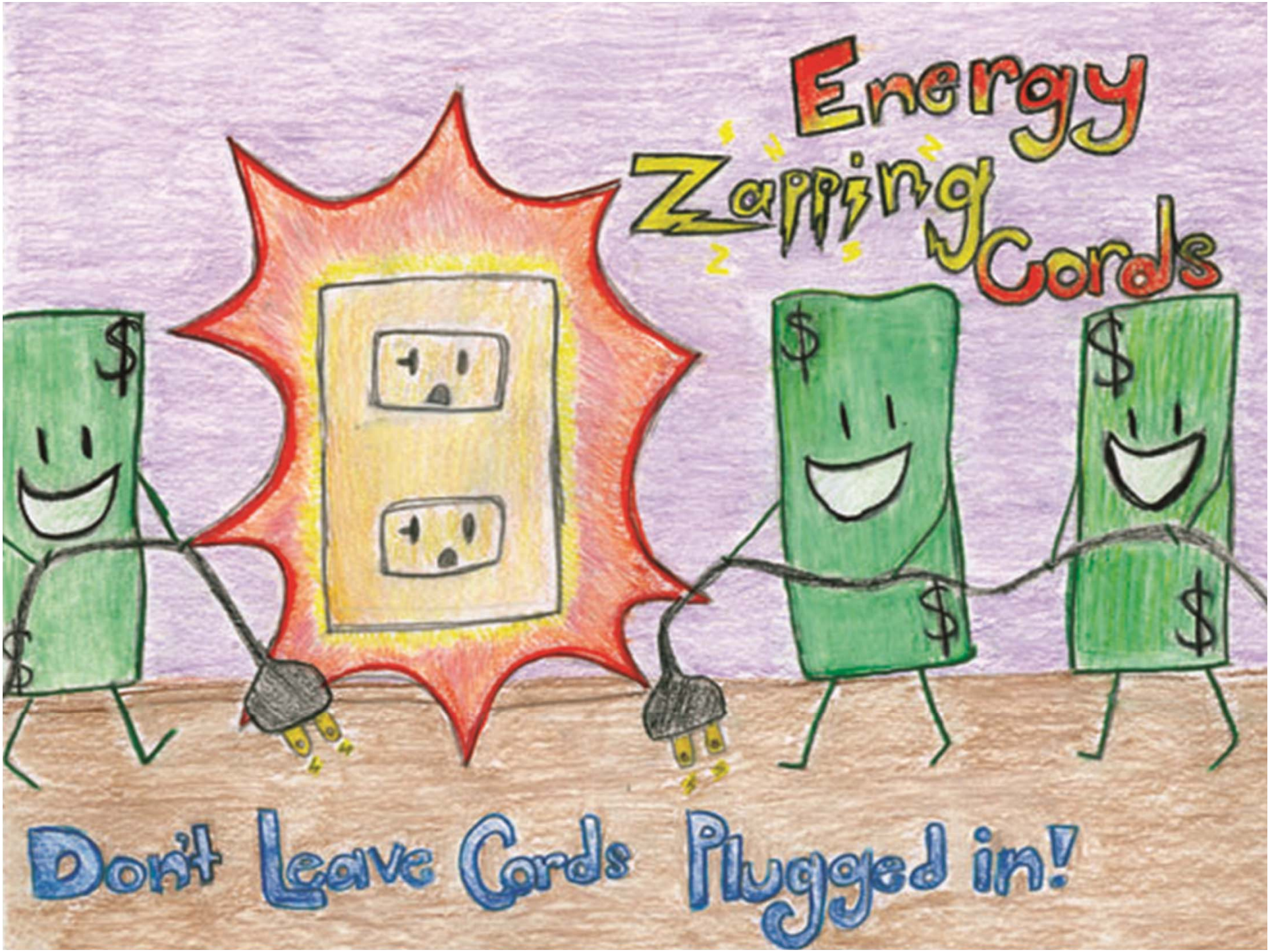
SCHOOL PARTNERSHIP PROGRAMS

- 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*

2012 Columbia Water & Light Calendar *compliments of your hometown utility*


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 ⇨ = _____ °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 ⇨ = _____ Pounds per Minute

Time of Shower (minutes) X _____ Minutes

Calculate ⇨ = _____ Use this answer in Sec 3 below

ENERGY CHOICES Lab Worksheet

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(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 ⇨	=	_____	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	÷	3412	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