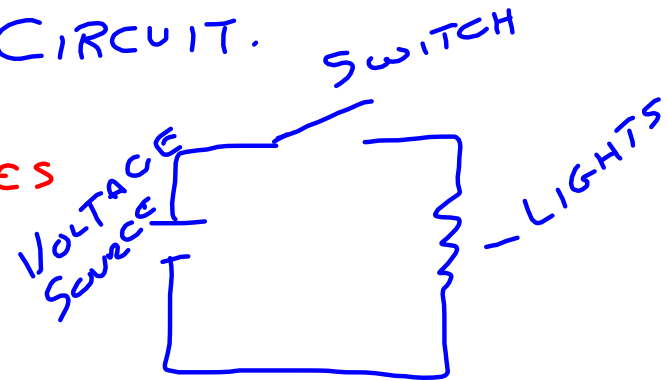


# Introduction to Circuits

# How Do You DRAW CIRCUITS?

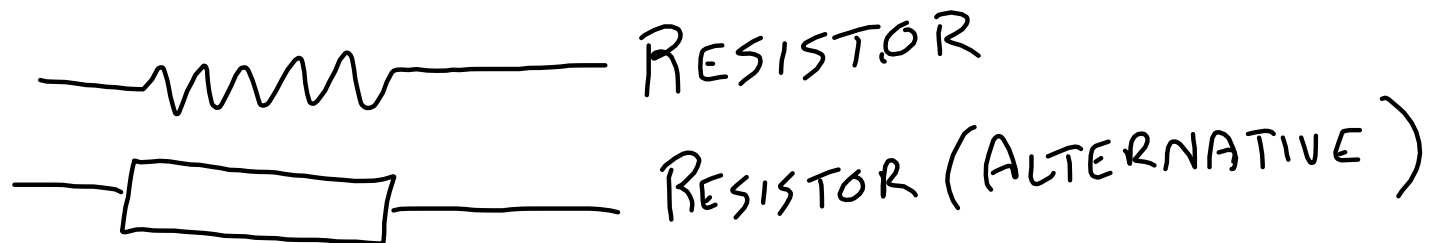
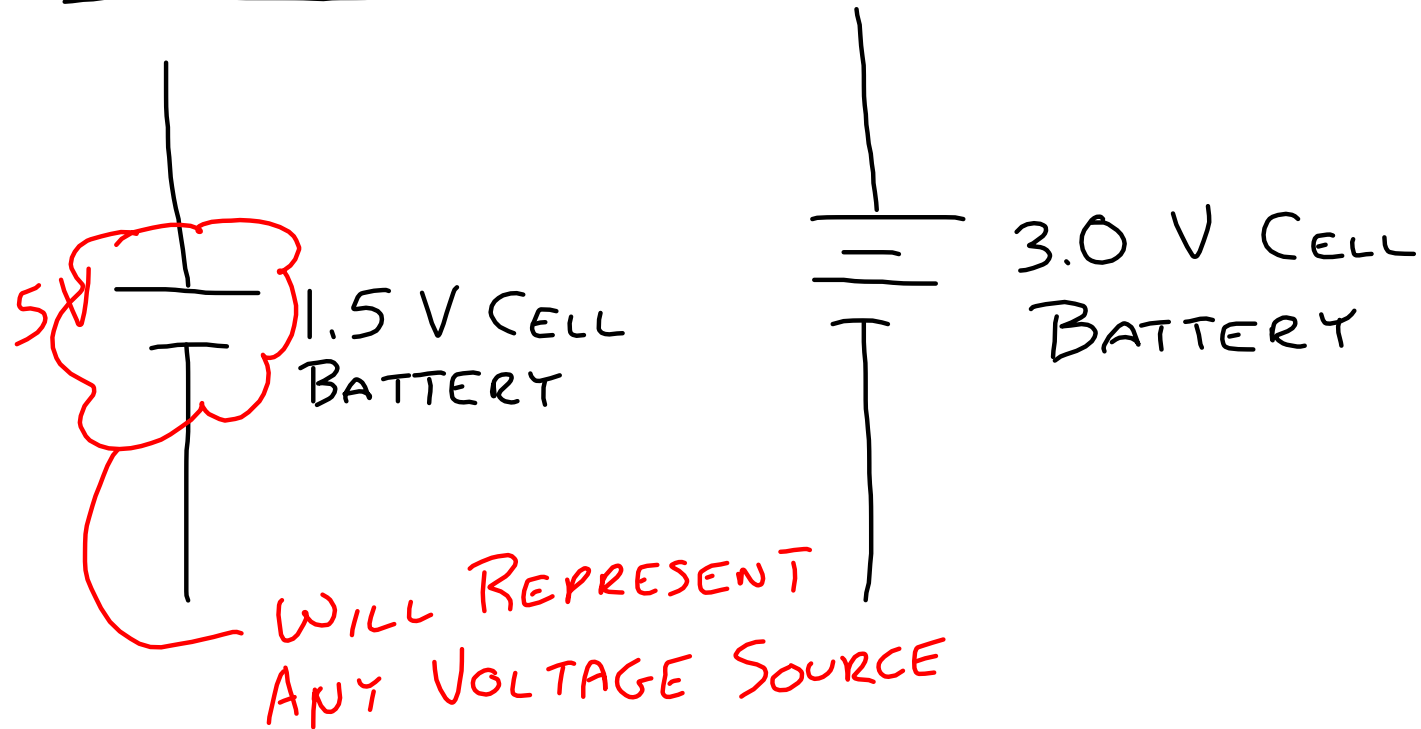
- SCHEMATIC DIAGRAMS  
(AKA CIRCUIT DIAGRAMS)
- THEY SHOW THE LOGIC OF A CIRCUIT.
- THEY DO NOT SHOW THE PHYSICAL  
ARRANGEMENT OF THE CIRCUIT.
- USE CORNERS / STRAIGHT LINES  
FOR CLARITY WHEN MAKING  
THESE.
- LABEL ALL CIRCUIT ELEMENTS



