Township of Ocean Schools

Assistant Superintendent
Office of Teaching and Learning

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DEPARTMENT: Science COURSE: Science Stories

Curriculum Development Timeline

School: Township of Ocean Intermediate School

Course: Science Stories

Department: Science

Board Approval	Supervisor	Notes
August 2021	Patrick Sullivan	Born Date
August 2024	Patrick Sullivan	Updated to include New State Mandates

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Township of Ocean Pacing Guide			
Week	**Quarter 1/ Quarter 3**	**Week**	**Quarter 2/ Quarter 4**
1	Course Intro./ Galveston Hurricane 1900 Story	11	Medical Advances Since 1930: Ellis Island Immigrants, Disease Identifications and Treatments
2	Understand and Explore Hurricanes and Human Impact	12	Medical Advances: Explore Diseases and Cures
3	Titanic 1912: Story, Construction of Ship, Planning for the Voyage, What Went Wrong	13	Human Impact on Genetics: Selectively Breeding for Animal Traits
4	Titanic: Math and STEM Activity, Navigation by Sea	14	Human Impact on Genetics: Hybridization of Animals and Crops
5	Mt. Everest Expedition 1996: Story, Preparation for a Climb	15	Human Impact on Genetics: GMOs
6	Mt. Everest Expedition: Air Pressure, Design a Pack Challenge	16	Apollo 13: Story, Space Exploration
7	Donner Party 1846: Story, Exploring Sierra Nevada and it's Weather	17	Apollo 13: Space Race, Gravity, Astronaut Training
8	Donner Party: Understanding Why Women Were More Likely To Survive	18	Science Story Independent Interest Topic:Chose Topic and Research
9	Thailand Tsunami 2004: Story, How to be Prepared	19	Science Story Independent Interest Topic: Explore Science Behind Story, Begin Presentation
10	Thailand Tsunami: Ocean Floor Topography, Earthquakes, Related Stories	20	Science Story Independent Interest Topic: Present to Class

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Core Instructional & Supplemental Materials including various levels of Texts
• Newsela articles • Discovery Education • Gizmos • Generation Genius • PBS: The American Experience • National Geographic • YouTube video/movie clips • NASA Website: https://www.nasa.gov/ • Phet Simulations • NOAA Website: https://www.noaa.gov/ • Digital medical journals, articles, simulations • Library of Congress Website: https://www.loc.gov/collections/?fa=subject_topic:american+history

Time Frame	**Unit 1 (2 Weeks)**

Topic
Galveston Hurricane 1900 Story

Alignment to Standards
MS-ESS2-4: Develop a model to describe the cycling of water through Earth's systems driven by energy from the sun and the force of gravity. **MS-ESS2-6:** Develop and use a model to describe how unequal heating and rotation of the Earth cause patterns of atmospheric and oceanic circulation that determine regional climates. **MS-ESS3-2:** Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects. **MS-ESS3-5**: Ask questions to clarify evidence of the factors that have caused climate change over the past century. **MS-ETS1-1** Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.

Learning Objectives and Activities

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Learning Objectives:

- Understand the Categories of Hurricanes
- Explore how climate change has affected the frequency, power and how rapidly they intensify.
- Understand and explore hurricanes and impact on humans/infrastructure,etc.

Learning Activities:

- Track Hurricanes
- Naming Hurricanes and Retired Names
- Preparing for a Hurricane
- Research Other Catastrophic Hurricanes (Katrina, Super Storm Sandy, "The Perfect Storm"-1991)
- FEMA
- Collect Data on Current Hurricanes
- Good Environmental Stewards

Assessments

Formative:

- Hurricane preparation checklist
- Sketchnotes
- Guided discussions
- Google Classroom Posts and Online Discussions
- Geographic Storm Tracking

Summative:

- Hurricane Map

Benchmark:

- Pre-assessment Benchmark

Alternative:

- Famous Hurricane Presentation

Interdisciplinary Connections

ELA

W.SE.6.6. Gather relevant information from multiple print and digital sources; assess the credibility of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and providing basic bibliographic information for sources.

RI.CR.6.1. Cite textual evidence and make relevant connections to support analysis of what an informational text says explicitly as well as inferences drawn from the text.

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RI.MF.6.6. Integrate information when presented in different media or formats (e.g., visually, quantitatively) to develop a coherent understanding of a topic or issue.

RI.AA.6.7. Trace the development of and evaluate the argument and specific claims in a text, distinguishing claims that are supported by reasons and evidence from claims that are not.

