Kindergarten

Unit Name K1	**Motion and Stability: Forces and Interactions**
Estimated Timeline	October
NGSS and Student Learning Objectives	**K-PS2-1** Plan and conduct an investigation to compare the effects of different strengths or different directions of pushes and pulls on the motion **K-PS2-2** Analyze data to determine if a design solution works as intended to change the speed or direction of an object with a push or a pull.
Suggested projects, activities, labs used to support content, and resources	● Examples of pushes or pulls could include a string attached to an object being pulled, a person pushing an object, a person stopping a rolling ball, and two objects colliding and pushing on each other. Push and pull races. Limit assessment to different relative strengths or different directions, but not both at the same time. Mouse Trap game. Design a track (marbles) ● Examples of problems requiring a solution could include having a marble or other object move a certain distance, follow a particular path, and knock down other objects. (Dominoes) ● Examples of solutions could include tools such as a ramp to increase the speed of the object and a structure that would cause an object such as a marble or ball to turn. Design a ramp and comparing heights for speed. ● Design a roller coaster
Suggested Assessments	Students can demonstrate competency with tasks such as: ● Generating, discussing, and analyzing data ● Constructing spoken and written explanations ● Engaging in evidence-based discussion ● Reflecting on their own understanding ● Journal Entries ● Response/Exit Tickets
Suggested Resources	● https://www.kbs.msu.edu/wp-content/uploads/2017/02/NGSS-Interactive-Read-Alouds.pdf ● http://www.nextgenscience.org/ ● http://www.brainpopjr.com ● Scholastic News (w/ online resource) ● Science Spin (w/ online resource)
Differentiation for students with IEPs, 504, and or students at risk of failure	1. Extended time for task completion (Assignments, Assessments, etc..) 2. Provide copy of accurate notes 3. Breaking down and chunking assignments 4. Restating and clarifying instruction 5. Extra book provided to keep at home 6. Organizational assistance (notebook, assignment pad, lab materials, etc..) 7. Option to type instead handwriting notes 8. Adjusting class schedule to alternate instruction (morning/afternoon) 9. Modify test and quizzes 10. Provide manipulative examples

	11. Preferential Seating 12. Use of Graphic Organizers (charts, visual outlines, etc..) 13. Repetition and clarification of directions 14. Assessments and class work read aloud 15. Provide checklists 16. Movement breaks 17. Visual representation of print version 18. Use of a alarm/fimer to aide with time management, including transitional warning 19. Nonverbal cue for off-task behavior 20. Provide positive reinforcement 21. Hands on learning activities 22. Ask student to restate directions or concepts taught 23. Deliver directions one step at a time, gradually increasing the number of steps delivered 24. Explain the purpose of the assignment to the student 25. Provide managed choices to increase on task behavior 26. Allow for break passes when needed
Differentiation for English Language Learners	1. Provide alternate ways for the student to respond (verbal/pictographic answers instead of written) 2. Substitute a hands-on activity or use of different media in projects for a written activity 3. Provide word banks / word walls 4. Prepare and distribute advance notes 5. Provide model sentence frames and sentence starters for both oral responses and written responses 6. Provide additional time to complete assessments and assignments 7. Model and use gestures to aid in understanding 8. Model tasks by giving one or two examples before releasing students to work independently 9. Present instructions both verbally and visually 10. Simplify written and verbal instructions
Differentiation for Enrichment	1. Encourage independent studies or investigations 2. Encourage creative expression by allowing students to choose how to explore a problem 3. Invite students to explore points of view 4. Varied levels of reading text 5. Enriched hands on center that students can explore independently 6. Higher order thinking tasks and questions 7. Provide leadership opportunities in lab groups 8. Allow opportunities to analyze and evaluate materials

	Energy
Estimated Timeline	November/December
NGSS and Student Learning Objectives	K-PS3-1-Make observations to determine the effect of sunlight on Earth's surface.

	K-PS3-2 Use tools and materials to design and build a structure that will reduce the warming effect of sunlight on an area.
Suggested projects, activities, labs used to support content, and resources	• Examples of Earth's surface could include sand, soil, rocks, and water. • Water experiments- liquid, solid, gas, and how heat affects. Ice in sunlight and ice in shade experiment. • Sun's heat experiment: Using Rocks on plates put in shade and sunlight. Compare heat and feel. • Limit assessment of temperature to relative measures such as warmer/cooler • Examples of structures could include umbrellas, canopies, and tents that minimize the warming effect of the sun. • Design shade for your pet rock.
Suggested Assessments	Students can demonstrate competency with tasks such as: • Generating, discussing, and analyzing data • Constructing spoken and written explanations • Engaging in evidence-based discussion • Reflecting on their own understanding • Journal Entries • Response/Exit Tickets
Suggested Resources	https://www.kbs.msu.edu/wp-content/uploads/2017/02/NGSS-Interactive-Read-Alouds.pdf • http://www.nextgenscience.org/ • http://www.brainpopjr.com • Scholastic News (w/ online resource) • Science Spin (w/ online resource)
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	From Molecules to Organisms: Structures and Processes
Estimated Timeline	January/February
NGSS and Student Learning Objective	K-LS3-1-Make observations to construct an evidence-based account that young plants and animals are like, but not exactly like, their parents.
Suggested projects, activities, labs used to support content, and resources	● Examples of patterns could include that animals need to take in food but plants do not ● The different kinds of food needed by different types of animals ● The requirement of plants to have light ● All living things need water Plant Unit ● Planting, observing and comparing plant growth based upon needs ● Comparing needs and wants of different plants (desert etc) Animal Units

