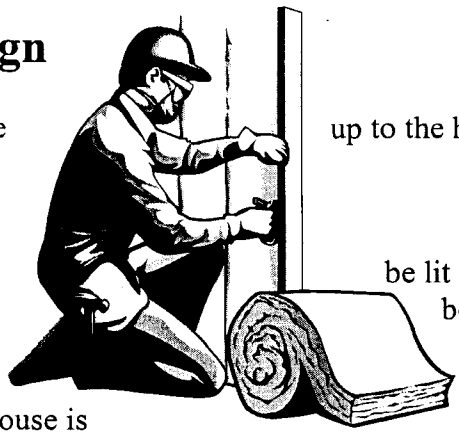
Energy Efficient Home Design



Goal: To bring the temperature inside the house up to the highest degree possible using one standard birthday candle.

General Guidelines

Use only the materials listed. Candle may only be lit once. Exterior of the home should be attractive. The interior surface must be non-flammable. Safety against fire is foremost and any home of questionable safety will be disqualified. Important dimensions, limitations and applied criteria must be adhered to. The weight of the house is limited to 600 grams.

Material List

Cardboard (4" X 8" sheets are provided)
Aluminum foil (12" width)
Shredded paper or other insulating material approved by the instructor.
6 feet of duct tape
Cellophane (12" width)
hot glue

Subsystems and features

House must have 4 windows – 2"X3" minimum and viewable to the inside of the home.
Candle may be placed inside or outside the home.
Furnace and furnace ducting may be constructed from any material the student chooses.
If removable, the furnace system does not have to be included in the home weight.
The candle may not be within 3" of any wall whether contained or not.
The candle must have 6" of open space between top of candle and any ceiling surface.

Testing

A thermometer will be inserted into the home at a location 5" above the base of the candle.
The tip of the thermometer will be located just inside the interior wall (not shoved deeply into air space).
25% based on two elevation views, wall cross-section view, submitted material list.
25% attractiveness of design, accuracy to original drawing, overall construction quality, use of materials.
50% based on temperature obtained, unique aspects of design or subsystem, any support material.

Note to the instructor:

This activity would reinforce material taught in an energy course related to energy efficient housing, light construction principles course or engineering related course.

Video support for this content is available from Energy Center of Wisconsin, 595 Science Drive, Madison, WI 53711-1060, 1-608-238-4601, www.ecw.org. A three part series on energy efficient home building.

Activity a creation of Byron C. Anderson, Menomonie School District, E5243 732nd Avenue, Menomonie, WI 54751, www.msd.k12.wi.us for 1998-99 only.