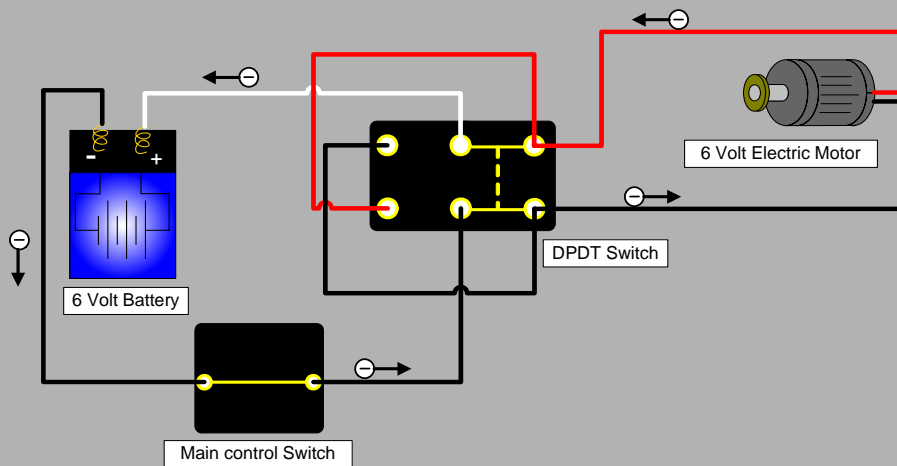


Beyond the book concepts...

Advanced DC Circuits



Lesson Objectives:

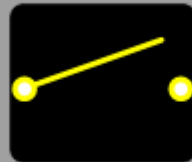
1. Identify different types of switches and their symbols
2. Define SPST, SPDT, and DPDT
3. Review basic circuits- simple, simple switch, series and parallel circuits.
4. Build a Selector Switch circuit
5. Adding an Interlock
6. Build a 3-way switch control circuit
7. Build a 3-way and 4-way switch control circuit
8. Look at another application for a DPDT switch

Electrical Symbols and Meanings

Symbols are pictures of electrical devices that are used in electrical circuits. Learn the following meaning of the symbols shown below. These symbols will be used together to make a picture map of an electrical circuit. On the following pages you will see many different electrical circuits that you can build.



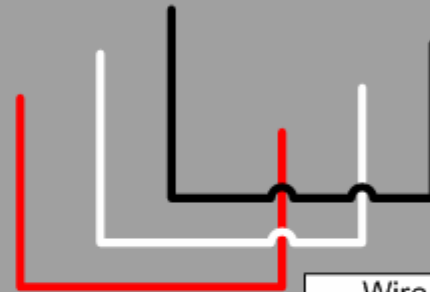
6 Volt Battery



SPST Switch



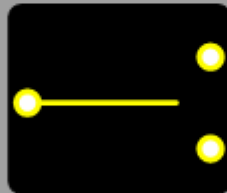
Also called a Single Pole Single Throw switch (SPST).



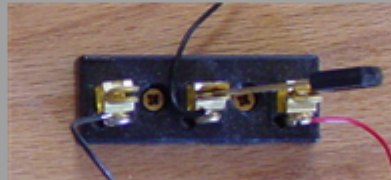
Wire



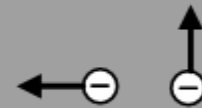
Light bulb with lamp holder



SPDT Switch



Also called a Single Pole Double Throw switch (SPDT).

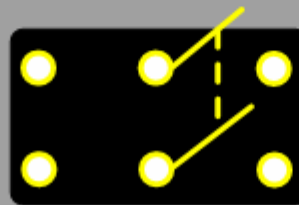
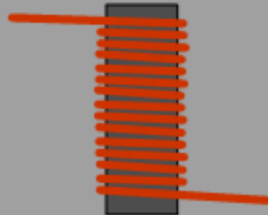


Flow of electrical current

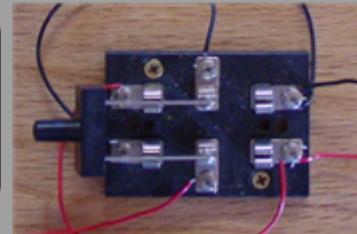


Fuse

Electromagnet



DPDT Switch



Also called a Double Pole Double Throw switch (DPDT).

