Name: _____ Group: _____ Date: _____

Tech labs

TECH 16

The transformation of energy

PROGRAMS: ST, EST, AST
LAB TYPE: Observation
CONCEPT: Transformation of energy
STUDENT BOOK: Chapter 14, page 471

GOAL

Observe the electrical function of energy transformation in a simple electric motor.

OBSERVATION CRITERIA

1. In electrical engineering, what is meant by an *electrical function?*

_____

_____

_____

_____

2. There are various types of electrical functions. Complete the table below by defining the main types of electrical functions and by giving at least one example of a component for each type.

Electrical function	Definition	Example
Power supply		
Conduction		

Name: _____ Group: _____ Date: _____

(continued)

Electrical function	Definition	Example
Insulation		
Protection		
Control		
Transformation of energy		

3. Give three examples of forms of energy that can be obtained from the transformation of electrical energy.

_____

_____

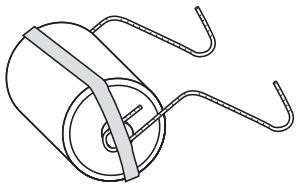
Name: _____ Group: _____ Date: _____

MATERIALS

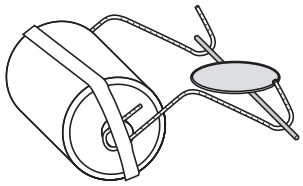
- D battery
- wide elastic band
- 2 large metal paper clips (modified for this lab)
- 7-coil solenoid
- permanent magnet
- piece of cardboard

PROCEDURE

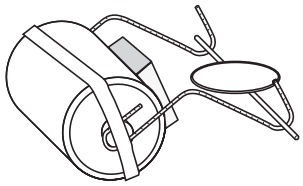
1. Assemble an electric motor, following steps *a)* to *d)*:
   a) Attach a modified paper clip to each terminal of the battery with the elastic band, as shown below.



   b) Place the solenoid in the hooks formed by the paper clips.



   c) Place the magnet on the battery as shown below so that the solenoid begins to rotate. If necessary, tap gently on the solenoid to get it started.



   d) Adjust the motor parts so that the solenoid rotates constantly.
2. Let the solenoid rotate for at least one minute without stopping.
3. With your index finger, touch the paper clip lightly near the point where it meets the negative terminal of the battery. Record the sensation you experience.
4. Place the piece of cardboard between the paper clip and the negative terminal of the battery. Record the reaction of the solenoid.
5. Remove the piece of cardboard. Set the solenoid in motion again.
6. Carefully remove the magnet from the battery. Record the reaction of the solenoid.
7. Put away the materials.

Name: _____ Group: _____ Date: _____

OBSERVATIONS

1. When you touched the paper clip, what did you feel?

_____

2. What happened when you placed the piece of cardboard between the paper clip and the negative terminal of the battery?

_____

3. What happened when you removed the magnet from the battery?

_____

REFLECTING ON YOUR OBSERVATIONS

1. Among the steps in the procedure you performed, what showed you that:

a) electrical energy is required for the motor to work?

_____

_____

b) magnetic energy is required for the motor to work?

_____

2. In the electric motor you built, electrical energy was transformed into two other forms of energy. In the table below, write these two forms of energy and the observations that led you to identify them.

Form of energy	Conclusive observation

3. Complete the table below by identifying the electrical function of each component of the electric motor.

Component	Electrical function
Battery	
Paper clips	
Elastic	
Rotor (rotating solenoid)	