

RACING TO THE FUTURE™ LESSON PLAN #2 WORKSHEET HOW ELECTRIC MOTORS WORK

Now that you have completed the first lesson and learned about circuits, we will take the next step and show how an electric motor works. Electric motors are a type of circuit. In this lesson we will use the same type of electric motor that are used by the slot cars you might build for Racing to the Future™. Below are the parts that make up an electric motor.

Magnets - (1 North and 1 South)

Armature (See Drawing#1)

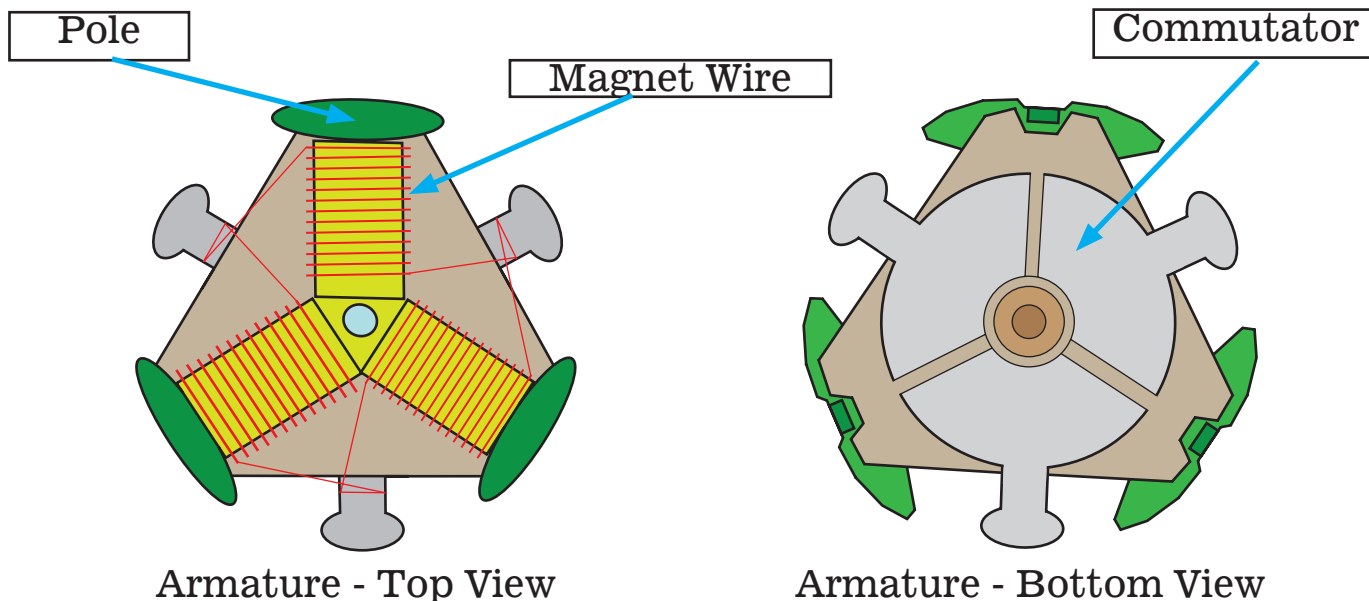
Commutator (See Drawing #1)

Power Source (The Track)

Brushes (Motor Brushes)

Power Terminals
(Pick Up Shoes on a Slot Car)

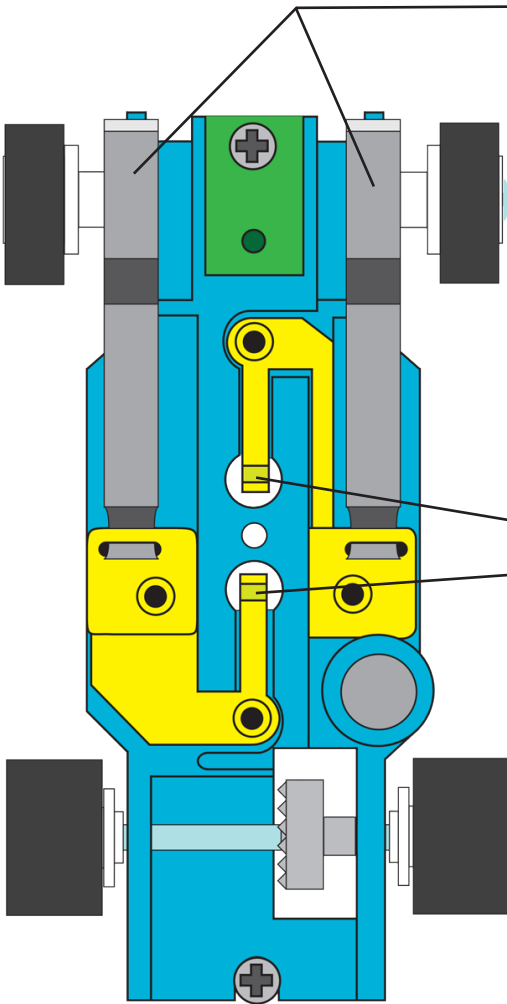
Drawing #1
Parts of the Armature



Below is a drawing of a slot car chassis. We will use this as our electric motor example. The *armature*, *motor brushes* and *magnets*, are hidden inside the chassis. We will look at them in the next drawing.

