

TEACHER'S MANUAL

This Suitcase Program provides the materials and lesson plans for teachers of grades 5-6 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 5-6

5.PS2.1	Test the effects of balanced and unbalanced forces on the speed and direction of motion of objects.
5.PS2.3	Use evidence to support that the gravitational force exerted by Earth on objects is directed toward the Earth's center.
5.ETS1.1	Research, test, re-test, and communicate a design to solve a problem.
5.ETS1.2	Plan and carry out tests on one or more elements of a prototype in which variables are controlled and failure points are considered to identify which elements need to be improved.
5.ETS2.1	Use appropriate measuring tools, simple hand tools, and fasteners to construct a prototype of a new or improved technology.

- 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 otherwise sense or do at all, or as quickly or efficiently.
- 6.PS3.2 Construct a scientific explanation of the transformation between potential and kinetic energy.
- 6.PS3.3 Analyze and interpret data to show the relationship between kinetic energy and the mass of an object and its speed.
- 6.LS2.6 Research the ways in which an ecosystem has changed over time in response to changes in physical conditions, population balances, human interactions, and natural catastrophes.

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

UNIT I: Defining an Earthquake

LEVEL 3: Energy Waves Cause Earthquakes

ACTIVITY I: Wet Wave Experience

DURATION OF ACTIVITY: 30 minutes

LESSON OBJECTIVES

Students will watch one demonstration and participate in one activity on elastic rebound, and apply the principle to an earthquake activity.

GUIDING QUESTION

What happens during a transfer of energy and how does that relate to an earthquake?

TENNESSEE STATE STANDARDS

- 5.ETS1.1 Research, test, re-test, and communicate a design to solve a problem.
6.PS3.2 Construct a scientific explanation of the transformation between potential and kinetic energy.

MATERIALS INCLUDED

Master 8, Elastic Rebound
Goggles

MATERIALS PROVIDED BY TEACHER

Overhead projector
Transparency made from Master 8, Elastic Rebound
Strip of 1/16th wood lath the size of a ruler, or a 1/4" dried stick about 1' long (about 30 cm)
Sink or basin large enough to hold wood
Water to fill basin

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

UNIT I: Defining an Earthquake

LEVEL 3: Energy Waves Cause Earthquakes

ACTIVITY II: It's Your Fault

DURATION OF ACTIVITY: 30 minutes?

LESSON OBJECTIVES

Students will demonstrate the phenomenon of fault creep, and distinguish it from earthquake activity.

GUIDING QUESTIONS

What happens when pieces of the Earth's crust move? What is the difference between the smooth movement that simulated fault creep and the buildup and sudden release of stress that caused them to stumble in the demonstration.

TENNESSEE STATE STANDARDS

- 5.PS2.1 Test the effects of balanced and unbalanced forces on the speed and direction of motion of objects.
- 6.PS3.2 Construct a scientific explanation of the transformation between potential and kinetic energy.

MATERIALS INCLUDED

Master 9, Dresser Drawers
Master 10a, Earthquake Terms

MATERIALS PROVIDED BY TEACHER

Overhead projector
Transparencies of Masters 9 and 10a
A sign saying either Block A or Block B
(students can make them and letter them neatly)
String or tape for affixing sign

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

UNIT I: Defining an Earthquake

LEVEL 3: Energy Waves Cause Earthquakes

ACTIVITY III: Visual Vocabulary

DURATION OF ACTIVITY: 30 minutes

LESSON OBJECTIVES

Guide children on an imaginary journey to the center of the Earth.

GUIDING QUESTION

What does the center of the Earth look like, and what might cause earthquakes?

TENNESSEE STATE STANDARDS

6.LS2.6 Research the ways in which an ecosystem has changed over time in response to changes in physical conditions, population balances, human interactions, and natural catastrophes.

MATERIALS INCLUDED

Master 10b, Earthquake Terms Worksheet

MATERIALS PROVIDED BY TEACHER

Overhead projector
Movie clips, video clip slides, filmstrip, or written eyewitness account(s) of earthquakes
Transparency made from Master 10b
Worksheets made from Master 10b
Colored pencils

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

UNIT I: Defining an Earthquake

LEVEL 3: Energy Waves Cause Earthquakes

ACTIVITY IV: Local Legends

DURATION OF ACTIVITY: 30 minutes

LESSON OBJECTIVES

Students will list some events that occur during an earthquake. Student will locate their own state on an outline map of the United States and determine from the study of epicenter maps if their local area and state have experienced earthquakes. Students will read and discuss earthquake legends and locate the place where each legend originated on an outline map of the world.

