

Reading Public Schools

Instilling a joy of learning and inspiring the innovative leaders of tomorrow



Science Curriculum Guide

Grade 4

Theme: Matter and Energy

In Fourth Grade, student scientists...

- observe and interpret patterns related to the transfer of matter and energy on Earth, in physical interactions, and in organisms.
- learn about motion, transfer, and conversion of energy in different contexts.
- interpret patterns of change over time as related to deposition and erosion. They study landscapes of today for evidence of past processes.
- learn that animals' internal and external structures support life, growth, behavior, and reproduction.
- work through the engineering design process. They develop solutions through building, testing, and redesigning prototypes for a specific purpose.

MA Department of Education STE Curriculum Frameworks, 2016

Fourth Grade Content Standards

Earth and Space Science

- Earth's Place in the Universe
- Earth's Systems
- Earth and Human Activity

Life Science

- From Molecules to Organisms: Structures and Processes

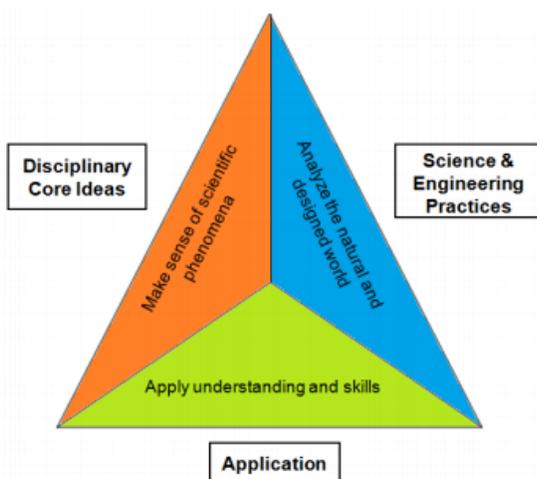
Physical Science

- Energy
- Waves and Their Applications in Technologies for Information Transfer

Technology/Engineering

- Engineering Design

Components of STE Standards



The STE standards are designed to include three interrelated components: conceptual understanding of disciplinary core ideas, science and engineering practices, and application to the natural and designed world.

MA Department of Education STE Curriculum Frameworks, 2016

Science and Engineering Practices

The practice standards describe behaviors that scientists engage in as they investigate, build models, and construct theories about the natural world. They are a set of practices that engineers use as they design and build models and systems to solve problems. They are the skills that provide the foundation for scientific and technical reasoning.

1. Ask Questions and Define Problems
2. Develop and Use Models
3. Plan and Carry Out Investigations
4. Analyze and Interpret Data
5. Use Mathematical and Computational Thinking
6. Construct Explanations and Design Solutions
7. Engage in Argument from Evidence
8. Obtain, Evaluate, and Communicate Information



Core Ideas	Essential Questions	Resources/ Instructional Tools
Earth & Space Science: Earth’s Place in the Universe	<ul style="list-style-type: none"> • What role has erosion and/or deposition played in the formation of the landscape? What evidence do you have to support your claim? 	Know Atom Unit(s): <ul style="list-style-type: none"> • Matter and Energy • Shaping Earth’s Surface
Earth & Space Science: Earth’s Systems	<ul style="list-style-type: none"> • How are rocks, soils and sediments impacted by weathering and erosion? • What do the patterns of mountain ranges, deep ocean trenches, volcanos, and earthquakes indicate about Earth’s boundaries? 	Know Atom Unit(s): <ul style="list-style-type: none"> • Shaping Earth’s Surface • Earth & Human Activity
Earth & Space Science: Earth and Human Activity	<ul style="list-style-type: none"> • Where do energy and fuels come from? • What makes an energy source renewable? • How would you evaluate solutions that might reduce impact of natural events? 	Know Atom Unit(s): <ul style="list-style-type: none"> • Shaping Earth’s Surface • Earth & Human Activity
Life Science: From Molecules to Organisms: Structures and Processes	<ul style="list-style-type: none"> • What is the impact of internal and external structures on animal and plant survival, growth, behavior and reproduction? 	Know Atom Unit(s): <ul style="list-style-type: none"> • Plant & Animal Structures • Organisms and Their Environment
Physical Science: Energy	<ul style="list-style-type: none"> • How does the speed of an object relate to the energy of the object? • How can energy be transferred from place to place? • What happens to energy when objects collide? • How can a device convert energy types or use energy to produce motion, light, or sound? 	Know Atom Unit(s): <ul style="list-style-type: none"> • Matter and Energy • Plant & Animal Structures • Energy Transfers • Electrical Energy • Sound Waves • Light and Communication
Physical Science: Waves and Their Applications in Technologies for Information Transfer	<ul style="list-style-type: none"> • What would a model look like that represents a mechanical wave showing patterns of motion and impacts on the movement of objects? • How must light behave for an object to be seen by the human eye? • How can information be transferred in a decodable pattern? 	Know Atom Unit(s): <ul style="list-style-type: none"> • Sound Waves • Light and Communication
Technology/Engineering Engineering Design	<ul style="list-style-type: none"> • How can you design, test, and revise a prototype? • How can you decide the strengths and weaknesses of a model or a prototype? 	Know Atom Unit(s): <ul style="list-style-type: none"> • Earth & Human Activity • Energy Transfers • Electrical Energy • Light and Communication

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Curriculum Guide Overview

Curriculum Guide	Curriculum guides are public documents that are aligned with the Massachusetts Department of Education Curriculum Frameworks. They focus on the set of standards that students will learn within certain disciplines at appropriate grade levels. Curriculum Guides are intended for teachers, parents, and the wider school community as an overview document of the course of study for the year.
Curriculum Map	Curriculum maps are internal documents utilized as planning tools for teachers. Curriculum maps keep a focus on the end-of-year standards and chart a course for the teaching and learning over the year. They are typically organized in a grade-level overview organized by month or marking period. Curriculum maps typically include; standards and expectations for the grade/content, essential skills/ concepts, methods of assessment, and major content resources. Maps are never “done” as ongoing work of educators include revisions, additions, and revisits to the maps. They provide an overview for the year while also allowing educators to see a vertical picture of how the content develops as students progress through each grade.
Theme	Each grade is focused on a grade-level theme that links the standards and all four Science, Technology, and Engineering disciplines together. The standards used as the foundation of our curriculum come directly from the Massachusetts Department of Education Curriculum Frameworks. State standards may be viewed here: http://www.doe.mass.edu/frameworks/
Content Standards	Content Standards describe what students should know and be able to do within each grade-level.
Science & Engineering Practices	While presented as distinct skill sets, the eight practices intentionally overlap and interconnect. These skills should be reflected in curricula and instruction that engage students in an integrated use of the practices.
Core Ideas	Core ideas are the “big ideas” within each discipline under which the specific standards are organized.
Essential Questions	Essential questions are questions that are not answerable with an easy answer or a simple instruction. The purpose of essential questions is to provide opportunities for inquiry into the learning and act as an umbrella to anchor the unit/lesson.
Resources/ Instructional Tools	Resources identified in Curriculum Guides are not intended to be exhaustive, nor are they intended to be prescriptive. The resources identified may function as a menu of curriculum resources from which educators identify the most appropriate tools to utilized in their classrooms. More specifics about identified resources are identified within the curriculum map documents.