Subject Area: Physical Science
Grade Level: 8th
Bedminster Township School

Unit #: 1
Matter and Its Interactions

Dates: September - January	**Time Frame:** 15 weeks

Overview

In this unit, students will examine the basics of matter, including subunits of matter such as the atom and subatomic particles. A specific focus on the interactions of matter in both physical and chemical means as well as mechanisms that cause matter to change will be deeply studied. The presence of energy within all chemical systems will be examined in its many forms.

Enduring Understandings

- Atomic structure
- Periodic table
- States of Matter
- Kinetic molecular theory
- Physical and chemical properties
- Physical and chemical changes
- Endothermic changes
- Exothermic changes
- Molecule structure
- Elements, compounds, mixtures
- Solutions, acids, and bases
- Synthetic materials
- Balancing chemical equations
- Chemical reactions
- Law of Conservation of Mass

Skill and Knowledge Objectives

- Recognize and define the states of matter
- Determine the difference between physical and chemical changes
- Identify which changes are endothermic or exothermic
- Understand how the Periodic Table is organized
- Identify, calculate, and model the parts of an atom
- Understand how molecules and compounds are formed
- Determine the difference and model between an element, compound, and mixture
- Summarize the characteristics of a solution
- Explain the importance of the kinetic molecular theory
- Balance chemical equations
- Explain the Law of Conservation of Mass

Assessments

Pre-Assessment:

- Unit Pre Assessment
  - Modifications:
    - General Education (GenEd) Standard/Full version of the test
    - IEP / 504 - Limited multiple choice selections, choice of long-response essay, word bank for fill-ins
    - G&T - Extension questions, additional writing tasks, greater depth
    - At-Risk - Limit scope or number of higher-order thinking questions
    - MLL - Translate function available on Chromebook

Formative Assessment:

- Section quizzes (vocabulary, mathematical applications, homework), posters, models, lab activities and reports, Google Forms, Kahoot/Blooket review games, NGSS 3-dimensional performance tasks
  - Modifications:
    - General Education (GenEd)- Standard/Full version of the material
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Self-Reflection/Self-Assessment:

- Exit slips, self-reflection
  - Modifications:
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Summative Assessment:

- Unit Post Assessment, unit project
  - Modifications:
    - General Education (GenEd) Standard/Full version of test / full project requirements
    - IEP / 504 - Limited multiple choice selections, choice of long-response essay, word bank for fill-ins / simplified project requirements / frequent project check-ins to document progress
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Resources

- HMH, Science Fusion: *Matter*
- *IXL Science*
- *Teacher-created resources including presentations, activities, and assessments*
- *BrainPOP Science*
- *Various YouTube videos as selected and previewed by the teacher*

- *Newsela*
- Gizmo Science Simulations
- Middleschoolchemistry.com
- Readworks.org
- PhET Interactive Simulations
- NJ Student Learning Standards
- Read the Standards NGSS

Standards Addressed:

NJ Student Learning Standards for (Content Area):

MS-PS1: Matter and Its Interactions

- MS-PS1-1: Develop models to describe the atomic composition of simple molecules and extended structures.
- MS-PS1-2: Analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred.
- MS-PS1-3: Gather and make sense of information to describe that synthetic materials come from natural resources and impact society.
- MS-PS1-4: Develop a model that predicts and describes changes in particle motion, temperature, and state of a pure substance when thermal energy is added or removed.
- MS-PS1-5: Develop and use a model to describe how the total number of atoms does not change in a chemical reaction and thus mass is conserved.
- MS-PS1-6: Undertake a design project to construct, test, and modify a device that either releases or absorbs thermal energy by chemical processes.

NJSLS for Grades 6-8 (Reading Standards for Science and Technical Subjects - RST)

NJSLS.ELA-Literacy.RST.6-8:

- **RST.6-8.1:** Cite specific textual evidence to support analysis of science and technical texts.
- **RST.6-8.2:** Determine a text's central ideas or conclusions; provide an accurate summary distinct from prior knowledge or opinions.
- **RST.6-8.3:** Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.
- **RST.6-8.4:** Determine the meaning of symbols, key terms, and other domain-specific words and phrases used in a specific scientific or technical context.
- **RST.6-8.7:** Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).

