First and Last Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Block \_\_\_\_\_ A or B

**Electricity and Circuits Phet Lab**

Learning Goals—Students will:

* understand basic properties of circuits.
* understand what is required to complete a circuit.
* be able to build series and parallel circuits and understand the difference between the different circuits.
* learn about conductors and insulators.

**Remember: Scientific Diagrams should be:**

**A-accurate**

**B-big (use all the space provided)**

**C-colorful**

**D-detailed (this includes labels!)**

***Check off each step as you complete it.***

* Go to <https://phet.colorado.edu/>
* Click “Play with Simulations.”
* Click “Physics” on the left side.
* Click “Electricity, Magnets & Circuits” on the left side.
* Click “Circuit Construction Kit: DC-Virtual Lab”
* Find a way to make a single lightbulb light up with as FEW parts hooked up as possible. When electricity flows through wires and makes something work, like a lightbulb, it is called a **circuit**.
* Draw your circuit here (see instructions for scientific diagrams above):
* What seems to make the lightbulb turn on in your circuit? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Make a gap in your circuit.
* Go to the “Grab Bag” on the left side and play with different objects. Find out which objects allow electricity to flow through and fill in the data table.

|  |  |
| --- | --- |
| Objects that allow electricity to flow  **(conductors)** | Objects that do not allow electricity to flow **(insulators)** |
|  |  |

* What do the conductors have in common? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* What do the insulators have in common? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* For the next few activities, you need to light up more than 1 bulb at the same time using just one battery.
* Find a way to hook up your bulbs in a way that if you break the connection at one bulb, ALL the bulbs go out.
* Draw your circuit here (see instructions for scientific diagrams above):
* Why did the rest of the bulbs go out if you break the connection at one bulb? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* This circuit is called a **series circuit** because the bulbs are hooked up in one long “series” or line. Name somewhere you have seen a string of lights that are also a series circuit. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Find a way to hook up your bulbs in a way that if you break the connection at one bulb, only that bulb goes out.
* Draw your circuit here (see instructions for scientific diagrams above):
* Why do the rest of the bulbs stay lit if you break the connection at one bulb? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* This circuit is called a **parallel circuit**, which has two or more single loops connected to the same battery. When 1 bulb goes out, the rest stay on. Name somewhere you have seen many bulbs hooked up to one power source, where one bulb can go out without affecting the others. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* You design toys for a toy company. Your boss wants you to hook up the lights in the toy car you are working on in the cheapest way possible, without consideration of the quality of the toy. Which circuit should you use if you want to save money by using fewer parts? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Why would this circuit be cheaper? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* You are an electrician working on a house. What type of circuit should you use for the house so that the owners don’t call to complain about their wiring? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Why use this circuit? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Experiment with the simulator, see what you can make it do!
  + What did you do the make the light bulbs glow brighter? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + What did you do to make light bulbs glow dimmer? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + How can you cause a fire? (In the simulator...NOT in the real world!) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_