MoSH

MAGNIFIERS:
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.PS1.1 Plan and conduct an investigation to describe and classify different kinds of materials including wood, plastic, metal, cloth, and paper by their observable properties (color, texture, hardness, and flexibility) and whether they are natural or human-made.

K.PS1.2 Conduct investigations to understand that matter can exist in different states (solid and liquid) and has properties that can be observed and tested.

K.LS1.2 Recognize differences between living and non-living materials and sort them into groups by observable physical attributes.

K.LS1.3 Explain how humans use their five senses in making scientific findings.

K.LS3.1 Make observations to describe that young plants and animals resemble their parents.

K.ETS1.1 Ask and answer questions about the scientific world and gather information using the senses.

K.ETS2.1 Use appropriate tools (magnifying glass, rain gauge, basic balance scale) to make observations and answer testable questions.

1.LS1.1 Recognize the structure of plants (roots, stems, leaves, flowers, fruits) and describe the function of the parts (taking in water and air, producing food, making new plants).

1.LS1.2 Illustrate and summarize the life cycle of plants.

1.LS1.3 Analyze and interpret data from observations to describe how changes in the environment cause plants to respond in different ways.

1.LS2.2 Obtain and communicate information to classify plants by where they grow (water, land) and the plant's physical characteristics.

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.LS1.1 Use evidence and observations to explain that many animals use their body parts and senses in different ways to see, hear, grasp objects, protect themselves, move from place to place, and seek, find, and take in food, water, and air.

2.LS1.2 Obtain and communicate information to classify animals (vertebrates-mammals, birds, amphibians, reptiles, fish, invertebrates-insects) based on their physical characteristics.

2.LS1.3 Use simple graphical representations to show that species have unique and diverse life cycles.

2.LS3.1 Use evidence to explain that living things have physical traits inherited from parents and that variations of these traits exist in groups of similar organisms.

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

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MAGNIFIERS: Suitcase Program [K-2]

ACTIVITY I: What is Magnification?

DURATION OF ACTIVITY: 45 minutes

LESSON OBJECTIVES
Students explore the concepts of lenses, magnification, and refraction.

GUIDING QUESTION
What is magnification?

TENNESSEE STATE STANDARDS

K.LS1.2	Recognize differences between living organisms and non-living materials and sort them into groups by observable physical attributes.
K.ETS1.2	Describe objects accurately by drawing and/or labeling pictures.
K.ETS2.1	Use appropriate tools (magnifying glass, rain gauge, basic balance scale) to make observations and answer testable scientific questions.
1.ETS2.1	Use appropriate tools (magnifying glass, basic balance scale) to make observations and answer testable scientific questions.
.ETS2.1	Use appropriate tools to make observations, record data, and refine design ideas.
2.ETS2.2	Predict and explain how human life and the natural world would be different without current technologies.

MATERIALS INCLUDED
Magnifying glasses
Optical lens wipe
Fingerprint Identification posters
Magnifying sheet
Pennies

MATERIALS PROVIDED BY TEACHER
Pencils
Paper
Transparent tape – ¾ works best
Printed paper – newspaper will work
Leaves

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MAGNIFIERS: Suitcase Program [K-2]

ACTIVITY II: Parts of a Plant

DURATION OF ACTIVITY: 45 minutes

LESSON OBJECTIVES

Students use magnifiers to observe plants. They describe and identify the parts of a plant.

GUIDING QUESTION

How can magnifiers help you learn about plants?

TENNESSEE STATE STANDARDS

K.LS1.1	Use information from observations to identify differences between plants and animals (locomotion, obtainment of food, and take in air/gasses).
K.LS1.2	Recognize differences between living organisms and non-living materials and sort them into groups by observable physical attributes.
K.LS3.1	Make observations to describe that young plants and animals resemble their parents.
K.ESS3.1	Use a model to represent the relationship between the basic needs (shelter, food, water) of different plants and animals (including humans) and the places they live.
K.ETS1.1	Ask and answer questions about the scientific world and gather information using the senses.
K.ETS1.2	Describe objects accurately by drawing and/or labeling pictures.
K.ETS2.1	Use appropriate tools (magnifying glass, rain gauge, basic balance scale) to make observations and answer testable scientific questions.
1.LS1.1	Recognize the structure of plants (roots, stems, flowers, fruits) and describe the functions of the parts (taking in water and air, producing food, making new plants).
1.LS2.3	Recognize how plants depend on their surroundings and other living things to meet their needs in the places they live.
1.ETS2.1	Use appropriate tools (magnifying glass, basic balance scale) to make observations and answer testable scientific questions.

