

A woman with dark hair is looking out a window. She is holding a red and white box in her left hand. The window has a view of a city street. A pink semi-transparent box contains the title text.

# *Your Guide to Hands-On Weatherization*



CHICAGO  
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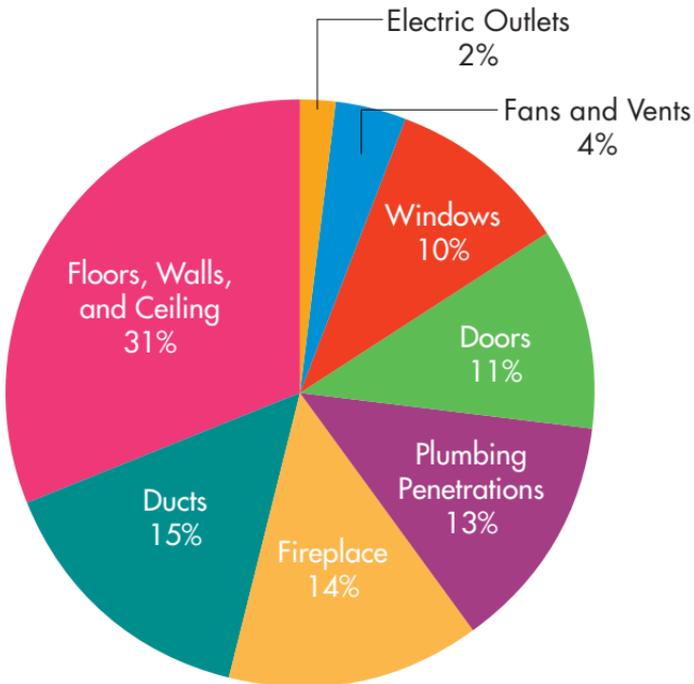
## Let's look inside for hidden energy losses.

Imagine that your home is snugly wrapped in a blanket that protects you and your family while keeping the cold winter weather outside. Perhaps there are some holes in this blanket where the cold air can sneak through – where warm air leaks out and cold air comes in. You can find these air leaks and close them to increase your comfort. This is what basic weatherization is all about. Sealing air leaks works the same way in the warm months – keeping out the unwanted heat while holding in cooler air.

You can find air leaks – large and small – by looking carefully at your apartment or home, then seal them using low-cost products that are easy to install. We'll show you sketches of some common air leak locations at doors, windows, and baseboards.

### Sealing Air Leaks

Warm air leaking out of your home during the winter and into your home in the summer can waste a lot of energy and money. Some of the quickest dollar-saving tasks you can do are to caulk, seal, and weatherstrip all seams, cracks, and openings to the outside to save on your heating and cooling. The graph below shows the average home's air leakage broken down by location.



*Average home air leakage by location*

Data courtesy of the U.S. Department of Energy, 2008

## Tools of the Trade

General rules: 1) prep site, 2) measure, 3) test the fit of the item, 4) cut, and 5) apply.

Preparation is very important. Look at the directions in the product packaging for specific guidance on each item. In general, though, be sure to clear away debris, wipe surfaces with a damp cloth, and let them dry before applying your products.

**RUBBER EPDM/WEATHERSTRIP:** durable edge seal for door and window openings

- The roll is made of two strips that need to be pulled apart into long strips. Gradually remove the adhesive backing as you press, sealing in place.

**V-SHAPED WEATHERSTRIP:** another durable edge seal for doors or windows

- Fold the strip in half lengthwise. Gradually remove the backing paper while pressing the adhesive side to the door or window surface. If applying to wood, tack the adhesive side at each end with a small nail to keep it in place as you remove the backing paper, then sink the nails in for greater adhesion. Do not nail the two sides of the V-shaped seal together! The adhesive side is nailed and the other side is free to open and close by the door or window.

**WINDOW KIT:** plastic film and tape to cover windows and other large openings

- Entirely cover each window that will remain closed for the whole winter or longer. Film functions like an “indoor storm window.” Especially good for windows that are too difficult to weatherstrip, or for other large openings like storm doors and fireplaces.

**CLEAR POLY TAPE:** for quick, temporary sealing needs

- Apply across window pane cracks. Protect your hands—cracked glass is sharp!

