MoSH

THE SUN & THE MOON:
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

1.PS3.1	Make observations to determine how sunlight warms Earth's surfaces (sand, soil, rocks, and water).
1.ESS1.1	Use observations or models of the sun, moon, and stars to describe patterns that can be predicted.
1.ESS1.2	Observe natural objects in the sky that can be seen from Earth with the naked eye, and recognize that a telescope, used as a tool, can provide greater detail of objects in the sky.
1.ESS1.3	Analyze data to predict patterns between sunrise and sunset and the change of seasons.
1.ETS2.1	Use appropriate tools (magnifying glass, basic balance scale) to make observations and answer testable questions.

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

ACTIVITY I: Moon Story

DURATION OF ACTIVITY: 45 minutes

LESSON OBJECTIVES

This storytelling activity uses a short poem about the moon to teach students that the Moon is a sphere, and we always see the same side of the "moonball". The students will learn that when we look at a sphere we are only able to see a circle (or a "face"). From night to night the Moon might look different, but it is always the same Moon.

GUIDING QUESTION

Why do we only see one side of the Moon?

TENNESSEE STATE STANDARDS

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.PS4.1	Use a model to describe how light is required to make objects visible. Summarize how illumination could be from an external light source or by an object giving off its own light.
1.ESS1.1	Use observations or models of the sun, moon, and stars to describe patterns that can be predicted.
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.

MATERIALS INCLUDED

Moon Poster

MATERIALS PROVIDED BY TEACHER

Small Styrofoam balls, one for each student
Art supplies to make a face and a "behind" on the Styrofoam moons

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

ACTIVITY II: The Shadow Knows…

DURATION OF ACTIVITY: 15 minutes per day for 1 month

LESSON OBJECTIVES

In this activity, students will demonstrate how the length of a shadow is affected by the apparent path of the Sun - shorter in winter, longer in summer. They will measure the shadow cast by a stationary meter stick, record the measurements and collect data over a period of at least 1-2 months.

GUIDING QUESTIONS

What causes your shadow to change in size at different times of the day? Will the shadow be the same at all times of the year? Why? Are shadows the same in every part of the world? Why?
How can shadows help you tell time?

TENNESSEE STATE STANDARDS

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.PS4.1	Use a model to describe how light is required to make objects visible. Summarize how illumination could be from an external light source or by an object giving off its own light.
1.ESS1.1	Use observations or models of the sun, moon, and stars to describe patterns that can be predicted.
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: *Moonbear's Shadow*
60-watt bulb, in fixture, no shade
Extension cord
Compass
Student activity sheets, in Supplementary Material Section of Teacher's Manual

MATERIALS PROVIDED BY TEACHER

Meter stick
Butcher paper (about 6' x 4')
Tape
Markers or crayons
Book: **Peter Pan** (Optional)

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

ACTIVITY III: The Earth Moves Around the Sun

DURATION OF ACTIVITY: 60 minutes

LESSON OBJECTIVES

The students will build simple sundials to demonstrate that the movement of the Sun causes shadows which can be used to help tell the time of day.

GUIDING QUESTIONS

How can shadows help you tell time? Will the shadows move? Why?
What are the shadows on your sundial similar to? What else is moving besides the shadows?
Are the shadows the same size? What makes the shadows' size change?

TENNESSEE STATE STANDARDS

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.PS4.1	Use a model to describe how light is required to make objects visible. Summarize how illumination could be from an external light source or by an object giving off its own light.
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

Stick (to be used as gnomon)
1 flower pot or a sturdy cardboard paper plate

MATERIALS PROVIDED BY TEACHER

Modeling clay

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

ACTIVITY IV: Comparing Times of the Day

DURATION OF ACTIVITY: 40 minutes

LESSON OBJECTIVES

Students will demonstrate that the movement of the Earth causes day and night. A classroom activity with a world globe and a light source will be reinforced by stories, actual observation of the Sun and student drawings. Students will make daily observations of the Sun in the morning or evening and illustrate what they see.

GUIDING QUESTIONS

When is it time to sleep? When is it time to wake up? Where is the Sun at night?
Why is it nighttime at some places of the Earth and day time at other places?
Does the Sun rise and set at the same time and at the same location?
What patterns can we observe from the sunrise and sunset?

TENNESSEE STATE STANDARDS

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.

