MoSH

MAGNETS & MAGNETISM:
Suitcase Program [K-2]

TEACHER'S MANUAL

This Suitcase Program provides the materials and lesson plans for teachers of grades K-2 with content and activities increasing in difficulty by grade level. Activities in this Suitcase Exhibit may assist in meeting the Tennessee State Standards.

ACTIVITIES

TENNESSEE STATE STANDARDS FOR K-2

K.ETS2.1	Use appropriate tools (magnifying glass, rain gauge, basic balance scale) to make observations and answer testable questions.
1.ETS1.1	Solve scientific problems by asking testable questions, making short-term and long-term observations, and gathering information.
1.ETS2.1	Use appropriate tools (magnifying glass, basic balance scale) to make observations and answer testable questions.
2.PS2.1	Analyze the push or the pull that occurs when objects collide or are connected.
2.ETS2.1	Use appropriate tools to make observations, record data, and refine design ideas.

For the entire activity and materials and to reserve a Suitcase Exhibit, please call 901.636.2362.

ACTIVITY I: Magnetic Classroom

DURATION OF ACTIVITY: 30 minutes

LESSON OBJECTIVES
Students test familiar objects in the classroom to determine what is magnetic.

GUIDING QUESTION
Which objects, that you see every day, are magnetic?

TENNESSEE STATE STANDARDS

K.ETS1.1	Ask and answer questions about the scientific world and gather information using the senses.
1.ETS1.1	Solve scientific problems by asking testable questions, making short-term and long-term. observations, and gathering information.
2.ETS2.1	Use appropriate tools to make observations, record data, and refine design ideas.

MATERIALS INCLUDED
Book, **The Mystery of Magnets**
Ceramic ring magnets
See Supplementary Materials for:
3 charts labeled Observations, Wonderings and Learnings

MATERIALS PROVIDED BY TEACHER
None

For the entire activity and materials and to reserve a Suitcase Exhibit, please call 901.636.2362.

ACTIVITY II: Determining the Attraction

DURATION OF ACTIVITY: 45 minutes

LESSON OBJECTIVES

Students sort objects into groups that are magnetic and groups that are not magnetic.

GUIDING QUESTIONS

What types of objects are attracted to a magnet?

TENNESSEE STATE STANDARDS

K.ETS1.1	Ask and answer questions about the scientific world and gather information using the senses.
1.ETS1.1	Solve scientific problems by asking testable questions, making short-term and long-term observations, and gathering information.
2.ETS2.1	Use appropriate tools to make observations, record data, and refine design ideas.

MATERIALS INCLUDED

Paperclips
Steel washers
Large rubber bands
Poker chips
Large steel nails
Steel screws
Brass washers
Aluminum nails
White stone and hematite samples
Ceramic ring magnets
Book **The Mystery of Magnets**
Chart “Will a magnet work?”
(in Supplementary Materials)
Ceramic bar magnets
Lodestone
Film canister of staples
Book **Magnetism and Electricity**

MATERIALS PROVIDED BY TEACHER

3 charts from previous lesson, labeled:
Observations, Wonderings, Learnings
Paper for each student

For the entire activity and materials and to reserve a Suitcase Exhibit, please call 901.636.2362.

ACTIVITY III: Magnetic Interactions

DURATION OF ACTIVITY: 30 minutes

LESSON OBJECTIVES

The students explore permanent magnets. They discover that two magnets will either attract or repel, depending on their orientation.

GUIDING QUESTION

Why do magnets sometimes attract each other and other times repel each other?

TENNESSEE STATE STANDARDS

K.ETS1.1	Ask and answer questions about the scientific world and gather information using the senses.
1.ETS1.1	Solve scientific problems by asking testable questions, making short-term and long-term. observations, and gathering information.
2.ETS2.1	Use appropriate tools to make observations, record data, and refine design ideas.

MATERIALS INCLUDED

Dowel stands with 4 magnets each
Book **The Mystery of Magnets**
Steel bar magnets
Horseshoe magnets

MATERIALS PROVIDED BY TEACHER

3 charts from previous lesson, labeled:
Observations, Wonderings, Learnings

For the entire activity and materials and to reserve a Suitcase Exhibit, please call 901.636.2362.