RST.6-8.8: Distinguish among facts, reasoned judgment based on research findings, and speculation in a text.

Technology: NJSLS Computer Science and Design Thinking

8.1 Computer Science and Design Thinking Standards (Grades 6-8)

1. **8.1.8.A.1**
   Demonstrate knowledge of a real-world problem using digital tools.
2. **8.1.8.A.2**
   Create a document (e.g., newsletter, reports, flyers) that includes text, graphics, and other digital elements, using word processing software.
3. **8.1.8.B.1**
   Synthesize and publish information about a local or global issue or event (e.g., using a blog, podcast, or video) with peers and experts, using digital tools.
4. **8.1.8.C.1**
   Collaborate to develop and publish work that provides information or solutions to a problem, using digital tools and resources.
5. **8.1.8.D.1**
   Understand and model appropriate online behaviors related to cyber safety, cyberbullying, cyber security, and cyber ethics including appropriate use of social media.
6. **8.1.8.D.2**
   Demonstrate the application of appropriate citations to digital content.
7. **8.1.8.D.3**
   Demonstrate an understanding of fair use and Creative Commons to intellectual property.
8. **8.1.8.E.1**
   Gather and analyze findings using data collection technology to produce a possible solution for a content-related problem or issue.
9. **8.1.8.F.1** Explore a local issue, by using digital tools to collect and analyze data to identify a solution and make an informed decision.
10. **8.1.8.IC.1**: Analyze the impact of computing technologies on culture and society.
11. **8.1.8.AP.2**: Create programs that use algorithms to solve a given problem.
12. **8.1.8.DA.1**: Explain the importance of data collection and analysis in the real world.
13. **8.1.8.DA.2**: Organize and present data in a way that can be interpreted by others.
14. **8.1.8.NI.1**: Identify potential cybersecurity threats and ways to protect against them.

8.2 Design Thinking:

- **8.2.8.ED.1**: Define a design problem and identify criteria and constraints.
- **8.2.8.ED.2**: Develop and test a model of a proposed solution.
- **8.2.8.ETW.1**: Compare how different technologies impact the environment.
- **8.2.8.EC.1**. Explain how ethics influence design and engineering decisions.

<u>NJ Student Learning Standards for Mathematics:</u>
8.EE.B.5 Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways. Calculating human population growth rate and graphing population data.

Financial Literacy: NJSLS Career Readiness, Life Literacies, and Key Skills

9.1 Personal Financial Literacy:

- **9.1.8.PB.1**: Relate the concept of financial choices to personal financial well-being.

- **9.1.8.PB.2**: Explain how spending choices and decisions impact future opportunities.
- **9.1.8.PB.3**: Create a personal budget to assess spending and saving plans.
- **9.1.8.PB.4**: Relate consumer decisions to personal financial success.
- **9.1.8.FP.1**: Describe the impact of inflation on purchasing power.
- **9.1.8.FP.2**: Evaluate the benefits of saving versus spending.
- **9.1.8.RM.1**: Analyze the purpose and forms of financial risk management.
- **9.1.8.CP.1**: Compare financial products and services.
- **9.1.8.EG.1**: Explain how earning power and working conditions impact personal financial decisions.

NJSLS - Career Readiness, Life Literacies, and Key Skills

- **9.4.8.CI.3**: Investigate new challenges and opportunities for personal growth, advancement, and transition.
- **9.4.8.CT.2**: Develop multiple solutions to solve a problem and evaluate short- and long-term consequences to determine the most appropriate solution.
- **9.4.8.DC.7**: Assess the impact of using a digital tool on personal and professional ethics.
- **9.4.8.TL.3**: Select appropriate tools to organize and present information digitally for different purposes.
- **9.4.8.IML.7**: Evaluate digital sources to determine the credibility and relevance of information needed for a specific problem or question.
- **9.4.8.GCA.2**: Demonstrate openness to diverse ideas and perspectives through active discussion to achieve a group goal.

