Orange Public Schools

Office of Curriculum & Instruction

2019-2020 Science Curriculum Guide

Grade 6

Module 3C: Interdependent Relationships in Ecosystems

May 11, 2020 – June 12, 2020

Board Approved: 1.14.2020

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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 determine the growth of an individual

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/Course Overview: Module 3C: Interdependent Relationships in Ecosystems

This is a hands-on course which engages 6th grade students in the construction of knowledge while engaging in three-dimensional learning guided by the Next Generation Science Standards. In this unit, students will focus on studying concepts related to life science, specifically Interdependent Relationships in Ecosystems. The purpose of this course is to have students develop, model, and carry out investigations related to this topic by using strategies aligned with the New Jersey Student Learning Standards and the Next Generation Science Standards (MS-LS2-4, MS-LS2-5, MS-ETS1-1, and MS-ETS1-3).

Students will focus on the following concepts and ideas:

Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.

- Emphasis is on recognizing patterns in data and making warranted inferences about changes in populations, and on evaluating empirical evidence supporting arguments about changes to ecosystems.

Evaluate competing design solutions for maintaining biodiversity and ecosystem services.

- Examples of ecosystem services could include water purification, nutrient recycling, and prevention of soil erosion.
- Examples of design solution constraints could include scientific, economic, and social considerations.

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.

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.

Unit 6: Interdependent Relationships in Ecosystems

Conceptual Flow:

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. They construct explanations for the interactions in ecosystems and the scientific, economic, political, and social justifications used in making decisions about maintaining biodiversity in ecosystems. The crosscutting concept of *stability and change* provide a framework for understanding the disciplinary core ideas.

This unit includes a two-stage engineering design process. Students first evaluate different engineering ideas that have been proposed using a systematic method, such as a tradeoff matrix, to determine which solutions are most promising. They then test different solutions, and combine the best ideas into a new solution that may be better than any of the preliminary ideas. Students demonstrate grade appropriate proficiency in *asking questions, designing solutions, engaging in argument from evidence, developing and using models,* and *designing solutions.* Students are also expected to use these practices to demonstrate an understanding of the core ideas.

This unit is based on MS-LS2-4, MS-LS2-5, MS-ETS1-1, and MS-ETS1-3.

Related Phenomena: The following links can be referenced for Life Science related phenomena:

NGSS Based Phenomena - https://thewonderofscience.com/phenomenal

#ProjectPhenomena - https://sites.google.com/site/sciencephenomena/

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

Sunrise Science (a collection of free websites) - http://sunrisescience.blog/free-websites-ngss-anchoring-phenomena/

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

Essential Questions:	Enduring Understandings:
What happens to ecosystems when the environment changes?	Ecosystems are dynamic in nature.
How can a single change to an ecosystem disrupt the whole system?	The characteristics of ecosystems can vary over time.
What limits the number and variety of living things in an ecosystem?	Disruptions to any physical or biological components of an ecosystem can lead to shifts in all the ecosystem's populations.
What makes a natural resource renewable? Non-renewable?	Small changes in one part of an ecosystem might cause large changes in another part.
Where do natural resources come from?	Patterns in data about ecosystems can be recognized and used to make warranted inferences about changes in populations.
How are natural resources used in society? What are some examples?	Evaluating empirical evidence can be used to support arguments about changes to ecosystems.
Why does the distribution of natural resources vary across the globe?	Biodiversity describes the variety of species found in Earth's terrestrial and oceanic ecosystems.
Is there a correlation between natural resource consumption and population growth?	The completeness, or integrity, of an ecosystem's biodiversity is often used as a measure of its health.
Can a renewable resource ever be depleted?	Changes in biodiversity can influence humans' resources, such as food, energy, and medicines.
What impact do humans have on Earth's environment when we gather and use natural resources?	Changes in biodiversity can influence ecosystem services that humans rely on.
What is the relationship between ecological footprint per capita, human population growth, economic income, and changes in biodiversity?	There are systematic processes for evaluating solutions with respect to how well they meet the criteria and constraints of a problem.
What is an ecosystem service and what are the four ecosystem services?	A solution needs to be tested and then modified on the basis of the test results, in order to improve it.
How are ecosystem services linked to biodiversity?	
What are threats to biodiversity?	
How can biodiversity be conserved?	
How can ecosystems be restored?	

