Orange Public Schools

Office of Curriculum & Instruction

2019-2020 Science Curriculum Guide

Grade 6

Module 1B: Energy- Types of Interactions

October 21, 2019 – November 27, 2020

Board Approved: 1.14.2020

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Table of Contents

GRADE 6 Yearlong Scope and Sequence by Instructional Weeks

Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12

UNIT 1 – Physical Science (Sept 9th – Nov 27th)

TOPIC 1 FORCE AND MOTION (6 Weeks)
Students use systems, system models, stability, and change to understanding ideas related to why some objects will keep moving and why other objects fall to the ground.

TOPIC 2 TYPES OF INTERACTIONS (6 Weeks)
In this unit, students use the practices of analyzing and interpreting data, developing and using models, and engaging in argument from evidence to make sense of the relationship between energy and forces.

Week 13	Week 14	Week 15	Week 16	Week 17	Week 18	Week 19	Week 20	Week 21	Week 22	Week 23	Week 24

UNIT 2 – Earth Science (Dec 2nd – Feb 14th)

TOPIC 1 ASTRONOMY (5 Weeks)
This unit is broken down into three sub-ideas: the universe and its stars, Earth and the solar system, and the history of planet Earth. Students examine the Earth's place in relation to the solar system, the Milky Way galaxy, and the universe.

TOPIC 2 WEATHER AND CLIMATE (4 Weeks)
This unit is broken down into three sub-ideas: Earth's large-scale systems interactions, the roles of water in Earth's surface processes, and weather and climate.

Unit 3 – Life Science Feb 24th – Jun 12th

TOPIC 1 Growth Development and Reproduction of Organisms (5 Weeks)
Students use data and conceptual models to understand how the environment and genetic factors

Week 25	Week 26	Week 27	Week 28	Week 29	Week 30	Week 31	Week 32	Week 33	Week 34	Week 35	Week 36

Unit 3 – Life Science (Feb 24th – Jun 12th)

TOPIC 1 Growth Dev and Rep of Organisms (5 Weeks)
Students use data and conceptual models to understand how the environment and genetic factors determine the growth of an individual organism

TOPIC 2 Matter and Energy in Organisms and Ecosystems (5 weeks)
Students analyze and interpret data, develop models, construct arguments, and demonstrate a deeper understanding of the cycling of matter, the flow of energy, and resources in ecosystems. They are able to study patterns of interactions among organisms within an ecosystem.

TOPIC 3 Interdependent Relationships in Ecosystems (5 Weeks)
Students build on their understanding of the transfer of matter and energy as they study patterns of interactions among organisms within an ecosystem. They consider biotic and abiotic factors in an ecosystem and the effects these factors have on a population.

Week 37	Week 38	Week 38	Week 40	Week 41	Week 42	Week 43					

UNIT 4 Engineering Design (June 15th – 26th)

TOPIC 1 ENGINEERING DESIGN PROCESS (2 Weeks)

Grade 6 Course Overview:

This is a hands-on course in which science concepts are taught to 6th grade students in a 3-dimensional manner guided by the NJSLS. We will focus on studying concepts related to physical science, specifically Motion and Stability: Forces and Interactions and Energy. The purpose of this course is to have students develop, model, and carry out investigations related to these topics by using strategies aligned with the New Jersey Student Learning Standards and the Next Generation Science Standards (MS-PS2 and MS-PS3).

Students will focus on the following

- interaction of force and mass
- explaining and applying Newton's laws of motion.
- gravity
- straight line motion
- kinetic and potential energy

Physical Science Unit 1B: Energy – Types of Interactions

Unit Summary:

In this unit, students use the practices of *analyzing and interpreting data*, *developing and using models*, and *engaging in argument from evidence* to make sense of the relationship between energy and forces.

Students:

- Are introduced to gravitational potential energy and use a ball falling into sand to investigate how the mass or height of an object relates to potential and kinetic energy.
- Develop a model to describe the energy of a system and use experimental evidence to support the claim that an energy transfer is responsible for changes in kinetic energy.
- Develop their understanding of important qualitative ideas about the conservation of energy. Students understand that objects that are moving have kinetic energy and that objects may also contain stored (potential) energy, depending on their relative positions.
- Predict the motion of a dynamic car following a collision with a car of the same mass and a car of a different mass.
- Apply the law of conservation of energy to explain energy transfer during a collision, develop a model to describe the total energy of the system, and apply Newton's three laws to explain the outcome of a collision.
- Use foam pipe insulation to build a basic roller coaster that transforms gravitational potential energy into kinetic energy and can be used

to test roller coaster design elements.