Career Readiness, Life Literacies, and Key Skills
9.4.8.CI.1: Assess data gathered on varying perspectives on causes of climate change (e.g., cross-cultural, gender-specific, generational), and determine how the data can best be used to design multiple potential solutions (e.g., RI.7.9, 6.SP.B.5, 7.1.NH.IPERS.6, 8.2.8.ETW.4).
Technology Integration
Career Education

Time Frame	**Unit 2 (2 Weeks)**
Topic	
Titanic 1912	
Alignment to Standards	
MS-ESS3-2: Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects. **MS-LS1-3**: Use arguments supported by evidence for how the body is a system of interacting subsystems composed of groups of cells. **MS-PS3-3**:Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer. **MS-ETS1-2:** Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.	

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Learning Objectives and Activities

Learning Objectives:

- Understand Archimedes Principle through the construction of the ship.
- Understand what goes into planning to live on a boat for several days.
- Explore what went wrong with the Titanic.
- Understand how humans are impacting the ocean which affects icebergs.

Learning Activities:

- Plan for the voyage activity Math and STEM Activity
- Icebergs- how deep they go (ice cube in water) - density
- How polar ice caps are melting
- Cartesian diver- bends
- Underwater technology research
- Life on the boat- history, different classes
- Using stars and tides to navigate- coriolis effect

Assessments

Formative:

- STEM boat activity
- Sketchnotes
- Guided discussions
- Relationships among ocean temps/currents + weather
- Describe the effects of water pressure

Summative:

- Titanic Math Project

Benchmark:

-

Alternative:

- Presentation on Human Endurance in Extreme Conditions

Interdisciplinary Connections

ELA
W.SE.6.6. Gather relevant information from multiple print and digital sources; assess the credibility of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and providing basic bibliographic information for sources.

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SL.PE.6.1. Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 6 topics, texts, and issues, building on others' ideas and expressing their own clearly.

SL.II.6.2. Interpret information presented in diverse media and formats (e.g., visually, quantitatively, orally) and explain how it contributes to a topic, text, or issue under study.

SL.PI.6.4. Present claims and findings, sequencing ideas logically and using pertinent descriptions, facts, and details to accentuate main ideas or themes; use appropriate speaking behaviors (e.g., eye contact, adequate volume, and clear pronunciation).

MATH
6.EE.C.9: Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation. (MS-LS1-1), (MS-LS1-2), (MS-LS1-3), (MS-LS1-6)

Career Readiness, Life Literacies, and Key Skills

9.4.8.IML.2: Identify specific examples of distortion, exaggeration, or misrepresentation of information.
9.4.8.IML.7: Use information from a variety of sources, contexts, disciplines, and cultures for a specific purpose (e.g., 1.2.8.C2a, 1.4.8.CR2a, 2.1.8.CHSS/IV.8.AI.1, W.5.8, 6.1.8.GeoSV.3.a, 6.1.8.CivicsDP.4.b, 7.1.NH. IPRET.8).

Technology Integration

Career Education

Time Frame	**Unit 3 (2 Weeks)**

Topic

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DEPARTMENT: Science COURSE: Science Stories

Mt. Everest Expedition 1996

Alignment to Standards

MS-LS2-1: Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem.
MS-LS1-2:Develop and use a model to describe the function of a cell as a whole and ways parts of cells contribute to the function.
MS-ESS2-2: Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales.
MS-ESS2-5: Collect data to provide evidence for how the motions and complex interactions of air masses result in changes in weather conditions.
MS-ETS1-1: Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.

Learning Objectives and Activities

Learning Objectives:

- Understand air pressure, gasses and molecules and how they affect the human. Explain how as altitude changes so does air pressure, which affects the climate causing continuous snow.

Learning Activities:

- Design a Pack Challenge: how to be prepared, through materials and how to training
- Altitude sickness
- “Into Thin Air”- Movie
- Documentaries on individual climbers and their experiences.

Assessments

Formative:

- Sketchnotes
- Guided discussions
- Explain the relationships between weather conditions/air pressure and the human body
- List the dangers of high altitude/low oxygen/low air pressure

Summative:

- Back Pack Design Presentation

Benchmark:

-

Alternative:

DEPARTMENT: Science COURSE: Science Stories

- Cartesian Diver
- Student Independent Research on Diving/ Pressure

Interdisciplinary Connections

ELA

SL.PI.6.4. Present claims and findings, sequencing ideas logically and using pertinent descriptions, facts, and details to accentuate main ideas or themes; use appropriate speaking behaviors (e.g., eye contact, adequate volume, and clear pronunciation).

SL.UM.6.5. Include multimedia components (e.g., graphics, images, music, sound) and visual displays in presentations to clarify information.