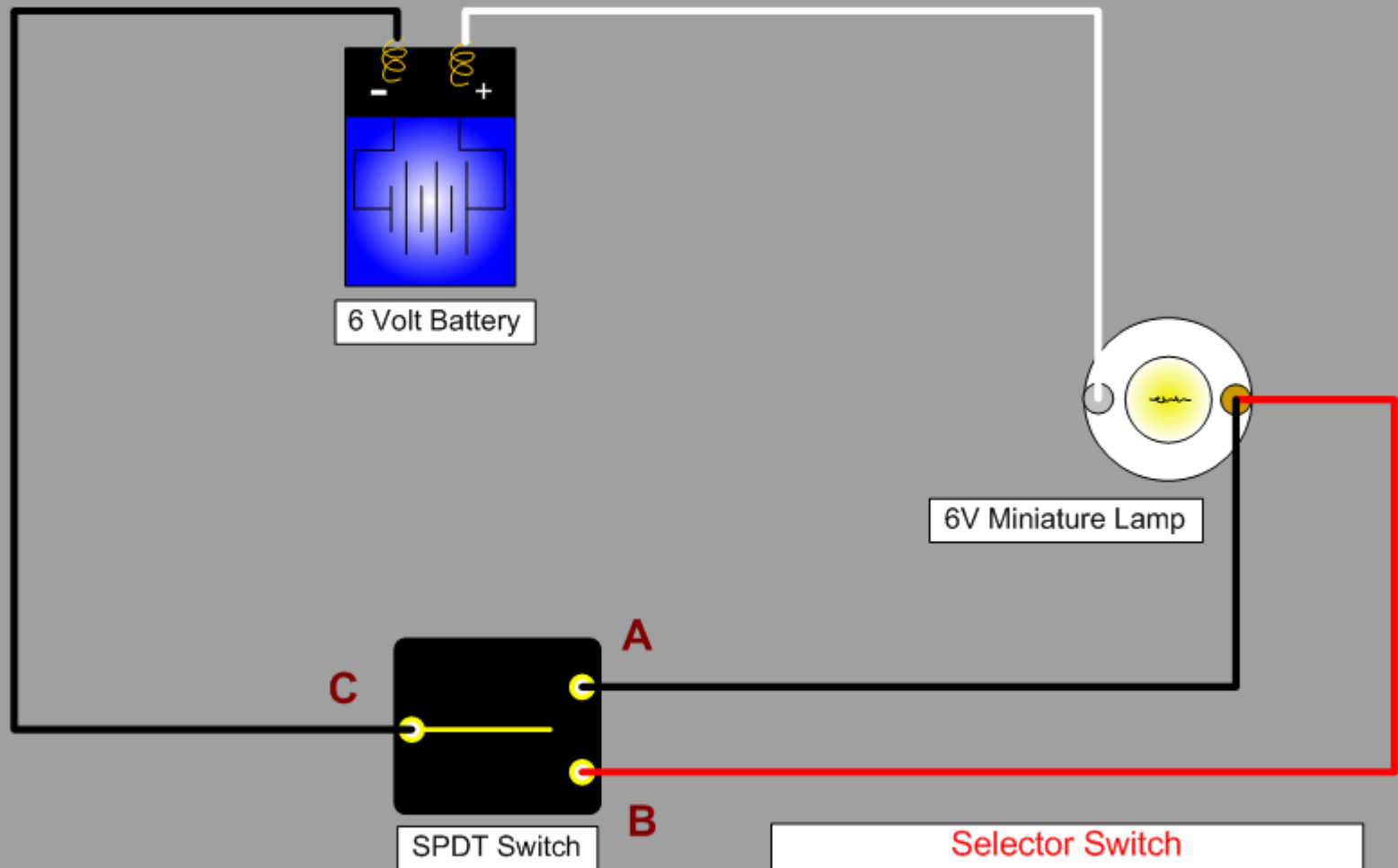


Wires connected together

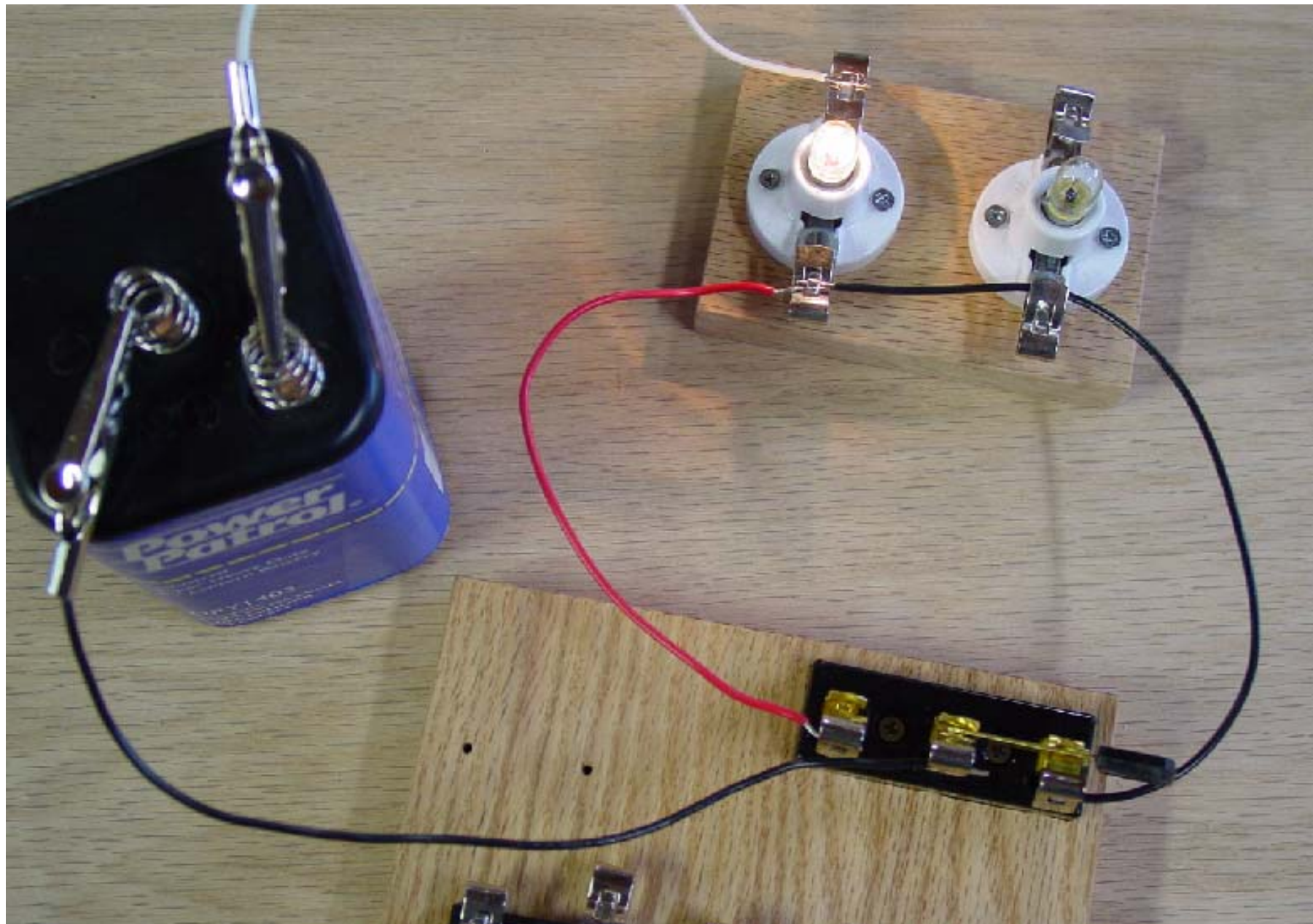


Wires not connected

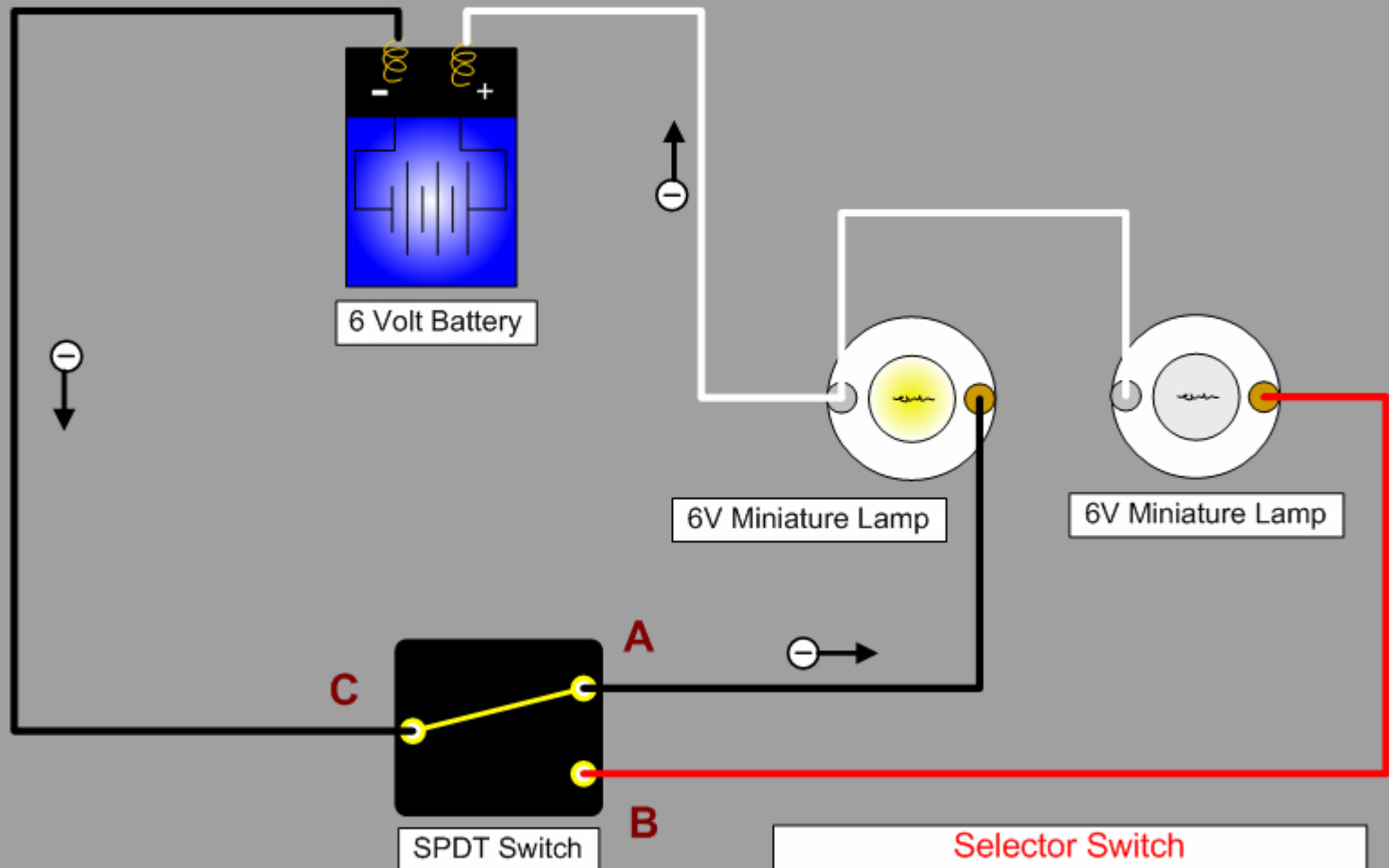
3-Way Switch Introduction- Selector Switch