- Construct a roller coaster that accomplishes a design challenge by defining criteria and constraints, evaluating competing design solutions, and testing and refining designs to optimize roller coaster performance.
- Based on MS-PS3-1 and MS-PS3-2.

Related Phenomena:

https://www.ngssphenomena.com/#/slinky-free-fall/

https://www.ngssphenomena.com/#/magnetic-rotation/

Additional Phenomena Resources

#Project Phonomena

https://sites.google.com/site/sciencephenomena/

Phenomena for NGSS

https://www.ngssphenomena.com/how-to-use-phenomena

The Wonder of Science – Phenomena

https://thewonderofscience.com/phenomenal

Sunrise Science (a collection of fee websites)

http://sunrisescience.blog/free-websites-ngss-anchoring-phenomena/

Teaching Channel – Phenomena

https://www.teachingchannel.org/video/using-phenomena-achieve

STEM Scopes – Developing Student Inquiry Through Phenomena

https://www.stemscopes.com/phenomena

Essential Questions:	Enduring Understandings:
○ What do you know about energy, forces, and motion? ○ Why do objects speed up, slow down, or change direction? ○ How can magnets affect motion? ○ How can we predict if the motion of an object will change or stay the same? ○ How can gravity affect the motion of objects on Earth? ○ How would a ball move if you threw it in space? ○ What happens to energy when two objects collide? ○ How is energy transferred and conserved? ○ What is the relationship between the kinetic energy of an object and its velocity and mass? ○ How is kinetic energy transformed into potential energy? ○ What are some real-world examples that illustrate the relationship between kinetic energy and potential energy? ○ How can one explain and predict interactions between objects and within systems of objects? ○ How can one predict an object's continued motion, changes in motion, or stability? ○ What happens when two unbalanced forces act on an object? ○ What kinds of forces can act on an object?	○ Energy can change form and be transferred between objects. ○ Change in motion depends on the sum of the forces on an object and its mass. ○ Collisions can transfer energy between objects and cause changes in motion. ○ Various factors affect the strength of magnetic force. ○ Graphs show changes in an object's motion ○ Energy can change form and be transferred between objects. ○ Change in motion depends on the sum of the forces on an object and its mass. ○ Collisions can transfer energy between objects and cause changes in motion. ○ Speed is one factor used to describe an object's motion. ○ Speed is a rate. ○ Average speed is the distance traveled divided by the time to travel that distance. ○ A description of motion depends on the location of the observer. ○ The net force on an object is the sum of all forces on the object.

- How does the mass of an object affect the outcome when an unbalanced force acts on it?
- How does an object behave when no unbalanced force is applied to it, and why?
- How are force, mass, and acceleration related?
- How can a force pushing in one direction cause movement in the opposite direction?
- How do objects at rest and in motion respond in the presence of an external, unbalanced force?
- What underlying forces explain the variety of interactions observed?
- What is gravity and how does it work?
- How does the force of gravity affect objects on Earth and in our solar system?
- How does the acceleration due to gravity relate to the mass of an object and its distance from Earth?
- How does gravity affect objects of different mass close to Earth, and how does that effect change as an object moves farther from Earth?
- How can one predict an object's continued motion, changes in motion, or stability?
- What is speed?
- What are velocity and acceleration?
- When and why does the motion of an object change?
- How could a change in straight line motion due to unbalanced forces be predicted from an understanding of inertia?

- An object's motion can be described by the sum of all of the forces acting on the object.
- The acceleration of an object is inversely related to the object's mass.
- The force of gravity causes objects to accelerate.
- Mass is related to the amount of matter in a body.
- Weight is a measure of the force of gravity on a body.
- The weight of a body is directly proportional to the mass of the body.
- A magnetic field is the area around a magnet within which another magnet experiences a magnetic force.
- Magnets exert a force on certain materials.
- The strength and direction of the magnetic force between two magnets changes as the magnets move closer to each other.
- The sum of forces acting on an object determines its motion.
- If the forces on an object are balanced, the motion of the object is unchanged.
- If the forces on an object are unbalanced, the motion of the object changes.
- Inertia is a property of matter that makes it resist a change in its motion.
- An object at rest will remain at rest if no unbalanced force acts on it.
- A moving object will move at a constant speed in a straight line if no unbalanced force acts on it.
- If the net force on an object is not zero, then the object has an unbalanced force acting on it.
- If the mass of an object is large, it requires a greater force to move in the same way as does an object with a small mass.
- Energy is the ability to do work.