# Schematic (or circuit) Diagrams

- Show the logic of an electrical circuit.
- DO NOT necessarily show the *physical* arrangement of the circuit.

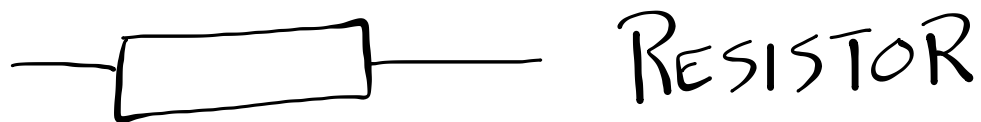
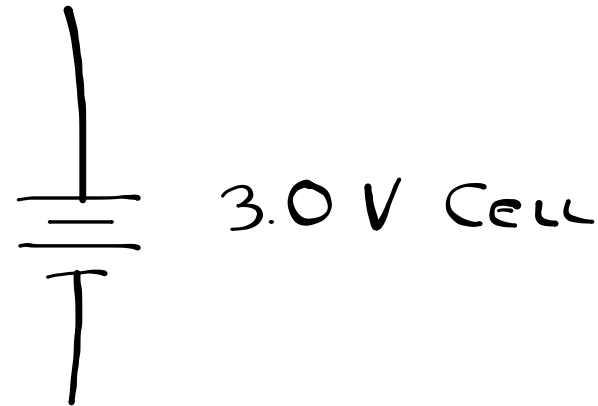
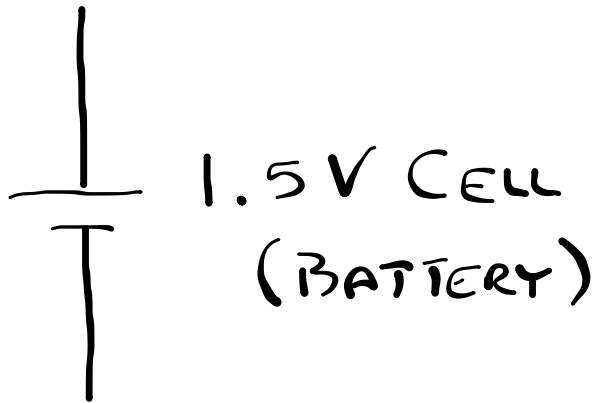
# SYMBOLS USED IN CIRCUIT DIAGRAMS:

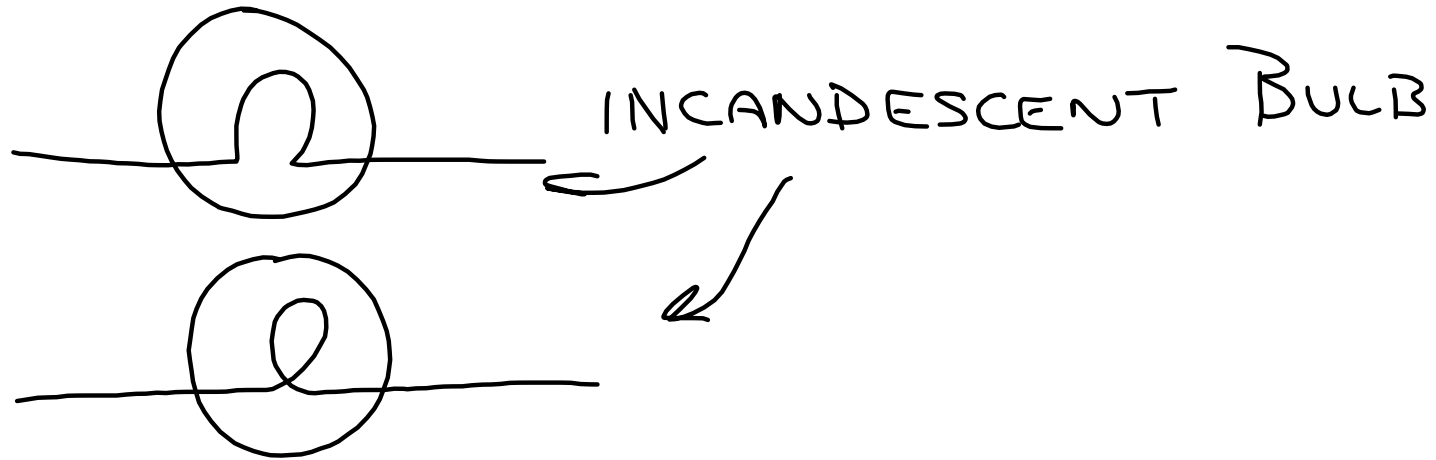


For A CIRCUIT, YOU NEED:

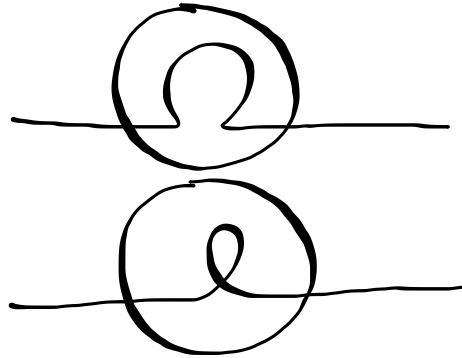
- 1) A VOLTAGE SOURCE (GIVES CHARGE A REASON TO MOVE)
- 2) CIRCUIT (GIVES CHARGE A PATH TO FOLLOW)
- 3) A LOAD (GIVES CHARGE A MEANS TO DO SOMETHING USEFUL)

## SYMBOLS USED ON SCHEMATIC DIAGRAMS:

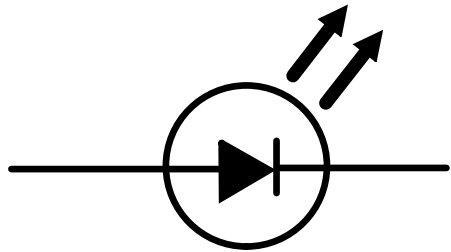




# MORE SYMBOLS



INCANDESCENT LIGHT  
" "