	● Wants and needs of plants or animals and their environment: Chicks, butterflies, Frogs, Penguins, Squirrels (hibernation) ● Habitat Design challenges: Ponds/Desert/Forest/Oceans/Arctic/Farm
Suggested Assessments	Students can demonstrate competency with tasks such as: ● Generating, discussing, and analyzing data ● Constructing spoken and written explanations ● Engaging in evidence-based discussion ● Reflecting on their own understanding ● Journal Entries ● Response/Exit Tickets
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	Earth's Systems
Estimated Timeline	March
NGSS and Student Learning Objectives	K-ESS1-1 Use observations of the sun, moon, and stars to describe patterns that can be predicted. K-ESS1-2-Make observations at different times of year to relate the amount of daylight to the time of year.
Suggested projects, activities, labs used to support content, and resources	● Qualitative observations could include descriptions of the weather (such as sunny, rainy, and warm) ● Quantitative observations could include numbers of sunny, windy, and rainy days in a month. ● Patterns could include that it is usually cooler in the morning than in the afternoon and the number of sunny days versus cloudy days in different months. ● Limit assessment of quantitative observations to whole numbers and relative measures such as warmer/cooler.

	• Different types of severe weather: Make or model types of weather noises. Ex: thunder, rain • Design a plan for a severe weather kit: include things for safety and fun • Create a weather forecasting center and create tools for weather prediction • Adapting to environment: Hibernation, storing food for the winter
Suggested Assessments	Students can demonstrate competency with tasks such as: • Generating, discussing, and analyzing data • Constructing spoken and written explanations • Engaging in evidence-based discussion • Reflecting on their own understanding • Journal Entries • Response/Exit Tickets
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	Earth and Human Activity
Estimated Timeline	April/May
NGSS and Student Learning Objectives	K-ESS3-1 Use observations of the sun, moon, and stars to descri K-ESS3-2Make observations at different times of year to relate the amount of daylight to the time of the year. K-ESS3-3Communicate solutions that will reduce the impact of climate change and humans on the land, water, air, and/or other living things in thelocal environment.
Suggested projects, activities, labs used to support content, and resources	• Relationships could include that deer eat buds and leaves, therefore, they usually live in forested areas • Grasses need sunlight so they often grow in meadows. • Plants, animals and their surroundings make up a system.

	● Emphasis is on local forms of severe weather. ● Human impact on the land : Recycle reduce reuse ○ Haunted House project ○ Gingerbread house project ○ Leprechaun traps ● Exploring where trash goes : Experiment burying trash and observing ● Natural Resources: 3 little pigs experiment- building houses using straw, popsicle sticks and clay bricks
Suggested Assessments	Students can demonstrate competency with tasks such as: ● Generating, discussing, and analyzing data ● Constructing spoken and written explanations ● Engaging in evidence-based discussion ● Reflecting on their own understanding ● Journal Entries ● Response/Exit Tickets
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	Engineering Design
Estimated Timeline	May/June
NGSS and Student Learning Objectives	K-2-ETS1-1-Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool. K-2-ETS1-2- Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps its function as needed to solve a given problem. K-2-ETS1-3-Analyze data from a test of two objects designed to solve the problem to compare the strengths and weaknesses of how each performs.
Differentiation for students with IEPs, 504, and or students at risk	1.Extended time for task completion (Assignments, Assessments, etc..) 2. Provide copy of accurate notes 3. Breaking down and chunking assignments

of failure	4. Restating and clarifying instruction 5. Extra book provided to keep at home 6. Organizational assistance (notebook, assignment pad, lab materials, etc.) 7. Option to type instead handwriting notes 8. Adjusting class schedule to alternate instruction (morning/afternoon) 9. Modify test and quizzes 10. Provide manipulative examples 11. Preferential Seating 12. Use of Graphic Organizers (charts, visual outlines, etc..) 13. Repetition and clarification of directions 14. Assessments and class work read aloud 15. Provide checklists 16. Movement breaks 17. Visual representation of print version 18. Use of a alarm/fimer to aide with time management, including transitional warning 19. Nonverbal cue for off-task behavior 20. Provide positive reinforcement 21. Hands on learning activities 22. Ask student to restate directions or concepts taught 23. Deliver directions one step at a time, gradually increasing the number of steps delivered 24. Explain the purpose of the assignment to the student 25. Provide managed choices to increase on task behavior 26. Allow for break passes when needed
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Grade 1

	Waves and their Applications in Technologies for Information Transfer
Estimated Timeline	September-October
NGSS and Student Learning Objectives	1-PS4-1-Plan and conduct investigations to provide evidence that vibrating materials can make sound and that sound can make materials vibrate. 1-PS4-2- Make observations to construct an evidence-based account that objects can be seen only when illuminated. 1-PS4-3-Plan and conduct an investigation to determine the effect of placing objects made with different materials in the path of a beam of light. 1-PS4-4-Use tools and materials to design and build a device that uses light or sound to solve the problem of communicating over a distance.
Suggested projects, activities, labs used to support content, and resources	• Examples of vibrating materials that make sound could include tuning forks and plucking a stretched string. • Examples of how sound can make matter vibrate could include holding a piece of paper near a speaker making sound and holding an object near a vibrating tuning fork. • Examples of observations could include those made in a completely dark room, a pinhole box, and a video of a cave explorer with a flashlight. Illumination could be from an external light source or by an object giving off its own light. • Examples of materials could include those that are transparent (such as clear plastic), translucent (such as wax paper), opaque (such as cardboard), and reflective (such as a mirror). • https://www.teacherspayteachers.com/Product/Science-Unit-on-Light-Aligned-NGSS-with-5-E-Lessons-929948 • Examples of devices could include a light source to send signals, paper cup and string “telephones”, and a pattern of drum beats.
Suggested Assessments	Students can demonstrate competency with tasks such as: • Generating, discussing, and analyzing data • Constructing spoken and written explanations • Engaging in evidence-based discussion • Reflecting on their own understanding • Journal Entries • Response/Exit Tickets
Suggested Resources	• https://www.kbs.msu.edu/wp-content/uploads/2017/02/NGSS-Interactive-Read-Alouds.pdf

