

# AC/DC GENERATOR DEMONSTRATION SET

CAT. NO.: ACDCSET

The AC/DC Generator Demonstration Set allows science students from the middle school to high school learn scientific principles that address National Science Education Standard B. This standard relates forces, motions, transfer, conservation, and interaction of energy.

This scientific apparatus consists of 2 permanent magnets, an armature, brushes, slip rings, commutator, turning wheel, light bulbs with sockets, terminals, a base, and jumper wires with banana plugs.

## THE AMMETER

Materials included: AC/DC Generator, red wire/green banana plugs, black wire/yellow banana plugs.

Materials needed: DC Ammeter with 2 ranges

Find the DC Side of the AC/DC Generator. Select the red wire with the green banana plugs. Slide one end of the wire into the black receptacle for the banana plug located nearest the light socket on the DC side only. Slip the other end of the red wire into the black receptacle for the banana plug located next to the edge of the wood.

Place your hand on the apparatus. Rotate the handle clockwise. Observe the light bulb. Is it bright? Do you have an open or closed circuit? Make a hypothesis on how to make the light bulb become bright. Try again by spinning the wheel again. Did the light get bright? Record your observation.

Is there a method for reading the **current** flowing through the bulb?

Obtain the DC Ammeter. Notice that it has two ranges on it. Always start at the lowest range on the instrument. The lowest positive terminal should be next to the negative sign of the Ammeter. Pull out the green banana plug from the receptacle located at the edge of the base. Place it inside of the opening that has 1 A under it. Pick up the black wire with yellow banana plugs. Slide one end of the black wire into the receptacle for the banana plug located next to the edge of the wood. Position the other end of the black wire into the opening with the black nut. Observe the negative sign under the opening. Hold your hand firmly down on the base of the generator. Rotate the wheel clockwise only for 1 minute. Observe the pointer of the ammeter. Record your observation. Move the red wire to the 5 A terminal. Repeat rotating the handle again for 1 minute. Write

down your reading of the pointer. Compare your reading again. How many amperes did you produce from your light bulb after one minute?

The amperes produced by the generator are indicated by the deflection of the needle on your DC Ammeter.

### ANALYSIS

Your reading in amperes should be identical after spinning the wheel for 1 minute. The only difference is you are using a different scale to read the amperes being generated.

An Ammeter is a scientific instrument used to measure the electrical current passing through an electrical circuit. The pointer of the instrument reads the amperage in an electrical circuit when the electrical circuit is flowing. Ammeters are always connected in series with the electrical circuit.

## ELECTRIC MOTOR

Materials provided: AC/DC Generator, red wire/green banana plugs, black wire/green banana plugs.

Materials needed: A voltmeter

Locate the DC motor at the bottom of the AC/DC Generator. Pick up the red wire with the green banana plugs. Slip one end of the red wire into the green receptacle for the banana plug located on the bottom. Put the other end of the red wire into the black receptacle for the banana plug located near the green receptacle.

Put your hand on the scientific apparatus. Rotate the handle clockwise for two minutes. Does anything happen? Record your observation.

Position your voltmeter near the base of the Generator. Observe the colored caps. These colors assist you to place your wires correctly. Always follow the color-coding on your voltmeter. Remember to use the lowest voltage shown when you start.

Insert the correct color of wires into the openings of the receptacles on the voltmeter. Rotate the handle clockwise for two minutes. Observe the pointer. Record the voltage produced by the DC motor. Now move the red wire to the next highest opening. Rotate the handle clockwise for two minutes. Record the voltage produced now. Has it changed?

### ANALYSIS

The DC motor converts **electrical energy** into **mechanical energy**. The electric motor is an apparatus that uses electric current to spin an axle which has a coil of wire wrapped on