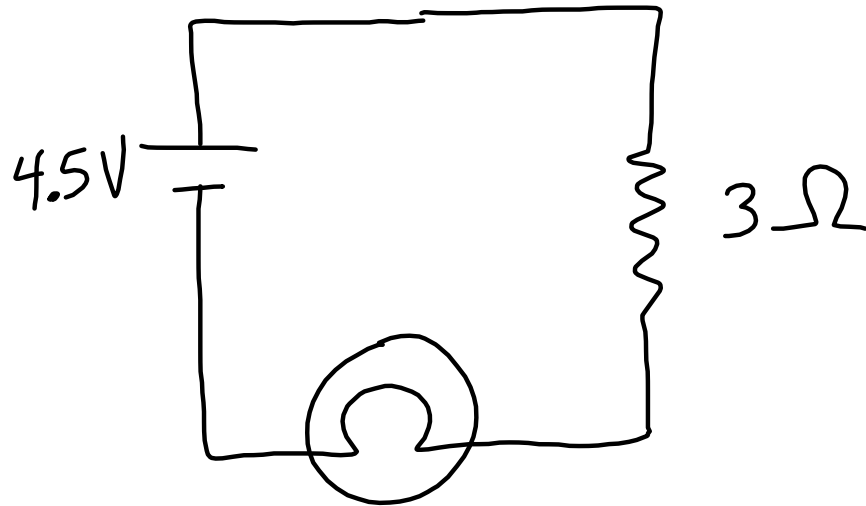


Light Emitting Diode

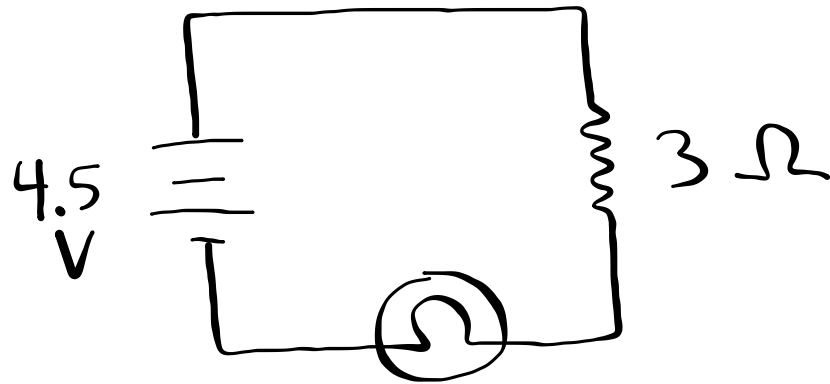
- Polarity matters -- short wire must be connected to the negative terminal of the power supply.
- Diodes only allow current to flow in one direction.



## EXAMPLE CIRCUIT :



# EXAMPLE CIRCUIT



## POWER SUPPLIES

- WHAT WE WILL USE FOR VOLTAGE SOURCES

### IMPORTANT POINTS:

- 1) THE RED LEAD (WIRE) GOES INTO THE POSITIVE CONNECTION.  
(ON THE GREY BOXES → PUT INTO "A").
- 2.) THE BLACK LEAD GOES TO THE NEGATIVE CONNECTION.
- 3) NEVER TOUCH THE LEADS TOGETHER WITHOUT A LOAD BETWEEN THEM.
- 4) ALWAYS HAVE THE POWER SUPPLIES OFF UNLESS IT IS NEEDED.
- 5) ALWAYS USE DC VOLTAGE. BLUE POWER SUPPLIES SHOULD BE ON THE 0-24VDC SETTING.

# POWER SUPPLIES

Most circuits don't have batteries. There is some other source of potential, or **VOLTAGE**

We will be using power supplies.

To make our circuits, we will be using alligator jumpers to connect components in various ways.

## IMPORTANT POINTS:

1. The red lead goes in the positive connection.
2. The black lead goes in the negative connection.
3. This is important so we don't get confused -- either wire will work in either connection.
4. NEVER TOUCH THE LEADS TOGETHER WITHOUT SOMETHING (THE LOAD) BETWEEN THEM -- YOU WILL SHORT THE POWER SUPPLY AND MIGHT BLOW FUSES!!
5. Always have the power supplies off until you need them on.
6. Always be using DC voltage. Blue power supplies should always be set to the 0-24 VDC setting.

Students set up their power supplies. The teacher prompts each step:

1. Without leads, connected, students adjust their supply to read 5V DC.
2. Then have their teacher check their reading (a multimeter might be needed).
3. Power supplies are turned off.
4. Leads are connected to each supply.
5. A light bulb is connected to each power lead.
6. The set-up is checked by an instructor.
7. Students turn their power supply on.
8. Students turn their power supply off.
9. Students draw a circuit diagram, using proper symbols, of their working circuit. This gets turned in.
10. Rewire your circuit so that the resistor and LED are in the circuit in series -- one after another. You will need to use the alligator jumper wire.
11. Turn your circuit on. If needed, turn the circuit off and make adjustments so that the LED lights.
12. Turn the circuit off. Draw a circuit diagram.