Social and Emotional Competencies - activities/topics

1. Self-Awareness

- Recognizing one's emotions and thoughts and their influence on behavior.
- Accurately assessing one's strengths and limitations, with a well-grounded sense of confidence and optimism.
- Identifying and labeling one's emotions.
- Recognizing personal traits, interests, and values.
- A sense of self-efficacy and optimism.

2. Self-Management

- Regulating one's emotions, thoughts, and behaviors in different situations.
- Managing stress, controlling impulses, and motivating oneself.
- Setting and working toward personal and academic goals.
- Demonstrating self-discipline and organizational skills.
- Using strategies for managing stress and overcoming challenges.

3. Social Awareness

- Showing understanding and empathy for others.
- Understanding social norms for behavior.
- Recognizing family, school, and community resources and supports.

- Respecting others and appreciating diversity in terms of cultural and social differences.
- Demonstrating consideration for and respecting others' perspectives.

4. Relationship Skills

- Establishing and maintaining healthy and rewarding relationships with diverse individuals and groups.
- Communicating, listening actively, and cooperating with others.
- Resisting inappropriate social pressure, negotiating conflict constructively, and seeking and offering help when needed.
- Developing positive peer relationships and resolving interpersonal conflicts constructively.

5. Responsible Decision-Making

- Making constructive and respectful choices about personal behavior and social interactions based on ethical standards, safety concerns, and social norms.
- Evaluating the consequences of one's actions and considering the well-being of oneself and others.
- Developing problem-solving skills and critical thinking.
- Reflecting on experiences and learning from them.

LGBTQ Awareness Infusion:

Discuss scientific research as non-discriminate toward anyone's gender, sexual preference, etc. Always let the data tell the story- all viewpoints are accepted!

Differentiation and Accommodations

Differentiate Instruction, depending on individual student needs (students with an IEP, 504, or Intervention Plan; ELL Students; Students At Risk; Gifted Students) **by:**

Presentation Accommodations

- Use alternate texts at lower readability level
- Work with fewer items per page or line and/or materials in a larger print size
- Use magnification device, screen reader, or Braille / Nemeth Code
- Use audio amplification device (e.g., hearing aid(s), auditory trainer, sound-field system (which may require teacher use of microphone)
- Be given a written list of instructions
- Record a lesson, instead of taking notes
- Have another student share class notes with him
- Be given an outline of a lesson
- Be given a copy of the teacher's lecture notes
- Be given a study guide to assist in preparing for assessments
- Use visual presentations of verbal material, such as word webs and visual organizers
- Use manipulatives to teach or demonstrate concepts

Response Accommodations

- Use sign language, a communication device, Braille, other technology, or a native language other than English
- Dictate answers to a scribe
- Capture responses on an audio recorder
- Use a spelling dictionary or electronic spell-checker
- Use a word processor to type notes or give responses in class

Setting Accommodations

- Work or take a test in a different setting, such as a quiet room with few distractions
- Sit where he learns best (for example, near the teacher & away from distractions)
- Use special lighting or acoustics
- Take a test in a small group setting
- Use sensory tools such as an exercise band that can be looped around a chair's legs (so fidgety kids can kick it and quietly get their energy out)
- Use noise buffers such as headphones, earphones, or earplugs

Timing Accommodations

- Take more time to complete a task or a test
- Have extra time to process oral information and directions
- Take frequent breaks, such as after completing a task

Scheduling Accommodations

- Take more time to complete a project
- Take a test in several timed sessions or over several days
- Take sections of a test in a different order
- Take a test at a specific time of day

Organization Skills Accommodations

- Use an alarm to help with time management
- Mark texts with a highlighter

Assignment Modifications

- Answer fewer or different test questions
- Create alternate projects or assignments

Curriculum Modifications

- Learn different material (such as continuing to work on multiplication while classmates move on to fractions, or moving ahead to an extension concept/skill while classmates continue to work on a core skill)
- Get graded or assessed using a different standard than the one for a classmate

IEP/504/At-Risk/Danger of Failing:

- Pass/Fail option on some assignments

- May waive "enrichment" assignments

ELL modifications: Utilize native language terms that relate to a current topic as being studied in this course (such as Latin root words for concepts and/or vocabulary terms).

