CON EDISON WEB-BASED MIDDLE SCHOOL ACTIVITY

Lesson to Accompany the DC Comic Book

Energy Safety and Efficiency

Overview

This activity accompanies and reinforces the safety and conservation messages of the Con Edison comic book Adventures with the DC Super Heroes: Energy Safety and Efficiency, and it encourages students to apply those messages to their world.

Objectives

Students will:

• Apply electrical safety and conservation lessons to their daily lives.
• Undertake an informal “safety and efficiency” inspection of their homes.
• Review the safety and conservation information contained the comic book.

Materials

DC Comic Book Adventures with the DC Super Heroes: Energy Safety and Efficiency Worksheet

Time Requirements

Homework or class period for reading the comic book and completing the worksheet, and then a whole or partial class period for discussion.

Procedure

1. Have your students read the comic book and complete the worksheet, either as homework or in class.

2. Take a class poll:
   a. How many students heat their homes with: 1) gas  2) heating oil  3) electricity  4) don’t know? If they don’t know, how might they find out?
   b. How many have a 1) gas range 2) electric range?
   c. How many heat their water with 1) gas  2) oil  3) electricity  4) a renewable resource, such as solar?  5) don't know? How could they find out?
   d. How many know where their electrical panel is, which contains their home's fuses or circuit breakers?

3. Ask your students to describe ways that energy can damage or injure people. Then review the dangers noted on pages 3, 5, 7, & 8 of the comic book and ask your students if they can think of hazards that were not covered.
4. Ask your students to describe ways they could save energy in the home. Then review the savings measures noted in the “Oracle’s Tips” of the comic book and ask if they can think of actions they could take that were not covered.

5. Review the Background Science information (below) on overloaded circuits, ground fault interrupt outlets, power strips, and fuse boxes/circuit breakers. Ask students to explain how frayed wires and overloaded plugs and circuits can start a fire. Discuss the reasons why electric space heaters can be a serious fire hazard.

*They draw a lot of electricity and generate heat.*

Have students complete the worksheet. You may want to brainstorm as a class about the essay questions.

**Background Science**

**Natural Gas and Fires**

Natural gas is a highly flammable, highly explosive substance. If you smell a gas leak (which smells like rotten eggs), leave the building immediately and call the fire department, the police, or Con Edison at 1-800-350-9346. (If you live in Brooklyn, Staten Island, or Queens, call Keyspan at 1-718-643-4050.) If you wait to inspect the situation more, you may be in danger. If you flip a light switch or try to make a phone call, you may create a tiny spark that could be enough to ignite the gas. The best way to be a hero is to clear out and yell for help.

**Overloaded Circuits**

Every outlet in your house is part of an electrical circuit. Each circuit is designed to carry a safe amount of electricity. If you plug too many appliances into a circuit – especially appliances that produce heat, such as toasters and irons – you could be "overloading" the circuit, meaning that you are asking for it to carry more electricity than its design allows. You might blow a fuse or trip a circuit breaker. But if any part of the safety system fails, you will start a fire. If you do not have enough outlets in your house, always unplug something before you plug in a new appliance.

**Insulation and Frayed Wires**

The insulation on an electric cord protects the wires. It prevents them from touching each other and overheating, and it protects you from electric shock. Sometimes, though, that insulation fails, and the wires get too hot. If that happens, watch out, a fire may start at any time. If you see cracks or breaks in wire insulation, tell an adult and make every effort to replace the wire as soon as possible.

**Water and Electricity**

The water in our homes and bodies is highly conductive, meaning that electricity flows through it easily. The simplest safety rule you will ever learn is that water and electricity don't mix!
**Worksheet**

**Energy Safety and Efficiency**

**Safety**

1. Which “energy dangers” have you either experienced in your life or think might happen to you? Which do you think is most dangerous? Rank them according to their likelihood of happening to you on a scale of 1 (least likely) to 7 (most likely).

<table>
<thead>
<tr>
<th>Energy Danger</th>
<th>I’ve experienced it</th>
<th>Might it happen to me?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Swimming during a lightning storm</td>
<td>yes/no</td>
<td></td>
</tr>
<tr>
<td>Plugged-in radio near a shower or bath</td>
<td>yes/no</td>
<td></td>
</tr>
<tr>
<td>Plugged-in radio near a swimming pool</td>
<td>yes/no</td>
<td></td>
</tr>
<tr>
<td>Using frayed electrical wires</td>
<td>yes/no</td>
<td></td>
</tr>
<tr>
<td>Using a fork to free toast in toaster</td>
<td>yes/no</td>
<td></td>
</tr>
<tr>
<td>Overloaded extension cords</td>
<td>yes/no</td>
<td></td>
</tr>
<tr>
<td>Being near fallen power lines</td>
<td>yes/no</td>
<td></td>
</tr>
</tbody>
</table>

(1 = least likely, 7 = most likely)
2. If you experience one of these energy dangers, what should you do?

Swimming as a thunder and lightning storm approaches ____________________
____________________________________________________________________
____________________________________________________________________

Spotting a plugged-in radio near a shower or bath__________________________
____________________________________________________________________
____________________________________________________________________

Spotting a plugged-in radio near a swimming pool _________________________
____________________________________________________________________
____________________________________________________________________

Spotting frayed electrical wires ________________________________________
____________________________________________________________________
____________________________________________________________________

Getting a piece of toast jammed in the toaster _____________________________
____________________________________________________________________
____________________________________________________________________

Overloading an outlet or an extension cord _______________________________
____________________________________________________________________
____________________________________________________________________

Being near a fallen power line _________________________________________
____________________________________________________________________
____________________________________________________________________

3. How can overloaded outlet plugs and electrical circuits start fires?
____________________________________________________________________
____________________________________________________________________
____________________________________________________________________

4. You have a power strip that has a radio/stereo, TV, and VCR plugged into it. There is one space left. Would it be safe to plug in a:

- **Video game?** ___Yes  ___No ___Maybe
- **Fan?** ___Yes  ___No ___Maybe
- **Iron?** ___Yes  ___No ___Maybe
- **Space heater?** ___Yes  ___No ___Maybe

Explain your answers: _______________________________________________
__________________________________________________________________
__________________________________________________________________

5. Why does natural gas smell bad?
__________________________________________________________________
__________________________________________________________________

6. Why should you not turn light switches or other appliances on or off if you smell the “rotten egg” odor of natural gas?
__________________________________________________________________
__________________________________________________________________
__________________________________________________________________

7. Your body is mostly saltwater. Why does that put you in danger of being electrocuted?
__________________________________________________________________
__________________________________________________________________
__________________________________________________________________

8. Do the other people in your household know the right thing to do if they smell gas?
__________________________________________________________________
__________________________________________________________________
Wasting Energy

1. List five energy saving tips from the comic book.
   1) __________________________
   2) __________________________
   3) __________________________
   4) __________________________
   5) __________________________

2. Which of these tips might save the most energy for your family?
   __________________________
   __________________________

3. Which uses more energy: a fan or an air conditioner?
   __________________________
   __________________________

5. How might a dripping faucet be wasting energy?
   __________________________
   __________________________