

Science 30	Unit C: Physics
Lesson 3 - Energy Conversions	84 mins

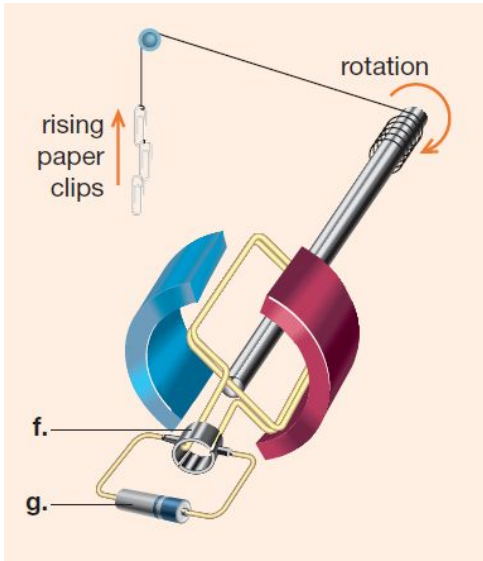
Types of Energy

- Kinetic - movement
- Potential - stored
- Gravitational - from gravitational fields
- Magnetic - from magnetic fields
- Electricity - from electrical fields
- Chemical - bonds between atoms
- Nuclear - energy within atoms
- Mechanical - objects moving
- Heat - moving atoms

Energy Conversations

<p>Energy cannot be created or destroyed. It can only change forms,</p> <p>Machine - something that changes energy from one form to another</p>	<p>Motor - chemical to mechanical</p> <p>Electric Motor - Electrical to mechanical</p> <p>Generator - mechanical to electrical</p> <p>Body - Chemical (food) to Heat and Mechanical</p>
---	---

Motors

	<ul style="list-style-type: none"> • Rotating Coil • Brush • Commutator (split-ring) • Voltage Source • Permanent Magnet • Armature
---	---

Science 30 - Lesson 27 - Unit C - Motors

Name: _____

Materials:

→ 1.5-V D-Cell → 1 m of Wire → Paper Clips → Tape	→ Sandpaper → Film Canister → Circular Magnet
--	---

The Problem

Create a simple electric motor

Criteria for Success

Score your motor's success using the table below.

Evaluation Criteria		
Level of success	Criterion	Score Points
1	coil moves but does not rotate	1
2	coil rotates less than one-half turn	2
3	coil rotates one-half to one turn	5
4	coil rotates more than one turn but for less than 10s	7
5	coil rotates continuously for 10s	10

Procedure

1. Use the film canister to wrap the length of wire into a coil. Leave 5 to 6 cm of wire free at each end of the coil. To keep your wire coil from unwinding, wrap the free ends around the coil a few times, as shown in Figure 3.12(a)
2. Use sandpaper to remove the enamel coating from one end of the wire. Then hold the coil on edge and sand off the enamel coating from only the bottom half of the other end of the wire. Figure 3.12(b) shows the wire's ends. When you are done, your wire coil should look like the one in Figure 3.12(a). This is your motor's armature.
3. Bend two paper clips so that they can support the wire coil and be attached to the ends of the D-cell. Use tape to hold the bent paper clips in contact with the metal ends of the cell, as shown in Figure 3.11. Attach the circular magnet to the D-cell as shown in Figure 3.11.
4. Place the coil so that it rests on the clips. Give the coil a small push to see if it will spin.
5. When your motor is complete, test it to see if it meets some or all of the criteria for success listed above. Make adjustments as necessary. Record what you have done and the adjustments you have made. (Make at least 3 adjustments, 1 at a time!)

- a. _____
- b. _____
- c. _____

Analyze

Motor's Score: _____

Explain why the coil of wire in your motor spins.

Did your coil spin better in one direction than another? Explain why it did or did not.

Describe problems you encountered in this activity and the steps you took to overcome them.

Based on your experience in this investigation, make a list of at least four troubleshooting instructions that would assist students constructing this motor in the future.

1. _____
2. _____
3. _____
4. _____

Draw and Label the parts to your Motor: (Armature, Communicator, Brushes, Source, Coil, Magnet)