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Differentiation for students with IEPs, 504, and or students at risk of failure	1.Extended time for task completion (Assignments, Assessments, etc..) 2. Provide copy of accurate notes 3. Breaking down and chunking assignments 4. Restating and clarifying instruction 5. Extra book provided to keep at home 6. Organizational assistance (notebook, assignment pad, lab materials, etc.) 7. Option to type instead handwriting notes 8. Adjusting class schedule to alternate instruction (morning/afternoon) 9. Modify test and quizzes 10. Provide manipulative examples 11. Preferential Seating 12. Use of Graphic Organizers (charts, visual outlines, etc..) 13. Repetition and clarification of directions 14. Assessments and class work read aloud 15. Provide checklists 16. Movement breaks 17. Visual representation of print version 18. Use of a alarm/fimer to aide with time management, including transitional warning 19. Nonverbal cue for off-task behavior 20. Provide positive reinforcement 21. Hands on learning activities 22. Ask student to restate directions or concepts taught 23. Deliver directions one step at a time, gradually increasing the number of steps delivered 24. Explain the purpose of the assignment to the student 25. Provide managed choices to increase on task behavior

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	<u>From Molecules to Organisms: Structure and Processes</u>
Estimated Timeline	November–December
NGSS and Student Learning Objectives	1-LS1-1-Use materials to design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs. 1-LS1-2-Read texts and use media to determine patterns in behavior of parents and offspring that help offspring survive. 1-LS3-1-Make observations to construct an evidence-based account that young plants and animals are like, but not exactly like, their parents.
Suggested projects, activities, labs used to support content, and resources	• Mimicking plant or animal solutions to solve human problems by designing clothing or equipment to protect bicyclists mimicking turtle shells, acorn shells and animal scales. • Stabilizing structures by mimicking animal tails and roots on plants. • Keeping out intruders by mimicking thorns on branches and animal quills; and detecting intruders by mimicking eyes and ears.

	• Observe and journal the life cycle of a praying mantis
Suggested Assessments	Students can demonstrate competency with tasks such as: • Generating, discussing, and analyzing data • Constructing spoken and written explanations • Engaging in evidence-based discussion • Reflecting on their own understanding • Journal Entries • Response/Exit Tickets
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	Earth's Place in the Universe
Estimated Timeline	January-March
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Suggested Assessments	Students can demonstrate competency with tasks such as: ● Generating, discussing, and analyzing data ● Constructing spoken and written explanations ● Engaging in evidence-based discussion ● Reflecting on their own understanding ● Journal Entries ● Response/Exit Tickets
Differentiation for students with IEPs, 504, and or students at risk of failure	1.Extended time for task completion (Assignments, Assessments, etc..) 2. Provide copy of accurate notes 3. Breaking down and chunking assignments 4. Restating and clarifying instruction 5. Extra book provided to keep at home 6. Organizational assistance (notebook, assignment pad, lab materials, etc.) 7. Option to type instead handwriting notes 8. Adjusting class schedule to alternate instruction (morning/afternoon) 9. Modify test and quizzes 10. Provide manipulative examples 11. Preferential Seating 12. Use of Graphic Organizers (charts, visual outlines, etc..) 13. Repetition and clarification of directions 14. Assessments and class work read aloud 15. Provide checklists 16. Movement breaks 17. Visual representation of print version 18. Use of a alarm/fimer to aide with time management, including transitional warning 19. Nonverbal cue for off-task behavior 20. Provide positive reinforcement 21. Hands on learning activities 22. Ask student to restate directions or concepts taught 23. Deliver directions one step at a time, gradually increasing the number of steps delivered 24. Explain the purpose of the assignment to the student 25. Provide managed choices to increase on task behavior 26. Allow for break passes when needed

Differentiation for English Language Learners	1.Provide alternate ways for the student to respond (verbal/pictographic answers instead of written) 2. Substitute a hands-on activity or use of different media in projects for a written activity 3. Provide word banks / word walls 4. Prepare and distribute advance notes 5. Provide model sentence frames and sentence starters for both oral responses and written responses 6. Provide additional time to complete assessments and assignments 7. Model and use gestures to aid in understanding 8. Model tasks by giving one or two examples before releasing students to work independently 9. Present instructions both verbally and visually 10. Simplify written and verbal instructions
Differentiation for Enrichment	1.Encourage independent studies or investigations 2. Encourage creative expression by allowing students to choose how to explore a problem 3. Invite students to explore points of view 4. Varied levels of reading text 5. Enriched hands on center that students can explore independently 6. Higher order thinking tasks and questions 7. Provide leadership opportunities in lab groups 8. Allow opportunities to analyze and evaluate materials

	Engineering Design
Estimated Timeline	April-May
NGSS and Student Learning Objectives	K-2-ETS1-1-Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool. K-2-ETS1-2- Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps its function as needed to solve a given problem. K-2-ETS1-3-Analyze data from a test of two objects designed to solve the problem to compare the strengths and weaknesses of how each performs.
Suggested	Students can demonstrate competency with tasks such as:

Assessments	● Generating, discussing, and analyzing data ● Constructing spoken and written explanations ● Engaging in evidence-based discussion ● Reflecting on their own understanding ● Journal Entries ● Response/Exit Tickets
Differentiation for students with IEPs, 504, and or students at risk of failure	1.Extended time for task completion (Assignments, Assessments, etc..) 2. Provide copy of accurate notes 3. Breaking down and chunking assignments 4. Restating and clarifying instruction 5. Extra book provided to keep at home 6. Organizational assistance (notebook, assignment pad, lab materials, etc.) 7. Option to type instead handwriting notes 8. Adjusting class schedule to alternate instruction (morning/afternoon) 9. Modify test and quizzes 10. Provide manipulative examples 11. Preferential Seating 12. Use of Graphic Organizers (charts, visual outlines, etc..) 13. Repetition and clarification of directions 14. Assessments and class work read aloud 15. Provide checklists 16. Movement breaks 17. Visual representation of print version 18. Use of a alarm/fimer to aide with time management, including transitional warning 19. Nonverbal cue for off-task behavior 20. Provide positive reinforcement 21. Hands on learning activities 22. Ask student to restate directions or concepts taught 23. Deliver directions one step at a time, gradually increasing the number of steps delivered 24. Explain the purpose of the assignment to the student 25. Provide managed choices to increase on task behavior 26. Allow for break passes when needed
Differentiation for English Language Learners	1.Provide alternate ways for the student to respond (verbal/pictographic answers instead of written) 2. Substitute a hands-on activity or use of different media in projects for a written activity 3. Provide word banks / word walls 4. Prepare and distribute advance notes 5. Provide model sentence frames and sentence starters for both oral responses and written responses 6. Provide additional time to complete assessments and assignments 7. Model and use gestures to aid in understanding 8. Model tasks by giving one or two examples before releasing students to work independently

	9. Present instructions both verbally and visually 10. Simplify written and verbal instructions
Differentiation for Enrichment	1.Encourage independent studies or investigations 2. Encourage creative expression by allowing students to choose how to explore a problem 3. Invite students to explore points of view 4. Varied levels of reading text 5. Enriched hands on center that students can explore independently 6. Higher order thinking tasks and questions 7. Provide leadership opportunities in lab groups 8. Allow opportunities to analyze and evaluate materials

Grade 2

	Science Launch
Estimated Timeline	September
NGSS	K-2-ETS1-1
Student Learning Objectives	● Scientists ask questions, solve problems, make models and investigate. ● Scientists draw conclusions, analyze and interpret data. ● Scientists use interactive notebooks to organize ideas, share observations and reflect on results. ● Scientists follow safety procedures during investigations. ● Teacher models investigation and students observe and discuss ● Students repeat investigation with teacher guidance (procedures, diagrams, and results) ● Teacher models recording, investigation, reflections in notebook and students practice with guided instruction.
Suggested Assessments	Students can demonstrate competency with tasks such as: ● Generating, discussing, and analyzing data ● Constructing spoken and written explanations ● Engaging in evidence-based discussion ● Reflecting on their own understanding ● Journal Entries ● Response/Exit Tickets
Suggested resources	● http://www.nextgenscience.org/ ● https://betterlesson.com/home ● http://www.brainpopjr.com ● http://www.learn360.com ● https://www.teachingchannel.org

	● Scholastic News (w/ online resource) ● Science Spin (w/ online resource)
Differentiation for students with IEPs, 504, and or students at risk of failure	1.Extended time for task completion (Assignments, Assessments, etc..) 2. Provide copy of accurate notes 3. Breaking down and chunking assignments 4. Restating and clarifying instruction 5. Extra book provided to keep at home 6. Organizational assistance (notebook, assignment pad, lab materials, etc.) 7. Option to type instead handwriting notes 8. Adjusting class schedule to alternate instruction (morning/afternoon) 9. Modify test and quizzes 10. Provide manipulative examples 11. Preferential Seating 12. Use of Graphic Organizers (charts, visual outlines, etc..) 13. Repetition and clarification of directions 14. Assessments and class work read aloud 15. Provide checklists 16. Movement breaks 17. Visual representation of print version 18. Use of a alarm/fimer to aide with time management, including transitional warning 19. Nonverbal cue for off-task behavior 20. Provide positive reinforcement 21. Hands on learning activities 22. Ask student to restate directions or concepts taught 23. Deliver directions one step at a time, gradually increasing the number of steps delivered 24. Explain the purpose of the assignment to the student 25. Provide managed choices to increase on task behavior 26. Allow for break passes when needed
Differentiation for English Language Learners	1.Provide alternate ways for the student to respond (verbal/pictographic answers instead of written) 2. Substitute a hands-on activity or use of different media in projects for a written activity 3. Provide word banks / word walls 4. Prepare and distribute advance notes 5. Provide model sentence frames and sentence starters for both oral responses and written responses 6. Provide additional time to complete assessments and assignments 7. Model and use gestures to aid in understanding 8. Model tasks by giving one or two examples before releasing students to work independently 9. Present instructions both verbally and visually 10. Simplify written and verbal instructions
Differentiation for Enrichment	1.Encourage independent studies or investigations 2. Encourage creative expression by allowing students to choose how to explore a problem

	3. Invite students to explore points of view 4. Varied levels of reading text 5. Enriched hands on center that students can explore independently 6. Higher order thinking tasks and questions 7. Provide leadership opportunities in lab groups 8. Allow opportunities to analyze and evaluate materials