	Models of all kinds are important for testing solutions. The iterative process of testing the most promising solutions and modifying what is proposed on the basis of the test results leads to greater refinement and ultimately to an optimal solution. Small changes in one part of a system might cause large changes in another part. Scientific knowledge can describe the consequences of actions but does not necessarily prescribe the decisions that society takes.

Possible Student Misconceptions:

Students may believe that organisms are able to effect changes in bodily structure to exploit particular habitats or that they respond to a changed environment by seeking a more favorable environment. It has been suggested that the language about adaptation used by teachers or textbooks to make biology more accessible to students may cause or reinforce these beliefs.

Some students think dead organisms simply rot away. They do not realize that the matter from the dead organism is converted into other materials in the environment. Some students see decay as a gradual, inevitable consequence of time without need of decomposing agents. Some students believe that matter is conserved during decay, but do not know where it goes.

NGSS Performance Expectations: ***Students who demonstrate understanding can…***

Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations. **(MS-LS2-4)**

Evaluate competing design solutions for maintaining biodiversity and ecosystem services. **(MS-LS2-5)**

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-ETS1-1)**

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-ETS1-3)**

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Engaging in Argument from Evidence Construct an oral and written argument supported by empirical evidence and scientific reasoning to support or refute an explanation or a model for a phenomenon or a solution to a problem. (MS-LS2-4) Evaluate competing design solutions based on jointly developed and agreed-upon design criteria. (MS-LS2-5) **Asking Questions and Defining Problems** Define a design problem that can be solved through the development of an object, tool, process or system and includes multiple criteria and constraints, including scientific knowledge that may limit possible solutions. (MS-ETS1-1) **Analyzing and Interpreting Data** Analyze and interpret data to determine similarities and differences in findings. (MS-ETS1-3) ---------- - **Connections to Nature of Science** **Scientific Knowledge is Based on Empirical Evidence** Science disciplines share common rules of obtaining and evaluating empirical evidence. (MS-LS2-4)	**LS2.C: Ecosystem Dynamics, Functioning, and Resilience** Ecosystems are dynamic in nature; their characteristics can vary over time. Disruptions to any physical or biological components of an ecosystem can lead to shifts in all its populations. (MS-LS2-4) Biodiversity describes the variety of species found in Earth's terrestrial and oceanic ecosystems. The completeness or integrity of an ecosystem's biodiversity is often used as a measure of its health. (MS-LS2-5) **LS4.D: Biodiversity and Humans** Changes in biodiversity can influence humans' resources, such as food, energy, and medicines, as well as ecosystem services that humans rely on--- for example, water purification and recycling. (MS-LS2-5) **ETS1.B: Developing Possible Solutions** There are systematic processes for evaluating solutions with respect to how well they meet the criteria and constraints of a problem. (MS-LS2-5 & MS-ETS1-3) Sometimes parts of different solutions can be combined to create a solution that is better than any of its predecessors. (MS-ETS1-3) **ETS1.A: Defining and Delimiting Engineering Problems**	**Stability and Change** Small changes in one part of a system might cause large changes in another part. (MS-LS2-4 and MS-LS2-5) **Influence of Science, Engineering, and Technology on Society and the Natural World** All human activity draws on natural resources and has both short and long-term consequences, positive as well as negative, for the health of people and the natural environment. (MS-ETS1-1) The uses of technologies and limitations on their use are driven by individual or societal needs, desires, and values; by the findings of scientific research; and by differences in such factors as climate, natural resources, and economic conditions. (MS-ETS1-1) ---------- **Connections to Engineering, Technology, and Applications of Science** **Influence of Science, Engineering, and Technology on Society and the Natural World** The use of technologies and any limitations on their use are driven by individual or societal needs, desires, and values; by the findings of scientific research; and by differences in such factors as climate, natural resources, and economic conditions. Thus technology use varies from region to region and over time. (MS-LS2-5) ----------