GUIDING QUESTION

Which of the states experience a lot of earthquakes? Which states experience very few or no earthquakes? According to the map, does our state experience a small, medium, or large number of earthquakes? What is the correlation between the origins of the legends and the density of the earthquake epicenters?

TENNESSEE STATE STANDARDS

5.ETS2.2

6.LS2.6

MATERIALS INCLUDED

Master 5, World Map
Master 11, U.S. Map with epicenters
Booklet of earthquake legends (See Appendix)

MATERIALS PROVIDED BY TEACHER

Overhead projector
Transparencies of Masters 5 and 11
World Map (or use Master 5, World Map)
For each student:
Booklet of legends
Worksheets made from Master 11

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

UNIT II: Why and Where Earthquakes Occur

LEVEL 3: Layers, Plates, and Quakes

ACTIVITY I: Crust to Core: A Pizza the Earth

DURATION OF ACTIVITY: 30 minutes

LESSON OBJECTIVES

Students will make a model of the layers of the Earth and be able to describe the composition of the layers and their interrelationships.

GUIDING QUESTIONS

What are the layers of the earth?

TENNESSEE STATE STANDARDS

5.ETS2.1 Use appropriate measuring tools, simple hand tools, and fasteners to construct a prototype of a new or improved technology.

MATERIALS INCLUDED

Master 15, A Pizza the Earth

MATERIALS PROVIDED BY TEACHER

Overhead projector

Transparency from Master 15

Transparency markers

For each student:

3 sheets of unlined paper, standard size

No. 2 pencil

Meter stick

Tape

Copies of Master 16, Graph of the Earth's Layers

Copies of Master 15 (optional)

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

UNIT II: Why and Where Earthquakes Occur

LEVEL 3: Layers, Plates, and Quakes

Activity II: Slide, Collide and Separate

DURATION OF ACTIVITY: 30 minutes?

LESSON OBJECTIVES

Students will model and describe the activity at the three major types of plate boundaries.

GUIDING QUESTIONS

What happens when lateral plates slide? What happens when continental crust slides, and when they are pushed together?

TENNESSEE STATE STANDARDS

- 5.PS2.1 Test the effects of balanced and unbalanced forces on the speed and direction of motion of objects.
- 6.PS3.2 Construct a scientific explanation of the transformation between potential and kinetic energy.
- 6.LS2.6 Research the ways in which an ecosystem has changed over time in response to changes in physical conditions, population balances, human interactions, and natural catastrophes.

MATERIALS INCLUDED

Master 17, Plate Boundaries Map

MATERIALS PROVIDED BY TEACHER

Overhead projector
For each student: Copies of Master 17
10 sheets of lined notebook paper or other
8 ½" X 11" sheets
One sheet of colored construction paper
Scissors
Transparent tape
Metric ruler

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

UNIT II: Why and Where Earthquakes Occur

LEVEL 3: Layers, Plates, and Quakes

Activity III: The History of Geography

DURATION OF ACTIVITY: 30 minutes

LESSON OBJECTIVES

Students will observe a demonstration of convection currents and relate the process to plate movement.

GUIDING QUESTION

What might cause the Earth's plates to move?

TENNESSEE STATE STANDARDS

6.PS3.3 Analyze and interpret data to show the relationship between kinetic energy and the mass of an object and its speed.

MATERIALS INCLUDED

Master 18, Convection Current and Plate Cross Section
Master 19, Formation and Break-up of Pangaea

MATERIALS PROVIDED BY TEACHER

Overhead projector
Transparencies made from Master 18 and Master 19
Materials and directions from Unit II, Level 2, Activity Four
World map or globe

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

UNIT II: Why and Where Earthquakes Occur

LEVEL 3: Layers, Plates, and Quakes

Activity IV: Flippin' through Pangaea

DURATION OF ACTIVITY: 30 minutes?

LESSON OBJECTIVES

Students will construct a model of continental movement from ancient time through the present and into the future.

GUIDING QUESTIONS

What changes do you see from the front to the back of your flip book? What do you think will happen to the continents in the future?

TENNESSEE STATE STANDARDS

6.LS2.6 Research the ways in which an ecosystem has changed over time in response to changes in physical conditions, population balances, human interactions, and natural catastrophes.

