

# 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 are designed to meet Tennessee State Standards.

## ACTIVITIES

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## TENNESSEE STATE STANDARDS FOR K-2

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.ESS2.1	Analyze and interpret weather data (precipitation, wind, temperature, cloud cover) to describe weather patterns that occur over time (hourly, daily) using simple graphs, pictorial weather symbols, and tools (thermometer, rain gauge).
K.ESS2.2	Develop and use models to predict weather and identify patterns in spring, summer, autumn, and winter.
K.ESS3.2	Explain the purpose of weather forecasting to prepare for, and respond to, severe weather in Tennessee.
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 questions.
1.PS3.1	Make observations to determine how sunlight warms Earth's surfaces (sand, soil, rocks, and water).
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.ESS1.1	Recognize that some of Earth's natural processes are cyclical while other have a beginning and an end. Some events happen quickly, while others occur slowly over time.
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: What is Weather?

**DURATION OF ACTIVITY:** 60 minutes on first day, then 15 minutes per day for 4 days

### LESSON OBJECTIVES

Students will observe the weather daily and record their observations. These observations will be recorded at the end of the week on a master chart. Students will also assemble weather collages using magazine and calendar photos of different weather conditions.

### GUIDING QUESTIONS

What is weather? What are seasons? What is temperature? How do weather and the seasons affect our daily lives?

### TENNESSEE STATE STANDARDS

- K.ESS2.1 Analyze and interpret weather data (precipitation, wind, temperature, cloud cover) to describe weather patterns that occur over time (hourly, daily) using simple graphs, pictorial weather symbols, and tools (thermometer, rain gauge).
- K.ESS2.2 Develop and use models to predict weather and identify patterns in spring, summer, autumn, and winter.
- 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.
- 1.ESS1.3 Analyze data to predict patterns between sunrise and sunset, and the change of seasons.
- 1.ETS1.1: Solve scientific problems by asking testable questions, making short-term and long-term observations, and gathering information.
- 2.ESS1.1 Recognize that some of Earth's natural processes are cyclical, while others have a beginning and an end. Some events happen quickly, while others occur slowly over time.
- 2.ETS2.1 Use appropriate tools to make observations, record data, and refine design ideas.

### MATERIALS INCLUDED

Demonstration Thermometer  
Chart, School Days Forecast  
Dry erase markers  
Poster, The Weather  
Poster, Clouds  
Poster, Types of Precipitation  
Poster, The Water Cycle, Nature's Recycling System  
Set of laminated Weather Symbols, for use with Forecast Charts  
Key to Weather Symbols, in Supplementary Materials

### MATERIALS PROVIDED BY TEACHER

Scotch tape  
A 12 x 18-inch sheet of construction paper for each child  
A ruler for each child  
Coloring materials  
Poster boards, glue sticks, old magazines and calendars to cut up, scissors, markers

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

## ACTIVITY II: Clouds

**DURATION OF ACTIVITY:** 2 days, 60 minutes each

1st Day: Warm-up and Part A

2nd Day: Parts B and C

### LESSON OBJECTIVES

Students will observe clouds, perform an experiment to make a cloud, and make cotton models of four different types of clouds.

### GUIDING QUESTIONS

What are clouds and how are they formed?

### TENNESSEE STATE STANDARDS

- K.ESS2.1 Analyze and interpret weather data (precipitation, wind, temperature, cloud cover) to describe weather patterns that occur over time (hourly, daily) using simple graphs, pictorial weather symbols, and tools (thermometer, rain gauge).
- 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
- 1.ESS1.2 Observe natural objects in the sky that can be seen from Earth with the naked eye and recognize that telescope, used as a tool, can provide greater detail of objects in the sky.
- 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

Plastic canister  
Glass bowl (needs to be chilled)  
Baggies  
Poster, "The Cloud Chart"  
Poster, "Clouds"  
Poster, "The Water Cycle, Nature's Recycling System"  
Book Plus Science Models/Puzzle CLOUD  
Books, Staub, Frank, *The Kids' Book of Clouds & Sky*  
4 cloud worksheets: In the Supplementary Materials Section

### MATERIALS PROVIDED BY TEACHER

Matches  
Hot water  
Cracked ice  
Rolls of cotton  
Blue construction paper  
Glue  
Black markers

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

## ACTIVITY III: Rainfall and Moisture

### DURATION OF ACTIVITY

Part A: 30 minutes 1<sup>st</sup> day, then 15 minutes per day for the next 4 days  
Parts B and C: 30 minutes each.