W.AW.6.1. Write arguments on discipline-specific content (e.g., social studies, science, math, technical subjects, English/Language Arts) to support claims with clear reasons and relevant evidence.

MATH
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. (MS-ESS2-2), (MS-ESS2-3)

Career Readiness, Life Literacies, and Key Skills

9.4.8.IML.10: Examine the consequences of the uses of media (e.g., RI.8.7).

Technology Integration

8.2.8.EC.1: Explain ethical issues that may arise from the use of new technologies.

Career Education

Time Frame	**Unit 4 (2 Weeks)**

Topic

Donner Party 1846

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Alignment to Standards

MS-ESS3-2: Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects.
MS-ESS2-5: Collect data to provide evidence for how the motions and complex interactions of air masses result in changes in weather conditions.
MS-ESS2-6: Develop and use a model to describe how unequal heating and rotation of the Earth cause patterns of atmospheric and oceanic circulation that determine regional climates.

Learning Objectives and Activities

Learning Objectives:

- Understanding Why Women Were More Likely To Survive in extreme conditions.
- Explain the meteorologic effects when air masses are forced over high topography (like the Sierra Nevada) causing weather phenomenon.
- Relate to human emotions and sympathizing with the decisions explorers/rescuers had to make.

Learning Activities:

- Create a weather map of the Sierra Nevada area that includes the California Trail with the “Hastings Shortcut” used.
- Research and understand Manifest Destiny.
- Create a body chart comparing the body composition of women vs men.
- What we need to survive- create a meal plan to survive on a cross country excursion.
- Manifest Destiny lesson
- Play” Oregon Trail”

Assessments

Formative:

- 3-D California Trail Map
- Sketchnotes
- Guided discussions
- Google Classroom Posts and Online Discussions
- Describe the various obstacles faced during the journey

Summative:

- Nutrition Guide for the Wilderness
- List and describe mountain climates/terrains

Benchmark:

-

Alternative:

- Pioneer Travel Timeline 1846-1847

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DEPARTMENT: Science COURSE: Science Stories

Interdisciplinary Connections
ELA **W.SE.6.6.** Gather relevant information from multiple print and digital sources; assess the credibility of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and providing basic bibliographic information for sources. **SL.II.6.2.** Interpret information presented in diverse media and formats (e.g., visually, quantitatively, orally) and explain how it contributes to a topic, text, or issue under study.
Career Readiness, Life Literacies, and Key Skills
9.4.8.IML.15: Explain ways that individuals may experience the same media message differently.
Technology Integration
Career Education

Time Frame	**Unit 5 (2 Weeks)**
Topic	
Thailand Tsunami 2004	
Alignment to Standards	
MS-ESS2-2: Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales. **MS-ESS2-3:** Analyze and interpret data on the distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence of the past plate motions. **MS-ESS3-2:** Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects.	
Learning Objectives and Activities	

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Learning Objectives:

- Understand how tsunamis are formed.
- Explore the ocean floor topography.
- List the causes of tsunamis, including earthquakes, volcanoes and landslides.
- Recognize a tsunami and explain what to do if there was one.
- Put the threat of tsunamis (or any natural disaster) in perspective.

Learning Activities:

- "The Impossible"- Movie
- Research the technologies created to save lives and mitigate destruction created by a tsunami.
- Build a Seismograph
- Track earthquakes: identify their magnitude using the richter scale and project the effect it will have.
- What would you do?
- STEM Earthquake Building Activity

Assessments

Formative:

- Sketchnotes
- Guided discussion on how to recognize and react to a tsunami
- Google Classroom Posts and Online Discussions
- Describe the characteristics of tsunami waves

Summative:

- Earthquake Proof Building with seismograph

Benchmark:

-

Alternative:

- Tracking Tsunami Data Project

Interdisciplinary Connections

ELA

RI.CR.6.1. Cite textual evidence and make relevant connections to support analysis of what an informational text says explicitly as well as inferences drawn from the text.

W.AW.6.1. Write arguments on discipline-specific content (e.g., social studies, science, math, technical subjects, English/Language Arts) to support claims with clear reasons and relevant evidence. **B.** Support claims (s) with logical reasoning and relevant, accurate data and evidence, that demonstrate an understanding of the topic or text, using credible sources.