	○ Potential energy is stored energy. ○ Kinetic energy is energy of motion. ○ Gravitational potential energy works against gravity. ○ Energy can be transformed within a system. ○ Changing an object's vertical position changes gravitational potential energy. ○ When work is done on an object, energy is transferred from one form to another. ○ Changing an object's mass changes gravitational potential energy. ○ When work is done on an object, energy is transferred from one form into another. ○ As an object changes speed, its kinetic energy changes. ○ If one object exerts a force on a second object, the second object exerts an equal force in the opposite direction on the first object. ○ Action-reaction force pairs involve two objects interacting, whereas single objects move as the result of unbalanced forces acting on them. ○ Action-reaction force pairs can be applied to move an object in a predictable manner. ○ Action-reaction force pairs are not the same as balanced forces acting on a single object. ○ When two objects collide, one exerts a force on the other that may cause an energy transfer. ○ When the kinetic energy of an object changes, energy is transferred from or to an object. ○ Momentum is a measure of an object's resistance to changes in motion.

	○ The mass of an object affects its momentum and kinetic energy following a collision. ○ Newton's laws can be used to explain the outcome of a collision. ○ When the kinetic energy of an object changes, energy is transferred from or to an object. ○ Testing a prototype helps ensure a successful design solution. ○ Iterative testing and modification can optimize a design. ○ Energy is conserved in a closed system

Possible Student Misconceptions:

- Students may think that energy and force are the same thing; in fact, energy is the ability to do work while a force is a push or a pull.
- Students may think that energy is a thing, or an intrinsic property of an object; in fact, an object's potential energy can change depending on the object's position or condition.
- Students may not think that energy can transfer from one object to another or change from one form to another; in fact, energy is continually being transferred between objects and changing from one form to another. For example, potential energy can change to kinetic energy, and vice versa.
- Students may think that kinetic energy depends only on an object's speed or velocity; in fact, kinetic energy relates to a moving object's mass as well, by the ratio of one-half its mass times the square of its velocity.
- Students may think that some energy is destroyed as it changes from one form to another. In fact, energy, like mass, cannot be created or destroyed. A roller coaster does slow down and will eventually come to a stop, but energy is not lost. Most of the energy has been transformed into thermal energy through friction.
- Students may think that potential energy depends only on the height of an object above the ground; in fact, an object can have potential energy depending on its condition, and all objects have chemical potential energy stored in their atomic or molecular structures.

Additional Resources

Forces and Motion

http://assessment.aaas.org/topics/1/FM#/0

Energy: Forms, Transformation, Transfer, and Conservation

http://assessment.aaas.org/topics/1/EG#/0

NGSS Performance Expectations: ***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. *Assessment is limited to two objects and electric, magnetic, and gravitational interactions.

	Disciplinary Core Ideas	Crosscutting Concepts

Science and Engineering Practices		
• Asking questions and defining problems. • Developing and using models. • Planning and carrying out investigations. • Analyzing and interpreting data. • Using mathematics and computational thinking. • Constructing explanations and designing solutions. • Engaging in argument from evidence. • Obtaining, evaluating, and communicating information.	• PS2.A: Forces and Motion • PS2.B: Types of Interactions • PS3.A: Definitions of Energy • PS3.B: Conservation of energy and energy transfer • PS3.C: Relationship between energy and forces • ETS1.A: Defining and delimiting engineering problems • ETS1.B: Developing possible solutions • ETS1.C: Optimizing the design solution	• Patterns • Cause and effect • Scale, proportion, and quantity • Systems and system models • Energy and matter • Structure and function • Stability and change • Connections to engineering, technology, and applications of science: influence of science, engineering, and technology on society and the natural world.