**CAULK AND CAULK GUN:** seals small gaps around non-movable parts

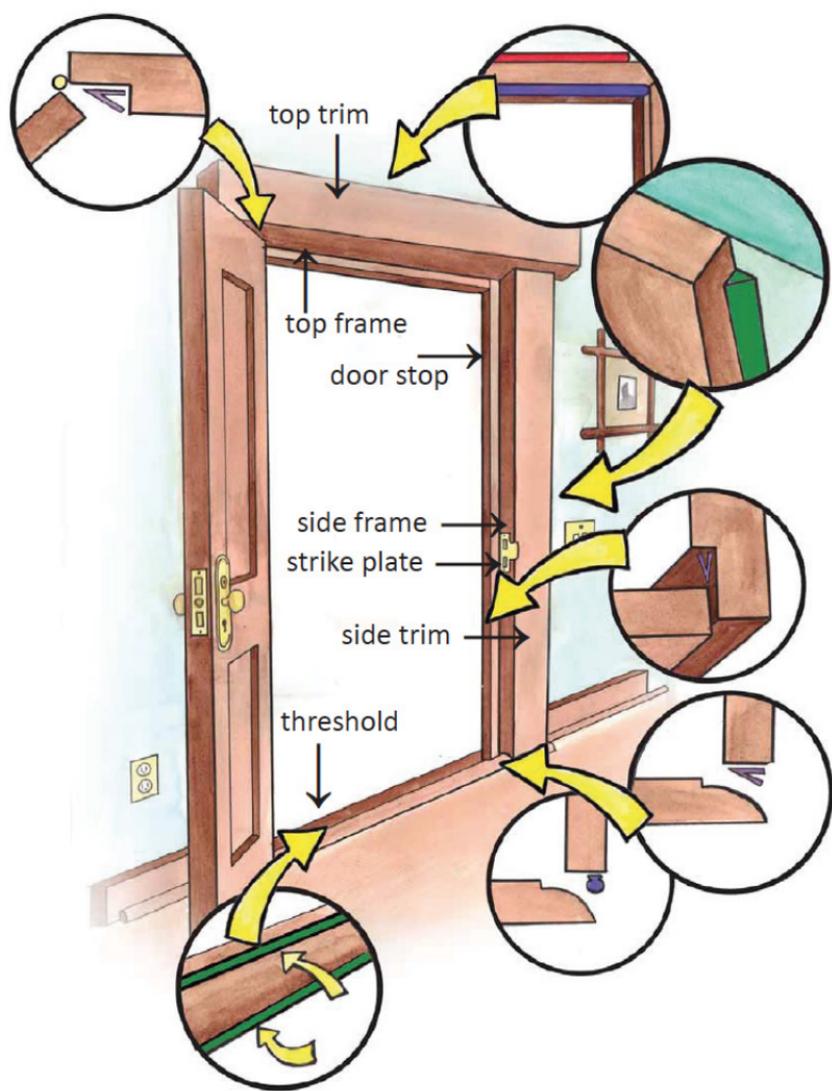
- We recommend low-VOC caulk that dries clear for this application
- First, lay down newspaper or paper towels as a nearby resting spot for your soon-to-be open tube of caulk. Then, prepare your tube of caulk: cut the tip off of the tube at about a 45-degree angle. This will create a hole approximately 1/8” in diameter. Next, pick up the caulk gun. Holding the cylinder of the caulk gun in one hand, pull back the plunger with the other. (Do not press the trigger at this time or you will not be able to move the plunger.) Seat the open tube of caulk in the caulk gun, then press the trigger to move the plunger into place. Have paper towel or newspaper available to catch any overflow. Cover the tip of the tube with tape when you store the caulk for its next use. Clean up extra caulk with water.

**FOAM ROD:** flexible foam rod for filling openings larger than 1/4”

- Push pieces of the foam rod into openings larger than 1/4”. (These openings are too big to be filled by caulk alone.) If preferred for appearance, you can apply caulk over the rod.

**DOOR SWEEP:** Many varieties; blocks gap between the bottom of the door and the threshold.

*Keep your work area safe. Adult supervision is advised for installation of these items.*



# Doors

Your goal is to find openings around the edge of the door and decide which items in your kit work best to close each gap. To start, be sure that the door is hanging correctly. If necessary, tighten up the hinges, door knob, striker plate and parts of the door frame.