MATERIALS INCLUDED

Masters 20a through 20d

MATERIALS PROVIDED BY TEACHER

Copies of Masters 20a through 20d for each student
Scissors
Stapler

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

UNIT III: Physical Results of Earthquakes

LEVEL 3: Building Up and Breaking Down

ACTIVITY I: Mountain, Plain, and Plateau

DURATION OF ACTIVITY: 30 minutes

LESSON OBJECTIVES

Students will describe three major landscape features: mountains, plains, and plateaus.

GUIDING QUESTIONS

What kind of landscape do you live in? Where is the mountain landscape region nearest to your area? Where is the nearest plains region? What about plateaus?

TENNESSEE STATE STANDARDS

6.LS2.6 Research the ways in which an ecosystem has changed over time in response to changes in physical conditions, population balances, human interactions, and natural catastrophes.

MATERIALS INCLUDED

Master 25a, Landscape Regions
Master 1b, U.S. Map (with states)

MATERIALS PROVIDED BY TEACHER

Overhead projector
Transparencies of Master 25a and 1b
A variety of scenic photographs showing major Earth features – mountains, plains, plateaus, and oceans
For each student:
Crayons or colored pencils
Class notebook
Handout of Master 25a, Landscape Region
Worksheet

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

UNIT III: Physical Results of Earthquakes

LEVEL 3: Building Up and Breaking Down

ACTIVITY II: The Folding Mountain Mystery

DURATION OF ACTIVITY: 30 minutes?

LESSON OBJECTIVES

Students will identify mountains, plains, and plateaus on a landscape map.

GUIDING QUESTIONS

How were the “folded” mountain ranges formed? Do you see evidence of plates converging near the Folded Appalachians or Ouachitas ranges?

TENNESSEE STATE STANDARDS

- 5.PS2.1 Test the effects of balanced and unbalanced forces on the speed and direction of motion of objects.
- 6.LS2.6 Research the ways in which an ecosystem has changed over time in response to changes in physical conditions, population balances, human interactions, and natural catastrophes.

MATERIALS INCLUDED

Master 25b, Landscape Regions of the U.S.
Master 17, Plate Boundaries Map
Master 19, Formation and Breakup of the Pangaea

MATERIALS PROVIDED BY TEACHER

Overhead projector
Transparencies from Masters 25b, 17, and 19
Classroom map of the U.S.
For each small group: Three to five hand towels
or fabric scraps of approximately the same size

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

UNIT III: Physical Results of Earthquakes

LEVEL 3: Building Up and Breaking Down

ACTIVITY III: Mountain Modeling

DURATION OF ACTIVITY: 30 minutes?

LESSON OBJECTIVES

Students will construct models of various types of mountains and relate those to specific places in the United States.

GUIDING QUESTIONS

What could cause the uplifting and downdropping actions in the Earth's lithosphere?

TENNESSEE STATE STANDARDS

- 5.PS2.1 Test the effects of balanced and unbalanced forces on the speed and direction of motion of objects.
- 6.LS2.6 Research the ways in which an ecosystem has changed over time in response to changes in physical conditions, population balances, human interactions, and natural catastrophes.

MATERIALS INCLUDED

None

MATERIALS PROVIDED BY TEACHER

For each group:

Dull table knife or scissors

Newspapers to cover desks or work surfaces

Rectangle block of plastic foam or furniture foam, at least 2" (10 cm) long and wide and 2" (8-10 cm) thick

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

UNIT III: Physical Results of Earthquakes

LEVEL 3: Building Up and Breaking Down

ACTIVITY IV: Underwater Avalanche

DURATION OF ACTIVITY: 30 minutes

LESSON OBJECTIVES

Students will identify, from observing illustrations of the Earth's surface features, which of them were created by earthquakes. Students will identify abyssal plains and underwater deltas, and model their formation.

GUIDING QUESTION

How are abyssal plains and underwater deltas formed?

TENNESSEE STATE STANDARDS

6.LS.2.6 Research the ways in which an ecosystem has changed over time in response to changes in physical conditions, population balances, human interactions, and natural catastrophes.

MATERIALS INCLUDED

Master 26, Ocean Bottom

MATERIALS PROVIDED BY TEACHER

Overhead projector

Transparency made from Master 26

For each small group:

A trough 50 cm – 1 meter long (this could be a section of PVC rain gutter or a shipping tube cut and lined with plastic. Halves of a quart milk cartons would also work)

2-liter container filled with water

Trough supports (blocks of wood or old books)

Sandy soil or mixture of sand and dry pottery clay (kaolin) to simulate sediment

Plastic shoe box or baking pan to hold water and sediment

Corrugated cardboard strips with the grooves exposed (Tear off the outer layer of paper)

Tape

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

UNIT IV: Measuring Earthquakes

LEVEL 3: Sizing Up Earthquakes Waves

ACTIVITY I: Popping P-Waves

DURATION OF ACTIVITY: 30 minutes?

