

Correlation to Standards

Science and Engineering:

NY State Science and Technology Standards (MST)

Standard 1: Inquiry Students will use mathematical analysis, scientific inquiry, and engineering design, as appropriate, to pose questions, seek answers, and develop solutions.

Standard 4: Science, Physical Setting (PS)

Key Idea 4: Energy exists in many forms, and when these forms change energy is conserved.

Key Idea 5: Energy and matter interact through forces that result in changes in motion.

Standard 5: Technology Students will apply technological knowledge and skills to design, construct, use, and evaluate products and systems to satisfy human and environmental needs.

Standard 6: Interconnectedness: Common Themes

Key Idea 2: Models are simplified representations of objects, structures, or systems used in analysis, explanation, interpretation, or design.

Key Idea 6: In order to arrive at the best solution that meets criteria within constraints, it is often necessary to make trade-offs

Standard 7: Interdisciplinary Problem Solving

Key Idea 2: Strategies. Solving interdisciplinary problems involves a variety of skills and strategies, including effective work habits; gathering and processing information; generating and analyzing ideas; realizing ideas; making connections among the common themes of mathematics, science, and technology; and presenting results.

Next Generation Science Standards

Grade 3 3-PS2 Motion and Stability: Forces and Interactions

<http://www.nextgenscience.org/3ps2-motion-stability-forces-interactions>

Students who demonstrate understanding can:

3-PS2-1. Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object

3-PS2-2. Make observations and/or measurements of an object's motion to provide evidence that a pattern can be used to predict future motion.

Grade 4 4-PS3 Energy

<http://www.nextgenscience.org/4ps3-energy>

Students who demonstrate understanding can:

4-PS3-1. Use evidence to construct an explanation relating the speed of an object to the energy of that object.

4-PS3-3. Ask questions and predict outcomes about the changes in energy that occur when objects collide.

4-PS3-4. Apply scientific ideas to design, test, and refine a device that converts energy from one form to another.

Grade 5 5-PS2 Motion and Stability: Forces and Interactions

<http://www.nextgenscience.org/5ps2-motion-stability-forces-interactions>

Students who demonstrate understanding can:

5-PS2-1. Support an argument that the gravitational force exerted by Earth on objects is directed down.

Grades 3-5 3-5-ETS1 Engineering Design

<http://www.nextgenscience.org/3-5ets1-engineering-design>

Students who demonstrate understanding can:

3-5-ETS1-1. Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.

3-5-ETS1-2. Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

3-5-ETS1-3. Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

Middle School:

MS-PS2 Motion and Stability: Forces and Interactions

<http://www.nextgenscience.org/mgps2-motion-stability-forces-interactions>

Students who demonstrate understanding can:

MS-PS2-1. Apply Newton's Third Law to design a solution to a problem involving the motion of two colliding objects.*

MS-PS2-4. Construct and present arguments using evidence to support the claim that gravitational interactions are attractive and depend on the masses of interacting objects.

MS-PS2-5. Conduct an investigation and evaluate the experimental design to provide evidence that fields exist between objects exerting forces on each other even though the objects are not in contact.

MS-PS3 Energy

<http://www.nextgenscience.org/mgps3-energy>

Students who demonstrate understanding can:

MS-PS3-1. Construct and interpret graphical displays of data to describe the relationships of kinetic energy to the mass of an object and to the speed of an object.

MS-PS3-2. Develop a model to describe that when the arrangement of objects interacting at a distance changes, different amounts of potential energy are stored in the system.

MS-PS3-5. Construct, use, and present arguments to support the claim that when the kinetic energy of an object changes, energy is transferred to or from the object.

MS-ETS1 Engineering Design

<http://www.nextgenscience.org/msets1-engineering-design>

Students who demonstrate understanding can:

MS-ETS1-1. Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.

MS-ETS1-2. Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.

MS-ETS1-3. Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.

MS-ETS1-4. Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.

