

TEACHER NOTES

Education Standards

Six categories of NSTA content standards are addressed in the Earth Science books and Teacher Resource.

- Unifying Concepts and Processes
- Science as Inquiry
- Physical Science
- Earth and Space Science
- Science and Technology
- Science in Personal and Social Perspectives

Four thematic strands of NCSS curriculum standards are also addressed.

- Time, Continuity, and Change
- People, Places, and Environments
- Science, Technology, and Society
- Global Connections



Comprehension Strategies

Strategies are provided throughout the Teacher Resource. These strategies cover core reading skills. The core skills students will be using include:

- Recognizing the main idea
- Identifying a sequence
- Understanding cause and effect
- Comparing and contrasting
- Differentiating fact from opinion
- Recognizing problems and solutions
- Drawing conclusions
- Making inferences

In addition, they will have opportunities to use reading strategies such as:

- Predicting
- Clarifying
- Questioning
- Summarizing

Key Characteristics of Science Matters: Earth Science Teacher Resource

1. Rationale

The Science Matters: Earth Science Teacher Resource has been developed to accompany the Earth Science series. The resource addresses what teachers teach, how they teach it, and why. The five lesson plans include core activities and activities for differentiated learning through which students will explore Earth science. These activities include group work, research, and interdisciplinary projects that will help students meet important knowledge and skill outcomes in U.S. curricula for Grades 3–6. See page 4 for suggested times for these activities.

2. Educational Standards

The Earth Science books and accompanying Teacher Resource will help your students meet key National Science Education Standards for Grades K–12, as set out by the National Science Teachers Association (NSTA), in addition to curriculum standards defined by the National Council for Social Studies (NCSS). Relevant knowledge and skill standards are listed in the Master Chart of Contents and under Teacher Notes.

3. Using the Earth Science Books in the Classroom

The Earth Science books introduce students to the rock cycle, geology, paleontology, minerals, volcanoes, and earthquakes. Opportunities for active learning include an Earth Science self-assessment and a culminating activity. Additional sources are listed to guide students in further research. Students can use the Table of Contents or Index in each book to find information on a specific topic. A glossary of terms is also provided at the end of each book. See the Teacher Notes on page 3 for summaries of the Earth Science books.

4. Skills Development

All lessons focus on higher level thinking skills as outlined by Bloom's Taxonomy. The activities provide opportunities for students to analyze, synthesize, and evaluate information and concepts about Earth science. Lesson 2 emphasizes collaborative learning. Lesson 3 focuses on developing effective research skills. Lesson 4 emphasizes synthesizing information, and Lesson 5 engages students in evaluating information and assessing their work. Activities based on best practices for reading strategies of the National Institute for Literacy are also included.

5. Differentiated Learning

Differentiation strategies for grade level and to accommodate individual needs are provided. These strategies can also be used to encourage students to practice different learning styles. Suggestions are made for using the core activities in different ways to accommodate students' skill levels in group work, research, critical thinking, and English language usage. In addition, all lessons include integration activities that engage students in verbal, written, and artistic expression. Lessons 2–5 also include enrichment activities to motivate highly motivated or gifted learners. Hands-on activities involve kinesthetic learning as well as creative thinking.

6. Comprehension Strategies

Each lesson provides strategies for guided reading—instruction for small student-groups reading the same texts. Guided reading encourages students with similar reading levels to use problem-solving skills to construct meaning from text. Specific comprehension strategies are integrated into activities or listed under Teacher Notes. The comprehension strategies provided fall into five categories.

- Students make predictions after viewing photographs, graphs, and other images.
- Students summarize their knowledge.
- Students suggest questions they have about a topic.
- Students infer based on obvious clues provided in written text or images.
- Students use imaging to picture what a written word looks like or what it means.

7. Assessment Strategies

The Teacher Resource describes various student products that can be assessed, including blackline masters (BLMs). BLM 1 can be used for formative assessment and summative assessment. Suggestions are also made for the use of self-tests from the Earth Science books and teacher-assessed Accelerated Reader quizzes, available through Follett at www.titlewave.com. Accelerated Reader quizzes test students' reading comprehension and knowledge of content from the student book series. Rubrics are provided for teacher-assessment of student participation and research skills, and students' products. Students can use BLM 5 for self- and peer-assessment.

