

DRAFTY SHOES



Discover how air escapes our houses and how that affects energy usage.

Grade Levels: K-1
Time: 45 minutes

INTRODUCTION:

Electricity is the most common form of energy we use. It is generated through a secondary source such as water power, fuel or coal. These secondary sources are used to turn a series of blades on a turbine that is connected to a generator. The movement of the spinning generator causes bundles of copper in the generator to create a magnetic field. The movement of electrons from one copper bundle to another makes an electric current.

In the Inland Northwest, many turbines are spinning inside hydroelectric dams using clean, renewable water power. The majority of energy in the rest of the United States is created by burning coal or natural gas.

These power plants release gases into the air such as carbon dioxide and sulfur dioxide. These gases affect the quality of air. Scientists have linked carbon dioxide to changes in global climate. To help curb this problem, technology with cleaner emissions is being researched and developed.

Another way to help curb this problem is by conserving energy. This means using less electricity. Using less electrical energy reduces the amount of carbon dioxide and other gases released into the atmosphere.

Some ways to conserve energy include turning off lights when they aren't needed and using energy-efficient appliances. Another way to conserve energy is to reduce drafts in homes. A drafty house wastes energy when heated or cooled air escapes outside. Reducing drafts means the heater or air conditioning unit has to work less.

LESSON STANDARDS:

- Ask questions and investigate the natural world and record observations. K-1 INQA
- Report on observations using drawings and words. K-1 INQD
- Record observations honestly and accurately. K-1 INQF
- Use simple tools and materials to solve a problem. K-1 APPA
- Develop two possible solutions to solve a problem. K-1 APPC

MATERIALS:

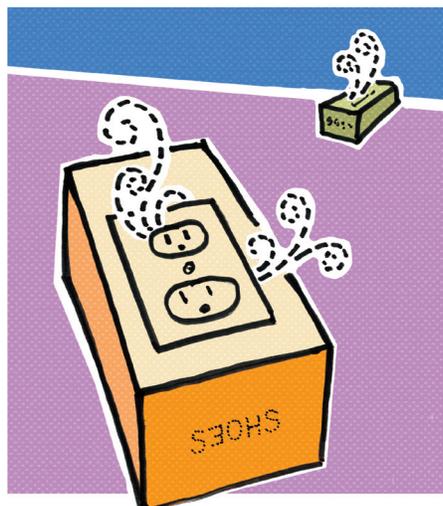
- Shoeboxes
- Dry ice
- Cups that fit in the shoeboxes
- Hot water
- Blue and red markers
- Box cutter

INSTRUCTIONS:

Before-class preparations:

1. On the bottom of each shoebox, use the templates to draw a picture of a common drafty location (e.g., fireplace, window, door with a mail slot, electrical outlet).
2. Cut a slit in the places indicated by dashed lines on the template.

MORE 



AVISTA

Activity:

1. Split your class into groups.
2. Explain to the students that they are looking for the spot on the box that leaks air.
3. Have students make predictions for all of the drafty places using a blue marker on the worksheet.
4. Put hot water in each cup.
5. Add a small amount of dry ice to each cup.

Caution: Dry ice is dangerously cold. Do not touch it with your bare hands and do not allow students to touch it with bare hands.

6. Have the students put the shoeboxes over the cups. The water vapor from condensation will start to fill the box.
7. Instruct the students to look at the top of their boxes and see where the vapor is escaping. Have the students mark this in red on the worksheet.
8. Have the students rotate around the room and look at each of the shoeboxes to see where the leakage is.

THINK ABOUT IT:

- Were you right about where you thought the leaks would be?
- What can you do to minimize leaks in your house?

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Did you know?

- A small crack, 1/16 of an inch, can let in as much air as opening your window 3 inches.
- 30 percent of the cold air in a fridge escapes every time you open the refrigerator door.
- The average family loses \$150 in energy cost due to small cracks and holes in their house. This adds up collectively to \$13 billion nationwide!

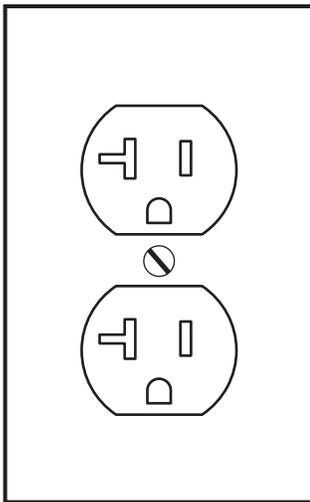


DRAFTY SHOES

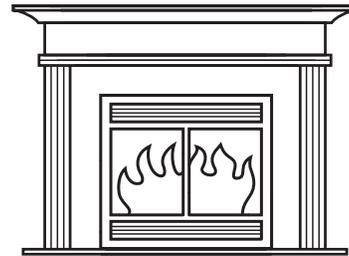
STUDENT WORKSHEET:

Examine these parts of a typical home.

