

TEACHER'S MANUAL

This Suitcase Program provides the materials and lesson plans for teachers of grades 3-5 with content and activities increasing in difficulty by grade level. Activities in this Suitcase Exhibit may assist in meeting the Tennessee State Standards.

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TENNESSEE STATE STANDARDS FOR 3-5

- 5.ETS2.2 Describe how human beings have made tools and machines (X-ray cameras, microscopes, satellites, computers) to observe and do things that they could not sense or do at all, or as quickly or efficiently.
- 5.ETS2.3 Identify how scientific discoveries lead to new and improved technologies.

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

ACTIVITY I: The Magnifying Power of Water

DURATION OF ACTIVITY: 45-50 minutes

LESSON OBJECTIVES

Students will make a magnifying lens from a few drops of water and observe that objects seen through a magnifying lens look bigger than they really are.

Students will learn the words associated with magnifiers.

GUIDING QUESTION

How do magnifiers work and how can water magnify objects?

TENNESSEE STATE STANDARDS

- 3.PS1.1 Describe the properties of solids, liquids, and gases and identify that matter is made up of particles too small to be seen.
- 3.ETS2.1 Identify and demonstrate how technology can be used for different purposes.
- 4.PS4.3 Investigate how lenses and digital devices like computers or cell phones use waves to enhance human senses.
- 5.ETS2.2 Describe how human beings have made tools and machines (X-ray cameras, microscopes, satellites, computers) to observe and do things that they could not sense or do at all, or as quickly or efficiently.
- 5.ETS2.3 Identify how scientific discoveries lead to new and improved technologies.

MATERIALS INCLUDED

Paper plates
Plastic food wrap
Eye dropper
Plastic cups
Jar of salt

MATERIALS PROVIDED BY TEACHER

Scissors
Tape
Water

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

ACTIVITY II: Getting to Know the Microscope & Magiscope

DURATION OF ACTIVITY: Two 15-minute parts, 30 minutes total

LESSON OBJECTIVES

Students learn the parts of the microscope and each part's purpose. Students will learn how to use the Magiscope and the proper technique for using prepared slides.

GUIDING QUESTION

How do microscopes help us see the complexity of everyday objects?

TENNESSEE STATE STANDARDS

- 3.ETS2.1 Identify and demonstrate how technology can be used for different purposes.
- 5.ETS2.2 Describe how human beings have made tools and machines (X-ray cameras, microscopes, satellites, computers) to observe and do things that they could not sense or do at all, or as quickly or efficiently.
- 5.ETS2.3 Identify how scientific discoveries lead to new and improved technologies.

MATERIALS INCLUDED

Microscopes
Magiscopes
Poster of the Microscope
Prepared slides

MATERIALS PROVIDED BY TEACHER

None

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

ACTIVITY III: Preparing a Wet-Mount Slide & Using the Microscope

DURATION OF ACTIVITY: Two 15-minute parts, 30 minutes total

LESSON OBJECTIVES

Students learn the techniques for using a microscope. Students make a wet-mount slide. Students make scientific observations and recognize spatial relationships under the microscope.

GUIDING QUESTION

How can a microscope help us investigate the tiny world of objects and organisms we could not observe without the aid of magnification?

TENNESSEE STATE STANDARDS

- 3.ETS2.1 Identify and demonstrate how technology can be used for different purposes.
- 5.ETS2.2 Describe how human beings have made tools and machines (X-ray cameras, microscopes, satellites, computers) to observe and do things that they could not sense or do at all, or as quickly or efficiently.
- 5.ETS2.3 Identify how scientific discoveries lead to new and improved technologies.

MATERIALS INCLUDED

Microscopes
Box of disposable microscope slides & cover slips
Droppers
Forceps
Magazine pages
Prepared slides of the "letter e"

MATERIALS PROVIDED BY TEACHER

Water

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

ACTIVITY IV: Using the Microscope to Observe Animal & Plant Cells

DURATION OF ACTIVITY: 50 minutes

LESSON OBJECTIVES

Students use a microscope to observe cells. Students discover the differences between plant and animal cells.

GUIDING QUESTION

What can a microscope help us learn about cells and the differences between plant and animal cells?

TENNESSEE STATE STANDARDS

- 3.ETS2.1 Identify and demonstrate how technology can be used for different purposes.
- 5.ETS2.2 Describe how human beings have made tools and machines (X-ray cameras, microscopes, satellites, computers) to observe and do things that they could not sense or do at all, or as quickly or efficiently.
- 5.ETS2.3 Identify how scientific discoveries lead to new and improved technologies.

