

## Cells in Series and Parallel

**Remember to always connect a cell and voltmeter, negative-to-negative and positive-to-positive.**

Purpose: To study the voltage of cells connected in series and parallel and the effect on a bulb.

### Cells in Series

1. Connect 1 dry cell through a switch to a bulb. Attach a voltmeter across the cell. Close the switch and record the voltage. Note the bulb brightness.
2. Repeat with 2 dry cells in series and then with 3 dry cells. Note any change in voltage or bulb brightness each time.

### Cells in Parallel

1. Connect 1 dry cell through a switch to the terminals of a voltmeter. Close the switch and record the voltage. Note the bulb brightness.
2. Repeat with 2 dry cells in parallel and then with 3 dry cells. Note any change in voltage or bulb brightness each time.

### Observations:

# of Cells in Series	Voltage (volts)	Bulb (brightness)	# of Cells in Parallel	Voltage (Volts)	Bulb (brightness)
1			1		
2			2		
3			3		

### Questions:

1. What happens to the total voltage as more cells are added in series?
2. What happens to the total voltage as more cells are added in parallel?
3. What advantage is gained by connecting cells in series.
4. What advantage is gained by connecting cells in parallel.
5. Would a bulb glow brighter if it was placed in a circuit with cells in series or parallel? Why?
6. Draw a circuit diagram showing 3 dry cells in series, 1 bulb, 1 switch, and wires. Label all components.
7. Draw a circuit diagram showing 3 dry cells in parallel, 1 bulb, 1 switch, and wires. Label all components.
8. Calculate the voltage for the following:
  - a) four 1.5 volt cells in series
  - b) two 2.0 volt cells + four 1.5 volt cells all in series
  - c) four 6.0 volt cells in series + six 1.5 volt cells in parallel