	The more precisely a design task's criteria and constraints can be defined, the more likely it is that the designed solution will be successful. Specification of constraints includes consideration of scientific principles and other relevant knowledge that are likely to limit possible solutions. (MS-ETS1-1) **ETS1.C: Optimizing the Design Solution** Although one design may not perform the best across all tests, identifying the characteristics of the design that performed the best in each test can provide useful information for the redesign process--- that is, some of those characteristics may be incorporated into the new design.	**Connections to Nature of Science** **Science Addresses Questions About the Natural and Material World** Scientific knowledge can describe the consequences of actions but does not necessarily prescribe the decisions that society takes. (MS-LS2-5)

Primary CCSS ELA/Literacy Connections: **RST.6-8.1** Cite specific textual evidence to support analysis of science and technical texts. (MS-LS2-4 & MS-ETS1-1 & MS-ETS1-3) **RI.8.8** Trace and evaluate the argument and specific claims in a text, assessing whether the reasoning is sound and the evidence is relevant and sufficient to support the claims. (MS-LS2-4 & MS-LS2-5) **WHST.6-8.1** Write arguments to support claims with clear reasons and relevant evidence. (MS-LS2-4) **WHST.6-8.9** Draw evidence from literary or informational texts to support analysis, reflection, and research. (MS-LS2-4)	**Primary CCSS Mathematics Connections:** **MP.4** Model with mathematics. (MS-LS2-5) **6.RP.A.3** Use ratio and rate reasoning to solve real-world and mathematical problems. (MS-LS2-5) **MP.2** Reason abstractly and quantitatively. (MS-ETS1-1 & MS-ETS1-3) **7.EE.3** Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), 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. (MS-ETS1-1 & MS-ETS1-3)

RST.6-8.8 Distinguish among facts, reasoned judgement based on research findings, and speculation in a text. (MS-LS2-5) **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. (MS-ETS1-1) **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). (MS-ETS1-3) **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. (MS-ETS1-3)	
Unit Performance Task:	

Instructional Resources:

- https://ngss.nsta.org/DisplayStandard.aspx?view=pe&id=200 (MS-LS2-4)
  - This link will take you to the National Science Teaching Association webpage. It provides information about the particular standard and offers many resources and activities to use in the classroom (new resources are added each week).

- https://ngss.nsta.org/DisplayStandard.aspx?view=pe&id=233 (MS-LS2-5)
  - This link will take you to the National Science Teaching Association webpage. It provides information about the particular standard and offers many resources and activities to use in the classroom (new resources are added each week).

- https://ngss.nsta.org/DisplayStandard.aspx?view=pe&id=206 (MS-ETS1-1)
  - This link will take you to the National Science Teaching Association webpage. It provides information about the particular standard and offers many resources and activities to use in the classroom (new resources are added each week).

- https://ngss.nsta.org/DisplayStandard.aspx?view=pe&id=209 (MS-ETS1-3)
  - This link will take you to the National Science Teaching Association webpage. It provides information about the particular standard and offers many resources and activities to use in the classroom (new resources are added each week).