MATERIALS INCLUDED

Magnifiers
Optical lens wipe
Botany Flip Chart
6 Plant Word Cards

MATERIALS PROVIDED BY TEACHER

Fresh, live flowers
Live plant
Poster paper
Crayons
Pencils
Markers
Glue

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

ACTIVITY III: Observing and Describing Seeds

DURATION OF ACTIVITY: 45 minutes

LESSON OBJECTIVES
Using magnifiers and four of the five senses, students observe, draw, describe and discuss four seeds.

GUIDING QUESTION
What are the differences and similarities among seeds?

TENNESSEE STATE STANDARDS

K.LS1.3	Explain how humans use their five senses in making scientific findings.
K.LS3.1	Make observations to describe that young plants and animals resemble their parents.
K.ESS3.1	Use a model to represent the relationship between the basic needs (shelter, food, water) of different plants and animals (including humans) and the places they live.
K.ETS2.1	Use appropriate tools (magnifying glass, rain gauge, basic balance scale) to make observations and answer testable scientific questions.
1.LS1.1	Recognize the structure of plants (roots, stems, leaves, flowers, fruits) and describe the function of the parts (taking in water and air, producing food, making new plants).
1.LS1.3	Analyze and interpret data from observations to describe how changes in the environment cause plants to respond in different ways.
1.LS2.1	Conduct an experiment to show how plants depend on air, water, minerals from soil, and light to grow and thrive.
1.LS2.2	Obtain and communicate information to classify plants by where they grow (water, land) and the plant's physical characteristics.
1.LS2.3	Recognize how plants depend on their surroundings and other living things to meet their needs in the places they live.
1.ETS2.1	Use appropriate tools (magnifying glass, basic balance scale) to make observations and answer testable scientific questions.
2.LS3.1	Use evidence to explain that living things have physical traits inherited from parents and that variations of these traits exist in groups of similar organisms.

MATERIALS INCLUDED
Magnifiers
Optical lens wipe
4 containers of seeds
Petri dishes

MATERIALS PROVIDED BY TEACHER
Glue
Poster paper
Markers
Pencils

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MAGNIFIERS: Suitcase Program [K-2]

ACTIVITY IV: Observing Insects with Magnifiers

DURATION OF ACTIVITY: 45 minutes

LESSON OBJECTIVES

Students observe bees with and without magnifiers. They compare and contrast what they see.

GUIDING QUESTION

How does a magnifier help you see the different parts of a bee?

TENNESSEE STATE STANDARDS

K.LS1.1	Use information from observations to identify differences between plants and animals (locomotion, obtainment of food, and take in air/gasses).
K.ETS1.1	Ask and answer questions about the scientific world and gather information using the senses.
K.ETS2.1	Use appropriate tools (magnifying glass, rain gauge, basic balance scale) to make observations and answer testable scientific 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 scientific questions.
2.LS1.1	Use evidence and observations to explain that many animals use their body parts and senses in different ways to see, hear, grasp objects, protect themselves, move from place to place, and seek, find, and take in food, water, and air.
2.LS1.2	Obtain and communicate information to classify animals (vertebrates-mammals, birds, amphibians, reptiles, fish, invertebrates-insects) based on their physical characteristics.
2.LS2.1	Develop and use models to compare how animals depend on their surroundings and other living things to meet their needs in the places they live.
2.ETS2.1	Use appropriate tools to make observations, record data, and refine design ideas.

MATERIALS INCLUDED

Magnifiers
Optical lens wipe
8 bees in magnifying boxes
8 bees in non-magnifying boxes
Inflatable bee
Insects poster
Bee Activity Sheets

MATERIALS PROVIDED BY TEACHER

Drawing paper
Pencils
Crayons and/or markers

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

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MAGNIFIERS: Suitcase Program [K-2]

ACTIVITY V: Observing Feathers with Magnifiers

DURATION OF ACTIVITY: 45 minutes

LESSON OBJECTIVES

Students use magnifiers to learn details about an object and how magnifiers help us see the complexity of familiar objects.