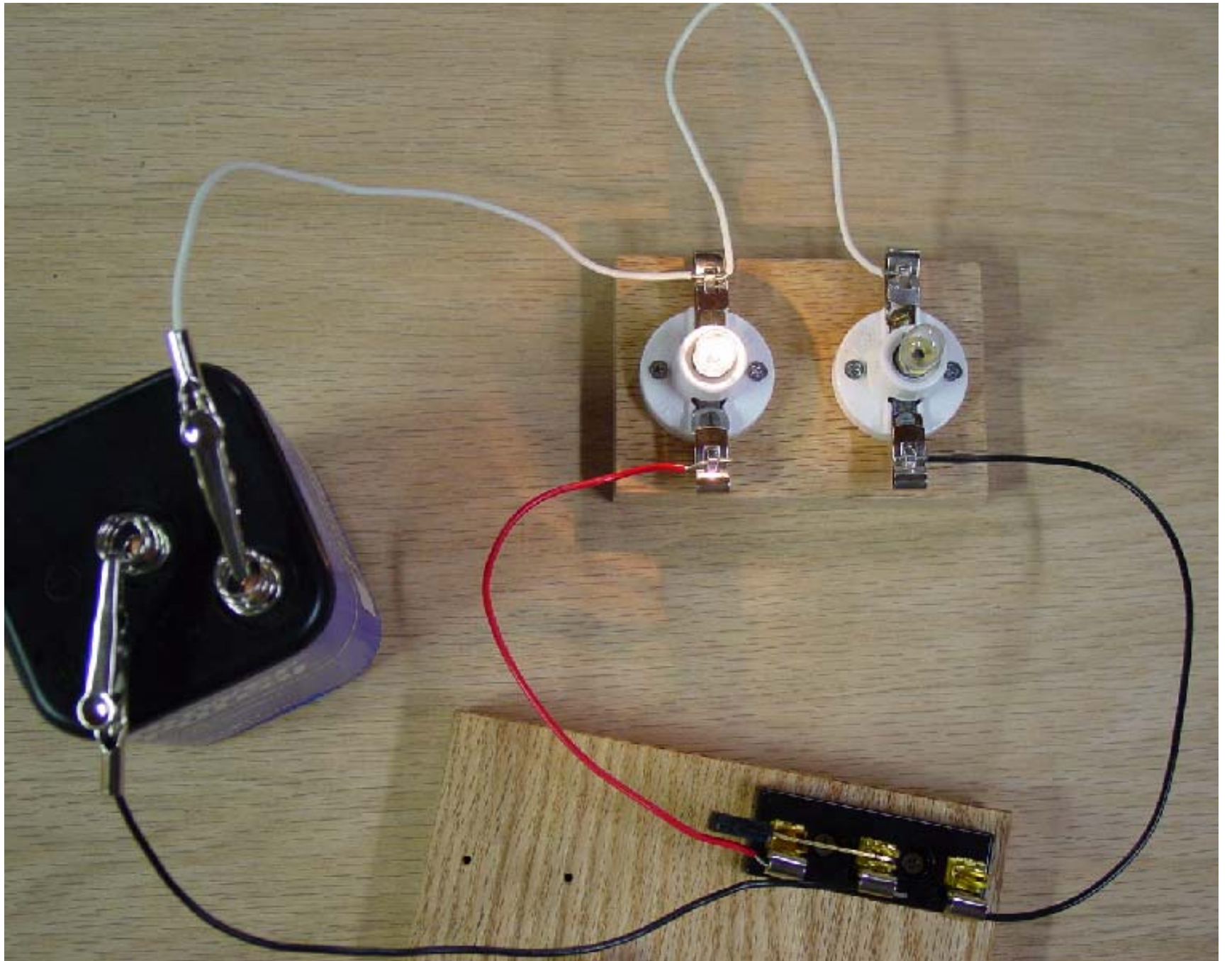
Selector Switch
What happens when the switch is moved to position A? Position B?



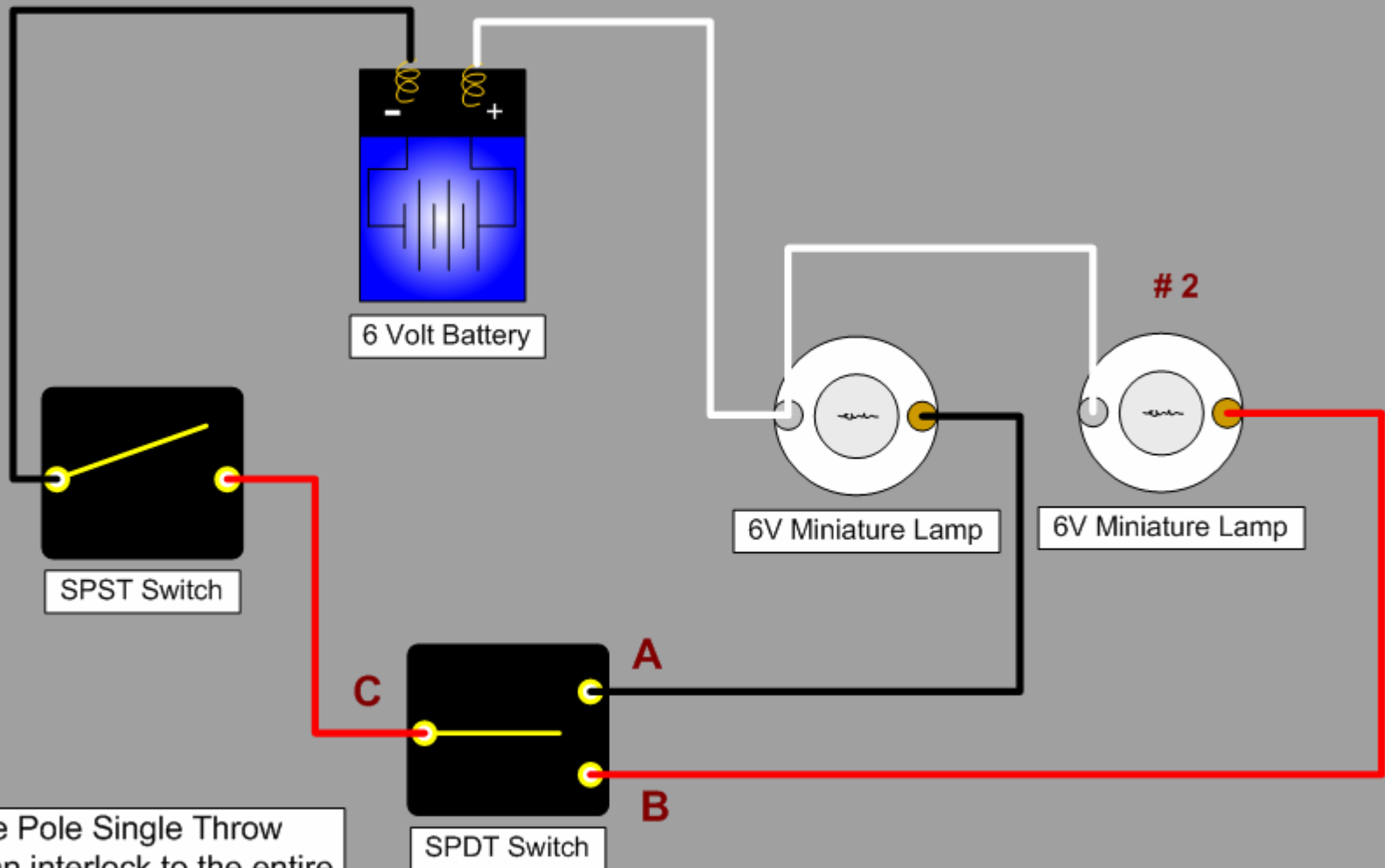
3-Way Switch - Selecting between 2 loads