Lesson Scope and Sequence				
Investigation Summary	**# of Class Sessions*** *1 session = 90 mins	**Investigation Part #/ Learning Objective**	**Main Activities to be undertaken and Primary Materials to be used during lesson**	**Assessment**
STC Lesson 7: Population Changes	0.5	Getting Started ● Students discuss how changes in an ecosystem impact populations. ● Students understand that both natural and human-made changes impact populations. ● Teacher's Edition pg 149		N/A
	3	Investigation 7.1: Changes to Your Pond ● Each group makes a change to a sample pond and measures its impact on the populations. ● Students will design an investigation to determine how a change, biotic or abiotic, affects the populations of organisms in a sample pond. ● Teacher's Edition pg 150 - 151	Lesson Master 7.1: Pond Testing	
	1	Investigation 7.2: Succession ● Students read Building Your Knowledge: *Mount St. Helens* and analyze Landsat images to determine how an environment can rebuild after a volcanic eruption ● Students explore both primary and secondary succession as they read Building Your Knowledge: *Succession.*	Landsat images of Mount St. Helens	

		• Students examine Landsat images after the eruption of Mount St. Helens to explore primary succession. • Students observe natural ecological patterns formed by succession. • Teacher's Edition pg 152 - 157		
	1	Investigation 7.3: Invasive Species • Students model how new species impact native species, and they learn more about invasive species as they read Building Your Knowledge: *Using Quadrats* and Building Your Knowledge: *Introduced and Invasive Species.* • Students use a quadrat sampling technique to analyze the change in a simulated population when an invasive species is introduced. • Teacher's Edition pg 158 - 160	Student Sheet 7.3: Invasive Species Student Sheet: Graph Paper	
	1	Investigation 7.4: Introduced or Invasive? • Students explore introduced and invasive species. • Students determine whether an organism is an invasive species. • Students examine patterns in characteristics among invasive species. • Teacher's Edition pg 161	Introduced and Invasive Species Card Set	
	1	Investigation 7.5: Monitoring Your Pond		

		• Students observe and make measurements of their pond ecosystems, and they consider how populations have changed in these ponds. • Students construct explanations for the changes in the populations of organisms in the model pond. • Teacher's Edition pg 162 - 162a		
	1	Reflecting On What You've Done • Students answer questions about the impact a small change could have on an ecosystem. • Students read and discuss Extending Your Knowledge: *Alien Invaders, Fires and Controlled Burns, Natural Disasters and Ecosystems* and Organism Profile: *Little Brown Rat.* • Students review an understanding of how different types of changes impact ecosystems. • Teacher's Edition pg 162b - 179		Exit Slip: How do changes to the physical or biological components of an ecosystem affect populations?
STC Lesson 9: Biodiversity	0.5	Getting Started • Students discuss different types of biodiversity and their importance as they read Building Your Knowledge: *Biodiversity.* • Students recognize what biodiversity refers to and why it is important. • Teacher's Edition pg 201 - 203		N/A

	2	Investigation 9.1: Measuring Biodiversity ● Students model four ways to measure biodiversity and analyze and interpret the data collected. ● Students read Building Your Knowledge: *Measuring Biodiversity* to strengthen their foundation for measuring biodiversity. ● Students model scientific methods for estimating population size and biodiversity. ● Students calculate the population of organisms in a model habitat based on data collected. ● Teacher's Edition pg 204 - 209	Student Sheet 9.1a: Measuring Biodiversity Group Data Student Sheet 9.1b: Measuring Biodiversity Class Data Student Sheet: Graph Paper	Exit Slip: Explain why you would not use the same sampling technique to measure the population size of dolphins as you would to measure the population size of mushrooms.
	3	Investigation 9.2: Engineering a Reintroduction ● Students conduct research about an organism, its habitat, and reintroductions of similar organisms to make a claim based on evidence about whether an organism should be reintroduced to parts of its historic range. ● Students obtain, evaluate, and communicate information about reintroduction. ● Students engage in argument from evidence about whether an organism should be reintroduced to an area of its historic range. ● Teacher's Edition pg 210 - 211	Student Sheet: Credible Source Rubric	
	1	Investigation 9.3: Biodiversity in Your Pond ● Students observe and make measurements of their pond ecosystems.		