GUIDING QUESTIONS

What covers the outside of a bird's body? Each feather is made up of smaller parts, what are these parts and what is their function?

TENNESSEE STATE STANDARDS

K.LS1.1	Use information from observations to identify differences between plants and animals (locomotion, obtainment of food, and take in air/gasses).
K.ETS1.1	Ask and answer questions about the scientific world and gather information using the senses.
K.ETS2.1	Use appropriate tools (magnifying glass, rain gauge, basic balance scale) to make observations and answer testable scientific 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 scientific questions.
2.LS1.1	Use evidence and observations to explain that many animals use their body parts and senses in different ways to see, hear, grasp objects, protect themselves, move from place to place, and seek, find, and take in food, water, and air.
2.LS1.2	Obtain and communicate information to classify animals (vertebrates-mammals, birds, amphibians, reptiles, fish, invertebrates-insects) based on their physical characteristics.
2.LS2.1	Develop and use models to compare how animals depend on their surroundings and other living things to meet their needs in the places they live.
2.ETS2.1	Use appropriate tools to make observations, record data, and refine design ideas.

MATERIALS INCLUDED

Magnifiers
Optical lens wipe
Big blue zipper board
2 Wing feathers
2 Tail feathers
4 Down feathers
5 Body feathers
Display mount with different feather types
Poster - Backyard Birds of North America

MATERIALS PROVIDED BY TEACHER

Drawing paper
Pencils
Crayons and/or markers

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

ACTIVITY VI: Observing Fur with Magnifiers

DURATION OF ACTIVITY: 45 minutes

LESSON OBJECTIVES
Students compare and contrast six different types of fur/hair, using magnifiers.

GUIDING QUESTIONS
What is fur and what is its purpose? Are there different kinds of fur? Is fur made up of smaller parts?

TENNESSEE STATE STANDARDS

K.LS1.1	Use information from observations to identify differences between plants and animals (locomotion, obtainment of food, and take in air/gasses).
K.ETS1.1	Ask and answer questions about the scientific world and gather information using the senses.
K.ETS2.1	Use appropriate tools (magnifying glass, rain gauge, basic balance scale) to make observations and answer testable scientific 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 scientific questions.
2.LS1.1	Use evidence and observations to explain that many animals use their body parts and senses in different ways to see, hear, grasp objects, protect themselves, move from place to place, and seek, find, and take in food, water, and air.
2LS1.2	Obtain and communicate information to classify animals (vertebrates-mammals, birds, amphibians, reptiles, fish, invertebrates-insects) based on their physical characteristics.
2.LS2.1	Develop and use models to compare how animals depend on their surroundings and other living things to meet their needs in the places they live.
2.ETS2.1	Use appropriate tools to make observations, record data, and refine design ideas

MATERIALS INCLUDED
Magnifiers
Optical lens wipe
Mammals poster
Photographs of elk, beaver, deer, raccoon, red fox, bison, sheep
7 fur swatches
Polar bear hair, human hair
Ball of knitting wool, wool sock

MATERIALS PROVIDED BY TEACHER
Drawing paper
Pencils
Crayons and/or markers

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ACTIVITY VII: Dirt in the Air

DURATION OF ACTIVITY: 45 minutes

LESSON OBJECTIVES

Using magnifiers, the students observe the accumulation of particulate matter over several days.

GUIDING QUESTIONS

Is there pollution in the air? Can it be seen with a magnifier?