Drawing #2
How an Electric Motor Works

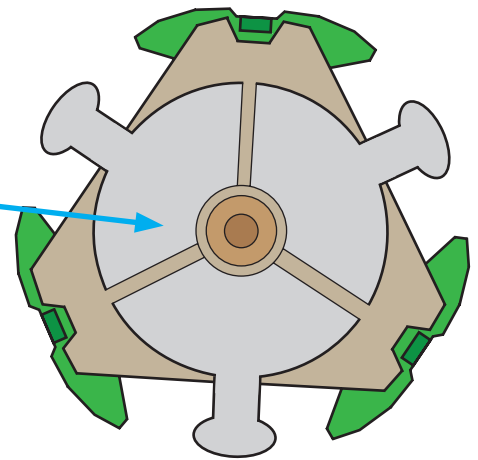
Pick Up Shoes (The Power Terminals) transfer electricity from the track rails (*The Power Source*) to the *Motor Brushes*.



The *Motor Brushes* transfer the electricity from the *Pick Up Shoes (The Power Terminals)* to the *Armature's Commutator Plates*, completing the electrical circuit.

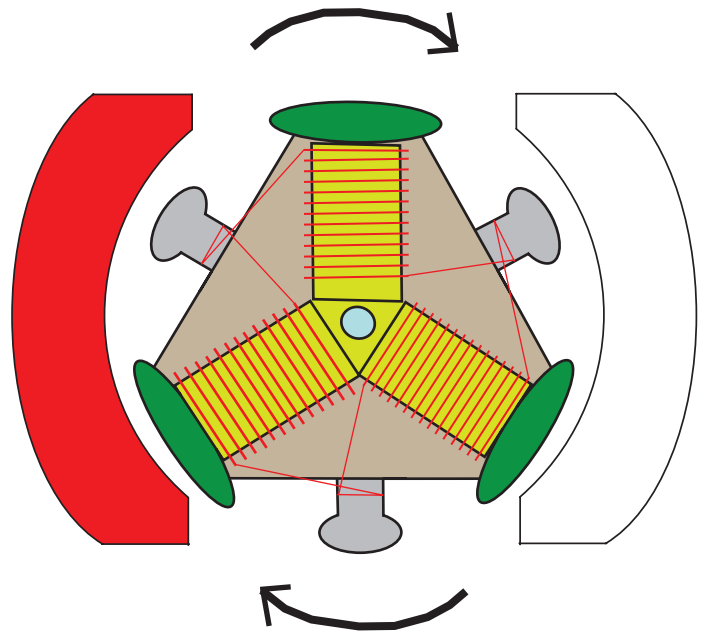
Drawing #3
How an Electric Motor Works

The *Commutator Plates* receive the electricity from the *Motor Brushes*.



Armature - Top View

The electricity is passed to the *Armature Wires* (a magnetic coil) charging the pole. The electrical current magnetizes the pole, forcing the charged coils field against the magnets in the motor. This results in torque pushing the next charged pole into the magnetic field causing the motor to spin. As electric current is increased, the charge on the pole increases, forcing the spin to be faster.



Activity: Fill in the Blanks (Choose From Words Below)

An electric _____ uses electricity and _____ to spin the _____. In a slot car the pick up shoes are the same thing as the _____. The Armature is made up of these 3 things, _____, _____ and the _____. The armature spins when _____ passes through the armature wire.

Magnets Electricity Commutator Motor

Power Terminals Armature Armature Wire Poles

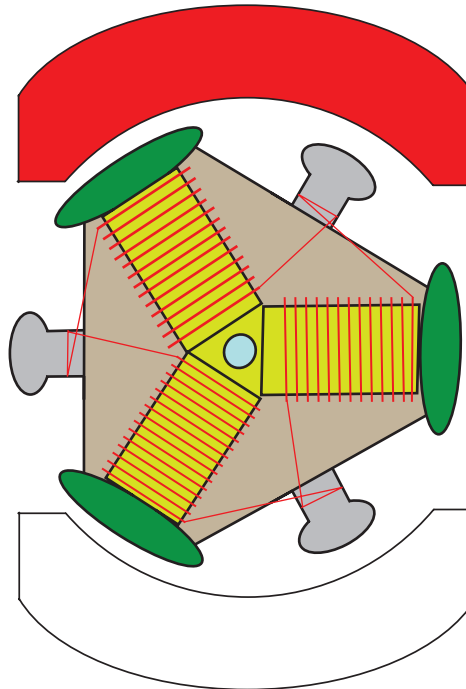
Draw a line from the word to the item in the drawing.

Magnets

Pole

Armature Wire

Armature



ANSWER SHEET

Activity: Fill in the Blanks (Choose From Words Below)

An electric MOTOR uses electricity and MAGNETS to spin the ARMATURE. In a slot car the pick up shoes are the same thing as the POWER TERMINALS. The Armature is made up of these 3 things, POLES, ARMATURE WIRE and the COMMUTATOR. The armature spins when ELECTRICITY passes through the armature wire.

Magnets Electricity Commutator Motor

Power Terminals Armature Armature Wire Poles

Draw a line from the word to the item in the drawing.