G + T Students: In-depth research assignments or extension activities

- Types of chemical reactions
- Discuss the use of combustion reactions for heating purposes or motor vehicles and the climate impact of using such as sources of usable energy

Subject Area: Science
Grade Level: 8th
Bedminster Township School

Unit #: 2
Motion and Stability

Dates: January - April	**Time Frame:** 12 weeks

Overview

This unit is focused on fostering students' understanding of how forces affect the motion of objects and the interactions between them. This core idea is broken down into two primary components: Forces and Motion, and Types of Interactions. In the Forces and Motion section, students identify Newton's first, second, and third laws, as well as the application of balanced and unbalanced forces. Upon mastery, students will focus on different kinds of forces and interactions, and how they operate over a distance; including Gravitational forces, Electromagnetic forces, and Friction / Air Resistance.

Enduring Understandings

- Motion, speed, velocity
- Acceleration
- Momentum
- Friction
- Forces (balanced vs. unbalanced)
- Newton's Laws of Motion
- Gravity
- Mass vs. weight
- Work and power
- Fluids and pressure
- Magnetic and electric forces

Skill and Knowledge Objectives

- Define and calculate speed, velocity, and acceleration
- Graph motion

- Investigate the factors that affect friction
- Calculate net force and determine if an object is in motion
- Explain Newton's Laws of Motion
- Explain how gravity can be increased or decreased
- Explain the difference between mass and weight
- Manipulate the strength of a magnetic field

Assessments

Pre-Assessment:

- Unit Pre Assessment
  - Modifications:
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Resources

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- *Teacher-created resources including presentations, activities, and assessments*
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- *Newsela*
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- Drskateboardscience.com
- Physics Classroom
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Cross-cutting Concepts and Standards Addressed:

NJ Student Learning Standards for (Content Area):

- **MS-PS2: Motion and Stability: Forces and Interactions**
  - MS-PS2-1: Apply Newton's Third Law to design a solution to a problem involving the motion of two colliding objects.
  - MS-PS2-2: Plan an investigation to provide evidence that the change in an object's motion depends on the sum of the forces on the object and the mass of the object.
  - MS-PS2-3: Ask questions about data to determine the factors that affect the strength of electric and magnetic forces.
  - 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**
  - 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-PS3-3: Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer.
  - MS-PS3-4: Plan an investigation to determine the relationships among the energy transferred, the type of matter, the mass, and the change in the average kinetic energy of the particles as measured by the temperature of the sample.
  - 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.

Engineering, Technology, and Applications of Science (ETS)

- **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.
- **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.

Technology: NJSLS Computer Science and Design Thinking

These standards focus on building students' understanding of technology, computational thinking, and digital literacy.

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Financial Literacy: NJSLS Career Readiness, Life Literacies, and Key Skills

These standards focus on helping students develop financial literacy skills, responsible decision-making, and career planning.

9.1 Personal Financial Literacy.

- **9.1.8.PB.1**: Relate the concept of financial choices to personal financial well-being.
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NJSLS - Career Readiness, Life Literacies, and Key Skills

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SEL Competencies

1. Self-Awareness

- Recognizing one's emotions and thoughts and their influence on behavior.
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- Identifying and labeling one's emotions.
- Recognizing personal traits, interests, and values.
- A sense of self-efficacy and optimism.

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3. Social Awareness

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- Recognizing family, school, and community resources and supports.
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- Demonstrating consideration for and respecting others' perspectives.

4. Relationship Skills

- Establishing and maintaining healthy and rewarding relationships with diverse individuals and groups.
- Communicating, listening actively, and cooperating with others.
- Resisting inappropriate social pressure, negotiating conflict constructively, and seeking and offering help when needed.
- Developing positive peer relationships and resolving interpersonal conflicts constructively.

5. Responsible Decision-Making

- Making constructive and respectful choices about personal behavior and social interactions based on ethical standards, safety concerns, and social norms.
- Evaluating the consequences of one's actions and considering the well-being of oneself and others.
- Developing problem-solving skills and critical thinking.
- Reflecting on experiences and learning from them.