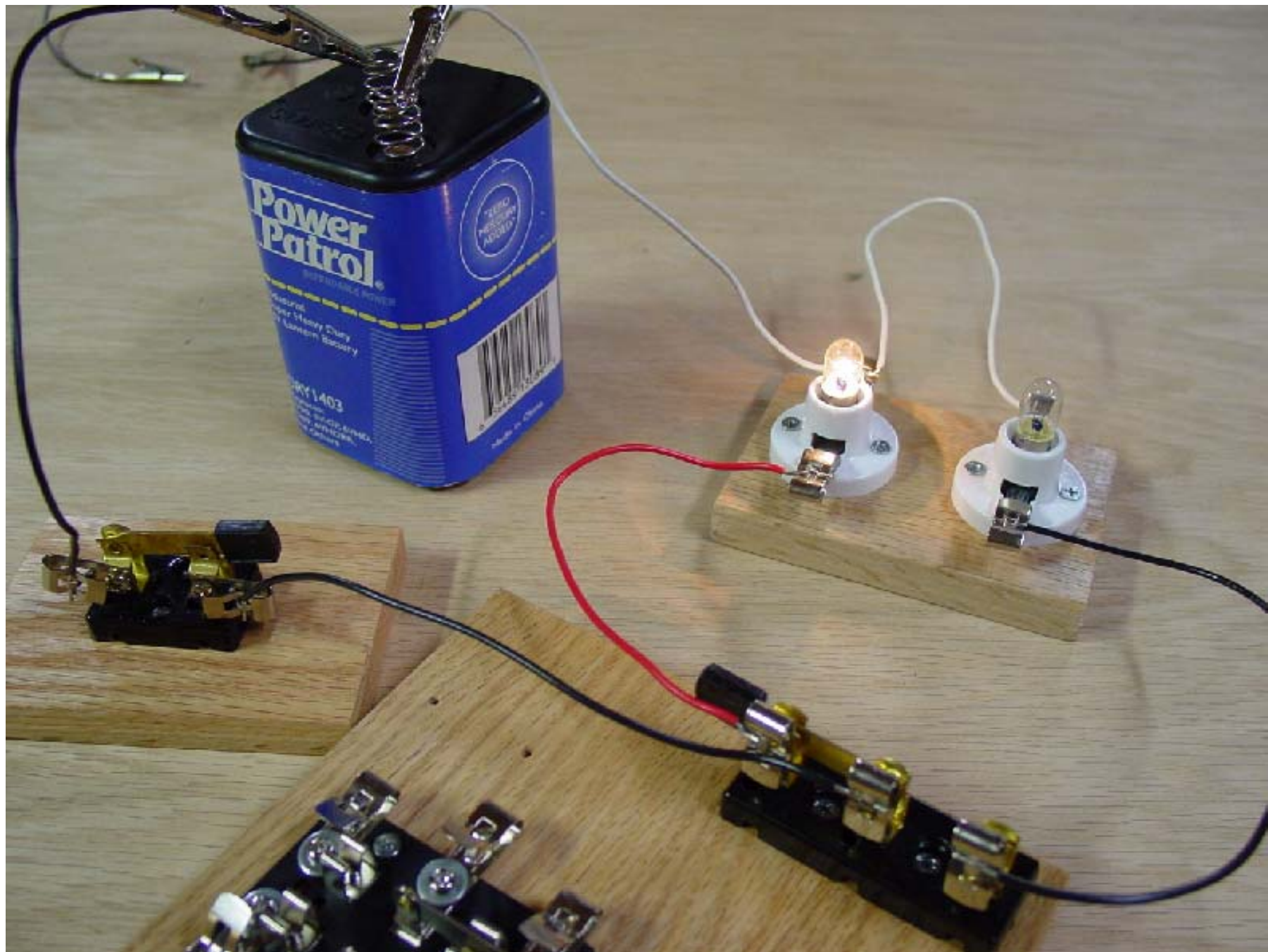
Selector Switch
What happens when the switch is moved to position A? Position B?



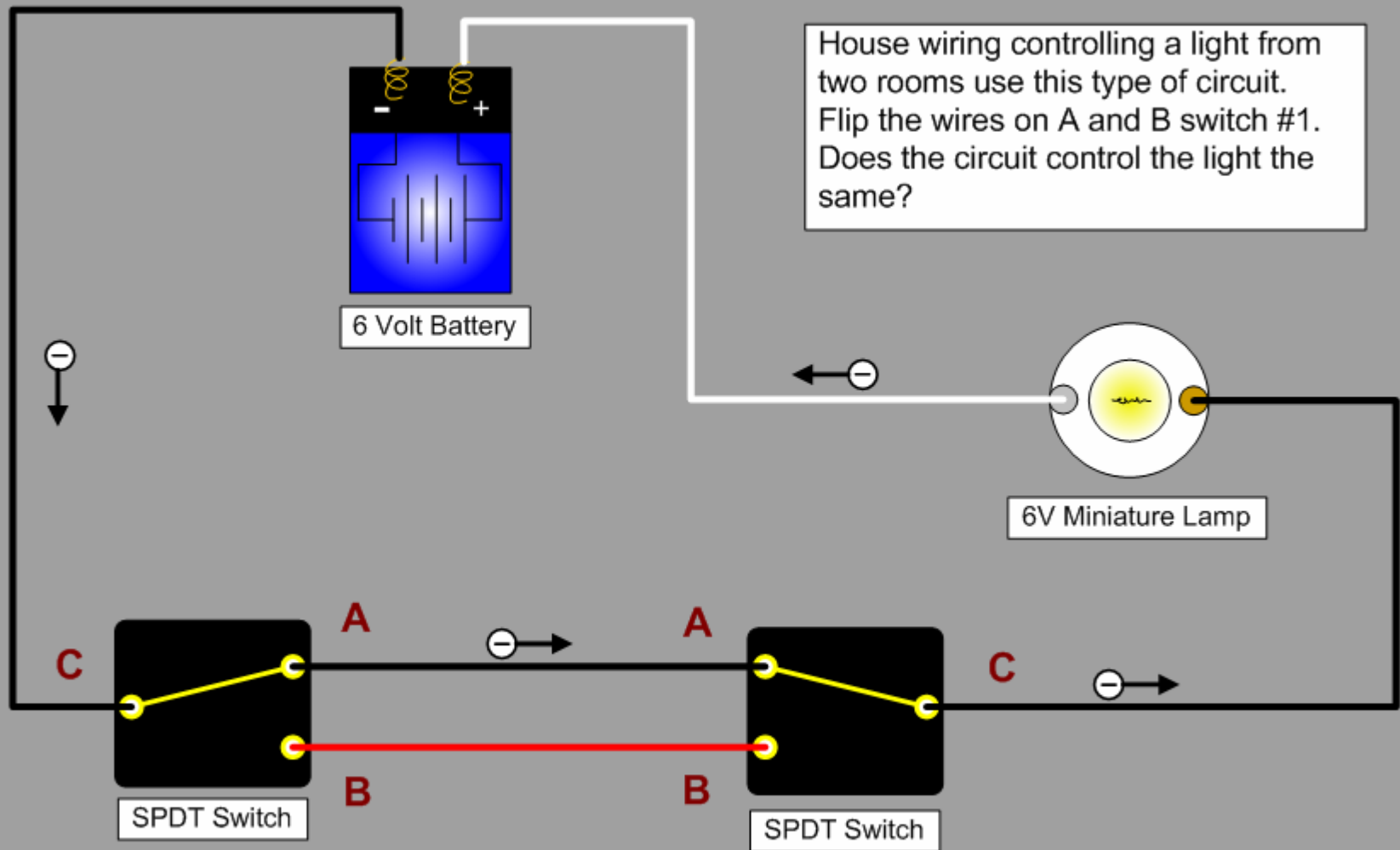
3-Way Switch, A or B selector with Interlock