TENNESSEE STATE STANDARDS

K.PS1.1	Plan and conduct an investigation to describe and classify different kinds of materials including wood, plastic, metal, cloth, and paper by their observable properties (color, texture, hardness, and flexibility) and whether they are natural or human-made.
K.PS1.2	Conduct investigations to understand that matter can exist in different states (solid and liquid) and has properties that can be observed and tested.
K.LS1.2	Recognize differences between living organisms and non-living materials and sort them into groups by observable physical attributes.
K.LS1.3	Explain how humans use their five senses in making scientific findings.
K.ETS1.1	Ask and answer questions about the scientific world and gather information using the senses.
K.ETS2.1	Use appropriate tools (magnifying glass, rain gauge, basic balance scale) to make observations and answer testable scientific questions.
1.LS1.3	Analyze and interpret data from observations to describe how changes in the environment cause plants to respond in different ways.
1.LS2.1	Conduct an experiment to show how plants depend on air, water, minerals from soil, and light to grow and thrive.
1.LS2.3	Recognize how plants depend on their surroundings and other living things to meet their needs in the places they live.
1.ETS2.1	Use appropriate tools (magnifying glass, basic balance scale) to make observations and answer testable scientific questions.
2.LS2.1	Develop and use models to compare how animals depend on their surroundings and other living things to meet their needs in the places they live.
2.LS2.2	Predict what happens to animals when the environment changes (temperature, cutting down trees, wildfires, pollution, salinity, drought, land preservation).
2.ETS2.1	Use appropriate tools to make observations, record data, and define design ideas.

MATERIALS INCLUDED

Magnifiers – hand & table top
Optical lens wipe
Book: **The Lorax**
Red lids
2 plastic Experiment Boxes A & B

MATERIALS PROVIDED BY TEACHER

Colored markers
White papers

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Suitcase Program [K-2]

SUITCASE EXHIBIT INVENTORY CHECKLIST

School: _____
Check Out: _____
Return Date: _____

MoSH Check In:	Teacher Check In:	Item	Books/Videos/Posters	Teacher Return:
		A	Teachers Guide	
		B	Book: You Can Use a Magnifying Glass	
		C	Book: The Lorax	
		D	Botany Flip Chart	
		E	Color Photograph: Beaver	
		F	Color Photograph: Fox	
		G	Color Photograph: Deer	
		H	Color Photograph: Raccoon	
		I	Color Photograph: Elk	
		J	Color Photograph: Sheep	
		K	Color Photograph: Bison	
		L	Fingerprint id Poster with all 8 images	
		M	Fingerprint id Poster: “Arch”	
		N	Fingerprint id Poster: “Tented Arch”	
		O	Fingerprint id Poster: “Loop”	
		P	Fingerprint id Poster: “Double Loop”	
		Q	Fingerprint id Poster: “Whorl”	
		R	Fingerprint id Poster: “Double Pocket Whorl”	
		S	Fingerprint id Poster: “Mixed”	
		T	Fingerprint id Poster: “Accidental”	
		U	Poster: “Insects”	
		V	Poster: “Mammals”	
		W	Poster: “Backyard Birds of North America”	

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MAGNIFIERS:
Suitcase Program [K-2]

SUITCASE EXHIBIT INVENTORY CHECKLIST

MoSH Check In:	Teacher Check In:	Item	Materials	Teacher Return:
		1	5 Loose Body Feathers	
		2	5 Loose Down Feathers	
		3	2 Loose Tail Feathers	
		4	2 Loose Wing Feathers	
		5	Big Blue Zipper Board	
		6	Table Top Magnifier	
		7	Display Mount with Different Feather Types	
		8	Display Mount with Polar Bear Hair	
		9	Display Mount with Human Hair	
		10	8 Bees in Clear Magnifying Boxes	
		11	8 Bees in Clear Non-Magnifying Boxes	
		12	8 Empty Magnifier Boxes	
		13	Jar of Grass Seeds	
		14	Jar of Peas	
		15	Jar Pumpkin Seeds	
		16	Jar of Kidney Beans	
		17	Container of Toothpicks	
		18	(1 film canister containing) 30 pennies	
		19	2 Pairs Blue Plastic Tweezers	
		20	Ball of Knitting Wool	
		21	6 Plant Word Cards	
		22	15 Clear Plastic Petri Dishes	
		23	7 Red Plastic Lids	
		24	10 Small Magnifying Glasses	
		25	10 Large Magnifying Glasses	
		26	Swatch: Beaver	
		27	Swatch: Fox	
		28	Swatch: Deer	
		29	Swatch: Raccoon	
		30	Swatch: Elk	
		31	Swatch: Sheep	
		32	Swatch: Bison	
		33	Inflatable Bee	
		34	Wool Sock	