LESSON OBJECTIVES

Student will distinguish between primary and secondary body waves (P-waves and S-waves).

GUIDING QUESTIONS

What is an earthquake, and how are an earthquake's waves released?

TENNESSEE STATE STANDARDS

- 5.PS2.1 Test the effects of balanced and unbalanced forces on the speed and direction of motion of objects.
- 6.PS3.3 Analyze and interpret data to show the relationship between kinetic energy and the mass of an object and its speed.

MATERIALS INCLUDED

Master 34, P-Waves Motion and S-Wave Motion
Master 10a, Earthquake Terms
5 Slinkies
4 Goggles

MATERIALS PROVIDED BY TEACHER

Overhead projector
Transparencies of Master 34 and 10a
Extra Slinkies and Goggles if possible, enough for every 2 students
Sign post labeled Focus (to be made in advance)

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

UNIT IV: Measuring Earthquakes

LEVEL 3: Sizing Up Earthquakes Waves

ACTIVITY II: The S-Wave Machine

DURATION OF ACTIVITY: 30 minutes

LESSON OBJECTIVES

Students will construct a model to simulate S-wave motion.

GUIDING QUESTIONS

What do you see when you activate the S-Wave Machine? How do S-waves compare to P-Waves?

TENNESSEE STATE STANDARDS

- 5.PS2.1 Test the effects of balanced and unbalanced forces on the speed and direction of motion of objects.
- 5.ETS1.2 Plan and carry out tests on one or more elements of a prototype in which variables are controlled and failure points are considered to identify which elements need to be improved.
- 6.PS3.3 Analyze and interpret data to show the relationship between kinetic energy and the mass of an object and its speed.

MATERIALS INCLUDED

Master 35, The S-Wave Machine
Master 34, _P-Wave Motion and S-Wave Motion
Paper clips
Metal washers

MATERIALS PROVIDED BY TEACHER

Overhead projector
Transparencies of Masters 35 and 34
For each group:
Shoebox without its top, or a 1- to 2-qt. paper milk carton
Compass point or other punching tool
Rubber band long enough to stretch the length of the shoebox or carton
Scissors

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

UNIT IV: Measuring Earthquakes

LEVEL 3: Sizing Up Earthquakes Waves

ACTIVITY III: Drum Rumbles

DURATION OF ACTIVITY: 30 minutes

LESSON OBJECTIVES

Students will compare P-waves and S-waves and their travel times.

GUIDING QUESTION

Which travel faster, S-waves or P-waves?

TENNESSEE STATE STANDARDS

- 5.PS2.1 Test the effects of balanced and unbalanced forces on the speed and direction of motion of objects.
- 6.PS3.3 Analyze and interpret data to show the relationship between kinetic energy and the mass of an object and its speed.

MATERIALS INCLUDED

None

MATERIALS PROVIDED BY TEACHER

A drum (any drum that's portable, or a coffee can)
2 posters, labeled "S-wave" and "P-wave"
A watch that indicates seconds, like a digital watch
Pencils and notebooks for each student

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

UNIT IV: Measuring Earthquakes

LEVEL 3: Sizing Up Earthquakes Waves

ACTIVITY IV: Set Up a Seismograph

DURATION OF ACTIVITY: 30 minutes?

LESSON OBJECTIVES

Students will construct a model seismograph, and identify its parts, and identify different amplitudes of simulated earthquake waves by using the seismograph.

GUIDING QUESTIONS

How does the amplitude of the wave on the seismograph relate to the magnitude of the earthquake it records? Which of your own seismograms would have the highest magnitude?

TENNESSEE STATE STANDARDS

- 5.PS2.1 Test the effects of balanced and unbalanced forces on the speed and direction of motion of objects.
- 5.ETS1.2 Plan and carry out tests on one or more elements of a prototype in which variables are controlled and failure points are considered to identify which elements need to be improved.
- 6.PS3.3 Analyze and interpret data to show the relationship between kinetic energy and the mass of an object and its speed.

MATERIALS INCLUDED

Master 29, Several Seismographs
Master 32, Seismogram Showing Amplitude
Replace with appropriate text.