MATERIALS INCLUDED

60-watt light - no shade
Extension cord

MATERIALS PROVIDED BY TEACHER

World globe
Small dot or cut-out figure to represent the student
Drawing paper, crayons, markers
Books: **Night is Coming** and **Where Does the Sun Go at Night?** or other books about the change from day to night.

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

ACTIVITY V: Sensing Energy

DURATION OF ACTIVITY: 50 minutes

LESSON OBJECTIVES

Students will explore the unseen energy produced by the Sun, using a variety of materials, such as UV detection beads and sunblock. They will perform experiments to help them understand that light has components that are both visible and invisible to our eyes, that exposure to light can be measured and controlled and that exposure to light can change the properties of an object.

GUIDING QUESTIONS

What types of energy does the Sun produce? How can we sense different types of solar radiation?

TENNESSEE STATE STANDARDS

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.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

5 or 6 Ultraviolet Detection Beads per child
9 empty, opaque film canisters per group
Colored filters
A white piece of cloth
A black piece of cloth
A baseball cap
Paper clips
Plastic wrap
A paintbrush or sponge
Sunglasses
Sunscreen (SPF 5 or 8, and 30)
Flashlight
UV filter kits
UV beads detector tubes

MATERIALS PROVIDED BY TEACHER

Water
UV eyeglasses (not included but may be purchased; must be extremely careful using)
Drawing materials
Lamps, overhead projector, a grow-light for plants (optional)

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

ACTIVITY VI: Sunspotter Activities

DURATION OF ACTIVITY: 40 minutes each

LESSON OBJECTIVES

By looking at the Sunspotter screen, students can view sunspots on the Sun and observe how the Sun appears to move in the sky due to Earth's rotation.

GUIDING QUESTIONS

What is a sunspot? Why does the sun appear to move in the sky?

TENNESSEE STATE STANDARDS

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 a 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

Sunspotter telescope and manual
Sun layer puzzle

MATERIALS PROVIDED BY TEACHER

White paper
Pencils
Drawing materials

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

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SUITCASE EXHIBIT INVENTORY CHECKLIST

School: _____
Check Out: _____
Return Date: _____

MoSH Check In:	Teacher Check In:	Item	Books/Videos/Posters	Teacher Return:
		A	Teacher's Guide	
		B	Book: The Moon	
		C	Book: A Look At The Sun	
		D	Book: The Sun	
		E	Book: The Moon	
		F	Book: Moonbear's Shadow	
		G	Poster: The Moon (Poster)	
		H	2 Posters: Moon Phases H.1: 9 illustrations H.2 8 illustrations	
		I	Lunar Photographs -8	
		J	Poster- The Sun	

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SUITCASE EXHIBIT INVENTORY CHECKLIST

MoSH Check In:	Teacher Check In:	Item	Materials	Teacher Return:
		1	Segmented Hoops – 10 ©Encyclopedia Brittanica, Inc.	
		2	Ping-Pong Balls – 31	
		3	Sun Layer Puzzle (7 pieces)	
		4	Sunspotter	
		5	Sun/Moon Cross Sections 2 items	
		6	Classroom Thermometers - 5	
		7	Solar Motion Model	
		8	Ball Caps -2	
		9	Kite String	
		10	Compass	
		11	35 pennies, in canister	
		12	Skewer sticks	
		13	Aluminum foil	
		14	Plastic wrap	
		15	Stick	
		16	Flower pot	
		17	Rope	
		18	60-watt light bulb and stand	
		19	Sun block - 2 (SPF 15 & SPF 30)	
		20	Sunglasses - 2	
		21	Touch N See Squares - 5	
		22	Film canisters - 36	
		23	UV Filter Kit - 2 filters (transparent & opaque)	
		24	UV beads	
		25	Stickers	
		26	Flashlights - 2 with batteries	
		27	5 Protractor sets - 5 protractors/5 drawing compasses	
		28	Tape measure in meters	
		29	Sun Clock & Solar Motion Demonstrator	
		30	Solar bag	
		31	Compasses – 5	
		32	Extension cord	
		33	Thermometers - 9	
		34	6 Styrofoam balls/6 pencils	
		35	Color filters - 8	
		36	Paper clips (box)	
		37	Toothpicks - 2 containers	
		38	Black & white cloth squares	
		39	UV Beads Detector Tubes - 9	
		40	Sponges - 4	
		41	Tennis Balls - 5	

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