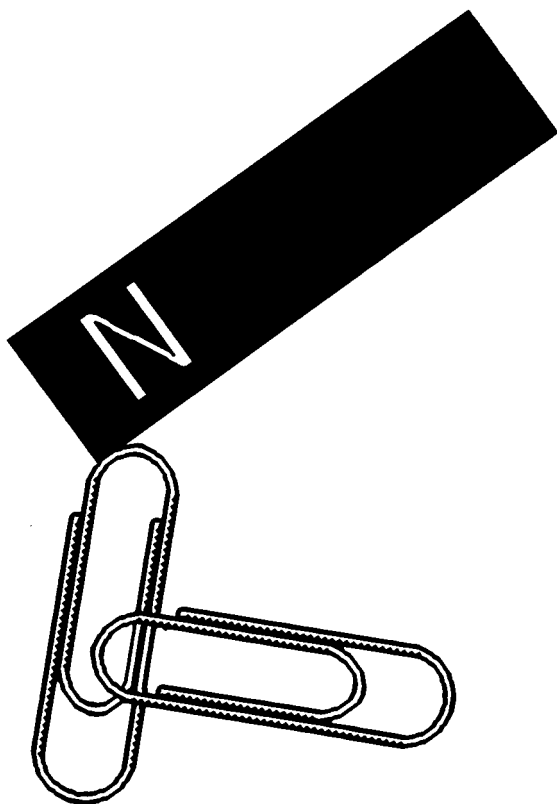


MAGNETISM

FROM
JUNIOR ELECTRICIAN
UNIT OF STUDY

INSTRUCTOR'S GUIDE



Magnetism

from
Junior Electrician
A Unit of Study

catalog #2665

Instructor's Guide

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PROGRAM OVERVIEW

This live-action video unit of study is designed for use at the primary level through fourth grade.

This video traces the history of the magnet from early Greeks discovering the lodestone to the use of magnetism for high speed trains. Properties of magnetism are demonstrated. The relationship between magnetism and electricity is explored.

STUDENT OBJECTIVES

After viewing the video and participating in the lesson activities, the students should be able to do the following:

- State that iron and steel are attracted to magnets.
- Recognize the lines of force between two magnets facing each other.
- Identify that the poles or ends of a magnet have the greatest force and that like poles of a magnet repel each other and unlike poles attract each other.
- Recognize that the earth has a magnetic field around it.

VIDEO PRESENTATION

Magnetism has always had a magical quality. It is an invisible force that interacts with only certain things. It can be used to defy laws of gravity or move objects across a table. Tell the class that today's video will help them to understand some of the key ideas and principles associated with magnets.

Show the video.

FOLLOW-UP DISCUSSION

1. The earth has a magnetic field around it. Compasses are used for navigation because the north-seeking side of the compass is attracted to the earth's magnetic north. Magnetic north is not located at geographic north. In fact, magnetic north wanders a bit but is located in the Hudson Bay area of Canada. Scientists have found that about every 500,000 years the two magnetic poles flip. That means the poles actually reverse.

2. The magnetic field around our planet protects us from exposure to the harmful radiation of space.

FOLLOW-UP ACTIVITIES

1. Activity sheet, WORD SEARCH

There are nine words from the video hidden throughout the word search.

2. Activity sheet, FILL-IN

This activity sheet is a review of the main ideas from the video. Students fill in the blank spaces with words provided at the bottom of the page.

3. Activity sheet, WHAT DO MAGNETS ATTRACT?

Students are asked to test different objects to see which ones are attracted to a magnet.

4. Activity sheet, CAN MAGNETISM GO THROUGH OBJECTS?

Students perform an experiment to find out which objects magnets can work through.

5. Activity sheet, COMPASS CONSTRUCTION

This experiment gives directions for making a simple compass.

6. Activity sheet, LINES OF FORCE

This experiment shows the invisible lines of force around magnets as they interact with other magnets.

FOLLOW-UP ACTIVITIES continues

7. Activity sheet, ELECTROMAGNETS

This experiment describes how a working electromagnet can be constructed.

8. Activity sheet, LESSON QUIZ

This is the quiz for this lesson.

PROJECTS

1. Electromagnets are used in a number of ways. Have students find out how electromagnets are used in phones, junk yards, hair dryers, doorbells, etc.

2. Many countries are developing electromagnetic trains that use magnets and electricity to speed along the track. Have some interested students find out about this new form of transportation.

ANSWER KEY

1. WORD SEARCH

M L D I M W T W E N E W
I H G A E Z O T Z J N H
Z Q O R C O I L C Q E P
U Q R P O T U A Y C M Q
T D N C E N E R A T O R
B O E N L V R P V C Z T
G H G W E A R H O Y V X
E A K C C O I R D V M K
M I K F C E G Y W H F G
A N R O R E B H O P B Z
G S M A O O E D H H N T
N L J S M X P L H V M K
E G Q B A M O X L J Z J
T T T W G G J A E F Y J
I A R O N H O V U X C C
S Q I R E T N D S X C C
H C O P T R R D E S L H

ANSWER KEY continued

2. FILL-IN

Over 2,000 years ago the Greeks discovered a special stone that could pick up small bits of iron. The stone was called a lodestone and was made of magnetite. It is possible to make a magnet if we rub a permanent magnet across either iron or steel nails. If these magnetized nails are dropped or heated they will lose their magnetism. It was found that an electric current flowing through a wire would make magnetic effects. An electromagnet is made by coiling an electric wire around an iron nail. The magnetism can be controlled by turning the electricity on and off. A generator is used to make electricity by spinning coiled wire in a magnetic field.

3. WHAT DO MAGNETS ATTRACT?

Magnets attract things made of iron or steel.

4. CAN MAGNETISM GO THROUGH OBJECTS?

Students should find that the magnet is still effective through glass, wood, plastic, paper, and many other things. The thickness of the material and the strength of the magnet determines whether the magnet will still effect an iron object on the other side.

ANSWER KEY continued

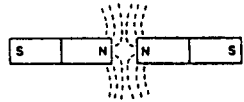
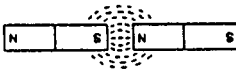
5. COMPASS CONSTRUCTION

Observations:

1. It should settle down and point north.
2. The needle and cork should eventually stop spinning and point north again.

Conclusion: The magnetized needle is attracted to magnetic north and will move to a position that allows it to point north.

6. LINES OF FORCE



Conclusion: When opposite poles of the magnets are brought close to each other, the lines of force are obviously pulling towards each other. When the poles of the two magnets are identical, the lines push apart.

7. ELECTROMAGNETS

Observations:

1. No
2. Yes
3. The magnetism went away so the paper clips fell.

Conclusion: The electromagnet needs electricity to work.

ANSWER KEY continued

8. QUIZ

Part A

1. electricity
2. poles
3. repel
4. attract
5. lodestones

Part B

1.



2. An electromagnet can be turned on and off. The magnetic force can be controlled.

3. Electromagnets are used in doorbells for pulling and releasing the clapper arm. They are used at junk yards for lifting heavy objects such as cars. They can be found in telephone receivers.

4. The magnets would repel each other. They would want to move apart because the same poles are facing each other.