LGBTQ Awareness Infusion:

Discuss scientific research as non-discriminate toward anyone's gender, sexual preference, etc.
Always let the data tell the story- all viewpoints accepted

Differentiation and Accommodations:

Differentiate Instruction, depending on individual student needs (students with an IEP, 504, or Intervention Plan; ELL Students; Students At Risk; Gifted Students) **by:**

Presentation Accommodations

- Use alternate texts at lower readability level
- Work with fewer items per page or line and/or materials in a larger print size
- Use magnification device, screen reader, or Braille / Nemeth Code
- Use audio amplification device (e.g., hearing aid(s), auditory trainer, sound-field system (which may require teacher use of microphone)
- Be given a written list of instructions
- Record a lesson, instead of taking notes
- Have another student share class notes with him
- Be given an outline of a lesson
- Be given a copy of the teacher's lecture notes
- Be given a study guide to assist in preparing for assessments
- Use visual presentations of verbal material, such as word webs and visual organizers
- Use manipulatives to teach or demonstrate concepts

Response Accommodations

- Use sign language, a communication device, Braille, other technology, or a native language other than English
- Dictate answers to a scribe
- Capture responses on an audio recorder
- Use a spelling dictionary or electronic spell-checker
- Use a word processor to type notes or give responses in class

Setting Accommodations

- Work or take a test in a different setting, such as a quiet room with few distractions
- Sit where he learns best (for example, near the teacher & away from distractions)
- Use special lighting or acoustics
- Take a test in a small group setting
- Use sensory tools such as an exercise band that can be looped around a chair's legs (so fidgety kids can kick it and quietly get their energy out)
- Use noise buffers such as headphones, earphones, or earplugs

Timing Accommodations

- Take more time to complete a task or a test
- Have extra time to process oral information and directions
- Take frequent breaks, such as after completing a task

Scheduling Accommodations

- Take more time to complete a project
- Take a test in several timed sessions or over several days
- Take sections of a test in a different order
- Take a test at a specific time of day

Organization Skills Accommodations

- Use an alarm to help with time management
- Mark texts with a highlighter

Assignment Modifications

- Answer fewer or different test questions
- Create alternate projects or assignments

Curriculum Modifications

- Learn different material (such as continuing to work on multiplication while classmates move on to fractions, or moving ahead to an extension concept/skill while classmates continue to work on a core skill)
- Get graded or assessed using a different standard than the one for a classmate

IEP/504/At-Risk/Danger of Failing:

- Pass/Fail option on some assignments
- May waive "enrichment" assignments

ELL modifications: Utilize native language terms that relate to a current topic studied in this course (such as unit vocabulary).

Subject Area: Science
Grade Level: 8th
Bedminster Township School

Unit #: 3
Energy

Dates: April-June	**Time Frame:** 8 weeks

Overview

In this unit, students will examine forms of energy, how it is transferred, and how it is utilized by living and nonliving things / the environment. Students will also understand that energy cannot be created or destroyed but is transferred between objects or systems. This includes concepts of potential and kinetic energy and their transfer in different scenarios, such as mechanical systems, collisions, and roller coasters. This also includes how energy can be transferred by heat, sound, light, and electricity. Students also explore how energy is connected to the forces acting on objects, including gravitational, electrical, and magnetic forces, and how energy changes can affect the motion of objects and systems. Finally, the role of Energy in chemical processes of everyday life is identified as well as the energy for civilization, both renewable and non-renewable.