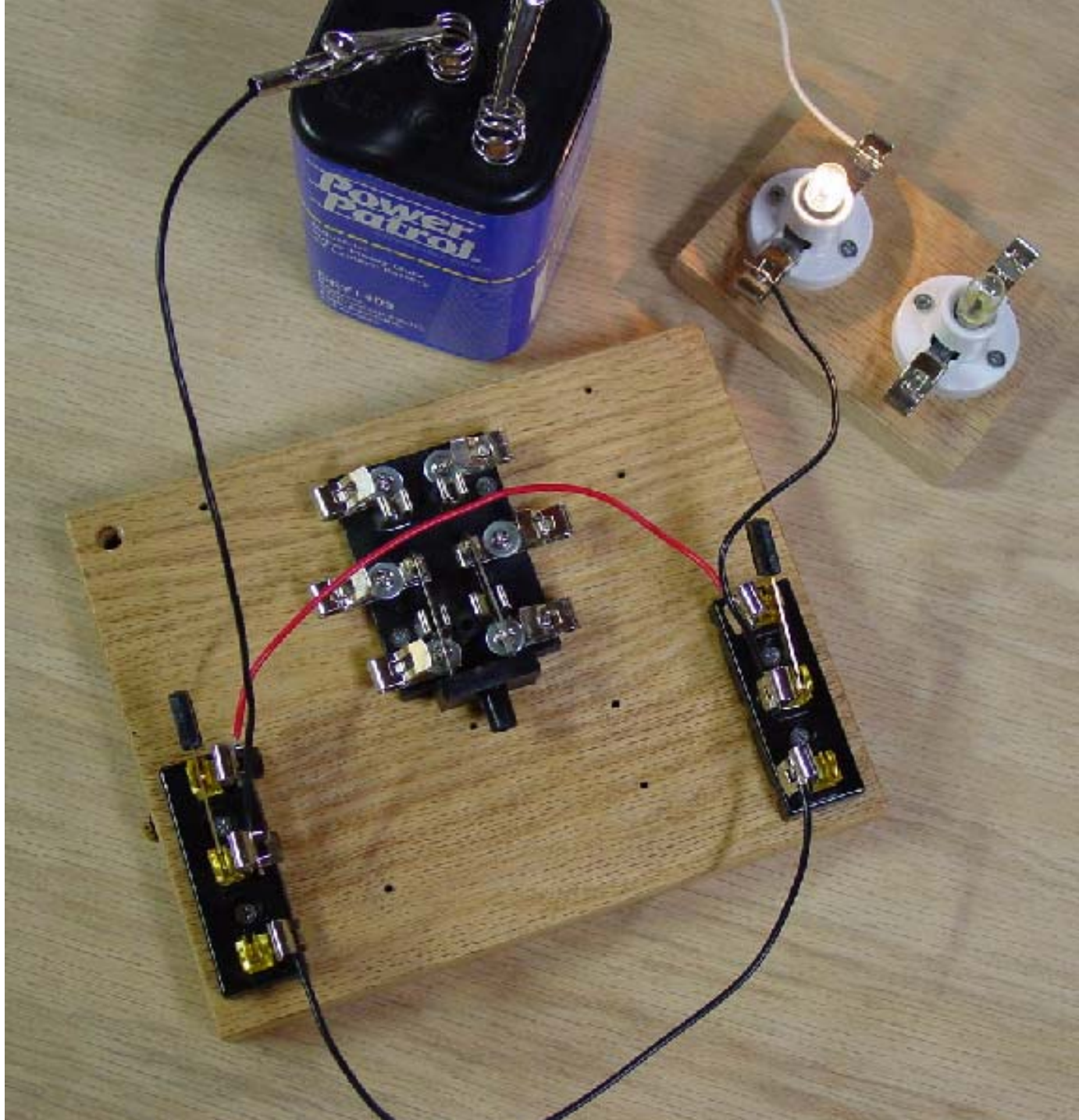
The Single Pole Single Throw switch is an interlock to the entire selector circuit. What needs to happen to light lamp # 2?



