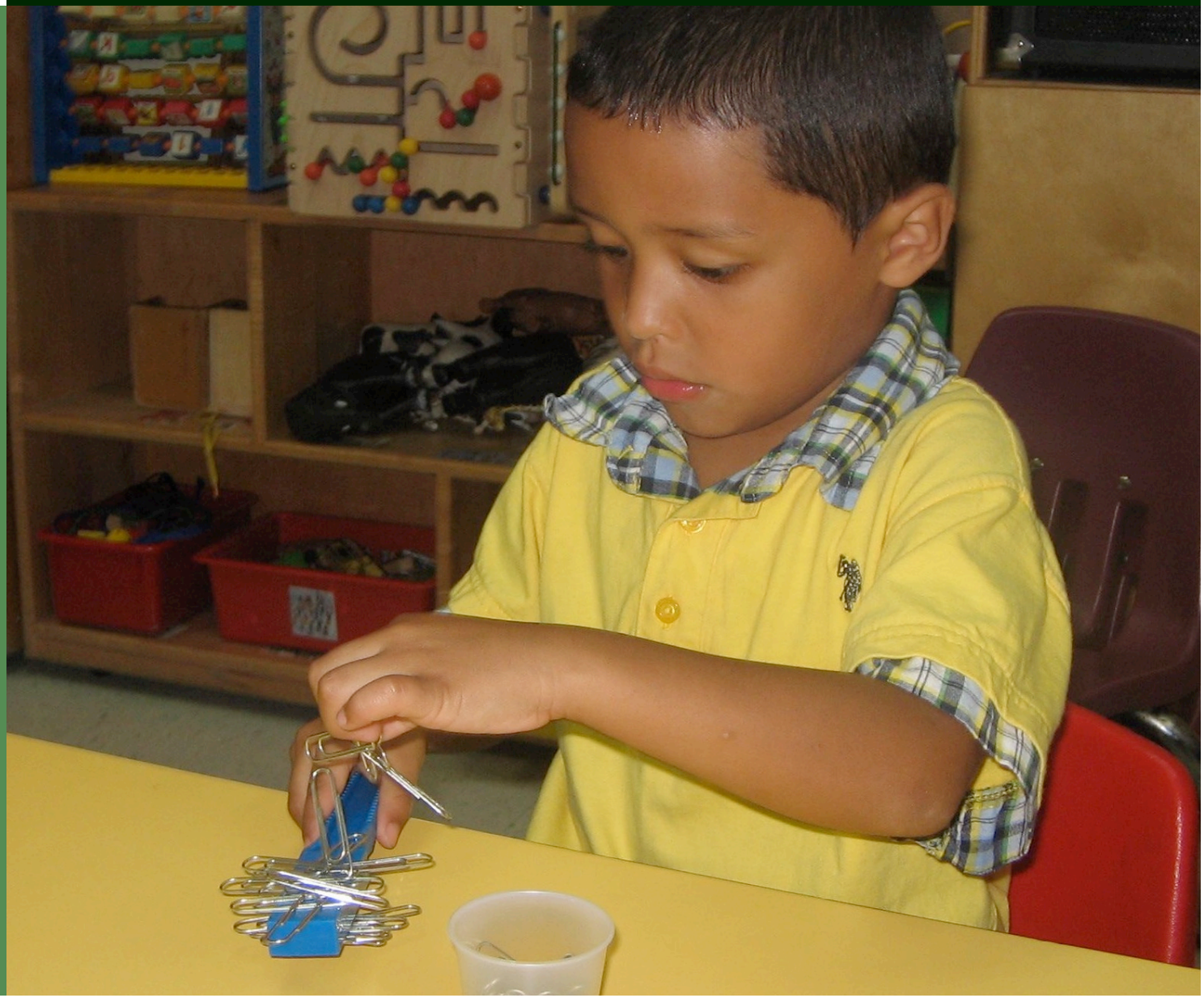
ECHOS®

Early Childhood
Hands-On Science

Magnificent Magnets



Acknowledgements

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Early Childhood Hands-On Science (ECHOS) is supported by the Institute of Education Sciences, U.S. Department of Education, through Grant R305A100275 to the Phillip and Patricia Frost Museum of Science. The opinions expressed herein are those of the authors and do not necessarily represent the position of the U.S. Department of Education.

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Contents

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Overview

Overall Goal: Children engage in investigative activities that encourage them to explore how magnets interact with common magnetic and nonmagnetic objects.

Lesson	Objective	Vocabulary	Key Concepts	Tools
#1: What Does a Magnet Do?	Children will classify objects as magnetic or nonmagnetic.	attract horseshoe magnet magnet magnetic/nonmagnetic pull	• Magnets pull, or attract, some objects. • An object that is magnetic can pull, or attract, a magnet. • Objects that are not attracted by a magnet are called nonmagnetic.	magnets
#2: Mighty Magnets	Children will explore magnets and classify their magnetic strength.	magnetic force strength strong/stronger	• Some magnets are stronger than other magnets. • Magnets come in many different shapes and sizes.	magnets
#3: Push and Pull	Children will learn about the push and pull of magnetic force.	bar magnet push/pushed repel/repelled	• Magnets can push, or repel, each other. • Magnetic force is invisible. You cannot see it or touch it. • Magnetic force can attract or repel without directly touching an object.	magnets
#4: Powerful Forces	Children will test and compare magnetic strength and force.	force between material thin thick	• Magnetic force is all around a magnet. • Some magnetic forces are stronger than others and can work through layers of various materials.	magnets