		• Students consider the level of biodiversity that exists in these ponds. • Students perform tests on a model pond and determine the level of biodiversity within it. • Teacher's Edition pg 212 - 212a		
	1	Reflecting On What You've Done • Students answer questions about biodiversity and human impact on biodiversity. • Students read Extending Your Knowledge: *Hotspots of Biodiversity: Tropical Rainforests and Coral Reefs, Amphibian Rescue,* and Organism Profile: *Beetles.* • Students review how biodiversity relates to other areas of ecology and how it relates to human impact on ecosystems. • Teacher's Edition pg 212b - 221		Exit Slip: What is biodiversity and why is it important?
STC Lesson 10: Human Impact	0.5	Getting Started • Students discuss how humans impact ecosystems as they read Building Your Knowledge: *Human Impacts.* • Students recognize how people impact ecosystems and why it is important to monitor this impact. • Teacher's Edition pg		N/A
	3	Investigation 10.1: Human Activities and Plants		

		● Students plan and carry out an investigation about human impacts on plants. ● Students build on their knowledge of human impact as they read Building Your Knowledge: *Monitoring Human Impacts*. ● Students plan and carry out an investigation to determine how a human activity impacts plant growth. ● Teacher's Edition pg		
	2	Investigation 10.2: Monitoring Human Impacts ● Students conduct research to explore a particular way that humans impact ecosystems. ● Students develop a plan to monitor the impact of a specific human activity. ● Students obtain, evaluate, and communicate information about a human activity and the manner in which it impacts the ecosystem. ● Students design a plan to monitor the impact of a specific human activity in order to minimize its effects. ● Teacher's Edition pg		
	1	Investigation 10.3: A Final Look at Your Pond ● Students assess their pond ecosystems and consider how to monitor human impact on ponds. ●		

		• Teacher's Edition pg		
	1	Investigation 4.4: Matter Cycles in Your Pond • Students observe and make measurements of their pond ecosystems and consider how matter moves in these ponds. • Students perform tests on a model pond and determine how matter moves through the pond. • Teacher's Edition pg 88 - 88b		
STC Lesson 11: Assessment: Ecosystems and Their Interactions	0.5	Getting Started Students participate in a unit review session and are briefly introduced to the Performance Assessment task. Review and reinforce concepts and skills from the *Ecosystems and Their Interactions* unit. Teacher's Edition pg 245		Summative
	4	Performance Assessment • Students complete a Performance Assessment in which they research a threat to an ecosystem service. Next, students	Lesson Master 11.PA: Ecosystems and Their Interactions Performance Assessment Scoring Rubric	Summative

		research and evaluate existing solutions to lessen or eliminate that threat, and then design their own solution. ● Students report their findings to the class in a group presentation. ● Students will complete a Performance Assessment by carrying out an investigation through research and analysis. ● Teacher's Edition pg 246 - 247	Student Sheet: Credible Source Rubric	
	1	Written Assessment ● Students respond individually to multiple-choice and constructed-response items aligned to the unit's learning goals. ● Students apply knowledge and skills to answer questions in a Written Assessment about concepts related to ecosystems and their interactions.	Master WA.1: Ecosystems and Their Interactions Assessment Student Sheet WA.1: Ecosystems and Their Interactions Written Assessment Answer Sheet	Summative
	1	Reflecting On What You've Done ● Students evaluate the feedback from their Performance and Written Assessments and make corrections as necessary. ● Students reflect on the unit and review their KWL charts from the Pre-Assessment and update responses based on what they have learned during the unit. ● Students analyze and reflect on Performance and Written Assessment results and compare understanding in the Pre-Assessment to current understanding.		Exit Slip: What have you learned about ecosystems and their interactions? Throughout this unit, you have examined this question. Evaluate your knowledge on this topic and provide examples. How has your knowledge of this topic increased?

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.