



Curiosity Guide #804

Electric Motors

Accompanies Curious Crew, Season 8, Episode 4 (#804)

DC Motor

Investigation #7

Description

Have you ever wondered how electricity flows through a motor? Let's find out!

Materials

- Eudax DC Motor
- 4 AA batteries

Procedure

- 1) Examine the parts of the motor and notice how the electricity will flow through the system.
- 2) Hook up the batteries to the two motor leads and observe what happens.

My Results

Explanation

The ideal voltage range for this model is from 1.5 volts to 6 volts. The batteries provide the electrical flow in one direction, so this is considered a direct current, or DC motor. DC motors also often use permanent magnets and are suitable for light duty work.

Although there are several parts in the motor, let's focus on the stationary outside magnetic part, called the stator, and the rotation wire coil in the center, called the rotor. As current flows from the battery through the wire, a magnetic field is generated that will react with the polarity of the permanent magnets, both attracting and repelling and causing an initial rotation. To keep the rotation going, a DC motor uses a commutator, which is a metal ring with two halves that surrounds the output axle. As the rotor turns, the commutator rotates and alternates touching two different brushes that connect to the power supply. This makes the current alternate to make the sequence of attraction and repulsion continuous, spinning the output axle.

Think about this! Imagine a loop of wire, the stator, positioned between two opposite stationary magnets. When the ends of the wire are connected to a battery, the energy flows through the battery, and a magnetic field is generated. But because the wire goes both out and back, the loop sides react differently in the magnetic field, making the wire rotate. It wouldn't take long for the ends of the wire to get twisted. To solve that problem, the motor uses the commutator around the axle, which allows the wire loop, or rotor, to rotate continuously by switching the direction of the current. Great design!

[Great Video Explanation for DC Motors](#)

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