

EVERSOURCE

Home Energy Challenge

Energy Awareness Month Edition

Haunted House Drafts & Weatherization

Students and families work together to explore how air can leak into and out of their homes and explore solutions to air infiltration.



National Energy Education Development Project

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Home Energy Challenge - Energy Awareness Month Edition

Haunted House Drafts & Weatheriation

What's In The Kit

- Pencil
- Thumbtack
- Tissue paper
- Weather stripping (adhesive backing)
- Caulking strips

Materials Needed at Home

- Scissors

Background

WHAT IS HEAT?

We use heat, called thermal energy, every day. We can't see heat, but we can feel it. Our bodies make heat, and our stoves and lights do, too. We heat our homes, our food, and our water. Sometimes there is too much heat and we move it. Air conditioners take heat from inside the house and move it outside. Swimming pools take heat from our bodies.

Heat is the kinetic energy in a substance. Kinetic energy is the energy of motion. Heat is the motion of tiny molecules that make up a substance, not the motion of the substance itself. Everything is made of atoms. Atoms bond together to form molecules. Molecules are the building blocks of substances. Even though we cannot see them, the molecules in substances are never still. They are always moving. That motion is the kinetic energy called heat.

HEAT SEEKS BALANCE

Everything in nature seeks balance. Heat seeks balance, too. Heat flows from hotter places to colder places and from hotter substances to colder substances. What happens if you pour hot water into a cold tub? The molecules of hot water have more energy. They are fast moving. They crash into the colder molecules and give them some of their energy. The molecules of hot water slow down. The molecules of cold water move more quickly. The cold water gets warmer. The hot water gets cooler. Eventually, all the water is the same temperature because all the water molecules are moving at the same speed. The heat in the water is in balance.

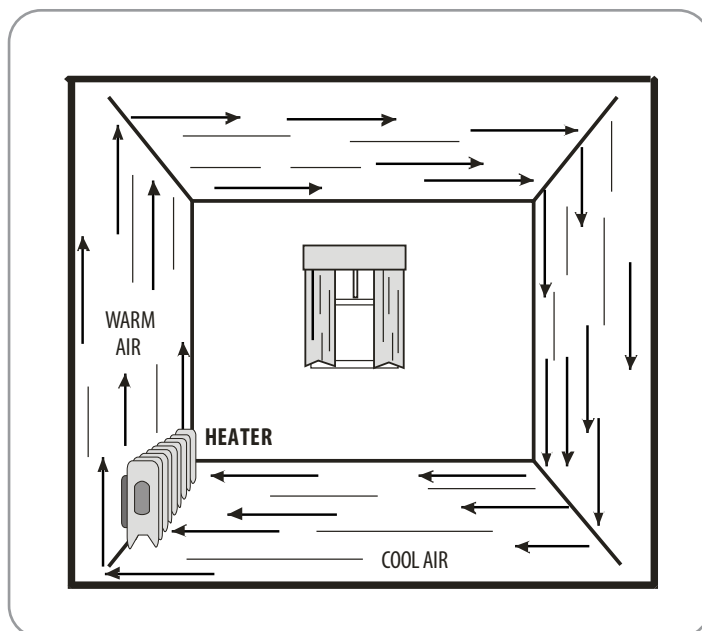
HEAT ENERGY IS ON THE MOVE – CONDUCTION, CONVECTION & RADIATION

Heat energy is always on the move. It moves to seek balance. Heat can move in many ways. When a hot object touches a cold object, some of the heat energy flows to the cold object. This is called conduction. Conduction is the way heat energy moves in solids. Cooking food in a pan on the stove is an example of conduction. The stove heats a cold pan. The heat moves through the pan into the food through conduction.

Heat also flows from molecule to molecule in liquids and gases. In fluids, (liquids and gases), the molecules are too far apart to conduct energy as they vibrate. The molecules in fluids are free to move and spin. As they move, they bounce against each other. The molecules with more energy give up some energy. The molecules with less energy gain some. Heat energy in liquids and gases moves by convection. As the molecules gain energy they spread out, become less dense and rise. Warm air rises. As they lose energy and cool, these molecules flow down. Cool air sinks. This rising and sinking is convection.