Primary CCSS ELA/Literacy Connections:	**Primary CCSS Mathematics Connections:**
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 of the text 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.6-8.9 Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic. WHST.6-8.1 Write arguments focused on discipline content.	MP.2 6 Reason abstractly and quantitatively, 6.EE.A.2 Write, read, and evaluate expressions in which letters stand for numbers. Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form, using tools strategically. 6.RP.A.1 Understand the concept of ratio and use ratio language to describe a ratio relationship between two quantities. 7.EE.B.3 Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form, using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the

WHST.6-8.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. WHST.6-8.7 Conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration WHST.6-8.8 Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation. MP.2 Reason abstractly and quantitatively. 6.NS.C.5 Understand that positive and negative numbers are used together to describe quantities having opposite directions or values; use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation. 6.EE.A.2 Write, read, and evaluate expressions in which letters stand for numbers. 7.EE.B.3 Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form, using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies.	reasonableness of answers using mental computation and estimation strategies. 7.EE.B.4 Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities. 7.RP.A.2 Recognize and represent proportional relationships between quantities. 8.EE.A.1 Know and apply the properties of integer exponents to generate equivalent numerical expressions. 8.EE.A.2 Use square root and cube root symbols to represent solutions to equations of the form x2 = p and x3 =p, where p is a positive rational number. Evaluate square roots of small perfect squares and cube roots of small perfect cubes. Know that sq. root of 2 is irrational. 8.F.A.3 Interpret the equation y = mx + b as defining a linear function, whose graph is a straight line; give examples of functions that are not linear.

7.EE.B.4 Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities.	

Unit Performance Task:

NGSS Assessment Portal

https://ngss-assessment.portal.concord.org/ngsa-collections

Readorium: (Classwork/Quiz Grade, Extension/Lesson Closer, Homework):

Vocabulary Spelling City: (classwork/Quiz Grade)

Spellingcity.com

Edulastic (online formative and summative 3D Assessments)

App.edulastic.com

Lesson Scope and Sequence

Unit Pacing and Duration	Focus Standards with CCSS Connections	Primary Resources & Supplements *Each link requires a teacher login for full access to assessments. All assessments can be found through each homepage by searching the key headings if login links are inaccessible.	Assessment *Each link requires a teacher login for full access to assessments. All assessments can be found through each homepage by searching the key headings if login links are inaccessible.
225 Minutes (5 - 45 minute class periods)	NGSS: • MS-PS3-1 • MS-PS3-2 • MS-PS3-5	Primary Resources: STC - Lesson 5: Kinetic and Potential Energy	NGSS Assessment Portal https://ngss-assessment.portal.concord.org/ngsa-collections

	CCSS for ELA: • RST.6-8.2 Key idea and details • RST.6-8.3 Key idea and details • RST.6-8.4 Craft and structure • RST.6-8.9 Integration of knowledge and ideas • RST.6-8.10 Range of reading and level of text complexity • SL.8.1 Comprehension and collaboration • WHST.6-8.1 Text types and purposes • WHST.6-8.2 Text types and purposes • WHST.6-8.7 Research to build and present knowledge • WHST.6-8.9 Research to build and present knowledge CCSS for Math: • 6.EE.A.2 Apply and extend previous understandings of arithmetic to algebraic expressions. • 6.EE.C.9 Represent and analyze quantitative relationships between dependent and independent variables.	https://carolinascienceonline.com/#/teacher/product-lines/STC/products/5806552d7d7f8024e43ba5ee?play Supplements: Phenomenal GRC Lessons (Gather, Reason, Communicate Investigations) https://sites.google.com/3d-grcscience.org/going3d/home Gizmos Online Investigations Explorelearning.com	Readorium: (Classwork/Quiz Grade, Extension/Lesson Closer, Homework): Vocabulary Spelling City: (classwork/Quiz Grade) Spellingcity.com Edulastic (online formative and summative 3D Assessments) App.edulastic.com
225 Minutes (5 - 45 minute class periods)	NGSS: • MS-PS2-1 • MS-PS2-2 • MS-PS3-5 CCSS for ELA: • RI.6.10 Range of reading and level of text complexity • RST.6-8.3 Key idea and details • SL.8.1 Comprehension and collaboration • SL.8.4 Presentation of knowledge and ideas • WHST.6-8.1.B Text types and purposes CCSS for Math: N/A	Primary Resources: STC - Lesson 7: Collisions https://carolinascienceonline.com/#/teacher/product-lines/STC/products/5806552d7d7f8024e43ba5ee?page=2&play Supplements: Phenomenal GRC Lessons (Gather, Reason, Communicate Investigations) https://sites.google.com/3d-grcscience.org/going3d/home Gizmos Online Investigations Explorelearning.com	NGSS Assessment Portal https://ngss-assessment.portal.concord.org/ngsa-collections Readorium: (Classwork/Quiz Grade, Extension/Lesson Closer, Homework): Vocabulary Spelling City: (classwork/Quiz Grade) Spellingcity.com Edulastic (online formative and summative 3D Assessments) App.edulastic.com

