



Earth Day®
CANADA

Energy House

Summary of Activity

Grade: 5-6 Subject: Environmental education, science, art

Time: 1 hr Theme: Energy

Description: Build a model house and test it for heat loss.

Overview

Students will understand the effects of energy consumption on the environment; specifically how heating our home affects the environment. They will test for heat/energy loss, and propose methods of preventing heat/energy loss. Finally, they will compare and make connections between renewable and non-renewable energy.

Ecoliteracy learning outcomes

- Limiting resource use and waste production
- Better understanding the complex issue of energy/heat loss and inefficient home heating/cooling
- Encouraging a low-impact habit of energy conservation

Materials

- Draft meter
- Small cardboard boxes (can fit baby jars inside)
- Pieces of wood (various sizes)
- Paper
- Aluminium foil
- Fibreglass insulation (Caution! Use gloves when handling.)
- Cotton/wool socks
- Baby food jars with lids (enough for each group*)
- Jug of hot water (or a kettle to boil water)
- Mittens
- Digital thermometers
- Observation Chart – see below

Instructions

Pre-activity discussion

1. Have a discussion with students about the different types of energy (renewable/non-renewable). Explore them through picture books. Ask students what parts of their home require energy to work and what types of energy are used to make their home comfortable all year around (heating and air conditioning).
 - a. The main source of heat in a home is the furnace, which is run using non-renewable resources. Constantly running a furnace wastes energy and, therefore, uses up non-renewable resources.
2. Ask students if they know how we keep temperatures inside different from the outside.
 - a. Insulation: Material that is used to keep heat in or out. In the wintertime, we want to keep the heat inside the building. In the summertime, we want to keep it out. There are many different types of insulation—fibreglass, bricks, wood, Styrofoam.
 - b. Have students explore the different insulation types and learn which are more environmentally friendly than others.
3. Highlight that when homes are not properly insulated, energy is lost. Relate this to detecting drafts (done in a previous lesson) and the cost of heating.



Earth Day®
CANADA

Energy House

4. As a group or in small groups, discuss and explore various places where drafts occur in the home.
 - a. What is the impact of drafts in a home?
 - b. What is the effect of drafts on energy consumption and on the environment?
 - c. Why is it bad to be running a furnace all the time to heat our homes?

Build a model draft energy house

Students will now build their own energy home to see the effects of insulation and impact of energy loss. They will test out different types of material used to prevent drafts and keep the heat in.

1. Request that students bring in a cardboard box. It should be large enough to hold a small baby jar (a furnace) inside.
2. *Divide the class into groups of two to three (2-3) students. Each group will have two or three cardboard boxes to make their group's home.
3. Students draw out the plans for their home. Each home will have a floor, four walls and a roof. The design is up to the students.
 - a. NOTE: There should be no windows or doors in your house initially.
4. Use the scissors to cut out the parts for the energy house and assemble it.
5. Once assembled each group is given a lidded baby jar with HOT water.
 - a. Place the baby jar of HOT water inside the house.
 - b. Put a thermometer into the house (not too close to the bottle). Leave the thermometer inside the house for about five minutes to let the house heat up. Record the finding on the observation chart.
 - c. Remove the jar and thermometer.
6. Groups then draw on their boxes where they would like to put the windows, doors or other parts that would create a draft in the house (such as holes for wires, ducts).
7. Use scissors to cut out the windows and doors.
8. Repeat Step #5. Record the temperature on the observation sheet.
9. Choose your insulation:
 - a. Each group chooses three (3) types of insulation to use in their energy home (fibreglass, wood, Styrofoam, paper, wool/cotton socks, aluminum foil). NOTE: Make sure all safety measures are followed when handling the fibreglass and wood.
 - b. Starting with one type, fill the inside of the house with the insulation. Use tape or glue as needed.
 - c. Place the thermometer inside the insulated house for five minutes. Record the initial temperature of the insulated house.
 - d. Next, place the baby jar of HOT water inside. Let it sit for five minutes and then take the temperature of the house. Record findings on the observation chart.
 - e. Repeat with the other two types of insulation.



Earth Day®
CANADA

Energy House

Follow up Questions

1. How was your model house different than a real house?
2. Which type of insulation worked best?
3. What are ways to improve insulation in your home?
 - a. New windows, doors
 - b. Caulking and weather-stripping
 - c. Using draft blockers

Extension

- A. Students can extend this activity by adding more parts to their houses, which would make it more energy efficient and heat saving. They can add their own solar panels on the roof.
- B. Students can bring in a copy of their utility bill and they can learn graphing – e.g. pie charts and other graphic organizers. Explore various ways of representing percentages.
- C. Create a public service announcement (PSA) or a newscast, where they have to demonstrate what they learned about energy conservation and heat saving with insulation. This would be tied into persuasive writing and communication.

Print resource

Observation temperature chart for model draft energy home

Initial temperature of the home (no windows or doors): _____

Temperature of home with drafts (windows and doors but no insulation): _____

Temperature of home with different types of insulation:

	Insulation type:	Insulation type:	Insulation type:
Initial temperature			
Final temperature			