Unit Name 2.2	Earth's Systems: Processes that Shape the Earth
Estimated Timeline	October - November
NGSS	2-ESS1-1 2-ESS2-1 2-ESS2-2 2-ESS2-3
Student Learning Objectives	● Use information from several sources to provide evidence that Earth events can occur quickly or slowly. ● Compare multiple solutions designed to slow or prevent wind or water from changing the shape of the land. ● Develop a model to represent the shapes and kinds of land and bodies of water in an area. ● Obtain information to identify where water is found on Earth and that it can be solid or liquid.
Suggested projects, activities, labs used to support content	● Examples of events and timescales could include volcanic explosions and earthquakes, which happen quickly and erosion of rocks, which occurs slowly. ● Examples of solutions could include different designs of dikes and windbreaks to hold back wind and water, and different designs for using shrubs, grass and trees to hold back the land. ● Build sand castles and demonstrate how slow/fast the Earth Changes. ● Read books based on natural disasters and do brain pops.
Suggested assessments	Students can demonstrate competency with tasks such as: ● developing and refining models ● generating, discussing and analyzing data ● constructing spoken and written scientific explanations ● engaging in evidence-based argumentation ● reflecting on their own understanding ● notebook entries ● response sheets ● Self assessment/rubric

Suggested resources	• http://www.nextgenscience.org/ • https://betterlesson.com/home • http://www.brainpopjr.com • http://www.learn360.com • https://www.teachingchannel.org • Scholastic News (w/ online resource) • Science Spin (w/ online resource)
Differentiation for English Language Learners	1.Provide alternate ways for the student to respond (verbal/pictographic answers instead of written) 2. Substitute a hands-on activity or use of different media in projects for a written activity 3. Provide word banks / word walls 4. Prepare and distribute advance notes 5. Provide model sentence frames and sentence starters for both oral responses and written responses 6. Provide additional time to complete assessments and assignments 7. Model and use gestures to aid in understanding 8. Model tasks by giving one or two examples before releasing students to work independently 9. Present instructions both verbally and visually 10. Simplify written and verbal instructions
Differentiation for Enrichment	1.Encourage independent studies or investigations 2. Encourage creative expression by allowing students to choose how to explore a problem 3. Invite students to explore points of view 4. Varied levels of reading text 5. Enriched hands on center that students can explore independently 6. Higher order thinking tasks and questions 7. Provide leadership opportunities in lab groups 8. Allow opportunities to analyze and evaluate materials

Unit Name 2.3	Structure and Properties of Matter
Estimated Timeline	December - January
NGSS	2-PS1-1 2-PS1-2 2-PS1-3 2-PS1-4
Student Learning Objectives	• Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties. • Analyze data obtained from testing different materials to determine which materials have the properties that are best suited for an intended purpose. • Make observations to construct an evidence based account of how an object made of a small set of pieces can be disassembled and

Unit Name 2.3	Structure and Properties of Matter
	made into a new object. ● Construct an argument with evidence that some changes caused by heating or cooling can be reversed and some cannot.
Suggested projects, activities, labs used to support content	● Observations could include color, texture, hardness, and flexibility. ● Patterns could include the similar properties that different materials share. ● Examples of properties could include strength, flexibility, hardness, texture, and absorbency. ● Examples of pieces could include blocks, building bricks, or other assorted small objects. ● Examples of reversible changes could include materials such as water, crayons and butter at different temperatures. ● Examples of irreversible changes could include cooking an egg, freezing a plant leaf, and heating paper.
Suggested assessments	Students can demonstrate competency with tasks such as: ● developing and refining models ● generating, discussing and analyzing data ● constructing spoken and written scientific explanations ● engaging in evidence-based argumentation ● reflecting on their own understanding ● notebook entries ● response sheets
Suggested resources	● http://www.nextgenscience.org/ ● http://www.brainpopjr.com ● http://www.learn360.com ● Foss online: http://www.fossweb.com ● https://www.teachingchannel.org ● Steve Spangler Science: Easy Science Experiments, Science Toys ... ● https://www.stevespanglerscience.com/ ● Scholastic News (w/ online resource) ● Science Spin (w/ online resource) ● What is the World Made Of? By Kathleen Weidner Zoehfeld ● Changing Matter (Science Readers) by Karen Larson ● http://betterlesson.com ● Bill Nye - Phases of Matter ● https://jr.brainpop.com/science/matter/changingstatesofmatter/
Differentiation for English Language Learners	1.Provide alternate ways for the student to respond (verbal/pictographic answers instead of written) 2. Substitute a hands-on activity or use of different media in projects for a written activity 3. Provide word banks / word walls

Unit Name 2.3	Structure and Properties of Matter
	4. Prepare and distribute advance notes 5. Provide model sentence frames and sentence starters for both oral responses and written responses 6. Provide additional time to complete assessments and assignments 7. Model and use gestures to aid in understanding 8. Model tasks by giving one or two examples before releasing students to work independently 9. Present instructions both verbally and visually 10. Simplify written and verbal instructions
Differentiation for Enrichment	1.Encourage independent studies or investigations 2. Encourage creative expression by allowing students to choose how to explore a problem 3. Invite students to explore points of view 4. Varied levels of reading text 5. Enriched hands on center that students can explore independently 6. Higher order thinking tasks and questions 7. Provide leadership opportunities in lab groups 8. Allow opportunities to analyze and evaluate materials