225 Minutes (5 - 45 minute class periods)	NGSS: • MS-PS3-5 • MS-ETS1-1 • MS-ETS1-2 • MS-ETS1-3 • MS-ETS1-4 CCSS for ELA: • RST.6-8.1 Key idea and details • RST.6-8.3 Key idea and details • RST.6-8.4 Craft and structure • RST.6-8.6 Craft and structure • RST.6-8.7 Integration of knowledge and ideas • RST.6-8.10 Range of reading and level of text complexity • SL.6.4 Presentation of knowledge and ideas • SL.8.1 Comprehension and collaboration • SL.8.1.B Comprehension and collaboration • SL.8.1.D Comprehension and collaboration • SL.8.5 Presentation of knowledge and ideas • WHST.6-8.1.B Text types and purposes • WHST.6-8.2 Text types and purposes • WHST.6-8.10 Range of writing CCSS for Math: • 6.EE.C.9 Represent and analyze quantitative relationships between dependent and independent variables. • 8.EE.B.5 Understand the connections between proportional relationships, lines, and linear equations.	Primary Resources: STC - Lesson 8: Transforming Energy https://carolinascienceonline.com/#/teacher/product-lines/STC/products/5806552d7d7f8024e43ba5ee?page=2&play Supplements: Phenomenal GRC Lessons (Gather, Reason, Communicate Investigations) https://sites.google.com/3d-grcscience.org/going3d/home Gizmos Online Investigations Explorelearning.com	NGSS Assessment Portal https://ngss-assessment.portal.concord.org/ngsa-collections Readorium: (Classwork/Quiz Grade, Extension/Lesson Closer, Homework): Vocabulary Spelling City: (classwork/Quiz Grade) Spellingcity.com Edulastic (online formative and summative 3D Assessments) App.edulastic.com

Modifications	
Special Education/ 504:	**English Language Learners:**
• Adhere to all modifications and health concerns stated in each IEP. • Give students a MENU of options, allowing them to choose assignments from different levels based on difficulty. • Accommodate Instructional Strategies: use of post-its, reading aloud text, graphic organizers, one-on-one instruction, class website (Google Classroom), handouts, definition list with visuals, extended time • Allow extra time to complete assignments or tests • Allow students to demonstrate understanding of a problem by drawing a functional model of the answer and then explaining the reasoning orally and/or writing. • Provide breaks between tasks, use positive reinforcement, use proximity • Work in a small group • Use large print books, Braille, or digital texts Strategies for students with 504 plans	• Simplify written and verbal instructions • Use manipulatives to promote conceptual understanding and enhance vocabulary usage • Allow for alternate forms of responses- drawing or speaking instead of writing to demonstrate knowledge when you are not specifically assessing writing • Allow the use of an online dictionary to look up the definition and hear the pronunciation of unknown words • Provide graphic representations, gestures, drawings, equations, and pictures during all segments of instruction • Utilize program translations tools such as Snap and Read (if available) • Utilize graphic organizers which are concrete, pictorial ways of constructing knowledge and organizing information • Use sentence frames and questioning strategies so that students will explain their thinking/ process of how to solve real life problems. • Reword questions in simpler language • Provide class notes ahead of time to allow students to preview material and increase comprehension • Provide extended time
Gifted and Talented:	**Students at Risk for Failure:**

