Addressing the *Next Generation Science Standards* (NGSS) by integrating the three dimensions of learning science—science and engineering practices, disciplinary core ideas, and crosscutting concepts.
The new Third Edition of *EarthComm* fully supports the vision of three-dimensional learning that is promoted in the *Next Generation Science Standards* (NGSS) by integrating science and engineering practices, disciplinary core ideas, and crosscutting concepts throughout sections and across chapters.

Each section of *EarthComm* helps students develop proficiency in targeted learning outcomes as they engage with phenomena that are relevant to them and their community.

**3D LEARNING**

**Science and Engineering Practices**
- Asking questions and defining problems
- Developing and using models
- Analyzing and interpreting data
- Constructing explanations and designing solutions

**Disciplinary Core Ideas**
- Plate tectonics and large-scale system interactions

**Crosscutting Concepts**
- Systems and system models

**LEARNING OUTCOMES**

In this section, you will

- **Use models** to explain how plates move and interact at plate boundaries.
- **Analyze and classify** the types of movement at plate boundaries using data on a world map that shows relative plate motion.
- **Use data** on world maps that show plate boundaries and plate motion to describe the present and future plate tectonic setting of your community.

*EarthComm* includes investigations that provide opportunities to develop and apply specific elements of one or more science and engineering practices. Students use these practices to explore core ideas and enhance their understanding of crosscutting concepts while making sense of phenomena.

In the Third Edition, the relationship between *EarthComm*’s investigation-based design and the three dimensions of the *Next Generation Science Standards* has been enhanced and made explicit to support students and teachers.
EarthComm maintains the 7E instructional model as the basis for classroom instruction.

The steps (phases) of the 7E model are elicit, engage, explore, explain, elaborate, evaluate, and extend. The 7E model extends the 5E model by including an **elicit** phase to emphasize the importance of eliciting prior understanding as well as an **extend** phase to stress the importance of "transfer of learning" within the context of the *Chapter Challenges* (projects). The 7E instructional model is integrated into each section of *EarthComm* and serves as the organizer for linking the three-dimensional performance expectations to classroom instruction.

**EarthComm** addresses the NGSS Disciplinary Core and Component Ideas in Earth and Space Sciences in cohesive Storylines.

The major themes of each of *EarthComm*'s eight chapters address all the disciplinary core and component ideas in the Earth and Space Sciences sections of NGSS. Engineering, Technology, and Applications of Science are meaningfully developed within the context of the *Chapter Challenges* (projects). Comprehensive, detailed Storylines for each section of each chapter are available in the *Teacher's Edition* of *EarthComm*. 

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**Chapter Mini-Challenge**

Your Chapter Challenge is to show the geologic history of your region. You will do this by preparing an exhibit for your local museum. You must think about the geologic events that have formed your region. The need to decide which ones to include in your exhibit. You now have enough information to start developing the design of your project.

Your Mini-Challenge is to create a display for your exhibit. This will help you organize your thoughts, ideas, and possibly be the final product. Look back at the Goal you wrote at the beginning of the chapter. Review your Goal so that you are clear on what you will be doing in the project. You will also need to develop a plan of how you will present your exhibit. What will the exhibit look like? How will it attract visitors to your exhibit? You will need to plan and make a display that you think will appeal to the visitors. 

You have completed four sections of the 7E model of how research changes its shape, or form, during metamorphosis. Finally, you need a geographic map to locate metamorphic rocks in your local area and wider region.

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**Science and Engineering Practices**

**Asking Questions and Defining Problems**

All the students examine the location of volcanoes and earthquakes across Earth's surface:
- Can volcanoes form anywhere on Earth? Why or why not?
- Can earthquakes occur anywhere on Earth? Why or why not?

These questions lead to student analysis of volcanoes and earthquakes location data. Students look for patterns in the data and generate ideas about why these patterns exist.

**Analyzing and Interpreting Data**

Students consider whether volcanoes and earthquakes occur by plotting a small sample of volcanic and earthquake data on a world map and then comparing their findings to a much larger data set. They may then hypothesize about the general relationship between these two natural features.

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**Disciplinary Core Ideas**

**ESS2.B: Plate Tectonics and Large-Scale System Interactions**

The theory of plate tectonics states that Earth's surface is composed of rigid plates that move relative to one another. The movement of these plates is driven by the dynamics of the Earth's mantle because it remains the location of plate margins. Volcanoes and earthquakes suggest the operation of processes in Earth's interior. Volcanoes are features that can be found under the ocean or on land. They form where tectonic plates are subducting or moving apart. Similarly, earthquakes are also concentrated along plate boundaries. They occur as faults break when tectonic plates collide, converge, or slide past one another.

**Crosscutting Concepts**

**Patterns**

Students analyze volcanic and earthquake location data. They look for patterns in the distribution of volcanoes and earthquakes across Earth's surface.

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**What Do You Need?**

- Interactive software and hardware
- Computer
- Internet access
- Graph paper
- Ruler
- Pencil
- Tape

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**Earth's Moving Lithospheric Plates**

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**Chapter 1.1 — Where Are the Volcanoes and Earthquakes?**

**Classroom Activity**

Students complete a map to analyze and describe the distribution of volcanoes and earthquakes at global, regional, and local scales. They plot the latitude and longitude of the volcanoes and earthquakes closest to their community and make observations about the locations of future volcanic activity.
PROJECT-BASED LEARNING
Students are motivated to learn in the context of highly engaging and authentic “real-world” projects, many of which are community based. The projects guide instruction, serve to organize meaningful learning, and promote the excitement and joy of learning.

EVIDENCE-SUPPORTED REASONING
Students actively engage in science and engineering practices to deepen their understanding of core ideas. Students work together to define problems, conduct investigations, make models, use computational thinking, write explanations, and discuss and present findings.

TECHNOLOGY-ENHANCED EXPERIENCES
The EarthComm website provides Learning Through Technology investigations, referenced in numerous sections of the student edition, as well as access to real-time data, additional videos, animations, and resources from non-profit, educational institutions and federal agencies.

TOTAL SUPPORT FOR EDUCATORS
Activate Learning™ is committed to providing comprehensive support services for districts implementing EarthComm. Our highly experienced implementation specialists will lead workshops to get you started and follow-up sessions that provide additional content and pedagogical support, as well as online and onsite mentoring.

RESEARCH-BASED CURRICULUM
EarthComm was based on research from the cognitive and learning sciences on how people learn. It was partly funded through National Science Foundation support and was produced through the rigorous, iterative, research-based cycles established by the NSF development process.

Chapters in EarthComm:
Chapter 1 Plate Tectonics
Chapter 2 Minerals, Rocks, and Structures
Chapter 3 Surface Processes
Chapter 4 Winds, Oceans, Weather, and Climate
Chapter 5 Global Climate Change
Chapter 6 Earth’s Natural Resources
Chapter 7 Earth System Evolution
Chapter 8 Astronomy
Introducing the Third Edition of

EarthComm®
Project-Based Earth and Space System Science

Addressing the Next Generation Science Standards (NGSS) by integrating the three dimensions of learning science—science and engineering practices, disciplinary core ideas, and crosscutting concepts.

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Activate Learning

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