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Career Readiness, Life Literacies, and Key Skills
9.4.8.IML.1: Critically curate multiple resources to assess the credibility of sources when searching for information.
Technology Integration
Career Education

Time Frame	**Unit 6 (2 Weeks)**
Topic	
Medical Advances Since 1930s	
Alignment to Standards	
MS-LS1-3: Use argument-supported by evidence for how the body is a system of interacting subsystems composed of groups of cells. **MS-LS3-1:** Develop and use a model to describe why structural changes to genes (mutations) located on chromosomes may affect proteins and may result in harmful, beneficial, or neutral effects to the structure and function of the organism.	
Learning Objectives and Activities	
Learning Objectives: • Explain what happened to immigrants coming to Ellis Island: The trip, contracting diseases and what happened when they arrived and a disease was identified. • Explore diseases that we now have vaccines and medical treatments for; original treatment, contraction, how it affected the body, and how the treatment was discovered. • Understand that humans have some control to prevent or create certain diseases in our populations. **Learning Activities:**	

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- Medical examination of immigrants on Ellis Island; pink eye, trachoma, tuberculosis, diphtheria, and other states of health such as poor physique, pregnancy and mental disability.
- Lesson on various diseases such as: Plagues, Polio, Measles, Mumps, Rutabella, Chickenpox, Typhoid, Leprosy
- Penicillin development- how it was discovered
- Development of type II diabetes and cancer; humans create certain diseases in our body.

Assessments

Formative:
- Sketchnotes
- Guided discussions
- Google Classroom Posts and Online Discussions
- List and describe major medical advances

Summative:
- Individual Research Project and Presentation
- Portfolio

Benchmark:
-

Alternative:
- Independent Research Project on Disease

Interdisciplinary Connections

ELA

L.VL.6.3. Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on grade 6 reading and content, including technical meanings, choosing flexibly from a range of strategies.

RI.IT.6.3. Analyze how a particular text's (e.g., article, brochure, technical manual, procedural text) structure unfolds by using textual evidence to describe how a key individual, event, or idea is introduced, illustrated, and elaborated in a text.

SL.UM.6.5. Include multimedia components (e.g., graphics, images, music, sound) and visual displays in presentations to clarify information.

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Career Readiness, Life Literacies, and Key Skills
9.4.8.IML.5: Analyze and interpret local or public data sets to summarize and effectively communicate the data.
Technology Integration
Career Education

Time Frame	**Unit 7 (3 Weeks)**
Topic	
Human Impact on Genetics: Advances Since Colonial America	
Alignment to Standards	
MS-LS4-4: Construct an explanation based on evidence that describes how genetic variations of traits in a population increase some individuals' probability of surviving and reproducing in a specific environment. **MS-LS4-5:** Gather and synthesize information about the technologies that have changed the way humans influence the inheritance of desired traits in organisms. **MS-LS4-6:** Use mathematical representations to support explanations of how natural selection may lead to increases and decreases of specific traits in populations over time.	
Learning Objectives and Activities	
Learning Objectives: • Investigate how early settlers survived before stores were built. • Understand how humans have selectively bred and genetically modified the genetics of various organisms. • Identify hybrid, selectively bred and GMO organisms that humans have influenced and why. **Learning Activities:** • Colonial Farming and Food: Famin to Prosperity	

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- Monsanto Debate
- Marcos Rodriguez Pantoja- Boy raised by wolves
- Domestication of Dogs: Pedigrees

Assessments

Formative:

- Design your own hybrid organism
- Sketchnotes
- Guided discussions
- Google Classroom Posts and Online Discussions
- One-minute papers

Summative:

- Debate Paper
- Writing Tasks
- Portfolio

Benchmark:

-

Alternative:

- Sketchnotes: “Do now and Wrap-up” participation.

Interdisciplinary Connections

RI.CI.6.2. Determine the central idea of an informational text and explain how it is supported by key details; provide a summary of the text distinct from personal opinions or judgments.

RI.IT.6.3. Analyze how a particular text’s (e.g., article, brochure, technical manual, procedural text) structure unfolds by using textual evidence to describe how a key individual, event, or idea is introduced, illustrated, and elaborated in a text.

RI.MF.6.6. Integrate information when presented in different media or formats (e.g., visually, quantitatively) to develop a coherent understanding of a topic or issue.

RI.AA.6.7. Trace the development of and evaluate the argument and specific claims in a text, distinguishing claims that are supported by reasons and evidence from claims that are not.