MATERIALS PROVIDED BY TEACHER

Overhead projector
Transparencies of Masters 29 and 32
For each small group:
Three blank sheets of paper
Thick-point felt marker
Quart- to gallon-sized container with handle
Approximately 16 oz. of sand or water
Strong string 1 to 3 feet (depends on student's height)
Table or desk
Tape
Scissors
Timing device

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

UNIT IV: Measuring Earthquakes

LEVEL 3: Sizing Up Earthquakes Waves

ACTIVITY V: The Mercalli Scale

DURATION OF ACTIVITY: 30 minutes

LESSON OBJECTIVES

Students will compare and contrast the difference between magnitude and intensity.

GUIDING QUESTIONS

Why do you think magnitude is more often reported than intensity?

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 otherwise sense or do at all, or as quickly or efficiently.

MATERIALS INCLUDED

Master 28, Modified Mercalli Scale
Master 36a, KWAT Television Script
and b, Master 36b, Wattsville Map Key

MATERIALS PROVIDED BY TEACHER

Master 36a, KWAT Television Script
Overhead projector
Transparency of Masters 28 and 36b
For each group:
Handouts of Masters 28, 36a and b
Pencils and colored pens

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

UNIT V: Earthquake Safety and Survival

PART 1: What Happens During an Earthquake?

ACTIVITY I: Size Up Your State

DURATION OF ACTIVITY: 30 minutes

LESSON OBJECTIVES

Students will identify the earthquake hazard for their state.

GUIDING QUESTIONS

What is the earthquake hazard for your state? How many states in the U.S. are free from earthquake hazards?

TENNESSEE STATE STANDARDS

- K.ETS2.1 Use appropriate tools (magnifying glass, rain gauge, basic balance scale) to make observations and answer testable 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 questions.
- 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.
- 2.ETS2.2 Predict and explain how human life and the natural world would be different without current technologies.
- 3.ESS3.1 Explain how natural hazards (fires, landslides, earthquakes, volcanic eruptions, floods) impact humans and the environment.
- 4.ESS2.2 Interpret maps to determine that the location of mountain ranges, deep ocean trenches, volcanoes, and earthquakes occur in patterns.
- 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 otherwise sense or do at all, or as quickly or efficiently.
- 6.LS2.6 Research the ways in which an ecosystem has changed over time in response to changes in physical conditions, population balances, human interactions, and natural catastrophes.

MATERIALS INCLUDED

Copy of Master 37, Earthquake Hazard Map

MATERIALS PROVIDED BY TEACHER

Overhead projector & transparency of Master 37
Crayons or colored pencils

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

UNIT V: Earthquake Safety and Survival

PART 1: What Happens During an Earthquake?

ACTIVITY II: Earthquake Simulation

DURATION OF ACTIVITY: 30 minutes

LESSON OBJECTIVES

Students will identify hazards caused by earthquakes and demonstrate safe behavior during an earthquake simulation.

GUIDING QUESTIONS

What does “drop and cover” mean? What are some things you can do to stay safe in case of an earthquake?

TENNESSEE STATE STANDARDS

- 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.PS2.3 Recognize the effect of multiple pushes and pulls on an object's movement or non-movement.
- 3.PS3.1 Recognize that energy is present when objects move; describe the effects of energy transfer from one object to another.
- 4.PS3.2 Observe and explain the relationship between potential energy and kinetic energy.
- 6.PS3.2 Construct a scientific explanation of the transformation between potential and kinetic energy.

MATERIALS INCLUDED

Master 38, Earthquake Simulator Script

MATERIALS PROVIDED BY TEACHER

Overhead Projector
Transparency of Master 38, Drop and Cover
Master 40
Desks or tables to get under
Optional items for simulation activity (chairs to rattle; pencils, books, and other objects to drop)

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

UNIT V: Earthquake Safety and Survival

PART 1: What Happens During an Earthquake?

ACTIVITY III: Know What Might Happen

DURATION OF ACTIVITY: 30 minutes

LESSON OBJECTIVES

Explain to students that we can avoid or reduce our chances of being hurt if we know what to expect and what to do during an earthquake.

GUIDING QUESTIONS

What would you do if an earthquake struck? What are some of potential hazards in each room of your home?