Two 3-way switches controlling a load

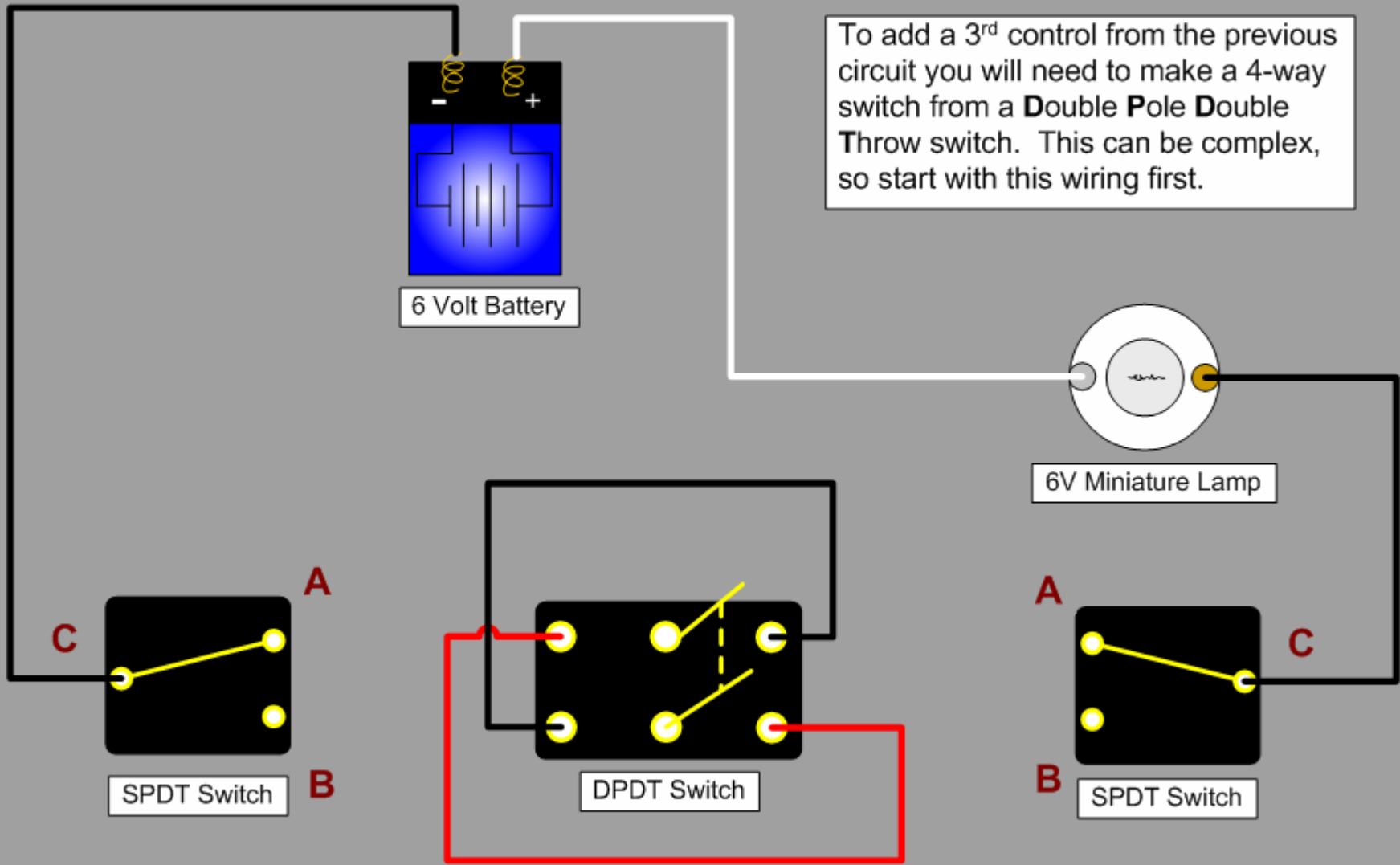


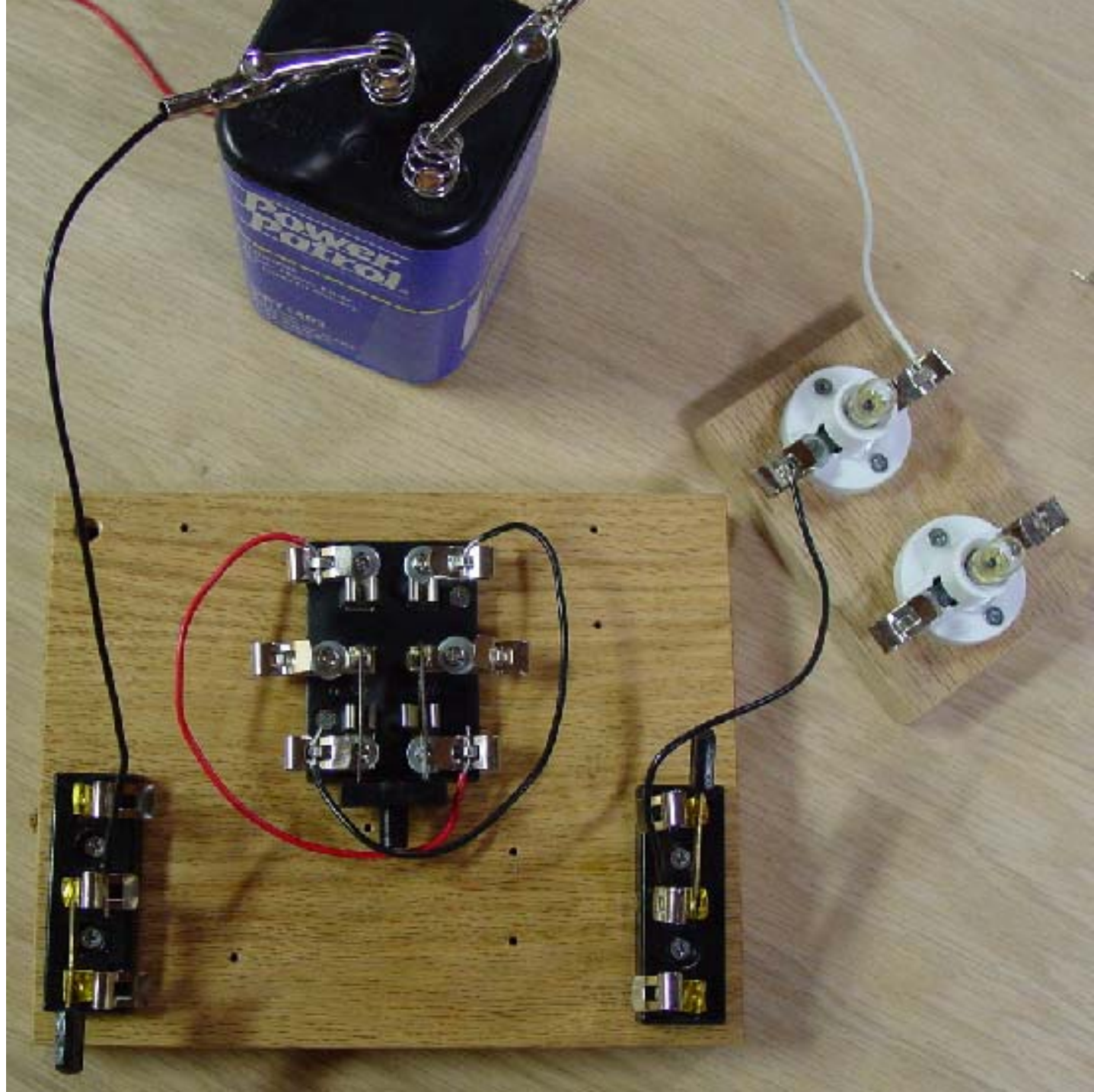
General rule: Common screw on a 3-way switch (letter C) is always either to the load or to the source for this type of control circuit.