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W.WR.6.5. Conduct short research projects to answer a question, drawing on several sources and refocusing the inquiry when appropriate. **SL.PE.6.1.** Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 6 topics, texts, and issues, building on others' ideas and expressing their own clearly.
Career Readiness, Life Literacies, and Key Skills
9.4.8.IML.7: Use information from a variety of sources, contexts, disciplines, and cultures for a specific purpose (e.g., 1.2.8.C2a, 1.4.8.CR2a, 2.1.8.CHSS/IV.8.AI.1, W.5.8, 6.1.8.GeoSV.3.a, 6.1.8.CivicsDP.4.b, 7.1.NH. IPRET.8).
Technology Integration
8.2.8.EC.1: Explain ethical issues that may arise from the use of new technologies.
Career Education

Time Frame	**Unit 8 (2 Weeks)**
Topic	
Apollo 13: Space Exploration	
Alignment to Standards	
MS-ESS1-1: Develop and use a model of the Earth-sun-moon system to describe the cyclic patterns of lunar phases, eclipses of the sun and moon, and seasons. **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	
Learning Objectives and Activities	
Learning Objectives: • Explain the main events of the Apollo 13 mission • Situate the Apollo 13 mission within American history	

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- Extract and summarize information from primary sources

Learning Activities:

- "Apollo 13" movie
- What went wrong and the solutions
- What is gravity?
- Moon exploration today
- Astronaut Training
- G-force
- Challenger clip
- First moon landing clip
- Race to the moon

Assessments

Formative:

- Survival Scenario Challenge
- Sketchnotes
- Guided discussions
- Google Classroom Posts and Online Discussions
- Analysis of event sequence that led to system failure

Summative:

- Astronaut Training Project

Benchmark:

- Final Portfolio

Alternative:

- Space and Its Effects on the Human Body

Interdisciplinary Connections

MATH
6.RP.A.1: Understand concept of ratio and use ratio language to describe ratio relationship between two quantities.

Career Readiness, Life Literacies, and Key Skills

9.4.8.IML.14: Analyze the role of media in delivering cultural, political, and other societal messages.

Technology Integration

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Career Education

Time Frame	**Unit 9 (3 Weeks)**

Topic

Science Story Independent Interest Topic

Alignment to Standards

NJSLS-S Based on Student Topic(s)

Learning Objectives and Activities

Learning Objectives:
- Explore a topic of personal interest to research and share with peers.
- Explore and understand the science behind the chosen topic.
- Gain experience with public speaking.

Learning Activities:
- Choose a topic that has a high level of interest.
- Research, understand and explain the science and human drama involved
- Self directed learning
- Create a visual presentation

Assessments

Formative:
- Concept Map
- Research Proposal
- Guided discussions
- Google Classroom Posts and Online Discussions
- Observational Assessment
- Individual check in's

Summative:
- Project Presentation

Benchmark:

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Alternative:

-

Interdisciplinary Connections
NJSLS Based on Student Topic(s)
Career Readiness, Life Literacies, and Key Skills
9.4.8.IML.12: Use relevant tools to produce, publish, and deliver information supported with evidence for an authentic audience.
Technology Integration
8.2.8.ED.2: Identify the steps in the design process that could be used to solve a problem.
Career Education

Modifications (ELL, Special Education, At Risk Students, Gifted & Talented, & 504 Plans)

ELL:

- Work toward longer passages as skills in English increase
- Use visuals
- Introduce key vocabulary before lesson
- Teacher models reading aloud daily
- Provide peer tutoring
- Use of Bilingual Dictionary
- Guided notes and/or scaffold outline for written assignments
- Provide students with English Learner leveled readers.

Supports for Students With IEPs:

- Allow extra time to complete assignments or tests
- Guided notes and/or scaffold outline for written assignments
- Work in a small group
- Allow answers to be given orally or dictated

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- Use large print books, Braille, or books on CD (digital text)
- Follow all IEP modifications

At-Risk Students:

- Guided notes and/or scaffold outline for written assignments
- Introduce key vocabulary before lesson
- Work in a small group
- Lesson taught again using a differentiated approach
- Allow answers to be given orally or dictated
- Use visuals / Anchor Charts
- Leveled texts according to ability

Gifted and Talented:

- Create an enhanced set of introductory activities (e.g. advance organizers, concept maps, concept puzzles)
- Provide options, alternatives and choices to differentiate and broaden the curriculum
- Organize and offer flexible small group learning activities
- Provide whole group enrichment explorations
- Teach cognitive and methodological skills
- Use center, stations, or contracts
- Organize integrated problem-solving simulations
- Propose interest-based extension activities
- Expose students to beyond level texts.

Supports for Students With 504 Plans:

- Follow all the 504 plan modifications
- Text to speech/audio recorded selections
- Amplification system as needed
- Leveled texts according to ability
- Fine motor skill stations embedded in rotation as needed
- Modified or constrained spelling word lists
- Provide anchor charts with high frequency words and phonemic patterns