Earth Science Series*Earthquakes*

When the ground shakes, we have earthquakes. A shift in the Earth's crust causes quakes to occur. Earthquake watchers grade quakes on how powerful they are.

Volcanoes

Powerful forces of heat and gas inside Earth cause volcanoes to erupt. Volcanoes can be destructive, but they are also builders. Volcanoes actually build islands!

Minerals

Minerals are all around us. They are solid substances found in the natural environment and often are made up of crystals. Minerals have many uses and forms, from buildings to jewelry.

Rocks

Rocks are found everywhere; they form Earth's crust and change all the time. The three categories of rocks are igneous, metamorphic, and sedimentary.

Fossils

Fossils are the rocklike remains of ancient plants and animals. Paleontologists study fossils to learn about prehistoric eras. Fossils tell us what plants and animals that no longer exist looked like.

The Rock Cycle

Rock material is not destroyed; it changes from one type of rock to another in a very slow recycling process. Rocks are broken down by weathering and erosion, including by humans.

Master Chart of Contents

Core Activity	Differentiated Learning	Materials	Science Curriculum Correlations
LESSON 1 Introducing Earth Science, Pages 6–7			
Using the Earth Science Map (45 min)	Integration What Do I Want to Know about Earth Science? (30 min)	Core Activity Earth Science Map, Earth Science 6-book series, BLM 1 What Do I Know about Earth Science?, chalkboard, whiteboard or flipchart and paper, chalk or markers Integration Earth Science Map, Earth Science 6-book series, chalkboard, whiteboard or flipchart and paper, chalk or markers	NSTA, K–12 Science as Inquiry Students understand the purpose of doing scientific inquiry. Earth and Space Science Students consider the properties of earth materials.
LESSON 2 Group Work, Pages 8–10			
Earth Scientists at Work (2x30 min sessions)	Integration Seeking Earth Scientists (20 min) Enrichment We Want to Know More (30 min) Hands On Becoming Rock Hounds (30 min)	Core Activity Earth Science Map, Earth Science 6-book series, BLM 2 Earth Scientists at Work, construction paper, felt tip markers, flipchart paper, other materials based on student needs Integration e-mail access, library access, notebooks, index cards, pencils Hands On shoeboxes, egg cartons, tag board, masonite board, felt tip markers, small index cards or tag board squares	NSTA, K–12 Science as Inquiry Students learn about the abilities necessary to do scientific inquiry and gain understanding about scientific inquiry. Science and Technology Students gain initial understanding about the relationship between science and technology. Science in Personal and Social Perspectives Students understand the need to recognize changes in the environment.
LESSON 3 Research, Pages 11–13			
Earth's Changing Landscape (4x30 min sessions)	Integration Creative Thinking (2x30 min) Enrichment Imagination Science (30 min) Hands On Science in Action (2x30 min)	Core Activity Earth Science Map, Earth Science 6-book series, other library sources, filtered Internet access, BLM 3 Researching Earth's Landscape Integration paper, pen, pencil, filtered Internet and computer access Enrichment Earth Science 6-book series, other library sources, filtered Internet access, chalkboard, whiteboard or flipchart and paper, chalk or markers Hands On Earth Science 6-book series, materials for experiments on page 21, chalkboard, whiteboard or flipchart and paper, chalk or markers	NSTA, K–12 Unifying Concepts and Processes Students understand changes brought about by evolution. Students consider evidence, models, and explanation. Science in Personal and Social Perspectives Students understand various types of resources. They recognize the correlation between science and technology. Physical Science Students focus on properties of objects and changes of properties in matter.
LESSON 4 Synthesis, Pages 14–16			
Putting the Pieces Together (30 min)	Integration Take Action (20 min) Enrichment Exploration that Rocks (2x30 min) Hands On Build a Model of Earth (30 min)	Core Activity Earth Science 6-book series, Earth Science Map, construction paper, chalkboard, whiteboard or flipchart and paper, chalk or markers, other materials as required by students' needs Enrichment <i>Rocks, The Rock Cycle, Minerals, Fossils</i> , BLM 4 Rock Exploration Hands On balloons, newspaper, glue, masking tape, tempera paints, brushes, construction paper	NSTA, K–12 Science as Inquiry Students recognize the relationship between explanation and evidence and understand the science of the natural world, which includes the capacity to reason with knowledge. Physical Science Students continue to consider properties of earth materials. Science in Personal and Social Perspectives Students recognize the correlation between science and technology in local challenges.
LESSON 5 Evaluation, Pages 17–19			
Earth, Our Active Planet (45 min)	Integration If Only I Could, I Would... (30 min) Enrichment Tools of Geology (20 min) Hands On Geology on Display (2x30 min sessions)	Core Activity Earth Science 6-book series, Earth Science Map, BLM 1 What Do I Know about Earth Science?, BLM 5 How Are We Doing?, construction paper, poster paper, other materials for creating visual aids Enrichment <i>Earthquakes, Fossils, Minerals, Volcanoes</i> , other reference materials, notebooks, pencils Hands On poster paper, modeling clay, felt tip pens, other materials students might need	NSTA, K–12 Science and Technology Students gain understanding about science and technology. Science as Inquiry Students increase their understanding and appreciation of science as inquiry. Earth and Space Science Students recognize the influence of changes in the earth and sky.

