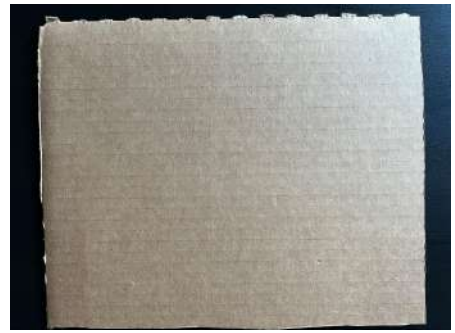
Lesson 8 Teacher Reference

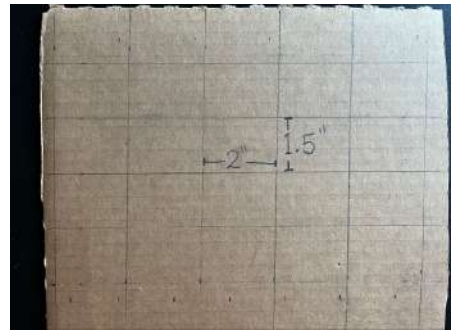
Light Bulb Array Assembly

Follow these steps to prepare the rectangular light bulb array. You will need this rectangular array to help students visualize the energy transfer patterns inside the microwave oven.

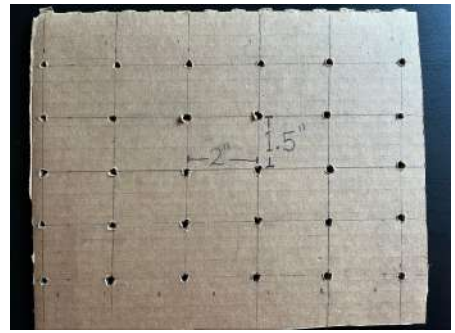
To visualize the hot and cold spots in the microwave oven, begin with a piece of cardboard of 9 x 11 inches.



With a pencil and a ruler, create a grid. The grid in the picture is 6 x 5 inches. To create a clearer pattern when the neon light bulbs turn on, the lines can be separated by 1.5 or 2 inches.



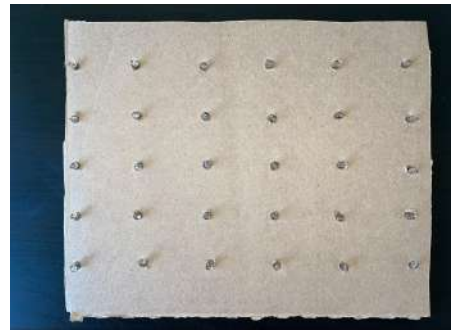
Use a pointy object to create holes at the intersections of the grid.



Remove the wires from the neon light bulbs to avoid any arcing in the oven.

Insert the neon light bulbs with the tip in.

Your grid should look like this.



During the class demonstration, follow the safety precautions in the Microwave Oven Manual. Remove the turntable, and place a microwave-safe platform on top of microwave-safe spacers to prevent the neon light bulbs from touching the oven floor.

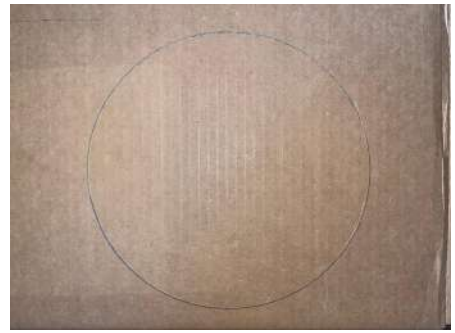
Place your cardboard grid on top of the platform, and place a small container with 20 ml of water on the grid to absorb the energy.

When you turn on the oven, some neon light bulbs will turn on and some will not. If you want to repeat this demonstration, do not run the oven for more than 10 seconds at a time. Replace the heated water with cold water, and then repeat the demonstration. If you don't see a clear pattern, reduce the amount of water in the container.

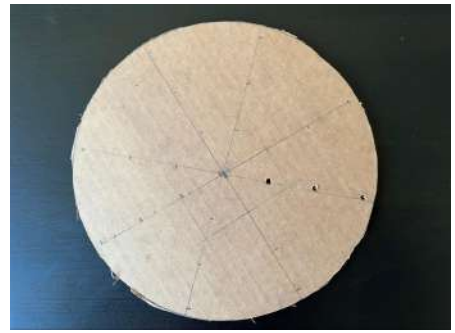
Follow these steps to prepare the circular light bulb array. You will need this circular array to help students make sense of the role of the turntable.

To visualize the changes in energy transfer when something is placed on the turntable, take the turntable out of the microwave oven and place it on a cardboard surface.

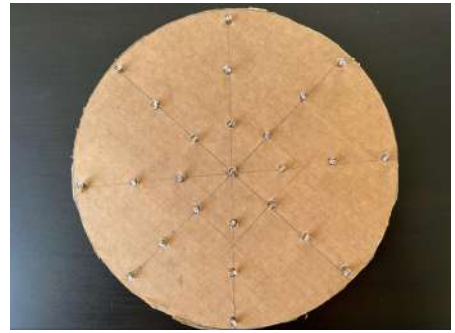
Use the turntable to draw a circumference on the cardboard.



Use a sharp tool to cut along the circumference you drew. Draw 4 radii evenly spaced along the cardboard circle, and make marks separated by 1.5 inches on each radius.



Use a pointy object to create holes on the marks, and insert the neon light bulbs with the tip in the holes. Your cardboard disk should look like this.



During the class demonstration, place the turntable back inside the oven.

Place your cardboard disk on top of the turntable, and place a small container of water on the disk to absorb the energy.

When you turn on the oven, all the neon light bulbs will turn on and off. If you want to repeat this demonstration, do not run the oven for more than 10 seconds at a time. Replace the heated water with cold water, and then repeat the demonstration.