TENNESSEE STATE STANDARDS

- K.ETS1.1 Ask and answer questions about the scientific world and gather information using the senses.
- 2.PS2.3 Recognize the effect of multiple pushes and pulls on an object's movement or non-movement.
- 3.ESS3.2 Design solutions to reduce the impact of natural hazards (fires, landslides, earthquakes, volcanic eruptions, floods) on the environment.
- 3.ETS2.1 Identify and demonstrate how technology can be used for different purposes.
- 6.LS2.6 Research the ways in which an ecosystem has changed over time in response to changes in physical conditions, population balances, human interactions, and natural catastrophes.

MATERIALS INCLUDED

None

MATERIALS PROVIDED BY TEACHER

Pencil and paper for each student
Crayons or colored pencils

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

UNIT V: Earthquake Safety and Survival

PART 2: Hunt for Hazards

ACTIVITY I: Classroom Hazard Hunt

DURATION OF ACTIVITY: 60-90 minutes

LESSON OBJECTIVES

Students will identify potential hazards in their classroom that may cause damage, injury or death during an earthquake. Students will also list, and if possible, make changes in their classroom to reduce potential hazards.

GUIDING QUESTIONS

What are some things that could move, fall or break during an earthquake? How can your classroom be made safer during an earthquake?

TENNESSEE STATE STANDARDS

- K.LS1.3 Explain how humans use their five senses in making scientific findings.
- 2.ETS1.3 Recognize that to solve a problem, one may need to break the problem into parts, address each part, and then bring the parts back together.
- 3.ESS3.1 Explain how natural hazards (fires, landslides, earthquakes, volcanic eruptions, floods) impact humans and the environment.

MATERIALS INCLUDED

Master 41, Fourth Grade Classroom
Master 42, Classroom Hazard Hunt
Grade Classroom

MATERIALS PROVIDED BY TEACHER

Overhead projector
Transparency made from Master 41, Fourth
Transparency marker
Handout of Master 41, Fourth Grade Classroom
Handout of Master 42, Classroom Hazard Hunt
Crayons or colored pencils
Drawing paper, optional

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

UNIT V: Earthquake Safety and Survival
PART 2: Hunt for Hazards

ACTIVITY II: Home Hazard Hunt

DURATION OF ACTIVITY: 30 minutes in classroom, 30 minutes at home; classroom follow up

LESSON OBJECTIVES

Students perform a Home Hazard Hunt to determine what hazards can be found in their own homes, and determine what actions they can take to reduce the danger.

GUIDING QUESTIONS

What are some of the hazards found in your home? What can you do to reduce the danger in your home?

TENNESSEE STATE STANDARDS

- K.LS1.3 Explain how humans use their five senses in making scientific findings.
- 2.ETS1.3 Recognize that to solve a problem, one may need to break the problem into parts, address each part, and then bring the parts back together.
- 3.ESS3.1 Explain how natural hazards (fires, landslides, earthquakes, volcanic eruptions, floods) impact humans and the environment.

MATERIALS INCLUDED

Master 43a, b, and c, Home Hazard Hunt Worksheets
Master 44, Quake-Safe Home Checklist

MATERIALS PROVIDED BY TEACHER

Overhead projector
Transparencies of Master 43a, b, and c, Home Hazard Hunt Worksheets
Transparency of Master 44, Quake-Safe Home Checklist
Pencil or pen

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

UNIT V: Earthquake Safety and Survival

PART 2: Hunt for Hazards

ACTIVITY III: Community Hazard Hunt

DURATION OF ACTIVITY: 30 minutes

LESSON OBJECTIVES

Students perform a Community Hazard Hunt to determine what hazards can be found in their communities, including damage to buildings, power lines, bridges, highways and railroad tracks, ponds, spilled chemicals, and determine what actions they can take to reduce the danger.

GUIDING QUESTIONS

What are some of the hazards found in your community? What can you do to anticipate hazards to avoid danger and injury?

TENNESSEE STATE STANDARDS

- K.LS1.3 Explain how humans use their five senses in making scientific findings.
- 2.ETS1.3 Recognize that to solve a problem, one may need to break the problem into parts, address each part, and then bring the parts back together.
- 3.ESS3.1 Explain how natural hazards (fires, landslides, earthquakes, volcanic eruptions, floods) impact humans and the environment.
- 6.LS2.6 Research the ways in which an ecosystem has changed over time in response to changes in physical conditions, population balances, human interactions, and natural catastrophes.