Unit Name 2.4	Interdependent Relationships in Ecosystems
Estimated Timeline	February - May
NGSS	2-LS2-1 2-LS2-2 2-LS4-1
Student Learning Objectives	● Plan and conduct an investigation to determine if plants need sunlight and water to grow. ● Develop a simple model that mimics the function of an animal in dispersing seeds or pollinating plants. ● Make observations of plants and animals to compare the diversity of life in different habitats. ● Plant seeds in three different environments and observe which grew faster.
Suggested projects, activities, labs used to support content	● Limit assessment to one variable at a time with sunlight and water. ● Emphasis on the diversity of living things in a variety of different habitats (not including specific animal and plant names). ● Endangered animal research project: focus on Habitat, animal description, and why they are endangered. ● Each classroom represents a different habitat. ● Turtles and Beavers research project. (pond) Read Turtle's Race with Beaver. ● Incorporate Empowering Writers-Oviparous creatures (research,

	publish,type, and draw habitat) Expository & Narrative writing • Engineer it- The children will make a plan to build a tool that will pick up and move different seeds. The children will record their plan, design a model, and test their tool. The children will graph how many seeds they were able to move with their tool.
Suggested assessments	Students can demonstrate competency with tasks such as: • developing and refining models • generating, discussing and analyzing data • constructing spoken and written scientific explanations • engaging in evidence-based argumentation • reflecting on their own understanding • notebook entries • response sheets
Suggested resources	• http://www.nextgenscience.org/ • https://betterlesson.com/home • http://www.brainpopjr.com • http://www.learn360.com • https://www.teachingchannel.org • Scholastic News (w/ online resource) • Science Spin (w/ online resource)
Differentiation for English Language Learners	1.Provide alternate ways for the student to respond (verbal/pictographic answers instead of written) 2. Substitute a hands-on activity or use of different media in projects for a written activity 3. Provide word banks / word walls 4. Prepare and distribute advance notes 5. Provide model sentence frames and sentence starters for both oral responses and written responses 6. Provide additional time to complete assessments and assignments 7. Model and use gestures to aid in understanding 8. Model tasks by giving one or two examples before releasing students to work independently 9. Present instructions both verbally and visually 10. Simplify written and verbal instructions
Differentiation for Enrichment	1.Encourage independent studies or investigations 2. Encourage creative expression by allowing students to choose how to explore a problem 3. Invite students to explore points of view 4. Varied levels of reading text 5. Enriched hands on center that students can explore independently 6. Higher order thinking tasks and questions 7. Provide leadership opportunities in lab groups 8. Allow opportunities to analyze and evaluate materials

Unit Name 2.5	Engineering Design
Estimated Timeline	June
NGSS	K-2-ETS1-1 K-2-ETS1-2 K-2-ETS1-3
Student Learning Objectives	● Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool. ● Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem. ● Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.
Suggested projects, activities, labs used to support content	● Students are asked to design and build a stick that can pollinate plants in the same manner that a bee does. ○ Use observations and the engineering design process to test a variety of materials and decide which would make the best rain-proof roof for a doghouse.
Suggested assessments	Students can demonstrate competency with tasks such as: ● developing and refining models ● generating, discussing and analyzing data ● constructing spoken and written scientific explanations ● engaging in evidence-based argumentation ● reflecting on their own understanding ● notebook entries ● response sheets
Suggested resources	● http://www.nextgenscience.org/ ● https://betterlesson.com/home ● http://www.brainpopjr.com ● http://www.learn360.com ● https://www.teachingchannel.org ● Scholastic News (w/ online resource) ● Science Spin (w/ online resource)

Differentiation for English Language Learners	1.Provide alternate ways for the student to respond (verbal/pictographic answers instead of written) 2. Substitute a hands-on activity or use of different media in projects for a written activity 3. Provide word banks / word walls 4. Prepare and distribute advance notes 5. Provide model sentence frames and sentence starters for both oral responses and written responses 6. Provide additional time to complete assessments and assignments 7. Model and use gestures to aid in understanding 8. Model tasks by giving one or two examples before releasing students to work independently 9. Present instructions both verbally and visually 10. Simplify written and verbal instructions
Differentiation for Enrichment	1.Encourage independent studies or investigations 2. Encourage creative expression by allowing students to choose how to explore a problem 3. Invite students to explore points of view 4. Varied levels of reading text 5. Enriched hands on center that students can explore independently 6. Higher order thinking tasks and questions 7. Provide leadership opportunities in lab groups 8. Allow opportunities to analyze and evaluate materials

Interdisciplinary Connections	**Technology Standards**
☐ Correlates to routines unit in math, rules and community units in social studies. ☐ Identify classroom routines in other subject areas: math, science, and social studies. ☐ Discuss routines in the community ☐ Understand what it means to “read close” in social studies and science. ☐ Offer short, nonfiction picture books and nonfiction articles on science, social studies, and foreign language related activities to encourage building background knowledge and independent reading about topics of interest to students. ☐ Encourage students to respond to texts in their specific subject area notebooks as they reflect on what they have been reading. Highlight texts, themes, and reflections that connect to themes related to the Holocaust, (Ex. bullying and	**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.

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21st Century Skills Integration (Career Ready Practices)
CLKS1 Act as a responsible and contributing community members and employee. CLKS2-Attend to financial well-being. CLKS3-Consider the environmental, social and economic impacts of decisions. CLKS4-Demonstrate creativity and innovation. CLKS5-Utilize critical thinking to make sense of problems and persevere in solving them. CLKS6-Model integrity, ethical leadership and effective management. CLKS7-Plan education and career paths aligned to personal goals. CLKS8-Use technology to enhance productivity increase collaboration and communicate effectively. CLKS9-Work productively in teams while using cultural/global competence

Essex Fells Science Curriculum
Updated December 2022

I. COURSE NAME: Science 3

II. COURSE PREREQUISITES: Science 2

III. GRADE LEVEL(S): 3

IV. COURSE DESCRIPTION:

Scientific and technological advances have proliferated and now permeate most aspects of life in the 21st century. It is increasingly important that all members of our society develop an understanding of scientific and engineering concepts and processes. Learning how to construct scientific explanations and how to design evidence-based solutions provides students with tools to think critically about personal and societal issues and needs. Students can then contribute meaningfully to decision-making processes, such as discussions about climate change, new approaches to health care, and innovative solutions to local and global problems. Essex Fells school is committed to developing in all students a capacity to think critically and communicate effectively. Through this curriculum, all Essex Fells students will possess an understanding of scientific concepts and processes required for personal decision making, participation in civic life, and preparation for careers in STEM fields.

