

Construction of a Thermal Gradient

Materials: Metal plate (preferably aluminum), Plexiglass sheets, corks, temperature probes, Styrofoam cooler box, crushed ice, hot-plate. While one can build thermal gradients which are fairly sophisticated and expensive in construction, they could also be built quite simply and cheaply.

The gradient basically consists of a metal plate enclosed in a Plexiglass box (124 cm long x 10 cm wide x 5 cm high). A strip of Plexiglass runs down the length of the plate to divide it into two lanes. The roof of the box should be removable with two holes in the center, one over each lane, for introducing the insects into the apparatus. One can use corks to close the holes once the insets are introduced. Cover the walls of the Plexiglass box with red, semitransparent paper to help block out light as the behavior of the insects can be affected by bright light.

The length of the metal plate is marked in 1 cm increments ON EACH SIDE OF THE GRADIENT (to make it easier for the students on either side of the apparatus to make recordings). It would be good to have the metal base wider than the Plexiglass box to allow for room to make the marks.

For measuring the temperature at different points on the gradient one can either attach thermocouple probes (about \$10.00 each) and a thermocouple thermometer (about \$25.00) to read the probes. These are available from any Scientific Supplies stores. However, a simpler and cheaper option would be to just buy a cooking thermometer with a metal probe available at most department stores for about \$15.00.

If you are going to use the thermocouple probes, drill 6 tiny holes (large enough for the wire of the probes to pass through) every 15 cm down the length of one wall of the Plexiglass box, (i.e. there should be a hole at the 15, 30, 45, 60, 75, and 90 cm mark). Thread the wires of the probes through the holes and attach them to the metal base with electrical tape.

Cut a hole in the Styrofoam cooler so that one end of the gradient can snugly fit into it, allowing room for ice. The other end of the gradient rests on a hot plate. The heights of the cooler and the hot plate should be such that the gradient is horizontal and not tilting toward one end.

****NOTE:** Make sure that the gradient end with the lower numbers is inserted into the ice chest while the end with the higher numbers rest on the hot plate.**