MATERIALS INCLUDED

Microscopes
Box of disposable microscope slides & cover slips
Prepared slides of onion skin, potato, and cheek cells
Toothpicks
Iodine
Methylene blue
Foam model of plant cell
Foam model of animal cell
Student sets of Specimen Fact Cards

MATERIALS PROVIDED BY TEACHER

Potato
Onion
Utility knife

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

ACTIVITY V: Developing Microscope Skills: More Animal & Plant Skills

DURATION OF ACTIVITY: 50 minutes

LESSON OBJECTIVES

Students use a microscope to observe and compare animal and plant cells.

GUIDING QUESTIONS

What are the similarities and differences between animal and plant cells?

TENNESSEE STATE STANDARDS

5.ETS2.2 Describe how human beings have made tools and machines (X-ray cameras, microscopes, satellites, computers) to observe and do things that they could not sense or do at all, or as quickly or efficiently.

MATERIALS INCLUDED

Microscopes
Box of disposable microscope slides & cover slips
Prepared slides of **Elodea** leaf, frog blood, and cheek cells
Toothpicks
Dropper
Methylene blue
Foam model of plant cell (optional)
Foam model of animal cell (optional)
Student sets of Specimen Fact Cards

MATERIALS PROVIDED BY TEACHER

None

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	Teacher Resource Packet	
		C	Book: Microscopes and Magnifying Lenses	
		D	Book: The World of the Microscope	
		E	Poster: Plant and Animal Cell	
		F	Info Sheet: Plant & Animal Cells. Teacher's Guide	

SUITCASE EXHIBIT INVENTORY CHECKLIST

MoSH Check In:	Teacher Check In:	Item	Materials	Teacher Return:
		1	Wolfe compound light microscope	
		2	Wolfe compound light microscope	
		3	Wolfe compound light microscope	
		4	Wolfe compound light microscope	
		5	Magiscope	
		6	Magiscope	
		7	Magiscope	
		8	Magiscope	
		9	Magiscope	
		10	Magiscope	
		11	Magiscope objectives and eyepiece: (1) 10 x magnification eyepiece, (1) 4 x objective, (1) 10 x objective	
		12	Magiscope objectives and eyepiece: (1) 10 x magnification eyepiece, (1) 4 x objective, (1) 10 x objective	
		13	Magiscope objectives and eyepiece: (1) 10 x magnification eyepiece, (1) 4 x objective, (1) 10 x objective	
		14	Magiscope objectives and eyepiece: (1) 10 x magnification eyepiece, (1) 4 x objective, (1) 10 x objective	
		15	Magiscope objectives and eyepiece: (1) 10 x magnification eyepiece, (1) 4 x objective, (1) 10 x objective	
		16	Magiscope objectives and eyepiece: (1) 10 x magnification eyepiece, (1) 4 x objective, (1) 10 x objective	
		17	Prepared specimen slide set – 8 slides	
		18	Prepared specimen slide set – 8 slides	
		19	Prepared specimen slide set – 8 slides	
		20	Prepared specimen slide set – 8 slides	
		21	Prepared specimen slide set – 8 slides	
		22	Prepared specimen slide set – 8 slides	
		23	Prepared specimen slide set – 8 slides	
		24	Prepared specimen slide set – 8 slides	
		25	Prepared specimen slide set – 8 slides	
		26	Prepared specimen slide set – 8 slides	
		27	Disposable slides, coverslips and lens paper – 1 box	
		28	10 Water droppers	
		29	10 Tweezers	
		30	10 Forceps	
		31	Toothpicks – 1 box	

		32	10 Thin Metric Rulers	
		33	Table Salt – 1 jar	
		34	Scissors & 3 spools of Colored Thread	
		35	Pencil Sharpener	
		36	Bamboo Stick	
		37	4 Corks	
		38	Paper Plates (about 40)	
		39	4 Plastic Cups	
		40	Plastic Wrap- 1 box	
		41	Methylene Blue (1 bottle)	
		42	Iodine (1 bottle)	
		43	4 Magazine Pages	
		44	Animal Cell Model (2 piece)	
		45	Plant Cell Model (2 piece)	
		46	Extra Prepared Specimen Slide Set (34 different slides)	