The performance expectations for third grade help students formulate answers to questions such as: “What is typical weather in different parts of the world and during different times of the year? How can the impact of weather-related hazards be reduced? How do organisms vary in their traits? What happens to organisms when their environment changes? How do equal and unequal forces on an object affect the object? How can magnets be used?”

Third Grade performance expectations include PS2, LS1, LS2, LS3, LS4, ESS2, ESS3 Disciplinary Core Ideas. Students are able to organize and use data to describe typical weather conditions expected during a particular season. By applying their understanding of weather-related hazards, students are able to make a claim about the merit of a design solution that reduces the impacts of such hazards. Students are expected to develop an understanding that organisms have different inherited traits, and that the environment can also affect the traits that an organism develops, which is acquired by students at this level. In addition, students are able to construct an explanation using evidence for how the variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing.

Students are expected to develop an understanding of types of organisms that lived long ago and also about the nature of their environments. Third grade students are expected to develop an understanding of the idea that when the environment changes, some organisms reproduce and survive, some move to new locations, some move into the transformed environment, and some die. Students are able to determine the effects of balanced and unbalanced forces on the motion of an object and the cause and effect relationships of electric or magnetic interactions between two objects not in contact with each other. They are then able to apply their understanding of magnetic interactions to determine a simple design problem that can be solved with magnets. The crosscutting concepts of patterns; cause and effect; scale, proportion, and quantity; systems and system models, interdependence of science, engineering, and technology; and influence of engineering, and technology; and influence of engineering, technology, and science on society and the natural world are called out as organizing concepts for these disciplinary ideas.

V. COURSE OBJECTIVES:

In third grade performance expectations, students are expected to demonstrate grade-appropriate proficiency in asking questions and defining problems; developing and using models, planning and carrying out investigations, analyzing and interpreting data,constructing explanations and designing solutions, engaging in argument from evidence, and obtaining, evaluating, and communicating information. Students are expected to use these practices to demonstrate understanding of core ideas.

VI. NEW JERSEY ADMINISTRATIVE CODE SUMMARY AND STATUTES

Curriculum Development: Integration of 21st Century Skills and Themes and Interdisciplinary Connections

District boards of education shall be responsible for the review and continuous improvement of curriculum and instruction based upon changes in knowledge, technology, assessment results, and modifications to the NJSLS, according to N.J.A.C. 6A:8-2.

1. District boards of education shall include interdisciplinary connections throughout the K–12 curriculum.
2. District boards of education shall integrate into the curriculum 21st century themes and skills (N.J.A.C. 6A:8-3.1(c)2).

21st century themes and skills integrated into all content standards areas (N.J.A.C. 6A:8-1.1(a)3).

"Twenty-first century themes and skills" means themes such as global awareness; financial, economic, business, and entrepreneurial literacy; civic literacy; health literacy; learning and innovation skills, including creativity and innovation, critical thinking and problem solving, and communication and collaboration; information, media, and technology skills; and life and career skills, including flexibility and adaptability, initiative and self-direction, social and cross-cultural skills, productivity and accountability, and leadership and responsibility.

Dissection Law
N.J.S.A. 18A:35-4.25 and N.J.S.A. 18A:35-4.24 authorize parents or guardians to assert the right of their children to refuse to dissect, vivisect, incubate, capture or otherwise harm or destroy animals or any parts thereof as part of a course of instruction.

Amistad Law: N.J.S.A. 18A 52:16A-88
Every board of education shall incorporate the information regarding the contributions of African-Americans to our country in an appropriate place in the curriculum of elementary and secondary school students.

Diversity and Inclusion Law: N.J.S.A. 18A:35-4.36a
Each school district shall incorporate instruction on diversity and inclusion in an appropriate place in the curriculum of students in grades kindergarten through 12 as part of the district's implementation of the New Jersey Student Learning Standards.

Holocaust Law: N.J.S.A. 18A:35-28
Every board of education shall include instruction on the Holocaust and genocides in an appropriate place in the curriculum of all elementary and secondary school pupils. The instruction shall further emphasize the personal responsibility that each citizen bears to fight racism and hatred whenever and wherever it happens.

LGBT and Disabilities Law: N.J.S.A. 18A:35-4.35
A board of education shall include instruction on the political, economic, and social contributions of persons with disabilities and lesbian, gay, bisexual, and transgender people, in an appropriate place in the curriculum of middle school and high school students as part of the district's implementation of the New Jersey Student Learning Standards (N.J.S.A.18A:35-4.36).

A board of education shall have policies and procedures in place pertaining to the selection of instructional materials to implement the requirements of N.J.S.A. 18A:35-4.35.

VII. TEXT/RESOURCES

A. Textbook
B. www.Amplify.com
C. Science journal
D. www.NSTA.org
E. www.nextgenscience.org
F. BrainPop
G. Generation Genius
H. Freckle
I. EdPuzzle
J. IXL.com
K. www.MysteryScience.com

VIII. EVALUATION/ ASSESSMENTS

Students can demonstrate competency with tasks such as developing and refining models; generating, discussing and analyzing data; constructing spoken and written scientific explanations; engaging in evidence-based argumentation; and reflecting on their own understanding. A combination of formative and summative

assessments will be utilized in thai course including, but not limited to teacher observations, student work and reflections, projects, quizzes and tests, and writing tasks.

IX. SCOPE AND SEQUENCE (see table below)

This course has been designed with respect to and in compliance with the expectations set forth in state approved standards.