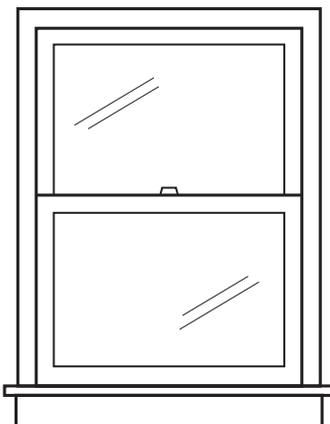
1. Where do you think each could leak air? Mark the locations in blue.
2. Where did you discover actual air leaks? Mark these locations in red.



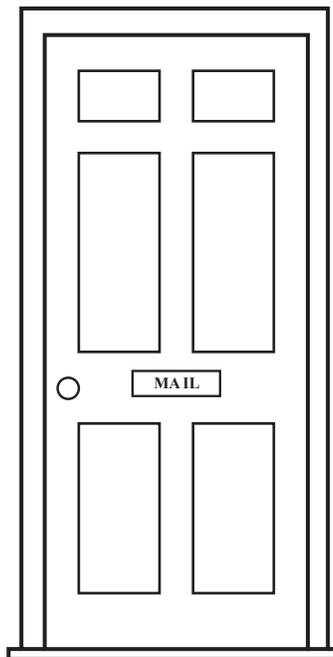
ELECTRICAL OUTLET



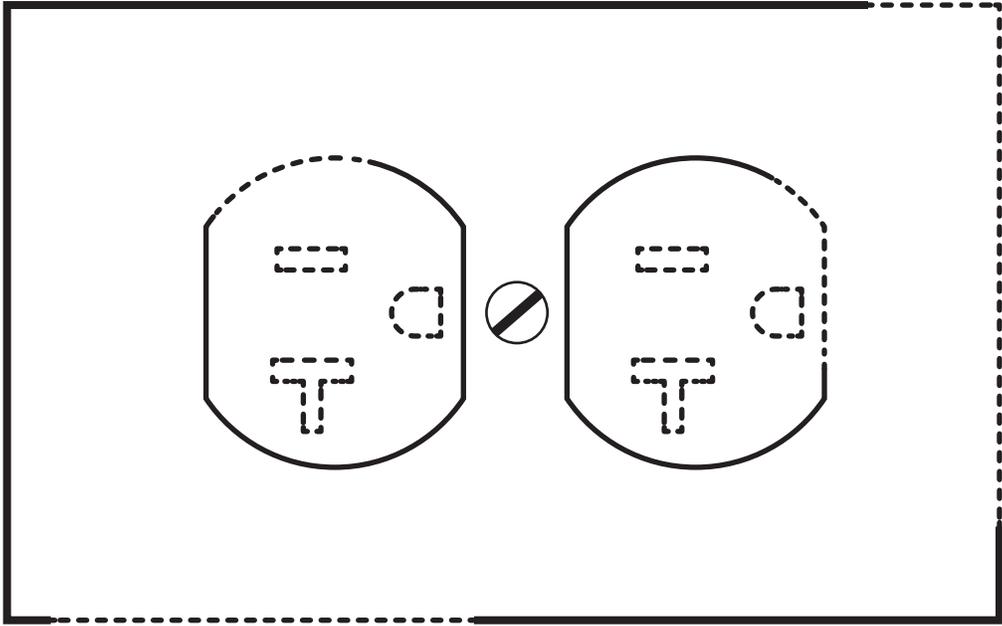
FIREPLACE



WINDOW

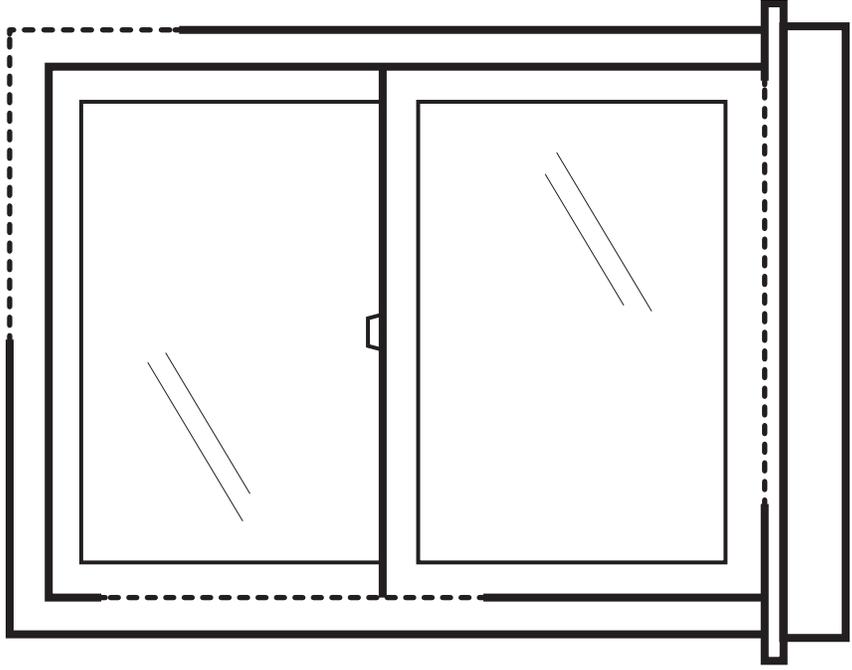


FRONT DOOR

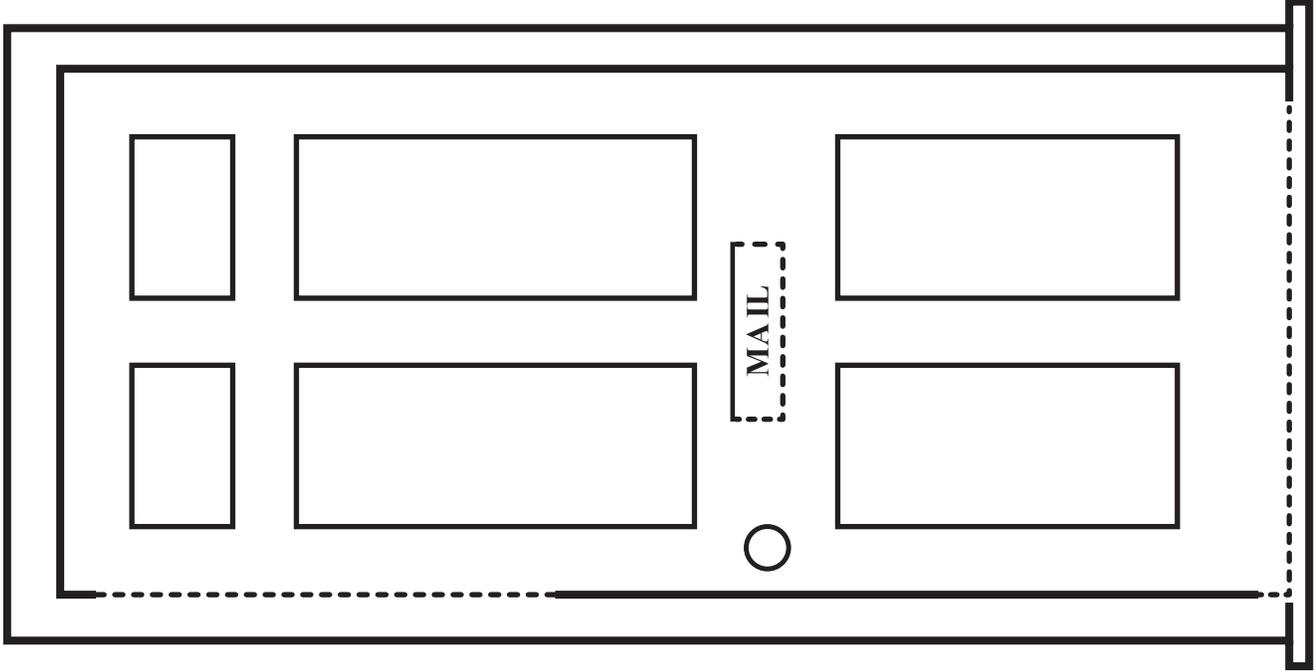