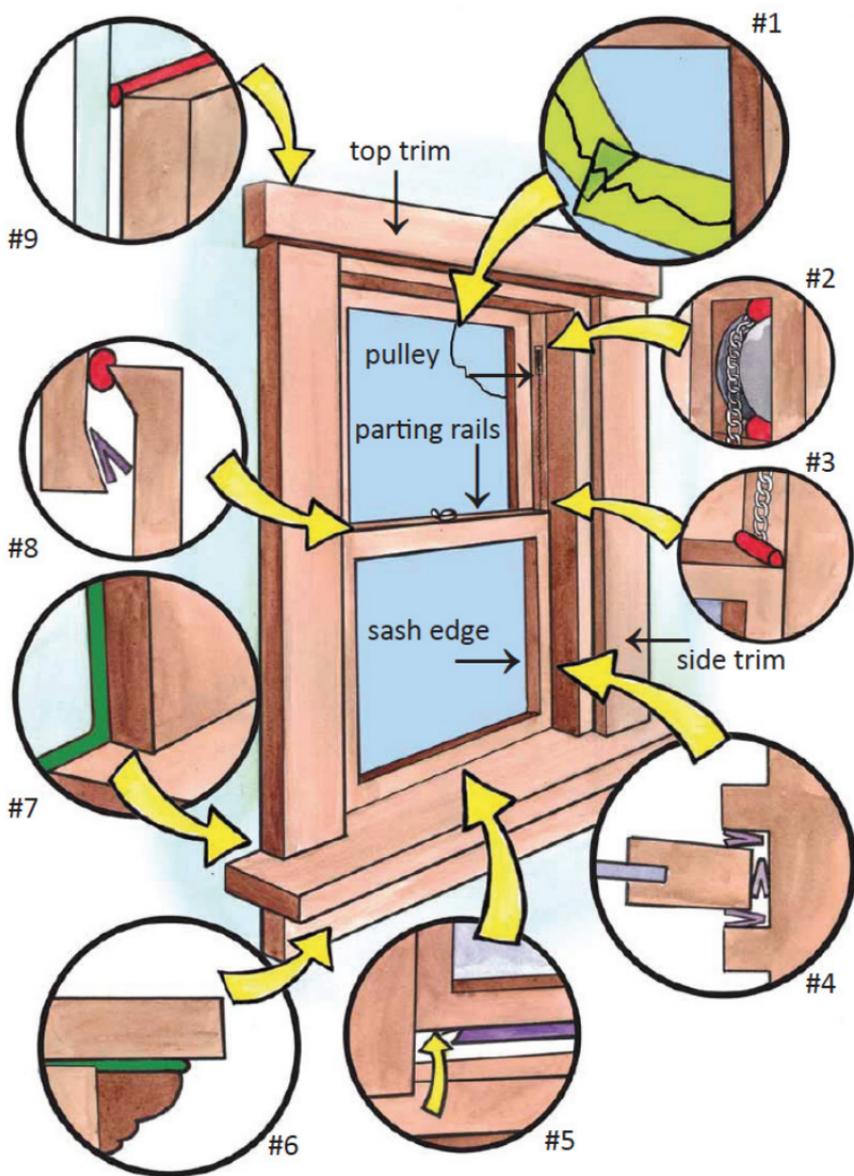
## STOPPING DOORWAY AIR LEAKS

Using the diagram to the left, go around the door and frame and look closely for the following openings when the door is closed. Look between:

- The door and the frame – top and sides
- The door and the door stop – top and sides  
*Note: The hinge side, latch side, and top may fit differently.*
- The top and side trim and the wall
- The door and the threshold
- The threshold and the floor

Now you can choose which of your supplies will work best in each case. Start by determining which item will plug the gap while still allowing the door to be easily opened and closed. Your choices from those listed on the previous page (color-coded in the image to the left) are:

- Rubber weatherstrip
- Caulk
- Foam road
- V-shaped weatherstrip
- Doorsweep (not pictured)



# Windows

## FOCUSING ON YOUR WINDOWS

Windows come in all shapes and sizes. Small gaps, openings, slits, cracks, and holes can sometimes be too numerous to count. Many gaps are necessary for windows to open and close—but some are energy wasters.

