

Non-obvious controls:

- You can type in a value for the **battery voltage** or use the arrows to change it.
- If you are doing a lecture demonstration, set your screen resolution to 1024x768 so the simulation will fill the screen and be seen easily.

Insights into student use / thinking:

- Students may think that electrons in a circuit are created by the voltage. This sim helps them see that electrons are always in the circuit and the voltage just makes them move.
- Some students may think that the energy diagram represents a physical object rather than a graph, so you may need to explicitly point out that this is not the case.

Suggestions for sim use:

- For tips on using PhET sims with your students see: [Guidelines for Inquiry Contributions](#) and [Using PhET Sims](#)
- The simulations have been used successfully with homework, lectures, in-class activities, or lab activities. Use them for introduction to concepts, learning new concepts, reinforcement of concepts, as visual aids for interactive demonstrations, or with in-class clicker questions. To read more, see [Teaching Physics using PhET Simulations](#)
- For activities and lesson plans written by the PhET team and other teachers, see: [Teacher Ideas & Activities](#)
- Use this sim to illustrate how distribution of energy levels in a material cause it to conduct or not.