• Organize and offer flexible small group learning opportunities / activities.
• Utilize elevated contextual complexity
• Inquiry based or open ended assignments, performance tasks and projects
• Allow more time to study concepts with greater depth
• Provide options, alternatives and choices to differentiate and broaden the curriculum.
• Promote the synthesis of concepts and making real world connections
• Provide students with enrichment practice that are imbedded in the curriculum
  ○ allowing students to design problems to be addressed by the class
  ○ allowing students to modify the lesson by introducing a related phenomena
  ○ allow for interest-based extension activities
• Utilize an enhanced set of introductory activities (e.g. phenomena, organizers, concept maps etc)
• Provide whole group enrichment explorations.
• Teach cognitive and methodological skills
• Allow for the use of stations
• Organize integrated problem-solving simulations.
	• Assure students have experiences that are on the Concrete- Pictorial- Abstract spectrum
	• Modify Instructional Strategies; extended time, reading aloud text, graphic organizers, flexible grouping, one-on-one instruction, class website (Google Classroom), inclusion of more visuals and manipulatives, Utilize Scaffolded Questioning, Field Trips, Google Expeditions, Peer Support, Modified Assignments, Chunking of Information, Peer Buddies
	• Assure constant parental/ guardian contact throughout the year with successes/ challenges
	• Provide academic contracts to students and guardians
	• Create an interactive notebook with samples, key vocabulary words, student goals/ objectives.
	• Always plan to address students at risk in the designing of learning tasks, instructions, and directions.
	• Try to anticipate where the needs will be and then address them prior to lessons.
	• Teacher should allow for preferential seating
	• Include Visual Cues/Modeling
	• Allow for technology Integration, especially Assistive Technology

21st Century Life and Career Skills:

Career Ready Practices describe the career-ready skills that all educators in all content areas should seek to develop in their students. They are practices that have been linked to increase college, career, and life success. These skills enable students to make informed decisions that prepare them to engage as active citizens in a dynamic global society and to successfully meet the challenges and opportunities of the 21st century workplace. As such, they should be taught and reinforced in all career exploration and preparation programs, with increasingly higher levels of complexity and expectation as a student advances through a program of study.

https://www.state.nj.us/education/cccs/2014/career/9.pdf

- **CRP1**. Act as a responsible and contributing citizen and employee.
- **CRP2**. Apply appropriate academic and technical skills.
- **CRP3**. Attend to personal health and financial well-being.
- **CRP4**. Communicate clearly and effectively and with reason.
- **CRP5**. Consider the environmental, social and economic impacts of decisions.
- **CRP6**. Demonstrate creativity and innovation.
- **CRP7**. Employ valid and reliable research strategies.
- **CRP8**. Utilize critical thinking to make sense of problems and persevere in solving them.
- **CRP9**. Model integrity, ethical leadership and effective management.
- **CRP10**. Plan education and career paths aligned to personal goals.
- **CRP11**. Use technology to enhance productivity.
- **CRP12**. Work productively in teams while using cultural global competence.

Students are provided with an equitable opportunity to communicate with peers effectively, clearly, and with the use of technical language. They are also encouraged to reason through experiences and exposure to phenomena that promote critical thinking and emphasize the importance of perseverance. Students are exposed to various mediums of technology, such as digital learning, and educational websites.

Technology Standards:

All students will be prepared to meet the challenge of a dynamic global society in which they participate, contribute, achieve, and flourish through universal access to people, information, and ideas.
https://www.state.nj.us/education/cccs/2014/tech/

8.1 Educational Technology:

All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.

A. **Technology Operations and Concepts:** Students demonstrate a sound understanding of technology concepts, systems and operations.
B. **Creativity and Innovation:** Students demonstrate creative thinking, construct knowledge and develop innovative products and process using technology.
C. **Communication and Collaboration:** Students use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others.
D. **Digital Citizenship:** Students understand human, cultural, and societal issues related to technology and practice legal and ethical behavior.
E. **Research and Information Fluency:** Students apply digital tools to gather, evaluate, and use of information.
F. **Critical thinking, problem solving, and decision making:** Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.

8.2 Technology Education, Engineering, Design, and Computational Thinking - Programming:

All students will develop an understanding of the nature and impact of technology, engineering, technological design, computational thinking and the designed world as they relate to the individual, global society, and the environment.

A. **The Nature of Technology: Creativity and Innovation-** Technology systems impact every aspect of the world in which we live.
B. **Technology and Society:** Knowledge and understanding of human, cultural, and societal values are fundamental when designing technological systems and products in the global society.
C. **Design:** The design process is a systematic approach to solving problems.
D. **Abilities in a Technological World:** The designed world in a product of a design process that provides the means to convert resources into products and systems.
E. **Computational Thinking: Programming-** Computational thinking builds and enhances problem solving, allowing students to move beyond using knowledge to creating knowledge.