Enduring Understandings

- Kinetic vs. potential vs. thermal
- Energy forms and transformations
- Temperature

- Methods of heat transfer
- Conservation of energy
- Renewable and nonrenewable resources
- Alternative energies
- Role of energy production and resulting climate change
- Rate of production of greenhouse gases from certain types of energy generation
- Role of mechanical advantage when optimizing renewable energy resources

Skill and Knowledge Objectives

- Predict what happens to the material when energy is transferred to it
- Identify the difference between heat and temperature
- Explain how heat is conserved in a system
- Determine and explain how heat is transferred from one system to another
- Identify renewable and non-renewable energy sources
- Explain the efficiency of renewable and non-renewable energy sources
- Examine the method of production and cost thereof for alternative energy endeavors

Assessments

Pre-Assessment:

- Unit Pre Assessment
  - Modifications:
    - General Education (GenEd) Standard/Full version of test
    - IEP / 504 - Limited multiple choice selections, choice of long-response essay, word bank for fill-ins
    - G&T - Extension questions, additional writing tasks, greater depth
    - At-Risk - Limit scope or number of higher-order thinking questions
    - MLL - Translate function available on Chromebook

Formative Assessment:

- Section quizzes (vocabulary, mathematical applications, homework), posters, models, lab activities and reports, Google Forms, Kahoot/Blooket review games, NGSS 3-dimensional performance tasks
  - Modifications:
    - General Education (GenEd)- Standard/Full version of material
    - IEP / 504 - Basic skills and concepts only (not responsible for enrichment content)
    - G&T- Addition of greater depth, extension-related material
    - At-Risk- Basic skills and concepts only (not responsible for enrichment content)
    - MLL - Translate function available on Chromebook, word bank of cognates / similar native language words provided

Self-Reflection/Self-Assessment:

- Exit slips, self-reflection
  - Modifications:
    - General Education (GenEd)- Standard/Full version of material
    - IEP / 504 - Simplify exit slip to one concept if necessary / provide multiple choice
    - G&T - Responsible for additional material / extension topics as well as basics/main concepts
    - At-Risk- Simplify exit slip to one concept if necessary / provide multiple choice
    - MLL - Translate function available on Chromebook

Summative Assessment:

- Unit Post Assessment, unit project
  - Modifications:
    - General Education (GenEd) Standard/Full version of test / full project requirements
    - IEP / 504 - Limited multiple choice selections, choice of long-response essay, word bank for fill-ins / simplified project requirements / frequent project check-ins to document progress
    - G&T - Extension questions, additional writing tasks, greater depth / additional components to project
    - At-Risk - Limit scope or number of higher-order thinking questions, limit multiple-choice selections, choice of long-response essay, word bank for fill-ins / simplified project requirements / frequent project check-ins to document progress
    - MLL - Translate function available on Chromebook, word bank of cognates / similar native language words provided / project directions and requirements provided in native language

Resources

- HMH, Science Fusion: *Motion, Forces, and Energy*
- *IXL Science*
- *Teacher-created resources including presentations, activities, and assessments*
- *BrainPOP Science*
- *Various YouTube videos as selected and previewed by the teacher*
- *Newsela*
- Gizmos Science Simulations
- Readworks.org
- PhET Interactive Simulations
- NJ Student Learning Standards
- Read the Standards NGSS

Standards Addressed:

NJ SLS- Science:

Physical Science (PS)

- **MS-PS3: Energy**
  - MS-PS3-1: Construct and interpret graphical displays of data to describe the relationships of kinetic energy to the mass of an object and 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-PS3-3: Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer.
  - MS-PS3-4: Plan an investigation to determine the relationships among the energy transferred, the type of matter, the mass, and the change in the average kinetic energy of the particles as measured by the temperature of the sample.
  - 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-PS4: Waves and Their Applications in Technologies for Information Transfer**
  - MS-PS4-1: Use mathematical representations to describe a simple model for waves that includes how the amplitude of a wave is related to the energy in a wave.
  - MS-PS4-2: Develop and use a model to describe that waves are reflected, absorbed, or transmitted through various materials.

- MS-PS4-3: Integrate qualitative scientific and technical information to support the claim that digitized signals are a more reliable way to encode and transmit information than analog signals.

Engineering, Technology, and Applications of Science (ETS)

- **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.
- **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.

Technology: NJSLS Computer Science and Design Thinking

These standards focus on building students' understanding of technology, computational thinking, and digital literacy.