Many of the items previously listed (color-coded in the image on the left) are useful with windows, including:

- **Caulk**
- **Foam rod**
- **Clear poly tape**
- **V-shaped weatherstrip**
- **Window kit (not pictured)**

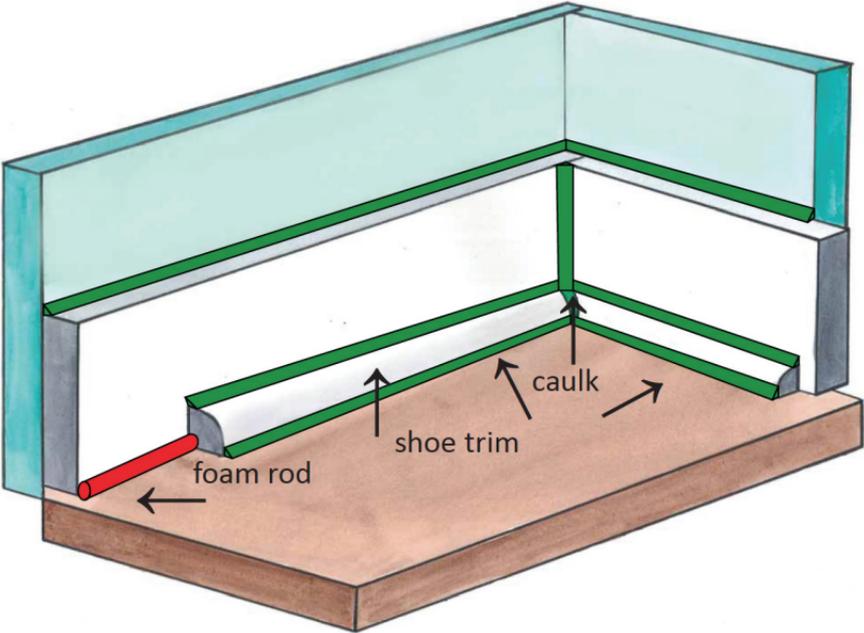
Choose a window or set of windows in your home where you notice air leaks. Look at the diagram to the left. Now find the parts of your window(s) where there are gaps or openings. You might see the gaps or feel air coming in.

Here are ways you might use the listed products, along with a matching inset number that illustrates its use in the window diagram to the left.

- Clear poly tape on cracked glass (#1)
- Foam rod in the pulley holes and openings of window sash, corner and frame (#2 and #3)
- V-shaped weatherstrip along sash edges (#4 and #5)
- Caulk between window trim and wall (#6 and #7)
- V-shaped weatherstrip between parting rails (and foam rod when window is open for an air conditioner) (#8)
- Foam rod and/or caulk between top trim and finished wall (#9)

You can decide which product best applies to your situation. As always, prepare and clean surfaces first.

Window kits function like interior storm windows once they are installed. They can also be applied to other energy wasters like fireplace openings (unused), whole house fans (unused during the winter), skylight wells, and seldom used attic or kneewall access hatches. Measure the windows or other openings carefully and plan before you cut the plastic film. Most of film is big enough to cover several windows.



# Baseboards

## FIND THE GAPS

The diagram at the left is a typical baseboard. The space where the wall meets the floor is usually covered by a base and shoe trim. Air from outdoors may leak in here, and you can stop leakage by sealing. Expect severe leakage where the shoe trim is missing. Check the carpet edge, under baseboard heaters, behind radiators, and peek under and behind kitchen and other built-in cabinets. Check closets, utility rooms, and other out-of-the way spots at exterior walls.

## PREPARATION

- Brush away dust and debris
- Remove remaining dust with a moist rag
- Allow area to dry
- Cover floor with newspaper

