

# TEACHER'S MANUAL

This Suitcase Program provides the materials and lesson plans for teachers of grades 6-8 with content and activities increasing in difficulty by grade level. Activities in this Suitcase Exhibit may assist in meeting the Tennessee State Standards.

## ACTIVITIES

<b>ACTIVITY I:</b> Getting to Know the Microscope	2
<b>ACTIVITY II:</b> Using the Microscope to Observe Animal & Plant Cells	3
<b>ACTIVITY III:</b> Developing Microscope Skills: More Animal & Plant Cells	4
<b>ACTIVITY IV:</b> Inside an Onion Skin & Stains	5
<b>ACTIVITY V:</b> Pond Water Exploration	6
<b>INVENTORY CHECKLIST</b>	7

## TENNESSEE STATE STANDARDS FOR 6-8

7.LS1.1	Develop and construct models that identify and explain the structure and function of major cell organelles as they contribute to the life activities of the cell and organism.
7.LS1.2	Conduct an investigation to demonstrate how the cell membrane maintains homeostasis through the process of passive transport.
7.LS1.3	Evaluate evidence that cells have structural similarities and differences across kingdoms.
7.LS1.8	Construct an explanation demonstrating that the function of mitosis for multicellular organisms is for growth and repair through the production of genetically identical daughter cells.
7.LS3.2	Distinguish between mitosis and meiosis and compare the resulting daughter cells.

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

## **ACTIVITY I: Getting to Know the Microscope**

**DURATION OF ACTIVITY:** Three 15-minute parts, 45 minutes total

### **LESSON OBJECTIVES**

Students learn the parts of the microscope and the basic techniques for its use. Students make a wet-mount slide. Students make scientific observations and recognize spatial relationships under the microscope.

### **GUIDING QUESTION**

How do we operate microscopes?

### **TENNESSEE STATE STANDARDS**

7.LS1.1      Develop and construct models that identify and explain the structure and function of major cell organelles as they contribute to the life activities of the cell and organism.

### **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 II: Using the Microscope to Observe Animal & Plant Cells**

**DURATION OF ACTIVITY:** 45-50 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**

- 7.LS1.1 Develop and construct models that identify and explain the structure and function of major cell organelles as they contribute to the life activities of the cell and organism.
- 7.LS1.2 Conduct an investigation to demonstrate how the cell membrane maintains homeostasis through the process of passive transport.
- 7.LS1.3 Evaluate evidence that cells have structural similarities and differences across kingdoms.
- 7.LS1.8 Construct an explanation demonstrating that the function of mitosis for multicellular organisms is for growth and repair through the production of genetically identical daughter cells.
- 7.LS3.2 Distinguish between mitosis and meiosis and compare the resulting daughter cells.

### **MATERIALS INCLUDED**

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

### **MATERIALS PROVIDED BY TEACHER**

Potato  
Utility knife

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

## **ACTIVITY III: Developing Microscope Skills: More Animal & Plant Cells**

**DURATION OF ACTIVITY:** 40 minutes

### **LESSON OBJECTIVES**

Students will practice making wet mount slides for examination under the microscope.  
Students will study five cell parts: cytoplasm, nucleus, chloroplasts, cell wall, and cell membrane.

### **GUIDING QUESTION**

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

### **TENNESSEE STATE STANDARDS**

- 7.LS1.1 Develop and construct models that identify and explain the structure and function of major cell organelles as they contribute to the life activities of the cell and organism.
- 7.LS1.2 Conduct an investigation to demonstrate how the cell membrane maintains homeostasis through the process of passive transport.
- 7.LS1.3 Evaluate evidence that cells have structural similarities and differences across kingdoms.

### **MATERIALS INCLUDED**

Microscopes  
Box of disposable microscope slides & cover slips  
Prepared slides of **Elodea** leaf & frog blood  
Dropper  
Methylene blue  
Pencil Sharpener  
Bamboo stick  
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.

## **ACTIVITY IV: Inside an Onion Skin & Stains**

**DURATION OF ACTIVITY:** 30 minutes

### **LESSON OBJECTIVES**

Students will observe onion skin cells and identify the major parts of the cell, concentrating on the features of plant cells.

Students will also observe the difference between unstained and stained specimens.

### **GUIDING QUESTIONS**

What is unique about plant cells? How do color stains help us study specimens?

### **TENNESSEE STATE STANDARDS**

- 7.LS1.1 Develop and construct models that identify and explain the structure and function of major cell organelles as they contribute to the life activities of the cell and organism.
- 7.LS1.2 Conduct an investigation to demonstrate how the cell membrane maintains homeostasis through the process of passive transport.
- 7.LS1.3 Evaluate evidence that cells have structural similarities and differences across kingdoms.

### **MATERIALS INCLUDED**

Microscopes  
Box of disposable slides and cover slips  
Eye droppers  
Toothpicks  
Tweezers  
Methylene blue  
Student sets of Specimen Fact Cards

### **MATERIALS PROVIDED BY TEACHER**

Onion  
Water

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

## ACTIVITY V: Pond Water Exploration

**DURATION OF ACTIVITY:** 50 minutes

### LESSON OBJECTIVES

Students use a sample of pond water to create microscope slides and observe the microscopic life in a pond.

### GUIDING QUESTION

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

### TENNESSEE STATE STANDARDS

- 7.LS1.1 Develop and construct models that identify and explain the structure and function of major cell organelles as they contribute to the life activities of the cell and organism.
- 7.LS1.2 Conduct an investigation to demonstrate how the cell membrane maintains homeostasis through the process of passive transport.
- 7.LS1.3 Evaluate evidence that cells have structural similarities and differences across kingdoms.

### MATERIALS INCLUDED

Microscopes  
Box of disposable slides and cover slips  
Box of depressed slides (reusable)  
Pond water  
Prepared slides of **amoeba proteus**, **spirogyra**,  
bacteria, **protozoa**, **hydra** and **paramecium**  
Iodine  
Eye droppers  
Forceps  
Pond Water Specimen Fact Cards (student and teacher set)

### 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)	