NSTA: National Science Teachers Association

Reading Levels

Social Studies Curriculum Correlations
<p>NCSS, K–12 Global Connections Students study global connections and interdependence.</p>
<p>NCSS, K–12 Science, Technology, and Society Students gain understanding of the relationships among science, technology, and society.</p> <p>Global Connections Students add to their knowledge of geography and global ecology.</p>
<p>NCSS, K–12 Science, Technology, and Society Students gain understanding of the relationships among science, technology, and society.</p> <p>Global Connections Students study global connections and interdependence.</p>
<p>NCSS, K–12 Time, Continuity, and Change Students concentrate on the factors that affect continuity and change.</p> <p>People, Places, and Environments Students gain appreciation for the interaction and interdependence of people, places, and environments.</p>
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Book Title	Fountas-Pinnell	Lexile	ATOS	Interest
<i>Earthquakes</i>	M	620	4.3	3–6
<i>Fossils</i>	M	760	5.2	3–6
<i>Minerals</i>	M/N	700	4.8	3–6
<i>The Rock Cycle</i>	M/N	720	4.8	3–6
<i>Rocks</i>	M/N	730	4.6	3–6
<i>Volcanoes</i>	M	660	4.5	3–6

Fountas-Pinnell

In their work on guided reading, Irene C. Fountas and Gay Su Pinnell describe the characteristics of books at 26 increasing reading levels, from A to Z. These levels correspond to approximate grade-level ranges, rather than specific grades. In the Fountas-Pinnell system, level M/N books are suitable for transitional readers in Grades 2–3 or higher. Fountas-Pinnell leveling takes into account such features as sentence complexity, text structure, vocabulary, content, layout, and visuals.

Lexile

Lexile measures are based on the Lexile Framework for Reading developed by MetaMetrics Inc. The framework provides a scientific approach for measuring reading levels. The Lexile scale is a common scale for readers and texts with measures from 200L (beginning-reader material) to above 1700L (advanced text). Lexile measures take into account semantic difficulty (word frequency) and syntactic complexity (sentence length).

ATOS

ATOS readability levels measure the textual difficulty of books based on the ATOS Readability Formula for Books from Renaissance Learning, Inc. ATOS readability levels indicate the most difficult level of text a student can comprehend expressed as a subset of a grade level. Readability levels are meant to be used in conjunction with interest levels of texts and students' reading levels in order to match books to students. The ATOS formula is based on statistics on student book-reading and analysis of entire books. Accelerated Reader quizzes can be used to assess student reading-levels.

Interest

Interest levels are publisher recommendations about the suitability of a book's content for a particular grade level. The suggested interest levels take into account the sophistication and maturity level of content, ideas, and themes.

Further information about reading levels of the books in the Earth Science series can be found at www.titlewave.com.