

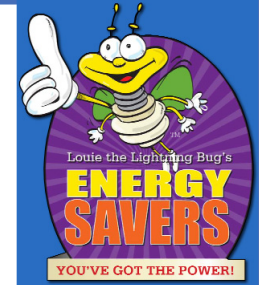
## Construct a simple bimetal strip to demonstrate thermal expansion

This apparatus can be used when teaching these Illinois Leading Standards (see accompanying demonstration):

**Elementary**– 11.A.1a, 11.A.1b, 11.A.1c, 11.A.1d, 11.A.1e, 11.A.1f

**Late Elementary**– 11.A.2a, 11.A.2b, 11.A.2c, 11.A.2d, 11.A.2e

**Middle/Junior High School**– 11.A.3a, 11.A.3b, 11.A.3c, 11.A.3d, 11.A.3e, 11.A.3f, 11.A.3g



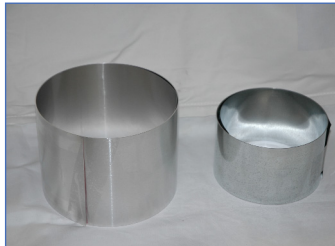
**Construction of the bimetal strip is intended to be accomplished by adults, only. This activity is not appropriate for elementary school students.**

### Materials Needed:

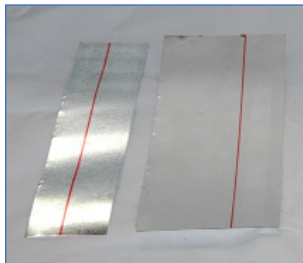
Aluminum and galvanized roof flashing • Tin snips • Epoxy adhesive recommended for joining metal • Aluminum foil • Two pieces of scrap wood • Woodworking clamps • Utility knife • Small metal file

### Construction:

Obtain sheets of two different metals. For the construction described here, we chose galvanized (steel coated with zinc) and aluminum roof flashing. These metals are easily available at hardware stores. Obtain the shortest lengths available.



We chose to cut metal strips from each type of flashing into strips 10 inches by 1 1/2 inches, so that the finished metal strip would be large enough to be viewed by all the students in the classroom.

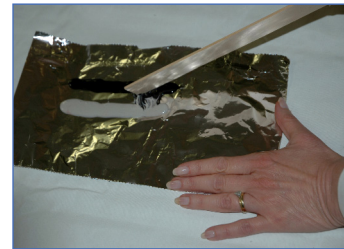


Mark cut lines with a marker and carefully cut with a pair of tin snips, available from a hardware store.

Next, bond the two strips of flashing with a two

part Epoxy adhesive. Look for a variety recommended for bonding metal and one that will withstand high temperatures.

Take two equal-sized metal strips. Clean the strips with solvent, as recommended in the epoxy directions.



Spread a sheet of aluminum foil and mix the epoxy resin and hardener in the recommended proportions. Evenly spread a thin layer of mixed adhesive completely over the surface of one of

the strips.

Place the other metal strip on top of the first one and in contact with the glue. Align the two strips. Some of the adhesive will squeeze from the edges. Wipe up excess.

Sandwich the glued metal strips between two pieces of



scrap wood, one above and one below the metal strips.

Securely clamp the two wooden pieces together to put pressure on the glued surface. In the absence of clamps, place heavy objects like bricks or large books on the top wooden surface. Again, extra glue will run out. Wipe excess as best as you can.



Allow the adhesive to cure according to the manufacturer's directions (usually overnight).

Unclamp and remove the scrap wood. Some of the excess adhesive may have run out and hardened to the wooden strips. Use a utility knife, putty knife, spatula or other thin blade to remove. Scrape away any excess glue that has hardened. Check the edges of the metal. It may be necessary to smooth sharp edges with a small file.

Now your bimetal strip is ready for your classroom demonstration. The actual demonstration is listed on instruction sheet No. 2.