Scientific and Engineering Practices

Asking Questions and Defining Problems

Planning and Carrying Out Investigations

Analyzing and Interpreting Data

Developing and Using Models

Constructing Explanations and Designing Solutions

Engaging in Argument from Evidence

Using Mathematics and Computational Thinking

Obtaining, Evaluating, and Communicating Information

Disciplinary Core Ideas (DCIs)

PS2A: Forces and Motion

PS2B: Types of Interactions

PS3: Energy

ETS1: Engineering Design

Crosscutting Concepts

Patterns

Cause and effect: Mechanism and explanation

Systems and System Models

Energy and Matter: Flows, Cycles, and Conservation

Stability and Change

Common Core State Standards for English Language Arts and Literacy in History/Social Studies, Science, and Technical Subjects

(R,CRR,7) Reading:

#7 Integrate and evaluate content presented in diverse media and formats, including visually and quantitatively, as well as in words

(IR,PreK-5,7) Reading Standards for Informational Text:

Integration of Knowledge and Ideas

(W,CRR,2) Writing:

#2 Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content.

(SL,CCR,1,2,3) Speaking and Listening: Comprehension and Collaboration:

#1 Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.
#2 Integrate and evaluate information presented in diverse media and formats, including visually, quantitatively, and orally.

#3 Evaluate a speaker's point of view, reasoning, and use of evidence and rhetoric

(SL,CCR,4,6) Speaking and Listening: Presentation of Knowledge and Ideas:

#4 Present information, findings, and supporting evidence such that listeners can follow the line of reasoning and the organization, development, and style are appropriate to task, purpose, and audience.

#6 Adapt speech to a variety of contexts and communicative tasks, demonstrating command of formal English when indicated or appropriate.

(L,CCR,1) Language Conventions for Standard English

#1 Demonstrate command of the conventions of standard English grammar and usage when writing and speaking

(L,CCR,4) Vocabulary Acquisition and Use

#4 Determine or clarify the meaning of unknown and multiple-meaning words and phrases by using context clues, analyzing meaningful word parts, and consulting general and specialized reference materials, as appropriate.

Common Core State Standards for Mathematics

Standards for Mathematical Practice

- #1 Make sense of problems and persevere in solving them.
- #2 Reason abstractly and quantitatively.
- #3 Construct viable arguments and critique the reasoning of others.
- #4 Model with Mathematics.

#5 Use appropriate tools strategically.

Domains:

Grades 4,5:

Measurement and Data, 4.MD, 5.MD

Common Core Frame Work for Social Studies

Correlation with Content Sequence

- Grade 3 Communities around the World
- Grade 6 The Eastern Hemisphere

Standards:

- 3) Geography
- 4) Economics
- 5) Civics, Citizenship, and Government

Social Studies Practices

- 1) Gathering, Using, and Interpreting Evidence
- 2) Chronological Reasoning and Causation
- 3) Comparison and Contextualization
- 4) Geographic Reasoning
- 5) Economics and Economics Systems

Themes with Context

- 2) Development, Movement, and Interaction of Cultures
 - Cultural diffusion and change over time as facilitating different ideas and beliefs.
- 3) Time, Continuity, and Change

- Reading, reconstructing, and interpreting events
- Analyzing causes and consequences of events and developments

4) Geography, Humans, and the Environment

- Interactions between regions, locations, places, people, and environments
- Spatial patterns of place and location

6) Power, Authority, and Governance

- Conflict, diplomacy, and war

8) Creation, Expansion, and Interaction of Economic Systems

- Scarcity of resources and the challenges of meeting wants and needs

9) Science, Technology, and Innovation

- Scientific and intellectual theories, findings, discoveries, and philosophies
- Applications of science and innovations in transportation, communication, military technology, navigation, agriculture, and industrialization
- Relationship between science, technology, and innovation and social, cultural, and economic change

10) Global Connections and Exchange

- Past, current, and likely future global connections and interactions
- Cultural diffusion; the spread of ideas, beliefs, technology, and goods
- Role of technology

Career Development and Occupational Studies (CDOS)

Standard 1: Career Development

Students will be knowledgeable about the world of work, explore career options, and relate personal skills, aptitudes, and abilities to future career decisions.

Standard 2: Integrated Learning

Students will demonstrate how academic knowledge and skills are applied in the workplace and other settings.

Standard 3a: Universal Foundation Skills

Students will demonstrate mastery of the foundation skills and competencies essential for success in the workplace.