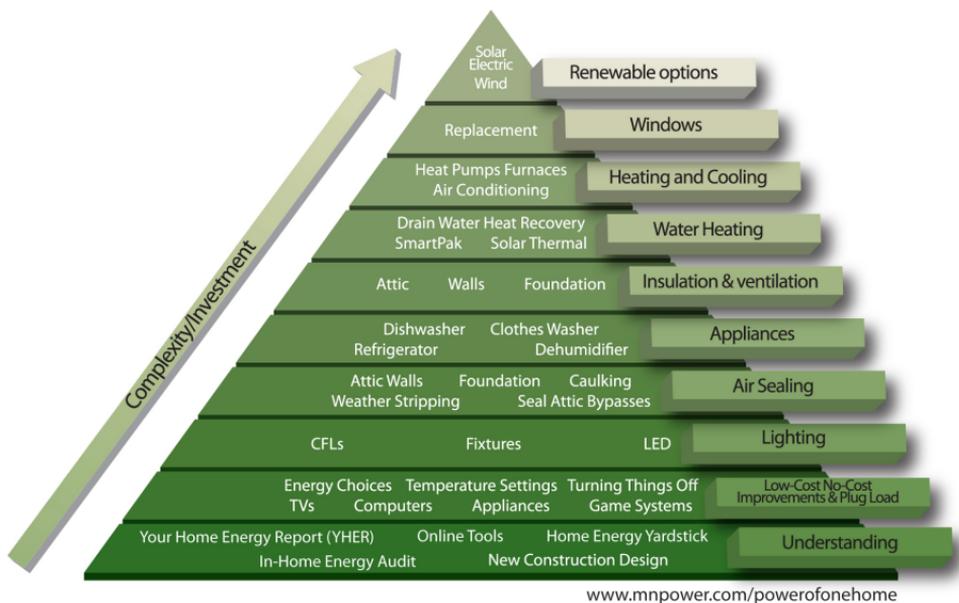
Pull the trigger of the caulk gun to start the caulk flowing. Practice caulking in a closet or utility room. Comfortable and safe body position is important. Pad your knees when sealing at floor base.

## APPLICATION

Fill gaps wider than 1/4" with foam rod before applying caulk. Start at a corner and run a continuous bead at a steady pace for as long as possible before stopping and starting. Adhere caulk to both sides of the gap. "Tool" the caulk - run your finger over the bead to adhere the material and smooth the surface, wetting your finger first.

Clean mistakes using a damp rag. For the neatest appearance, apply masking tape to the floor before starting to caulk. Apply the tape in a straight line 1/8" away from the shoe trim and remove the tape after the caulk is tooled and beginning to harden.

Instead of caulking at the shoe trim, you may hide your air sealing work by loosening the shoe trim, sealing between the floor and base trim, and then reinstalling the shoe. Caulk smaller gaps first, then cut the caulk gun nozzle larger (i.e., lower on the tip) before filling larger gaps. If you do not use the full tube of caulk, be sure to cap the end with tape to prevent the unused caulk from drying out before next use.



## Conservation—where do I begin?

The Pyramid of Conservation was designed by the electric company Minnesota Power to help homeowners prioritize steps and develop an action plan for reducing energy use in their homes. Although the focus is electricity saving, the pyramid applies to all energy use.

Each home or apartment is unique, but the Pyramid of Conservation is a good general guide. It encourages you to start with the actions at the base of the pyramid, then moves upward so you “carry” your savings with you as you implement more costly measures. So, start with education, behavioral changes, and energy efficiency, then go from there! The higher you go on the pyramid, the higher the cost and the longer they payback.

# Home Energy Quiz

Take a few minutes to mark true or false next to each statement.

**T**

**F**

- |                          |                          |                                                                                                                                                                                                              |
|--------------------------|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | 1. Setting the thermostat too low in winter when I leave the house will cancel out my energy savings because of the extra energy required to bring the room's temperature back to a comfortable level later. |
| <input type="checkbox"/> | <input type="checkbox"/> | 2. Turning lights on/off causes an electric surge that will cancel out energy savings from turning the lights off.                                                                                           |
| <input type="checkbox"/> | <input type="checkbox"/> | 3. It is better to use an appliance until it fails, rather than purchase a more efficient appliance before the old one fails.                                                                                |
| <input type="checkbox"/> | <input type="checkbox"/> | 4. A ceiling fan cools air in the house, so I should leave it on when I am not at home.                                                                                                                      |
| <input type="checkbox"/> | <input type="checkbox"/> | 5. Windows and doors are the primary source of air leakage in homes and apartments.                                                                                                                          |
| <input type="checkbox"/> | <input type="checkbox"/> | 6. Replacing windows gives me the greatest energy savings per dollar spent.                                                                                                                                  |
| <input type="checkbox"/> | <input type="checkbox"/> | 7. More attic ventilation is better. It prevents mold in the attic and cools living space in summer.                                                                                                         |
| <input type="checkbox"/> | <input type="checkbox"/> | 8. Duct leakage in attics, vented crawl spaces, or attached garages is a rare problem of minor consequence.                                                                                                  |

**ANSWERS CAN BE FOUND ON PAGE 14**

## *What else can I do?*

You can also pursue more permanent measures for increased savings. These include:

- Getting a professional energy audit that will provide recommendations for energy efficiency improvements for your home.
- Sealing air leaks at attic floors, basements and crawl spaces.
- Adding insulation to attics, walls and basements where needed (only after thorough air sealing).
- Making sure the heat gets from your furnace or boiler to your rooms (an average of 10% of heat is wasted by escaping outdoors).
- Upgrading your space heating equipment to a unit with a 95% efficiency or higher.