Adding a 4-way switch to control a load from 3 places

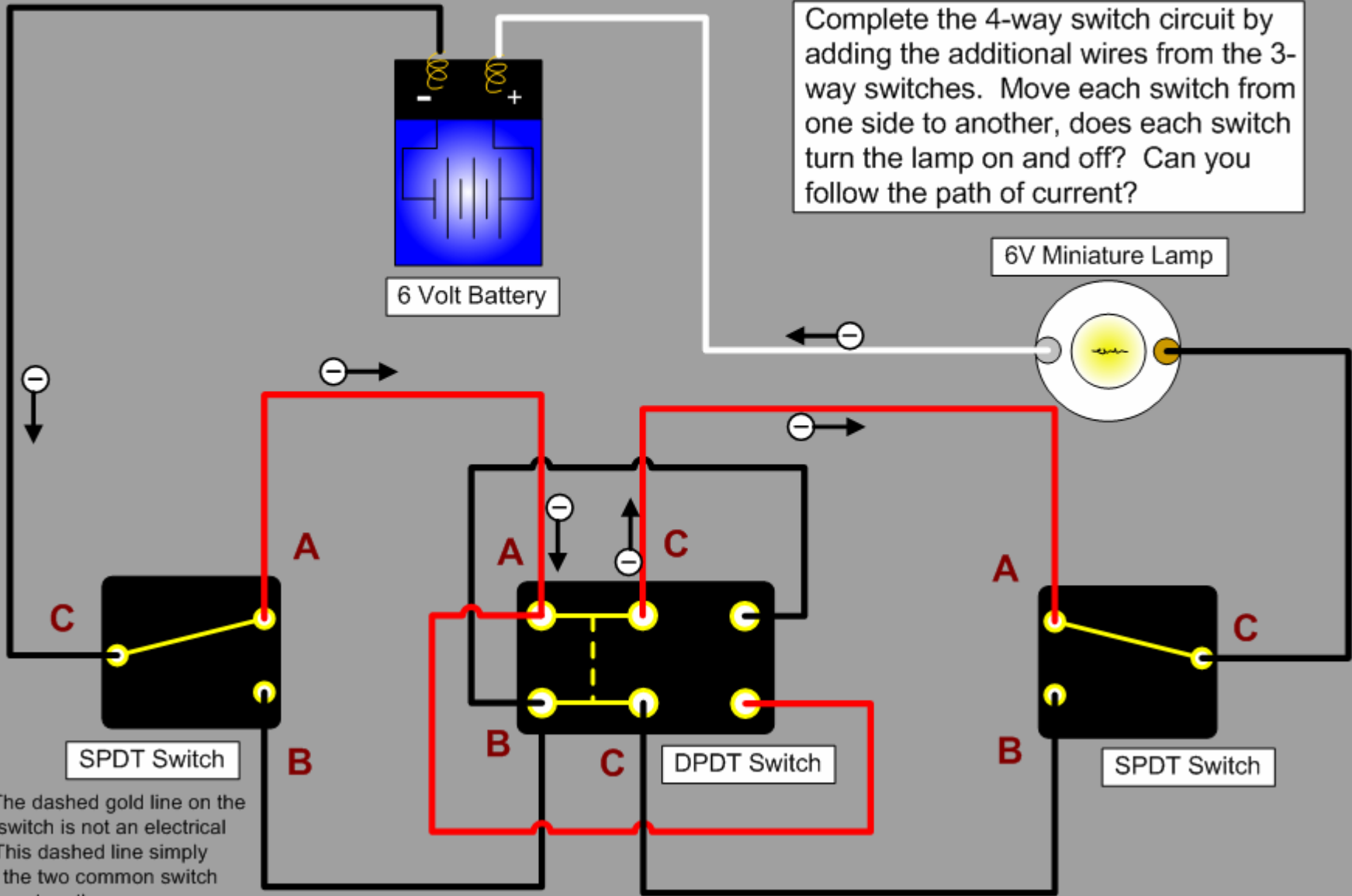
To add a 3rd control from the previous circuit you will need to make a 4-way switch from a **Double Pole Double Throw** switch. This can be complex, so start with this wiring first.





Adding a 4-way switch to control a load from 3 places

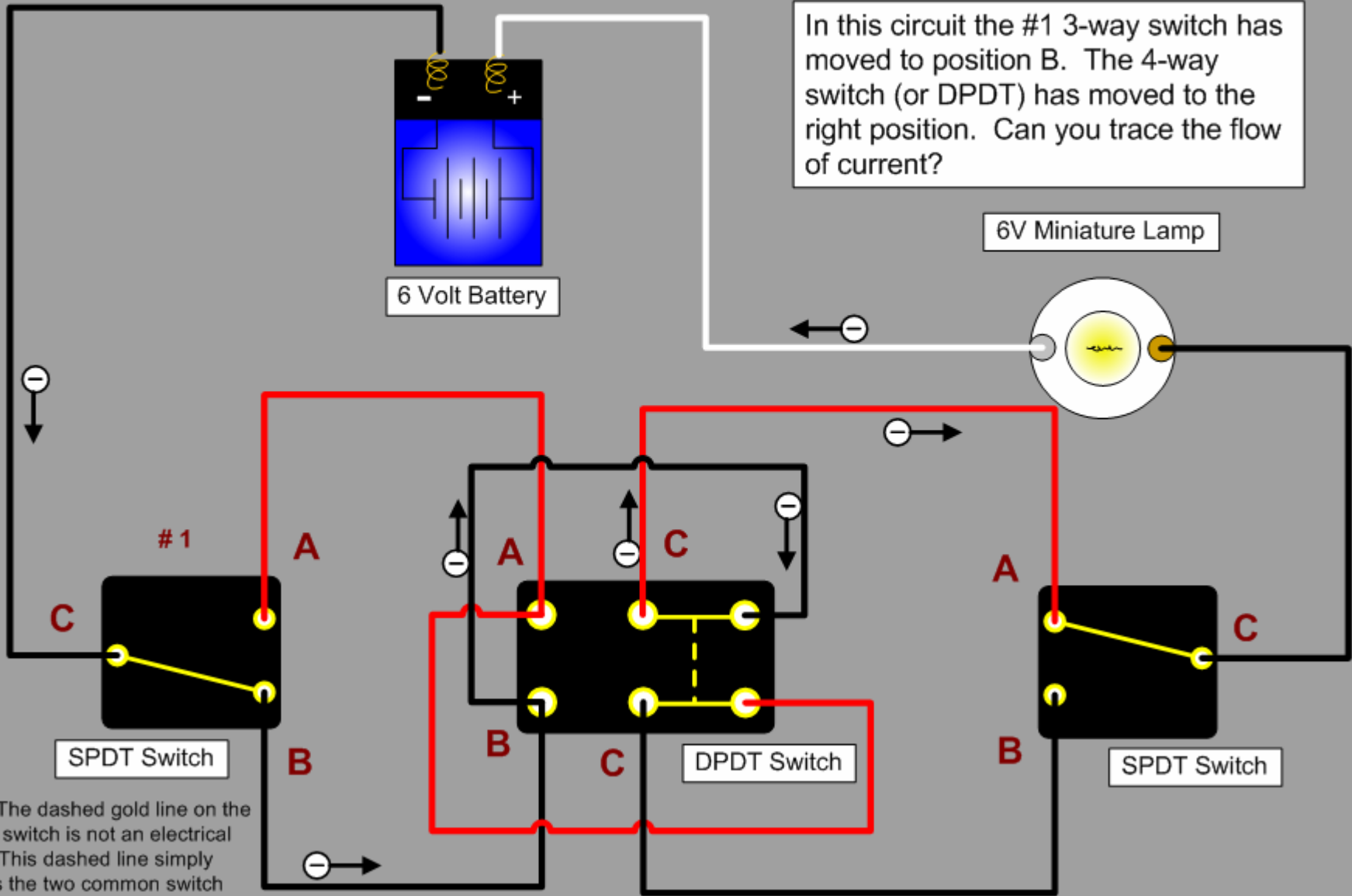
Complete the 4-way switch circuit by adding the additional wires from the 3-way switches. Move each switch from one side to another, does each switch turn the lamp on and off? Can you follow the path of current?