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Science Process Skills

Science Process Skills	Lesson #1	Lesson #2	Lesson #3	Lesson #4
Observing				
Identifies object properties	●	●	●	●
Uses senses to observe concrete, familiar objects	●	●	●	●
Differentiates between models and the real thing			●	
Uses measurement tools to record observations		●		
Uses tools to observe objects or events	●	●	●	●
Describing				
Describes key attributes of objects	●	●	●	●
Creates drawings or models depicting objects				
Describes changes in objects				
Discusses changes in variables that affect an investigation		●		
Categorizing				
Notices similarities and differences	●	●	●	
Sorts objects into groups using one attribute at a time	●			
Establishes own sorting criteria				
Sorts objects using multiple attributes				
Provides reasoning for grouping objects	●			
Predicting				
Verbalizes thinking	●	●	●	●
Recognizes and extends patterns	●			
Makes simple predictions	●	●	●	●
Makes predictions based on observations		●	●	●
Uses estimation to make quantitative predictions				
Experimenting				
Investigates models of objects/phenomena			●	
Manipulates materials	●	●	●	●
Identifies factors that might affect the outcome of an experiment		●		●
Participates in collecting data		●		
Interprets data using symbols or graphs	●	●		
Performs trial-and-error investigations			●	●
Drawing Conclusions				
Makes verbal interpretations of observations	●	●	●	●
Finds patterns from data collected	●	●	●	●
Connects findings from an investigation	●	●	●	●

Magnificent Magnets

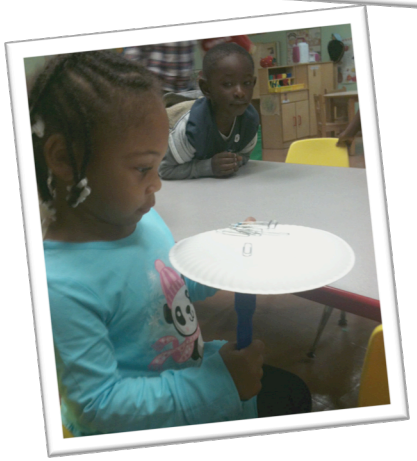
Lessons at a Glance

In ***What Does a Magnet Do?***, children classify various everyday objects as either magnetic or nonmagnetic, make predictions about a horseshoe magnet's ability to pull, or attract, objects, and then test their predictions. Simple sorting cards guide children as they classify the objects that are or are not attracted by a magnet wand.

In ***Mighty Magnets,*** children classify magnets by magnetic strength. First they observe a large horseshoe magnet pick up a pile of not one, but many paperclips. Can another magnet with a different size and shape do the same thing? An investigation about comparing magnetic strengths helps the children find out.

In ***Push and Pull,*** children experience the "push" and "pull" of magnetic force. They use a bar magnet to move a magnetic toy train both forward and backward along a track. Turning the magnets one way pushes the train forward; turning the magnet the other way pulls the train back. Children try to use magnetic force to move their train all the way across the table.

In ***Powerful Forces***, children conduct an investigation to determine how magnetic force can work through another object. In the investigation, they find out how many paper plates are needed to keep a magnetic force from picking up paper clips on the other side of the plate.



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Key Concepts

Whether playing with magnetic toys or exploring objects stuck to the refrigerator door, most children have experienced the pull of magnets. The magnetic property of certain objects to pull and "clink" together is easy to observe. However, to understand which materials are affected by magnets, as well as other important variables such as strength, distance, and direction of magnetic force, more careful observation is required. Although children will not develop a refined understanding of magnets until later years, ***Magnificent Magnets*** lays the foundation for these physical science concepts using magnetic and nonmagnetic materials in an engaging context.

- **Magnets** are objects that **attract** certain metals. Magnets can occur naturally or be manufactured. Objects that are attracted to magnets are called **magnetic**; objects not attracted to magnets are called **nonmagnetic**.

- Magnetic objects contain metals such as iron, cobalt, or nickel. These are found in objects like paper clips, key rings and refrigerator doors. Metallic objects without these metals, like brass keys, aluminum foil, and copper pennies, are nonmagnetic. Other examples of nonmagnetic materials are wood and plastic.

- Magnets come in a variety of sizes, shapes and strengths. Larger magnets are not necessarily stronger. A magnet's strength depends on the amount and type of magnetic material it contains. Magnetic strength can be measured by how much weight it can hold. Stronger magnets can hold more weight.

- Magnets have two magnetic poles (north and south); sometimes these are labeled N and S. If **like** poles are next to each other (north to north, or south to south), they will **repel** or **push away** from each other. If **opposite** poles face each other (north to south), they will attract or pull towards each other.

like poles repel

opposite poles attract

- As magnets are brought closer together, the **magnetic force** between them gets stronger. However, magnetic force can work at a distance, without the objects directly touching each other. Magnetic force can also work "through" another material, such as paper or glass. Stronger magnets can work through more layers of materials, thicker materials, and over longer distances than weaker magnets.

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Lesson Guide

TEACHER TALK

Teacher talk is indicated by **bold letters that appear in large print**. When you first start teaching ECHOS, you may need to rely heavily on this text to ensure that you are presenting the science concepts accurately. As you become familiar with the text, use it as a guide or refer to it only as needed. You should always read the entire script prior to delivering the lesson.

TEXT IN ALL CAPS

Text IN ALL CAPS appears throughout the script to emphasize a step or instructions given to children.

VOCABULARY WORDS

Vocabulary words are introduced during the lesson and reinforced in the Outcomes section.
They appear in ***red italic letters*** the first time they are introduced.

MATERIALS IN BLUE LETTERS

Materials listed in blue letters in the *Material Preparation* page, indicate materials that are non-consumable. Once acquired, these materials do not need to be replaced.

SCIENCE AREA

The last page of each lesson contains suggested materials that could be added to your science area. Before adding any materials for children's independent use, evaluate whether the item is safe to be explored with limited supervision. The science area should be a place that children use freely to explore and conduct their own trial and error experiments, rather than a display area.