Heat can also move through rays or waves called radiant energy. When you light a fire, the radiant energy from the fire will spread out, or radiate, to the molecules in the air close by. You can feel the heat from the fire when standing a few feet away because the molecules radiate the heat out. The area closest to the fire will stay the warmest until the fire goes out. Once that happens, the thermal energy continues to radiate out and back until the room or the area has reached an even temperature. This is radiation.

CONVECTION



Most heating or cooling systems use convection to transfer thermal energy. A forced air furnace will heat air, then use a fan to blow the warm air through duct work into the rooms of the building. Boiler systems heat water and then circulate water through piping systems in the rooms. Air conditioners remove thermal energy from air, then blow the cooled air into the warm room. The lower temperature air mixes with the higher temperature air in the room and reduces the overall temperature.

Heating and cooling systems use more energy than any other systems in residential and commercial buildings. Natural gas, oil and electricity are usually used to heat, and electricity is used to cool. The energy sources that power these heating and cooling systems contribute carbon dioxide emissions to the atmosphere. Using these systems wisely can reduce environmental emissions. You can save energy and money by having proper insulation, sealing air leaks, maintaining the equipment, and practicing energy-saving behaviors.

INSULATION AND WEATHERIZATION

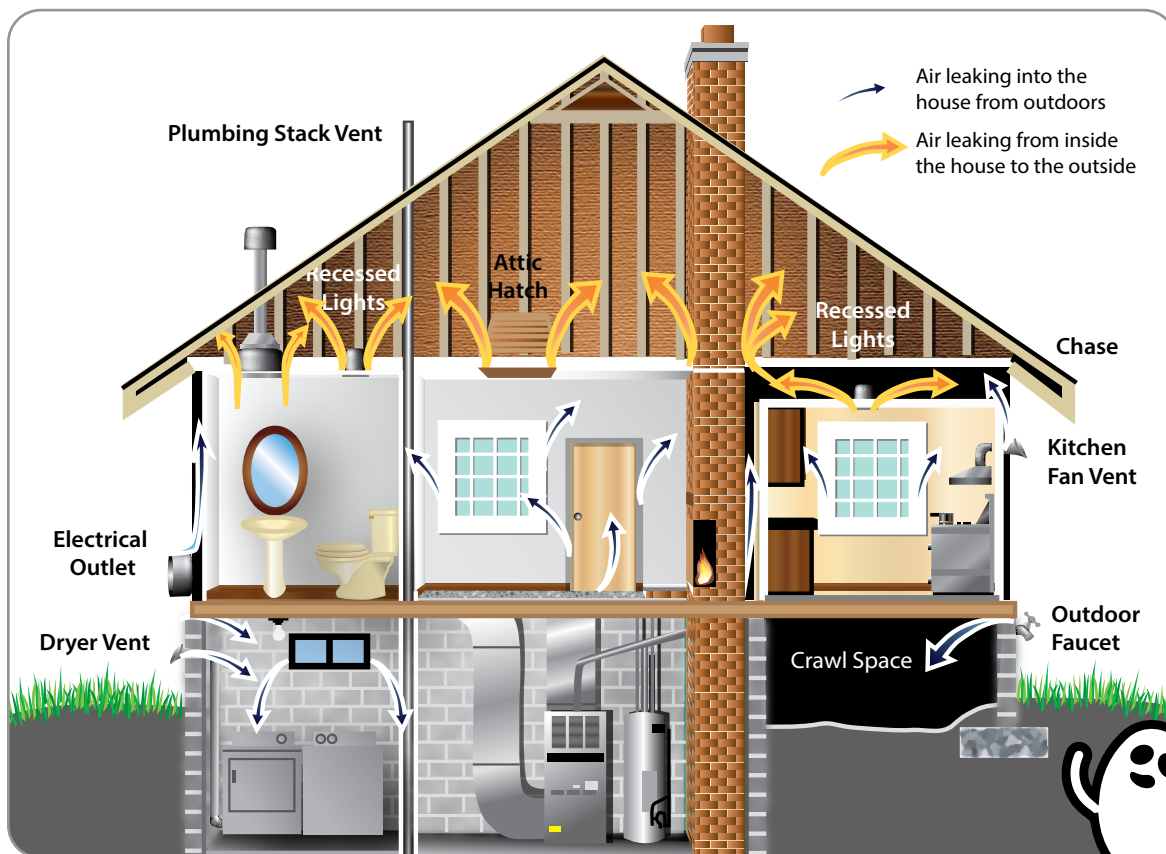
Since heat is always on the move, it is even moving through the spaces in our buildings. When we spend money to heat or cool the air inside, we want to keep it in. Insulation helps slow down the movement of thermal energy, so it seeks balance more slowly, and keeps us more comfortable longer. Insulation keeps the inside air separated from the outside air. Building owners can reduce heating and cooling costs by buying proper insulation. Some insulation materials work better than others in certain climates. Building owners should pick the right insulation for their weather and building design.

