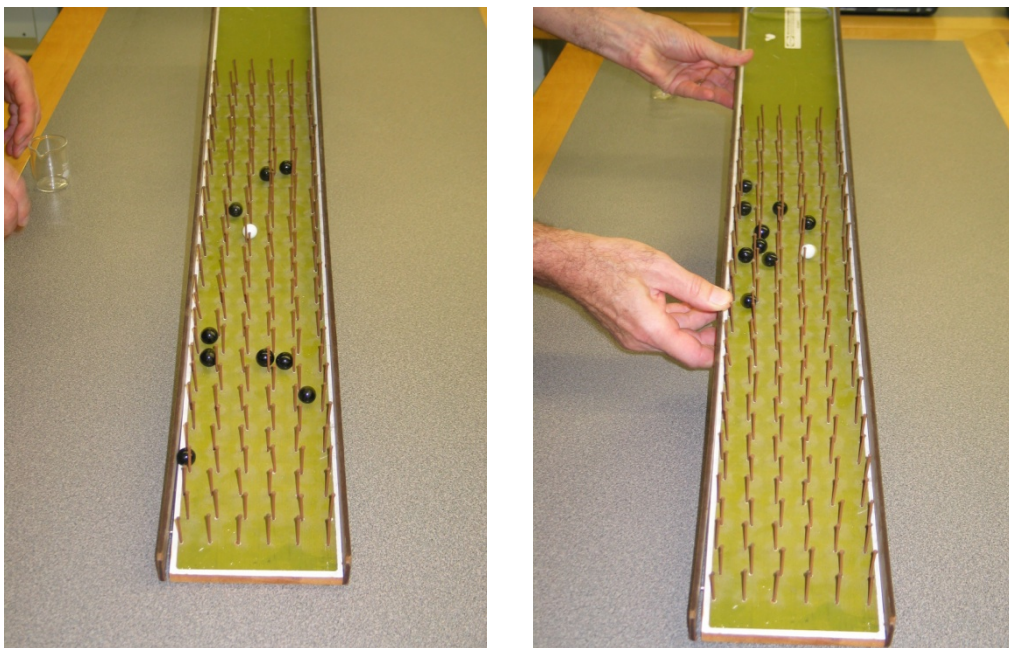


## Resistance Demonstrator



**Purpose:** To simulate resistance to current flow through a wire.

**Location:** Room 146; shelf M2

Set up the ramp and pour the marbles onto the top end, above the nails. Let them roll down the ramp to demonstrate how electrons travel through a wire with some resistance. The nails represent atoms or molecules. (You may need to shake the ramp a little, or manually move some marbles to keep them from getting stuck.)

Repeat the demonstration, but shake the ramp violently as the marbles roll down, in order to demonstrate that thermal vibrations of molecules cause resistance to increase. You may want to time each demo to show that it takes much longer for them all to reach the bottom when shaken.

You may want to point out the analogy between masses (marbles) moving from higher to lower gravitational potential energy and charges moving from higher to lower electrical potential energy.