MATERIALS INCLUDED

Master 45, Neighborhood Hazard Hunt
Master 46, Safety Rules for Shoppers
Master 47a, b, and c, Community Hazard Hunt

MATERIALS PROVIDED BY TEACHER

Overhead projector
Transparency and handouts made from Master 45, Neighborhood Hazard Hunt
Transparency marker
Crayons or colored pencils
Handouts made from Master 46, Safety Rules for Shoppers
Older Students: Handouts made from Masters 47a, b, and c, Community Hazard Hunt

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

UNIT V: Earthquake Safety and Survival

PART 3: Prepare and Share

ACTIVITY I: Brainstorming

DURATION OF ACTIVITY: 30 minutes

LESSON OBJECTIVES

Students will demonstrate an awareness of responsibility for their own well-being and the well-being of others during an emergency.

GUIDING QUESTIONS

What are some things you cannot take with you if you had to leave your home in an emergency? What are things that you really need to live? Are they easy to carry and travel with?

TENNESSEE STATE STANDARDS

- 1.ETS1.1 Solve scientific problems by asking testable questions, making short-term and long-term observations, and gathering information.
- 2.ETS1.3 Recognize that to solve a problem, one may need to break the problem into parts, address each part, and then bring the parts back together.
- 3.ESS3.2 Design solutions to reduce the impact of natural hazards (fires, landslides, earthquakes, volcanic eruptions, floods) on the environment.
- 5.ETS1.1 Research, test, re-test, and communicate a design to solve a problem.

MATERIALS INCLUDED

None

MATERIALS PROVIDED BY TEACHER

Blackboard and chalk

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

UNIT V: Earthquake Safety and Survival

PART 3: Prepare and Share

ACTIVITY II: Create a Kit

DURATION OF ACTIVITY: 30 minutes

LESSON OBJECTIVES

Students will list items to include in classroom, home, and vehicle emergency kits, and brainstorm uses for the kits other than earthquakes. Students will prepare an emergency kit for the classroom.

GUIDING QUESTIONS

What items should be included in an earthquake emergency kit? Why?

TENNESSEE STATE STANDARDS

- K.ETS2.1 Use appropriate tools (magnifying glass, rain gauge, basic balance scale) to make observations and answer testable questions.
- 1.ETS2.1 Use appropriate tools (magnifying glass, basic balance scale) to make observations and answer testable questions.
- 2.ETS2.1 Use appropriate tools to make observations, record data, and refine design ideas.
- 3.ESS3.2 Design solutions to reduce the impact of natural hazards (fires, landslides, earthquakes, volcanic eruptions, floods) on the environment.
- 3.ETS2.1 Identify and demonstrate how technology can be used for different purposes.
- 5.ETS2.1 Identify and demonstrate how technology can be used for different purposes.

MATERIALS INCLUDED

Earthquake Survival Kit., which includes:

Hard candy	Flashlight
Batteries (2D & 3AAA)	Water
Waterproof matches	First Aid Kit
Money	Radio
Scissors	Tape
Garbage bags	Playing cards
Paper & marker	Backpack

MATERIALS PROVIDED BY TEACHER

Art supplies
Writing paper and pencils

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

UNIT V: Earthquake Safety and Survival

PART 3: Prepare and Share

ACTIVITY III: Poster Party

DURATION OF ACTIVITY: 30 minutes

LESSON OBJECTIVES

Students will memorize a safety chant, make posters illustrating what they have learned, and distribute them around the school and community.

GUIDING QUESTION

How can you take what you've learned about earthquakes and use that information to inform others about earthquake safety and survival?

TENNESSEE STATE STANDARDS

2.S.10 Identify basic weather-related emergency guidelines. (Health standard)

MATERIALS INCLUDED

None

MATERIALS PROVIDED BY TEACHER

Poster board
Art supplies
Pencils and scarp paper for rough drafts

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

UNIT V: Earthquake Safety and Survival

PART 4: Evacuation Drill

ACTIVITY I: Get Ready, Get Set

DURATION OF ACTIVITY: 30 minutes

LESSON OBJECTIVES

Students will identify hazards they might find during evacuation, and develop actions they determine as helpful in dealing with the aftermath of an earthquake.

GUIDING QUESTIONS

What actions should you take after an earthquake if you are inside? What actions should you take if you are outside?

TENNESSEE STATE STANDARDS

- K.S.8 Distinguish between emergency and non-emergency situations.
- 2.S.8 Identify ways to reduce the risk of injuries and death from injury.
- 2.S.10 Identify basic weather-related emergency guidelines.
- 3.S.9 Describe appropriate actions for emergency and non-emergency situations.
- 3.S.10 Identify the importance of having a home safety plan for various emergency situations.
- 4.S.10 Demonstrate different methods of safe routes from emergency situations in home, school, and the community.
- 5.S.10 Compare and contrast the benefits and consequences of safety preparation when faced with an emergency situation.
- 6.SP.4 Identify appropriate resources available during emergency situations.