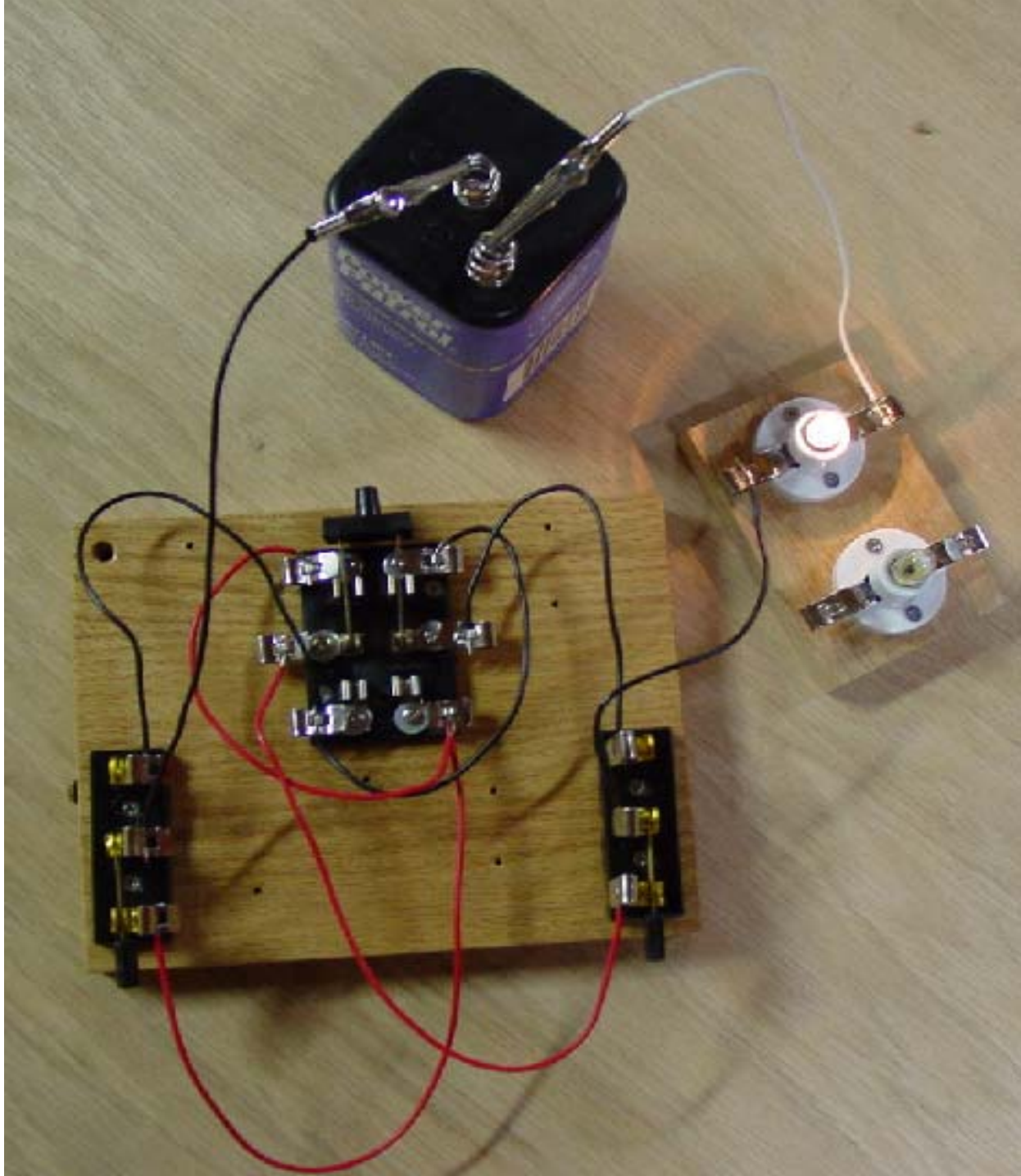
Note: The dashed gold line on the DPDT switch is not an electrical path. This dashed line simply means the two common switch legs move together.

Adding a 4-way switch to control a load from 3 places

In this circuit the #1 3-way switch has moved to position B. The 4-way switch (or DPDT) has moved to the right position. Can you trace the flow of current?

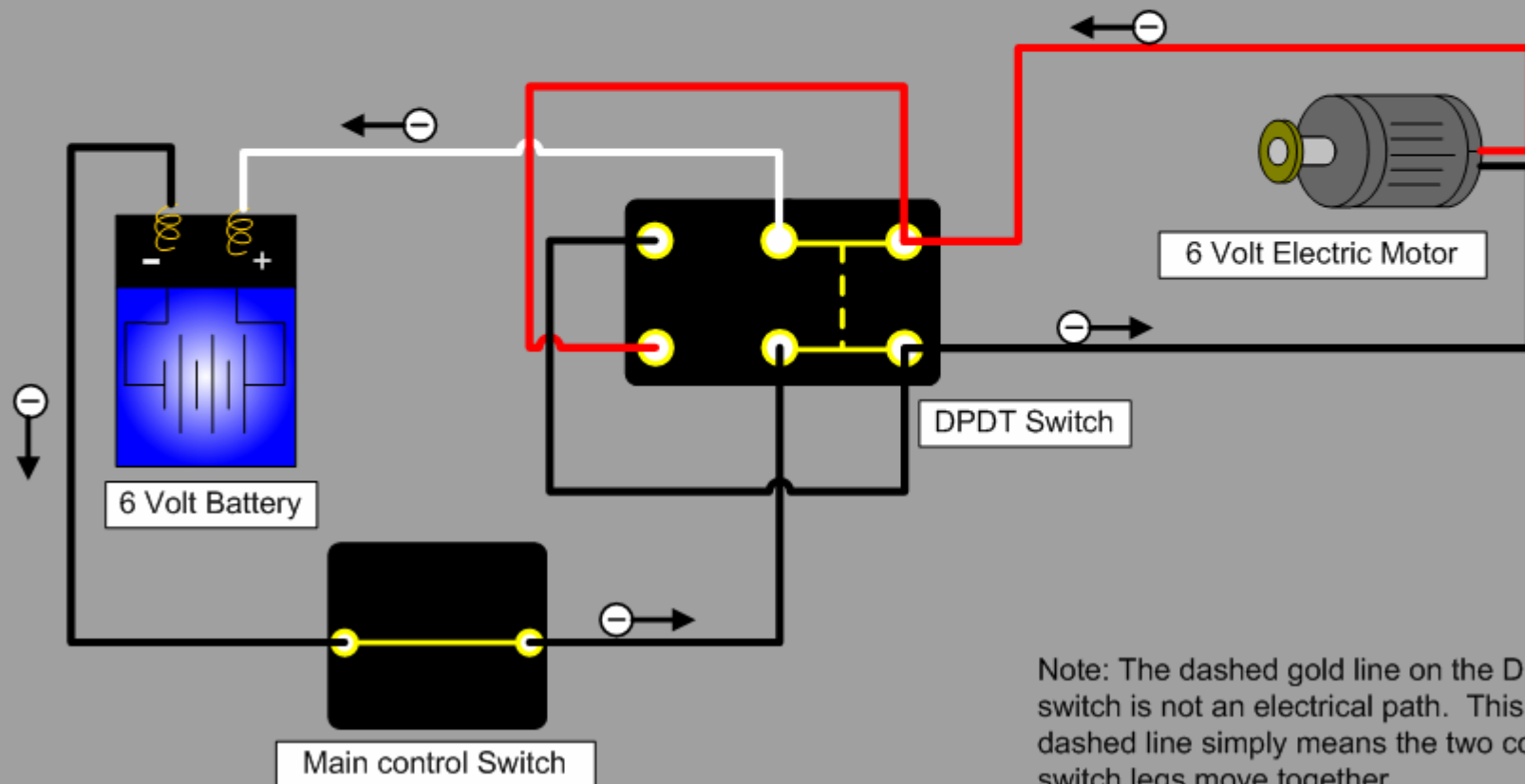


Note: The dashed gold line on the DPDT switch is not an electrical path. This dashed line simply means the two common switch legs move together.



DPDT Switch - DC motor Application

Here the DPDT switch is used to forward or reverse a DC motor by flipping the polarity of the battery to the motor terminals. Can you trace the path of current?



Note: The dashed gold line on the DPDT switch is not an electrical path. This dashed line simply means the two common switch legs move together.