## *Where can I find incentives for making energy efficiency improvements?*

Our gas and electric utilities, ComEd and Peoples Gas, are required by the state to offer energy efficiency programs. Check their websites for this year's offerings.

## *Going to the next level*

After you've done everything you can yourself, you might be interested in working with a certified energy auditor.

What do energy auditors do? As professionals, they perform on-site inspections and testing which identify the most cost-effective ways to save energy. Diagnostic tools are used to pinpoint hidden air leaks and defects. Such tools include an infrared camera, which shows temperature differences on outside walls, and a blower door, which depressurizes a house allowing for a systematic location of air leaks and a measurement of air lost to the outdoors.

After analyzing test results and observations from the survey, the energy auditor provides a written report that includes a prioritized list of recommended improvements along with their estimated costs and savings. Depending on the house, these improvements can range from insulating attics, walls, or basements, to closing air bypasses and upgrading heating systems.

Once the written report is received, you can think about getting bids from building contractors. Some energy auditors offer guidance during installation. Some insulation and heating firms hold energy auditor certification and offer "one-stop" services which combine testing for problems with installing solutions.

## Who should get an energy audit?

Anyone interested in doing more to save energy and money, but especially if you:

- Have uncomfortable areas in your home; or
- Are considering investing in structural home improvements or remodeling (such as window replacement or adding insulation).

Professional associations with member firms that provide energy audits:

- Illinois Association of Energy Rates and Home Performance Professionals  
<http://www.ilenergyraters.org/>
- Residential Energy Services Network (RESNET); <http://resnet.us/>
- Building Performance Institute; <http://www.bpi.org/>



## Home Energy Quiz Answers

All of the statements are energy myths and are **FALSE**.

1. Lowering the thermostat temperature, to say, 58 degrees, while asleep or away at work saves heating energy. Raising the temperature back to comfort levels makes the furnace or boiler run longer and more efficiently (reducing efficiency losses of cycling the equipment on & off). In other words, turning down the thermostat DOES save energy and money.
2. While technically true, turning lights off for even a few minutes is best.
3. Visit the ENERGY STAR website before replacing failed appliances! Most refrigerators older than 1993 are so inefficient that replacing them before they fail is worthwhile. You might get paid to get rid of that old refrigerator in your basement.
4. A ceiling fan cannot lower air temperature. In fact, the fan motor increases room temperature slightly. Like any fan, it simply moves air. However, people in the path of the air flow feel cooler because it carries away body heat.
5. Because one feels cold drafts at windows and doors it seems that they are major culprits. However, the biggest leaks are elsewhere (see pie chart on page 2). We are simply unaware of warm air escaping through most leaks, such as through the attic.
6. Salesmen often misinform people about the energy savings of replacement windows. They have a 70-90 year payback. Repairing windows and adding low-e storms to old windows are more cost-effective measures.
7. Preventing moisture from entering the attic by air sealing the floor is the key to preventing condensation and mold in the attic. A well air-sealed and insulated attic floor is also key to keeping the living space below cool in summer (and warm in winter). The effect of adding more vents to an already vented attic is trivial.
8. Ducts in attics, vented crawl spaces, and attached garages can be a major source of air leakage and energy loss. Unsealed joints, disconnected ducts, and gaps between duct boots and finished surfaces are major leak problems. Leaky ducts may also contribute to ice dams, condensation problems, and carbon monoxide entry into the house from a garage.

# *Interested in learning more about energy conservation and efficiency?*

Join the Chicago Conservation Corps or sign up for one of our workshops.

**LEARN MORE AT [WWW.NATUREMUSEUM.ORG/C3](http://WWW.NATUREMUSEUM.ORG/C3)**

## *Credits*

The content for this booklet was provided by eZing, Inc., a Chicago area energy guidance company in cooperation with Chicago Academy of Sciences / Peggy Notebaert Nature Museum staff.



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