8.1 Computer Science and Design Thinking Standards (Grades 6-8)

1. **8.1.8.A.1**
   Demonstrate knowledge of a real-world problem using digital tools.
2. **8.1.8.A.2**
   Create a document (e.g., newsletter, reports, flyers) that includes text, graphics, and other digital elements using word processing software.
3. **8.1.8.B.1**
   Synthesize and publish information about a local or global issue or event (e.g., using a blog, podcast, or video) with peers and experts, using digital tools.
4. **8.1.8.C.1**
   Collaborate to develop and publish work that provides information or solutions to a problem, using digital tools and resources.
5. **8.1.8.D.1**
   Understand and model appropriate online behaviors related to cyber safety, cyberbullying, cyber security, and cyber ethics including appropriate use of social media.
6. **8.1.8.D.2**
   Demonstrate the application of appropriate citations to digital content.
7. **8.1.8.D.3**
   Demonstrate an understanding of fair use and Creative Commons to intellectual property.
8. **8.1.8.E.1**
   Gather and analyze findings using data collection technology to produce a possible solution for a content-related problem or issue.
9. **8.1.8.F.1** Explore a local issue, by using digital tools to collect and analyze data to identify a solution and make an informed decision.

10. **8.1.8.IC.1**: Analyze the impact of computing technologies on culture and society.
11. **8.1.8.AP.2**: Create programs that use algorithms to solve a given problem.
12. **8.1.8.DA.1**: Explain the importance of data collection and analysis in the real world.
13. **8.1.8.DA.2**: Organize and present data in a way that can be interpreted by others.
14. **8.1.8.NI.1**: Identify potential cybersecurity threats and ways to protect against them.

8.2 Design Thinking:

- **8.2.8.ED.1**: Define a design problem and identify criteria and constraints.
- **8.2.8.ED.2**: Develop and test a model of a proposed solution.
- **8.2.8.ETW.1**: Compare how different technologies impact the environment.
- **8.2.8.EC.1**: Explain how ethics influence design and engineering decisions.

NJSLS for Grades 6-8 (Reading Standards for Science and Technical Subjects - RST)

NJSLS.ELA-Literacy.RST.6-8:

- **RST.6-8.1:** Cite specific textual evidence to support analysis of science and technical texts.
- **RST.6-8.2:** Determine the central ideas or conclusions of a text; provide an accurate summary distinct from prior knowledge or opinions.
- **RST.6-8.3:** Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.
- **RST.6-8.4:** Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context.
- **RST.6-8.7:** Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).
- **RST.6-8.8:** Distinguish among facts, reasoned judgment based on research findings, and speculation in a text.

Financial Literacy: NJSLS Career Readiness, Life Literacies, and Key Skills

These standards focus on helping students develop financial literacy skills, responsible decision-making, and career planning.

9.1 Personal Financial Literacy:

- **9.1.8.PB.1**: Relate the concept of financial choices to personal financial well-being.
- **9.1.8.PB.2**: Explain how spending choices and decisions impact future opportunities.
- **9.1.8.PB.3**: Create a personal budget to assess spending and saving plans.
- **9.1.8.PB.4**: Relate consumer decisions to personal financial success.
- **9.1.8.FP.1**: Describe the impact of inflation on purchasing power.
- **9.1.8.FP.2**: Evaluate the benefits of saving versus spending.
- **9.1.8.RM.1**: Analyze the purpose and forms of financial risk management.
- **9.1.8.CP.1**: Compare financial products and services.
- **9.1.8.EG.1**: Explain how earning power and working conditions impact personal financial decisions.

NJSLS - Career Readiness, Life Literacies, and Key Skills

- **9.4.8.CI.3**: Investigate new challenges and opportunities for personal growth, advancement, and transition.
- **9.4.8.CT.2**: Develop multiple solutions to solve a problem and evaluate short- and long-term consequences to determine the most appropriate solution.
- **9.4.8.DC.7**: Assess the impact of using a digital tool on personal and professional ethics.
- **9.4.8.TL.3**: Select appropriate tools to organize and present information digitally for different purposes.
- **9.4.8.IML.7**: Evaluate digital sources to determine the credibility and relevance of information needed for a specific problem or question.
- **9.4.8.GCA.2**: Demonstrate openness to diverse ideas and perspectives through active discussion to achieve a group goal.