MATERIALS INCLUDED

Materials and procedure for earthquake drill
Master 39, Drop and Cover

MATERIALS PROVIDED BY TEACHER

Overhead projector
Transparency of Master 39, Drop and Cover
Index cards

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

UNIT V: Earthquake Safety and Survival

PART 4: Evacuation Drill

ACTIVITY II: Put It All Together

DURATION OF ACTIVITY: 30 minutes

LESSON OBJECTIVES

Students will describe ways of helping others who are injured during earthquakes. Students will describe feelings they might have and dangers they might face after an earthquake.

GUIDING QUESTIONS

What are some things we can do to help care for each other and keep busy after an earthquake? How can you help with the clean-up and repair work? What items would help keep you safer when helping?

TENNESSEE STATE STANDARDS

- K.S.8 Distinguish between emergency and non-emergency situations.
- 2.S.8 Identify ways to reduce the risk of injuries and death from injury.
- 2.S.10 Identify basic weather-related emergency guidelines.
- 3.S.9 Describe appropriate actions for emergency and non-emergency situations.
- 3.S.10 Identify the importance of having a home safety plan for various emergency situations.
- 4.S.10 Demonstrate different methods of safe routes from emergency situations in home, school, and the community.
- 5.S.10 Compare and contrast the benefits and consequences of safety preparation when faced with an emergency situation.
- 6.SP.4 Identify appropriate resources available during emergency situations.

MATERIALS INCLUDED

Master 48, Drill and Evacuation Checklist

MATERIALS PROVIDED BY TEACHER

Chairs and other objects needed to simulate earthquake obstacles
Classroom emergency kit
Paper and pencils

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	Binder: Paper copies of transparencies	
		C	Binder: Transparencies	
		D	DVD: Yogi Bear Earthquake Preparedness	
		E	DVD: Faulting and Folding	
		F	DVD: Plate Tectonics	
		G	Audio CD: Elmo- Beatin' the Quake	
		H	Poster: The Earth's Fractured Surface	
		I	Poster: Earthquakes	
		J	Booklet: Yogi Bear Earthquake Preparedness	
		K	Seismograph Activity Model Investigation	
		L	Poster: Central United States. Earthquakes	

SUITCASE EXHIBIT INVENTORY CHECKLIST

MoSH Check In:	Teacher Check In:	Item	Materials	Teacher Return:
		1	Seismograph	
		2	6 Foam Blocks	
		3	Geology Demonstration Set: 4 3 ½-inch Foam Rectangles 3 20-inch Foam Strips	Tray 3 Strata Blocks 1 Volcano Model
		4	Rock	
		5	Earthquake Survival Kit Batteries (2D & 3AA) First Aid Kit Tape Playing Cards	Hard Candy Waterproof Matches Money Garbage Bags Paper & Marker Flashlight Water Radio Scissors
		6	Aluminum Foil	
		7	Large Mixing Bowl	
		8	Bucket	
		9	Coffee Can	
		10	Metal Baking Pan	
		11	3 Foam Trays	
		12	Plastic Bags	
		13	15 Droppers	
		14	4 Paper Punches	
		15	16 Small Paper Plates	
		16	String	
		17	Yarn	
		18	Timer	
		19	Straight Pins	
		20	2 Containers of Play-Doh	
		21	Toothpicks	
		22	2 bottles of Food Coloring	
		23	Measuring Cup	
		24	15 Metric Rulers	
		25	Dental Floss	
		26	Paper Clips	
		27	Measuring Tape	
		28	4 Goggles	
		29	5 Containers of Silly Putty	
		30	Clay	
		31	Washers	
		32	Straws	
		33	Stirring Sticks	
		34	Fabric Scraps	
		35	Quake Game (4 tokens, 1 die, 18 Go Cards, 18 Question Cards, 25 Quake Cards, Game board, Directions Card)	
		36	50 Cups	
		37	5 Slinkies	
		38	Lincoln Logs (3 large, 2 medium, 10 small, 45 tiny, 1 rooftop)	
		39	Building Blocks (10 red, 10 green, 10 blue, 10 yellow)	
		40	Bag - Penne Pasta	
		41	Lattice Wood	