ELECTRICAL OUTLET

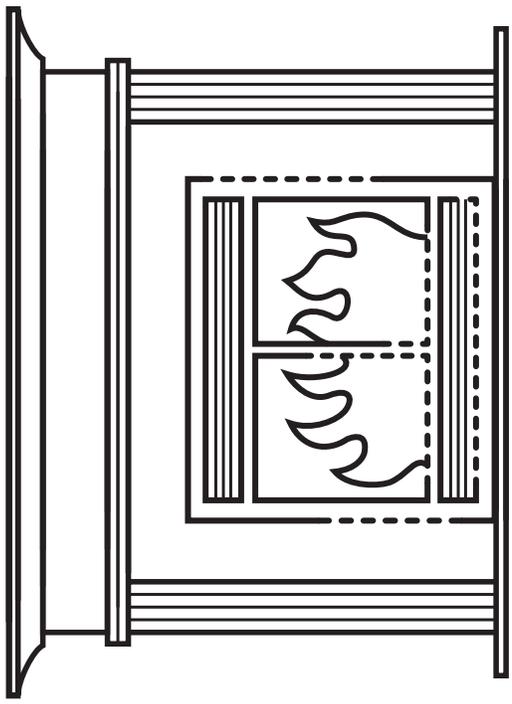
Use these templates as a guide to draw one image on the bottom of each shoebox.
Use a box knife to cut the dashed lines completely through the cardboard.



WINDOW



FRONT DOOR WITH MAIL SLOT



FIREPLACE

Use these templates as a guide to draw one image on the bottom of each shoebox.
Use a box knife to cut the dashed lines completely through the cardboard.