SEL Competencies:

1. Self-Awareness

- Recognizing one's emotions and thoughts and their influence on behavior.
- Accurately assessing one's strengths and limitations, with a well-grounded sense of confidence and optimism.
- Identifying and labeling one's emotions.
- Recognizing personal traits, interests, and values
- A sense of self-efficacy and optimism.

2. Self-Management

- Regulating one's emotions, thoughts, and behaviors in different situations.
- Managing stress, controlling impulses, and motivating oneself.
- Setting and working toward personal and academic goals.
- Demonstrating self-discipline and organizational skills.
- Using strategies for managing stress and overcoming challenges.

3. Social Awareness

- Showing understanding and empathy for others.
- Understanding social norms for behavior.
- Recognizing family, school, and community resources and supports.
- Respecting others and appreciating diversity in terms of cultural and social differences.
- Demonstrating consideration for and respecting others' perspectives.

4. Relationship Skills

- Establishing and maintaining healthy and rewarding relationships with diverse individuals and groups.
- Communicating, listening actively, and cooperating with others.

- Resisting inappropriate social pressure, negotiating conflict constructively, and seeking and offering help when needed.
- Developing positive peer relationships and resolving interpersonal conflicts constructively.

5. Responsible Decision-Making

- Making constructive and respectful choices about personal behavior and social interactions based on ethical standards, safety concerns, and social norms.
- Evaluating the consequences of one's actions and considering the well-being of oneself and others.
- Developing problem-solving skills and critical thinking.
- Reflecting on experiences and learning from them.

LGBTQ Awareness Infusion:

Discuss scientific research as non-discriminate toward anyone's gender sexual preference, etc. Always let the data tell the story- all viewpoints accepted

Differentiation and Accommodations:

Differentiate Instruction, depending on individual student needs (students with an IEP, 504, or Intervention Plan; ELL Students; Students At Risk; Gifted Students) **by:**

Presentation Accommodations

- Use alternate texts at lower readability level
- Work with fewer items per page or line and/or materials in a larger print size
- Use magnification device, screen reader, or Braille / Nemeth Code
- Use audio amplification device (e.g., hearing aid(s), auditory trainer, sound-field system (which may require teacher use of microphone)
- Be given a written list of instructions
- Record a lesson, instead of taking notes
- Have another student share class notes with him
- Be given an outline of a lesson
- Be given a copy of teacher's lecture notes
- Be given a study guide to assist in preparing for assessments
- Use visual presentations of verbal material, such as word webs and visual organizers
- Use manipulatives to teach or demonstrate concepts

Response Accommodations

- Use sign language, a communication device, Braille, other technology, or native language other than English
- Dictate answers to a scribe
- Capture responses on an audio recorder
- Use a spelling dictionary or electronic spell-checker
- Use a word processor to type notes or give responses in class

Setting Accommodations

- Work or take a test in a different setting, such as a quiet room with few distractions
- Sit where he learns best (for example, near the teacher & away from distractions)
- Use special lighting or acoustics

- Take a test in a small group setting
- Use sensory tools such as an exercise band that can be looped around a chair's legs (so fidgety kids can kick it and quietly get their energy out)
- Use noise buffers such as headphones, earphones, or earplugs

Timing Accommodations

- Take more time to complete a task or a test
- Have extra time to process oral information and directions
- Take frequent breaks, such as after completing a task

Scheduling Accommodations

- Take more time to complete a project
- Take a test in several timed sessions or over several days
- Take sections of a test in a different order
- Take a test at a specific time of day

Organization Skills Accommodations

- Use an alarm to help with time management
- Mark texts with a highlighter

Assignment Modifications

- Answer fewer or different test questions
- Create alternate projects or assignments

Curriculum Modifications

- Learn different material (such as continuing to work on multiplication while classmates move on to fractions, or moving ahead to an extension concept/skill while classmates continue to work on a core skill)
- Get graded or assessed using a different standard than the one for a classmate

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- Pass/Fail option on some assignments
- May waive "enrichment" assignments

ELL modifications: Utilize native language terms that relate to a current topic being studied in this course (such as forms of energy and types of fuel).