### LESSON OBJECTIVES

Part A: Students will help make a rain gauge and use it to measure rainfall.

Part B: Students will observe how water vapor condenses on a glass of ice water.

Part C: Students will observe how hot water vapor condenses on a cold bowl.

### GUIDING QUESTIONS

What causes rain? Where does moisture in the air come from? How do we measure rainfall?

### TENNESSEE STATE STANDARDS

- K.ESS2.1 Analyze and interpret weather data (precipitation, wind, temperature, cloud cover) to describe weather patterns that occur over time (hourly, daily) using simple graphs, pictorial weather symbols, and tools (thermometer, rain gauge).
- 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.ESS1.3 Analyze data to predict patterns between sunrise and sunset, and the change of seasons.
- 1.ETS1.1 Solve scientific problems by asking testable questions, making short-term and long-term observations, and gathering information.
- 2.ESS1.1 Recognize that some of Earth's natural processes are cyclical, while others have a beginning and an end. Some events happen quickly, while others occur slowly over time.
- 2.ETS2.1 Use appropriate tools to make observations, record data, and refine design ideas.

### MATERIALS INCLUDED

Six Way Weather meter  
Poster, "The Water Cycle"  
Poster, "The Water Cycle, Nature's Recycling System"  
Book, Down Comes the Rain, by Franklin M. Brantley  
Marbles  
Plastic canister  
Glass jar  
Glass bowl (needs to be chilled)

### MATERIALS PROVIDED BY TEACHER

Optional: Umbrella, raincoat, rain hat, rain boots  
Clear 2-liter plastic soda bottle  
Colored tape  
Scissors  
Ruler  
Water  
Ice

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

## ACTIVITY IV: Wind and Storms

**DURATION OF ACTIVITY:** 30 minutes each part (A and B)

### LESSON OBJECTIVES

Part A: Students will assist in “making a tornado” in a 2-liter bottle.

Part B: Students will make different storm sounds using a variety of objects.

### GUIDING QUESTIONS

What causes wind? What causes strong winds that result in dangerous storms, such as tornadoes? How can you tell a storm is coming by observing the clouds? Why do storms make noise?

### TENNESSEE STATE STANDARDS

- K.ESS2.2 Develop and use models to predict weather and identify patterns in spring, summer, autumn, and winter.
- K.ESS3.2 Explain the purpose of weather forecasting to prepare for, and respond to, severe weather in Tennessee.
- 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.PS4.2 Use tools and materials to design and build a device to understand that light and sound travel in waves and can send signals over a distance.
- 2.ESS1.1 Recognize that some of Earth’s natural processes are cyclical, while others have a beginning and an end. Some events happen quickly, while others occur slowly over time.
- 2.ESS2.2 Observe and analyze how blowing wind and flowing water can move Earth materials (soil, rocks) from one place to another, changing the shape of a landform and affecting the habitats of living things.

### MATERIALS INCLUDED

Book, **Feel the Wind Book, Twisters and Other Terrible Storms** (Grades 1-4)  
Tornado Tube  
Food coloring  
Chopsticks  
Plastic  
Plastic canisters  
Book, **Nature Activities: Weather Watcher** by Woodward, John

### MATERIALS PROVIDED BY TEACHER

2 plastic bottles the same size (16 oz., 1-liter or 2-liter)  
Water  
Glitter  
Balloons for each student  
Plastic containers to beat on (for rain)  
Old cookie sheets  
Rocks or pebbles

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

## **ACTIVITY V: Forecasting & How Weather Affects You: Dressing for the Seasons**

**DURATION OF ACTIVITY:** about 60 minutes

### **LESSON OBJECTIVE**

Students will match pieces of clothing to the appropriate season.

### **GUIDING QUESTIONS**

How do scientists predict the weather? How does the weather affect you every day?