Do you have an insulated cup or mug? Sometimes these mugs are insulated with foam or special coatings, like a can koozie or cardboard sleeve from your favorite coffee or hot chocolate stand. Other times these mugs will use two layers of material with a layer of air or gas between them. The layer of air helps to slow down the movement of heat just like a blanket or coat helps keep your heat from escaping. Walls and windows in homes often work the same way! Sometimes they use a roll of insulation or a layer of foam that is installed like a blanket in the walls. Windows are often made of layers of glass with gases between them to help slow down the movement of heat.

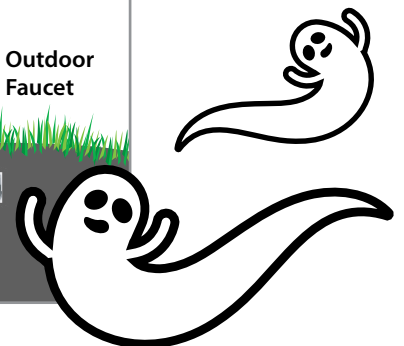
Insulation is like a blanket for buildings, but air can still infiltrate or leak in or out through small cracks. Sometimes, many small leaks can add up to the same amount of energy loss as leaving a window wide open. One of the easiest energy-saving measures is to caulk, seal, and weather-strip cracks and openings to the outside. These tools and actions are called weatherization. Homeowners can typically save on heating and cooling costs by air sealing their homes and adding insulation. Larger buildings, like schools and offices, can save even more by following the same steps.

In this challenge you will explore how heat moves! You will hunt for invisible drafts and leaks around your home that might be haunting your home and energy bills. You can use the sample weatherization and caulking to help fix any ghastly leaks you may find. Even new homes can have tiny little phantom leaks that make a noticeable difference.

