

## Acknowledgments

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The first version of the teacher's package was developed under the direction of Phyllis R. Marcussio, Director of Publications, National Science Teachers Association. Ms. Marcussio put together an excellent team of editor, illustrator, teacher-writers, subject-matter experts, and reviewers, including —

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## **Foreword to the Second Edition**

The original *Earthquakes - A Teacher's Package for K-6* (FEMA 159) was developed as a joint effort of the Federal Emergency Management Agency (FEMA) and the National Science Teachers Association (NSTA) under contract with FEMA. NSTA's project team produced an excellent product. Since its publication in 1988, over 50,000 teachers have requested copies.

This revised version brought members of the original project team together with a group of teachers who had used the materials extensively in their classroom and served as teacher-educators at FEMA's Tremor Troop workshops. About 75% of the original material remains unchanged: a few activities were removed and a few added.

A major change was the addition of assessments throughout the units. The examples we provide relate to life outside the classroom and/or activities similar to those of scientists. We also added matrices linking activities to the National Science Education Standards. You'll find these matrices in the Appendix, along with a new Glossary.

### **Features of This Package**

First of all, you do not need an education in science to use this package. Background for each unit covers all the science concepts treated in the lessons. You will have all the information you need, no matter what grade you teach and what kind of science preparation you've had. This is science made simple and fun, without sacrificing scientific accuracy.

Because young students learn best by doing, the lessons in this teaching package are primarily a series of hands-on experiences. You will need to locate simple materials for some of the lessons. Others require only things that are already in your classroom. At the end of each unit, you will find Masters ready to reproduce for transparencies, handouts, and worksheets. Masters are identified in the text by name and number.

Because students learn holistically, the lessons include methods and materials from language arts, mathematics, social studies, music, and the other fine arts, as well as physical science. Learning Links, found near the beginning of each set of activities, summarize some of these interdisciplinary connections. We also provided Scope and Sequence charts at the beginning of each unit.

Extensions, provided in each set of activities, suggest ways for your students to learn more about the topics. Use the Extensions for individual enrichment or to provide additional experiences for the entire class. Each set of activities also includes vocabulary, teaching tips, and illustrations. Matrices linking activities to the National Science Education Standards are located in the Appendix.

## **Organization and Overview**

The Teacher's Package has five units. Each of the first four units is divided into three levels: Level 1, for grades K-2; Level 2, for grades 3-4; and Level 3, for grades 5-6. Since classes and individuals vary widely you may often find the procedures in the other levels helpful for your students. The last unit has four parts with activities for students in all grades, K-6.

**Unit I, *Defining an Earthquake***, builds on what students already know about earthquakes to establish a working definition of the phenomenon. Legends from near and far encourage children to create their own fanciful explanations, paving the way for the scientific explanations they will begin to learn in this unit.

**Unit II, *Why and Where Earthquakes Occur***, presents the modern scientific understanding of the Earth's structure and composition, and relates this to the cause of earthquakes.

**Unit III, *Physical Results of Earthquakes***, provides greater understanding of the processes that shape our active Earth. Earthquakes are put in the context of the large- and small-scale changes that are constantly at work on the continents as well as the ocean floor.

**Unit IV, *Measuring Earthquakes***, explains earthquakes in terms of wave movement and introduces students to the far-ranging effects of earthquakes.

**Unit V, *Earthquake Safety and Survival***, focuses on what to expect during an earthquake; how to cope safely; how to identify earthquake hazards; and how to reduce, eliminate, or avoid them.

Units I through V are intended to be used in the order presented. When students ask questions about earthquake safety, the introduction in Unit V will help you answer their questions. You may want to take time then to do a few activities to enable students to develop quake-safe skills.

## Contents

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### Unit I: Defining an Earthquake

Level 1. What Is an Earthquake.....	13
Level 2. People Explain Earthquakes.....	19
Level 3. Energy Waves Cause Earthquakes.....	25

### Unit II: Why and Where Earthquakes Occur

Level 1. Inside Planet Earth.....	39
Level 2. Plates Going Places.....	43
Level 3. Layers, Plates, and Quakes.....	51

### Unit III: Physical Results of Earthquakes

Level 1. Earthquakes Shape Our Earth.....	65
Level 2. Landscape on the Loose.....	69
Level 3. Building Up and Breaking Down.....	79

### Unit IV: Measuring Earthquakes

Level 1. Earthquakes Great and Small.....	93
Level 2. Different Shakes for Different Quakes .....	99
Level 3. Sizing Up Earthquake Waves.....	103

### Unit V: Earthquake Safety and Survival

Part 1. What Happens During an Earthquake..	117
Part 2. Hunt for Hazards.....	125
Part 3. Prepare and Share... ..	133
Part 4. Evacuation Drill.. ..	139