### **TENNESSEE STATE STANDARDS**

- K.ESS2.1 Analyze and interpret weather data (precipitation, wind, temperature, cloud cover) to describe weather patterns that occur over time (hourly, daily) using simple graphs, pictorial weather symbols, and tools (thermometer, rain gauge).
- K.ESS2.2 Develop and use models to predict weather and identify patterns in spring, summer, autumn, and winter.
- K.ESS3.2 Explain the purpose of weather forecasting to prepare for, and respond to, severe weather in Tennessee
- K.ETS1.1 Ask and answer questions about the scientific world and gather information using the senses.
- 1.ESS1.3 Analyze data to predict patterns between sunrise and sunset, and the change of seasons.
- 1.ETS1.1 Solve scientific problems by asking testable questions, making short-term and long-term observations, and gathering information.
- 2.ETS1.1 Define a simple problem that can be solved through the development of a new or improved object or tool by asking questions, making observations, and gather accurate information about a situation people want to change.
- 2.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**

Six-way Weather Meter  
Barometer Anemometer  
Demonstration Thermometer  
Book, **Feel the Wind Book, Twisters and Other Terrible Storms** (Grades 1-4)  
Book, *The Kids' Book of Weather Forecasting*  
Book, **Weather!** by Rebecca Rupp  
Poster, "The Water Cycle" Poster, "The Water Cycle, Nature's Recycling System"  
Posters, "Clouds" & Poster, "Types of Precipitation"

### **MATERIALS PROVIDED BY TEACHER**

Different articles of clothing for different seasons

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: Milliken Transparencies	
		C	Book: Eyewitness Books Weather	
		D	Book: The Kid's Book of Clouds	
		E	Book: The Kid's Book of Weather Forecasting	
		F	Book: Feel the Wind	
		G	Book: Down Comes the Rain	
		H	Book: Weather!	
		I	Book: Nature Activities Weather Watcher	
		J	Pamphlet: Weather Boy Scouts of America merit badge series	
		K	Book: Magic Tree House-Twisters	
		L	Poster: The Weather	
		M	Poster: Water Cycle: Nature's Recycling System	
		N	Poster: Cloud Chart	
		O	Poster: Types of Clouds	
		P	Poster: Weather Forecasting maps	
		Q	Poster: Types of Precipitation	
		R	Poster: Earth's Atmosphere	
		S	Poster: Water Cycle	
		T	Poster: Clouds	
		U	Chart: School Days Forecast	
		V	Chart: Today's Weather	
		W	Booklet: Wild Weather (goes with NOVA videos)	
		X	Video: NOVA Tornado	
		Y	Video: NOVA Hurricane	
		Z	Video: NOVA Lightning	

**SUITCASE EXHIBIT INVENTORY CHECKLIST**

MoSH Check In:	Teacher Check In:	Item	Materials	Teacher Return:
		1	Demonstration thermometer	
		2	Six-way weather meter	
		3	Clamp (for six- way weather meter)	
		4	2 sets of plastic canisters with lids	
		5	Science model: Cloud (book plus)	
		6	Compact scale	
		7	2 enameled rectangular pans	
		8	10 Metal thermometers (water cycle kit)	
		9	10 clear containers with slotted lids (water cycle kit)	
		10	5 Metal cans (water cycle kit)	
		11	2 plastic spoons (water cycle kit)	
		12	sponge (water cycle kit)	
		13	Hygrometer	
		14	Tongs	
		15	Weather symbols (set of 61)	
		16	5 Sheets of removable stickers	
		17	Inflatable catch ball	
		18	Balloons (bag)	
		19	Marbles	
		20	Bubbles	
		21	Red food coloring	
		22	Rubber gloves	
		23	Bamboo skewers	
		24	Chopsticks- 1 set	
		25	Dry erase markers- set of 4	
		26	Stopwatch	
		27	Glass bowl	
		28	Small ceramic cup	
		29	Barometer	
		30	10 Sling psychrometers	
		31	Compasses	
		32	8 Digital thermometers	
		33	2 Black jar lids	
		34	Container of wire nuts	
		35	10 laboratory thermometers on white plastic	
		36	Tornado tubes	
		37	Anemometer	
		38	Box of rock salt	
		39	5 plastic plates	
		40	32 clothespins	
		41	Talcum powder	
		42	Package of paper plates	
		43	Box of baggies	
		44	Bag of rubber bands	
		45	Wind Wizard wind speed indicator	
		46	Saran Wrap	