ACTIVITY IV: The Force is With Us

DURATION OF ACTIVITY: 45 minutes

LESSON OBJECTIVES

Students make use of a balance to measure the force of attraction between two magnets. They also observe what happens when the distance between two magnets increases.

GUIDING QUESTIONS

How can we measure the force (magnetic fields) of two magnets?
What happens to magnetic force over distance?

TENNESSEE STATE STANDARDS

K.ETS1.1	Ask and answer questions about the scientific world and gather information using the senses.
1.ETS1.1	Solve scientific problems by asking testable questions, making short-term and long-term observations, and gathering information.
2.PS2.1	Analyze the push or the pull that occurs when objects collide or are connected.
2.ETS2.1	Use appropriate tools to make observations, record data, and refine design ideas.

MATERIALS INCLUDED

Balance and fulcrum bases
Plastic cups
Ceramic ring magnets
Blue post magnets
Poker chips
Steel washers

MATERIALS PROVIDED BY TEACHER

3 charts, from previous lesson, labeled: Observations, Wonderings, Learnings
Sheet of paper for each team with two columns labeled:
- "Predictions"
- "Tested Results"

For the entire activity and materials and to reserve a Suitcase Exhibit, please call 901.636.2362.

ACTIVITY V: Can Anything Stop the Force?

DURATION OF ACTIVITY: 45 minutes

LESSON OBJECTIVES

Students use a variety of materials to test the strength of magnetic fields.

GUIDING QUESTION

Can the magnetic force work through various materials?

TENNESSEE STATE STANDARDS

K.ETS1.1	Ask and answer questions about the scientific world and gather information using the senses.
1.ETS1.1	Solve scientific problems by asking testable questions, making short-term and long-term observations, and gathering information.
2.ETS2.1	Use appropriate tools to make observations, record data, and refine design ideas.

MATERIALS INCLUDED

Pressed wood squares
Plastic squares
Pieces of gold foil
Pieces of cloth
Plastic cups
Ceramic rings magnets
See Supplementary Materials for:
Chart “Will a magnet work through…?”

MATERIALS PROVIDED BY TEACHER

3 charts, from previous lesson, labeled:
Observations, Wonderings, Learnings
Container of water
Sheets of paper

For the entire activity and materials and to reserve a Suitcase Exhibit, please call 901.636.2362.

SUITCASE EXHIBIT INVENTORY CHECKLIST

School: _____
Check Out: _____
Return Date: _____

MoSH Check In:	Teacher Check In:	Item	Books/Videos/Posters	Teacher Return:
		A	Teacher's Manual	
		B	Book: The Mystery of Magnets	
		C	Book: Magnetism and Electricity	
		D	Book: Experiments with Magnets	
		E	Book: Science with Magnets	
		F	Book: Magnet Science	

SUITCASE EXHIBIT INVENTORY CHECKLIST

MoSH Check In:	Teacher Check In:	Item	Materials	Teacher Return:
		1	8 Horseshoe Magnets	
		2	14 6” Steel Bar Magnets	
		3	4 - Magnet on a Blue Post Magnets	
		4	12 Wand Magnets	
		5	30 Ceramic Ring Magnets	
		6	10 Cow Magnets	
		7	45 Magnetic Balls	
		8	13 Magnetic Pole Cards (6 Green “North” Cards, 6 Red “South” Cards & 1 “Earth”)	
		9	Clear container for water with lid	
		10	5 (Magnetite) Loadstone Boxes	
		11	20 Poker Chips	
		12	8 Steel Screws	
		13	8 Brass Washers	
		14	8 Large Aluminum Nails	
		15	15 Large Galvanized Nails	
		16	8 Large Rubber Bands	
		17	12 Small Compasses	
		18	Bag of Paper Clips	
		19	80 Large Steel Washers	
		20	8 White Stone and 8 Hematite Samples	
		21	2 Spools of String	
		22	6 Rectangular Iron Filings Boxes	
		23	8 Pieces of Gold Colored Aluminum Foil	
		24	8 Pieces of Cloth	
		25	8 Pressed Wood Squares	
		26	8 Plastic Squares	
		27	5 3-D Magnetic Field Visualizers	
		28	15 Dowel Stands with 4 Magnets each	
		29	5 Ceramic Bar Magnets	
		30	4 Sets of Balance and Fulcrum Base	
		31	22 Plastic Cups	