

# SNC1D PHYSICS

## THE CHARACTERISTICS OF ELECTRICITY

☛ Potential Difference  
(P.437-438)

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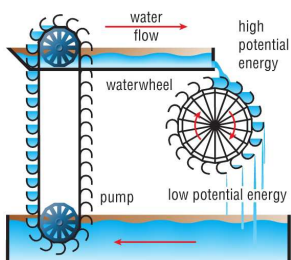
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### A Model for Electric Potential Energy

For centuries people have used the energy of falling water to push waterwheels. This is possible because water above the wheel has more gravitational potential energy than it does below the wheel. **Potential energy** is the energy stored in an object.



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1DPHYS - Potential Difference

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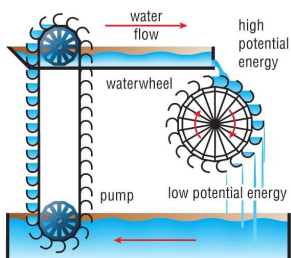
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### A Model for Electric Potential Energy

As water falls, some of this energy is used to spin the waterwheel. To keep the wheel spinning you need a steady supply of falling water such as a fast-flowing stream. If this is not available, a pump can be used to push the water up to its original position. As the water is pumped to its original position, its gravitational potential energy also increases to its original amount.



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### Electric Potential Energy & Potential Difference

Similarly, electrons leave the negative terminal of the battery with high **electric potential energy** which is used to operate the motor. As a result, the electrons return to the positive terminal of the battery with low electric potential energy. Once inside the battery, chemical reactions "re-energize" the electrons and send them out the negative terminal again. In this way, the battery acts like the pump.

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### Electric Potential Energy & Potential Difference

**NOTE!**  
The difference in electric potential energy between two points in a circuit is called the **potential difference** or **voltage (V)**. The SI unit for potential difference is the **volt (V)** and the symbol is **V**. It is this difference that causes current to flow in a closed circuit.

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### Electric Potential Energy & Potential Difference

**POTENTIAL DIFFERENCE (V)**

- ❖ difference in electric potential between two points in a circuit
- ❖ also called voltage
- ❖ SI unit is volts (V)

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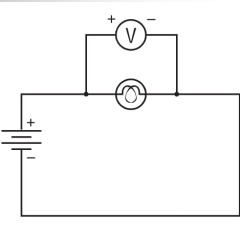
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### Measuring Potential Difference

The potential difference between two points in a circuit is measured with a **voltmeter**. Unlike an ammeter, a voltmeter must be connected in parallel with the load or energy source. The reason for this is that voltage is relative to two points. There is always a drop in voltage across a load or energy source.



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
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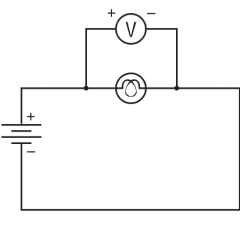
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### Measuring Potential Difference

**VOLTMETER**

- ❖ device used to measure potential difference
- ❖ must be connected in parallel with load or energy source
- ❖ circuit symbol is 



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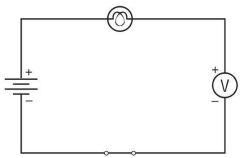
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### ✓ Check Your Learning

1. A student connected a voltmeter into a circuit as shown. Is this the correct way to connect a voltmeter? Explain.

no – it is connected in series – it should be connected in parallel instead



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