AIR INSULATION

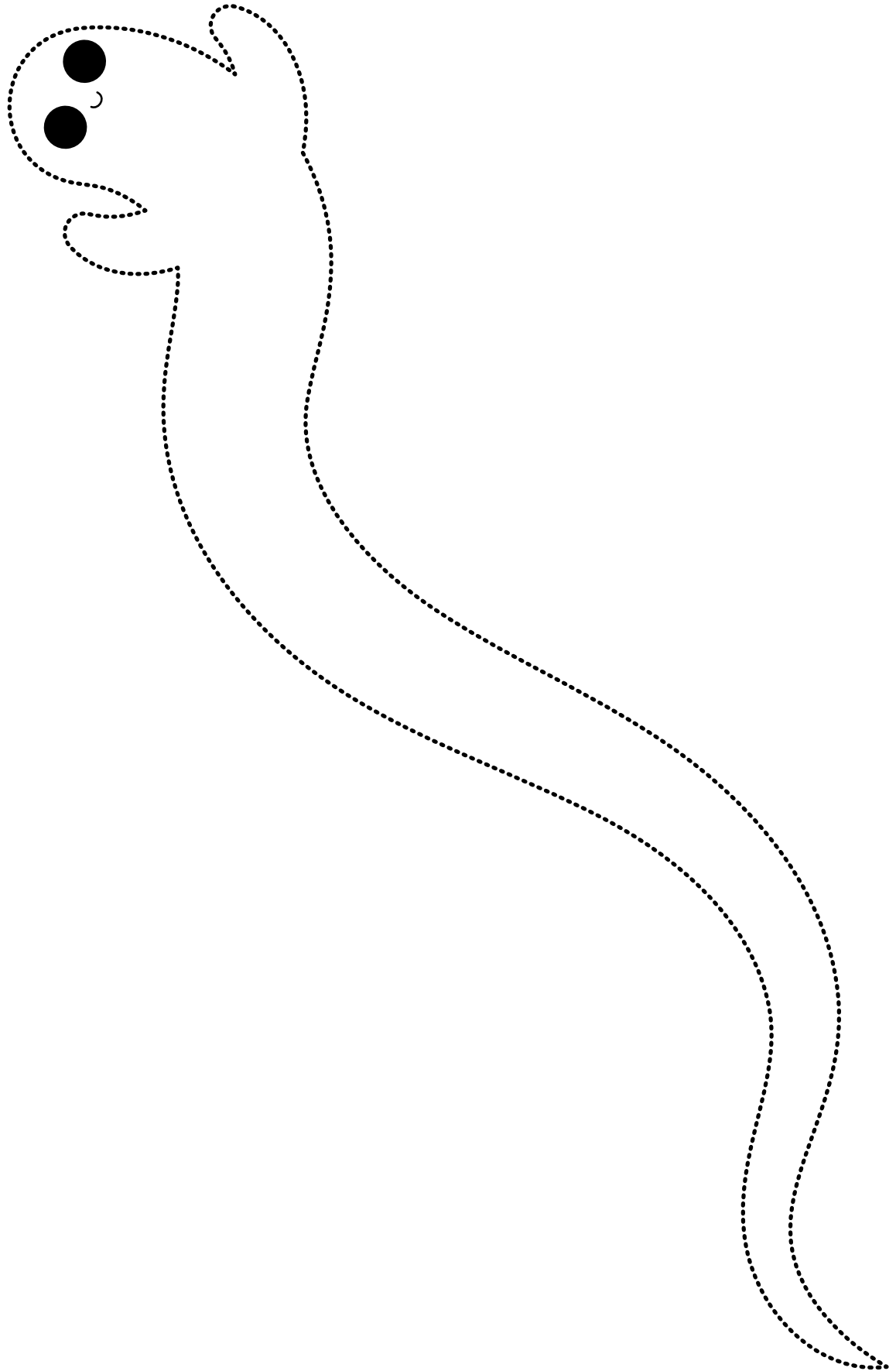


EVERSOURCE ENERGY SAVING TIPS



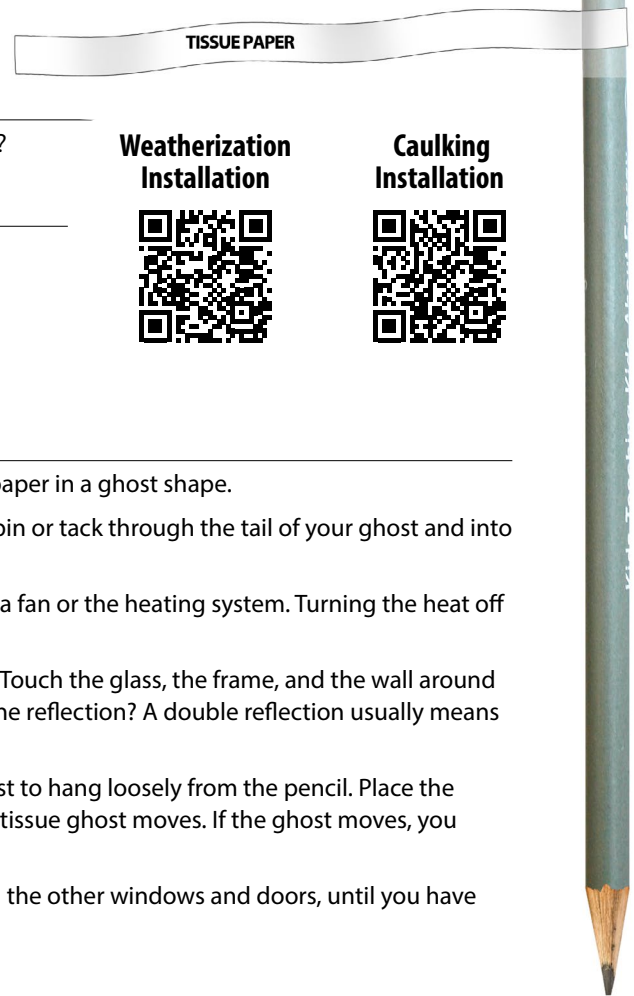
Home Energy Challenge

Haunted House Drafts & Weatherization - Drafty the Ghost



Home Energy Challenge

Haunted House Drafts & Weatherization



Question

How can you tell if the windows in your home or school seal tightly?

Materials

- 1 Pencil
- Sheet of tissue paper
- 1 Thumbtack
- Scissors
- Weatherization and caulking strips

Weatherization Installation



Caulking Installation



Procedure

1. Use the ghost-shaped template on page 4 to cut out a strip of tissue paper in a ghost shape.
2. Use a push pin to attach the tissue paper to the pencil by poking the pin or tack through the tail of your ghost and into the eraser.
3. Turn off anything that might cause an air current in the room, such as a fan or the heating system. Turning the heat off for a few minutes should not cause the room or building to get cold.
4. Stand in front of the window you are observing and record your data. Touch the glass, the frame, and the wall around the window. Can you see more than one layer of glass or more than one reflection? A double reflection usually means your window has more than one pane.
5. Hold the pencil so it is parallel to the floor. Allow the tissue paper ghost to hang loosely from the pencil. Place the pencil in front of the lower edge of the closed window. Observe if the tissue ghost moves. If the ghost moves, you have detected a draft. Record your observations.
6. Repeat the test around the other edges of the window, and around all the other windows and doors, until you have tested all the doors and windows of the room you are in.
7. Move to another room and continue testing.
8. Watch the weatherization and caulking installation videos from the QR code above. Fill or seal any leaks with caulking or weatherstripping. Ask an adult for help and supervision.

