Reading Public Schools

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

Science Curriculum Guide **Grade 6**

Course Description

The integration of Earth and space, life, and physical sciences with technology/engineering gives grade 6 students relevant and engaging opportunities with natural phenomena and design problems that highlight the relationship of structure and function in the world around them. Students relate structure and function through analyzing the macro- and microscopic world, such as Earth features and processes, the role of cells and anatomy in supporting living organisms, and properties of materials and waves. Students use models and provide evidence to make claims and explanations about structure-function relationships in different STE domains.

Sixth Grade Content Standards

Earth and Space Sciences

⇒ ESS1. Earth's Place in the Universe

⇒ ESS2. Earth's Systems

Life Science

⇒ LS1. From Molecules to Organisms: Structures and Processes

⇒ LS4. Biological Evolution: Unity and Diversity

Physical Science

⇒ PS1. Matter and Its Interactions

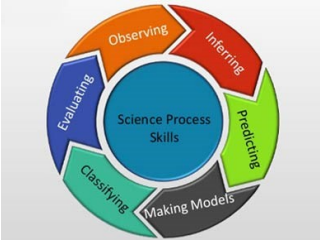
⇒ PS2. Motion and Stability: Forces and Interactions

⇒ PS4. Waves and Their Applications in Technologies for Information Transfer

Engineering/Technology

⇒ ETS1. Engineering Design

⇒ ETS2. Materials, Tools, and Manufacturing



Expectations: *What are the students doing?*

•Persisting when engaging with meaningful scientific tasks •Using information from observations to construct an evidence based account for natural phenomena •Constructing explanations using multiple sources of evidence

Instruction: *What are the students doing?*

•Asking questions that can be answered by investigation and predicting answers based on patterns •Drawing explicitly upon content they have learned in class in conversations with peers •Using mathematical skills to find patterns in large data sets

Assessment: *What are the students doing?*

•Demonstrating learning in multiple ways •Engaging in challenging learning tasks regardless of learning needs •Conducting investigations with multiple controlled variables and considering the accuracy of the data or the methods

Concepts	Essential Questions	Key Activities MAY Include
Earth & Space Science: Earth's place in the universe	• What causes lunar phases and eclipses of the Sun and Moon? • How do index fossils and rock layers help us determine the relative ages of rock formations? • How does the earth and solar system fit within our understanding of billions of galaxies in the universe?	• Universe models • Moon ball activity (phases and eclipses) • Index fossil activity • Rock layer activity • STEMscopes
Earth & Space Science: Earth's Systems	• Which types of evidence support that Earth's plates have moved great distances, collided, & spread apart ?	• Pangaea puzzle activity • STEMscopes
Life Science: From Molecules to Organisms: Structures & Processes	• What is the evidence that all organisms (unicellular & multicellular) are made up of cells? • How can you use a model to describe how parts of a cell contribute to the cellular functions? • What evidence can be used to explain that body systems interact to carry out essential functions of life?	• Cell analogy activity/project • Cells under microscopes—letter e, onion • Characteristics of life activity • Body system stations • System interactions writing assignment • STEMscopes
Life Science: Biological Evolution: Unity & Diversity	• How is the fossil record evidence of biological evolution? • How do anatomical structures support evolutionary relationships among & between fossils and modern organisms?	• Fossil stations • Branching diagrams activities • Evolution of objects • STEMscopes • Anatomical structure comparison activity
Physical Science: Matter & Its Interactions	• How do exothermic and endothermic reactions relate to the release and absorption of thermal energy? • How can you use a particle model of matter to explain and compare the densities of different materials? • How can mixtures of pure substances be separated by physical means?	• Reaction in a baggie • Mixture stations • Online density lab • Density lab/stations • Chemical reaction labs

Concepts	Essential Questions	Key Activities MAY Include
Physical Science Motion & Stability: Forces & Interactions	• What evidence supports that gravitational forces are attracted and only noticeable when there is a very large mass?	• Gravity on a sheet activity • PhET gravity simulation • Gravity Discussion
Physical Science Waves & Their Applications in Technologies for Information Transfer	• How do we understand the parts of a wave and what each term represents? • How can we use models to show that light rays and mechanical waves are reflected, absorbed, and transmitted through various materials?	• Wave Stations • Digital/Analog activity • Waves online simulation • Slinky activity
Tech/Engineering Engineering Design	• How do you ensure a successful solution of a design problem using criteria and constrains? • How do you apply scale and proportion to a visual representation of a design problem? • How do you communicate a design solution to an intended audience including features and limitations?	• Engineering Challenge • Design activity
Tech/Engineering Materials & Tools	• How can you analyze and compare the properties of various materials? • How can you select appropriate materials to construct a solution to a given task? • What tools do you choose to safely construct a prototype?	• Design activity

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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.
Standards	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/
Science and Engineering Practices	While presented as distinct skill sets, the eight practices intentionally overlap and interconnect. Skills such as those outlined above should be reflected in curricula and instruction that engage students in an integrated use of the practices.
Content Standards	The Content Standards describe what students should know and be able to do within each grade-level.
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	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.