### Appendix

Earthquake Background

Book of Legends

National Science Education Standards Matrices

### Glossary

## Earthquake Curriculum, K-6 List of Line Masters

### UNIT I

Master 1a.	U.S. Map (without state names)
Master 1b.	U.S. Map
Master 2.	The Turtle Tale
Master 3.	Turtle Tale Pop-up Puppet
Master 4.	Turtle Dot-to-Dot
Master 5.	World Map
Master 6.	World Map with Legend Sites
Master 7.	World Map with Epicenters
Master 8.	Elastic Rebound
Master 9.	Dresser Drawers
Master 10a.	Earthquake Terms
Master 10b.	Earthquake Terms Worksheet
Master 11.	U.S. Map with Epicenters

### UNIT II

Master 12a.	Layers of the Earth
Master 12b.	Earth Layers Worksheet
Master 13.	Earth Plates
Master 14a.	Earth Plate Puzzle Pieces
Master 14b.	Earth Plate Puzzle Pieces
Master 15.	A Pizza the Earth
Master 16.	Graph of the Earths Layers
Master 17.	Plate Boundaries Map
Master 18.	Convection Currents and Plate Cross Section
Master 19.	Formation and Breakup of Pangaea
Master 20a.	Pangaea Flip Book
Master 20b.	Pangaea Flip Book
Master 20c.	Pangaea Flip Book
Master 20d.	Pangaea Flip Book

### UNIT III

Master 21.	Fault Movements
Master 22.	Rural Community After an Earthquake
Master 23.	Fault Model
Master 24a.	Tsunami Facts
Master 24b.	Notable Tsunami
Master 25a.	Landscape Regions Worksheet
Master 25b.	Landscape Regions of U.S.
Master 25c.	Landscape Regions Key
Master 26.	Ocean Bottom

### UNIT IV

Master 27.	Shake Table
Master 28.	Modified Mercalli Scale
Master 29.	Seismographs
Master 30.	Seismogram Worksheet
Master 31.	Earthquake Magnitude and Energy
Master 32.	Seismogram Showing Amplitude
Master 33.	Earthquake Severity Worksheet
Master 34.	P-Wave Motion and S-Wave Motion
Master 35.	The S-Wave Machine
Master 36a.	KWAT Television Script
Master 36b.	Wattsville Map
Master 36c.	Wattsville Map Key

### UNIT V

Master 37.	Earthquake Hazard of the U.S.
Master 38.	Earthquake Simulation Script
Master 39.	Drop, Cover and Hold
Master 40.	Coalinga Schools Report
Master 41.	Fourth Grade Classroom
Master 42.	Classroom Hazard Hunt
Master 43a.	Home Hazard Hunt Worksheet
Master 43b.	Home Hazard Hunt Worksheet
Master 43c.	Home Hazard Hunt Worksheet
Master 44.	Quake-Safe Home Checklist
Master 45.	Neighborhood Hazard Hunt
Master 46.	Safety Rules for Shoppers
Master 47a.	Community Hazard Hunt
Master 47b.	Community Hazard Hunt
Master 47c.	Community Hazard Hunt
Master 48.	Drill and Evacuation Checklist
Master 49.	Home Earthquake Safety



## Earthquake Curriculum, K-6 -- Scope and Sequence Chart

### Unit I: Defining an Earthquake

Level	Concept	Laboratory	Mathematics	Language Arts	Social Studies	Art
<b>K-2</b>	An earthquake is a sudden, rapid shaking of the Earth caused by the release of energy stored in rocks. Legends are traditional narrative explanations of natural phenomena that evolve when scientific explanations are not available.	Sand and box demonstration of earthquakes		Vocabulary development of earthquake words Original earthquake legends	Effects of earthquakes on model buildings Effect of earthquakes on people Cultures and legend origins	Illustrations of legends Illustrations of Earth's interior Mural making
<b>3-4</b>	An earthquake is a sudden, rapid shaking of the Earth caused by the release of energy stored in rocks. Legends are traditional narrative explanations of natural phenomena which evolve, when scientific explanations are not available Earthquake energy is released in the form of waves	Silicone putty rocks Gelatin simulation of earthquakes		Earthquake legends Paragraph writing Class discussion	Map study of cultures associated with earthquake legends Map study of epicenters	Illustrations of earthquake causes Illustrations of earthquake legends
<b>5-6</b>	Earthquakes result from the build-up and release of energy stored in rocks Earthquakes occur over much of the world and the United States Various societies have produced earthquake legends to explain these natural occurrences	Stick simulation of earthquakes Fault action game	Map scales to measure distances	Vocabulary development of earthquake words Earthquake legends Oral reading and note taking	Map study of earthquake locations Map study of cultures associated with earthquake legends Map study of state locations	Sign making Diagram making