Data

ROOM	WINDOW OR DOOR DESCRIPTION (MATERIALS IT IS MADE OF, LOCATION IN ROOM, ETC.)	LAYERS OF GLASS	LATCH CLOSED?	LEAK DETECTED?

Results of tissue paper test:

Did you detect leaks or see any gaps around the windows and doors that should be filled with caulking or weatherstripping?

Final Data Collection & Submission Form

Submit this form to share your results and photos of your family completing the Eversource Home Energy Challenge Haunted House Drafts and Weatherization Activity to be entered in our prize drawing.

Student Name: _____

Student Address: _____

Student Grade: _____ School: _____

Parent Email: _____ Parent Phone Number: _____

Results and Analysis

1. Did you find any air leaks around your home? List these leaky spots, share photos of any leaks you detect or fixes you made, if possible. *Check out www.eversource.com/home-savings for solutions

2. How is insulation and weatherization helpful in your homes and schools?

3. Email or mail this form and pictures of your student working on the project to be entered in the gift card prize drawing.

Submissions are due on or before October 31, 2026:

Email: info@homeenergychallenge.com

Mail:

Eversource Home Energy Challenge

P.O. Box 313

Rowley, MA 09169-9998

ATTN: Scott Halstead

4. Optional: Post a photo of draft hunting on your social media channels (Facebook, Twitter, Instagram, etc.). Use #HomeEnergyChallenge and tag Eversource in your particular state: @EversourceMA, @EversourceCT, or @EversourceNH.

**Posting on social media does not increase your chances of winning.*

x _____

By signing this form I confirm that I am a legal U.S. resident residing in one (1) of the Massachusetts, New Hampshire, and Connecticut communities listed in the Official Rules, am eighteen (18) years of age or older, and am a parent or guardian of a current student in grades K-12. Visit our website for official rules www.homeenergychallenge.com.