Unit 1	**Motion & Stability: Forces & Interaction**
Estimated Timeline	September-November
NGSS & Student Learning Objectives	**3-PS2-1**. Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object. **3-PS2-2.** Make observations and/or measurements of an object's motion to provide evidence that a pattern can be used to predict future motion. **3-PS2-3.** Ask questions to determine cause and effect relationships of electric or magnetic interactions between two objects not in contact with each other. **3-PS2-4:** Define a simple design problem that can be solved by applying scientific ideas about magnets. [Clarification Statement: Examples of problems could include constructing a latch to keep a door shut and creating a device to keep two moving objects from touching each other.] **3-5-ETS1-1**. Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost. **3-5-ETS1-2**. Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.
Suggested projects,	● Create an investigation to identify and describe the effects of different forces on an object's motion (starting, stopping,

activities, labs used to support content, and resources	changing direction). ● Develop an investigation to change the motion of an object at rest by applying both balanced (forces that sum zero) and unbalanced forces (forces that do not sum to zero). ● Develop models to represent balanced and unbalanced forces. ● Observe and record the motion of an object (control strength and vary the direction, control direction and strength, number of trials needed). ● Explore ways in which magnetic forces make an object move. ● Investigate why an object would not move even though a force (magnetic or electric) is acting on it. ● Investigate various degrees of force and their relation to the movement of objects. ● Design an improved model of an everyday object using a magnet (ex. being a magnetic latch to keep a door closed).
Suggested Assessments	Students can demonstrate competency with tasks such as: ● Generating, discussing, and analyzing data ● Constructing spoken and written explanations ● Engaging in evidence-based discussion ● Reflecting on their own understanding ● Journal Entries ● Response/Exit Tickets ● Constructing a scientific claim supported with evidence based research and reasoning.
Differentiation for Students with IEPs, 504, and Students at Risk of Failure	● Extended time for task completion (Assignments, Assessments, etc..) ● Provide copy of accurate notes ● Breaking down and chunking assignments ● Restating and clarifying instruction ● Extra book provided to keep at home ● Organizational assistance (notebook, assignment pad, lab materials, etc.) ● Option to type instead handwriting notes ● Adjusting class schedule to alternate instruction (morning/afternoon) ● Modify test and quizzes ● Provide manipulative examples ● Preferential Seating ● Use of Graphic Organizers (charts, visual outlines, etc..) ● Repetition and clarification of directions ● Assessments and class work read aloud ● Provide checklists ● Movement breaks ● Visual representation of print version ● Use of a alarm/fimer to aide with time management, including transitional warning ● Nonverbal cue for off-task behavior

	● Provide positive reinforcement ● Hands on learning activities ● Ask student to restate directions or concepts taught ● Deliver directions one step at a time, gradually increasing the number of steps delivered ● Explain the purpose of the assignment to the student ● Provide managed choices to increase on task behavior ● Allow for break passes when needed
Differentiation for English Language Learners	● Provide alternate ways for the student to respond (verbal/pictographic answers instead of written) ● Substitute a hands-on activity or use of different media in projects for a written activity ● Provide word banks / word walls ● Prepare and distribute advance notes ● Provide model sentence frames and sentence starters for both oral responses and written responses ● Provide additional time to complete assessments and assignments ● Model and use gestures to aid in understanding ● Model tasks by giving one or two examples before releasing students to work independently ● Present instructions both verbally and visually ● Simplify written and verbal instructions
Differentiation for Enrichment	● Encourage independent studies or investigations ● Encourage creative expression by allowing students to choose how to explore a problem ● Invite students to explore points of view ● Varied levels of reading text ● Enriched hands on center that students can explore independently ● Higher order thinking tasks and questions ● Provide leadership opportunities in lab groups ● Allow opportunities to analyze and evaluate materials

Unit 2	**Heredity: Inheritance and Variation of Traits**
Estimated Timeline	December-February
NGSS & Student Learning Objectives	**3-LS1-1.** Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death. **3-LS2-1.** Construct an argument that some animals form groups that help members survive. **3-LS3-1.** Analyze and interpret data to provide evidence that plants and animals have traits inherited from parents and that variation of these traits exists in a group of similar organisms. **3-LS3-2**. Use evidence to support the explanation that traits can be influenced by the environment. **3-5-ETS1-1**. Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost. **3-5-ETS1-2**. Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.
Suggested projects, activities, labs used to support content, and resources	● Research an organism's life cycle ● Develop models (conceptual, digital, physical, and/or drawing) to represent different animal life cycles ● Examine patterns across life cycles ● Observe and create a diagram outlining the stages in the life cycle of an organism. ● Students will develop a model (e.g. Punnet Squares, diagrams, simulations,) of genetic variation in offspring relative to their parents. ● Students will use cause- and-effect relationships found in the model between the type of reproduction and resulting genetic variation to predict that more genetic variation occurs in organisms. ● Investigate patterns and data in relation to inherited traits. ● Students will identify inherited traits in partners.
Suggested Assessments	Students can demonstrate competency with tasks such as: ● Generating, discussing, and analyzing data ● Constructing spoken and written explanations

	● Engaging in evidence-based discussion ● Reflecting on their own understanding ● Journal Entries ● Response/Exit Tickets ● Constructing a scientific claim supported with evidence based research and reasoning.
Differentiation for Students with IEPs, 504, and Students at Risk of Failure	● Extended time for task completion (Assignments, Assessments, etc..) ● Provide copy of accurate notes ● Breaking down and chunking assignments ● Restating and clarifying instruction ● Extra book provided to keep at home ● Organizational assistance (notebook, assignment pad, lab materials, etc.) ● Option to type instead handwriting notes ● Adjusting class schedule to alternate instruction (morning/afternoon) ● Modify test and quizzes ● Provide manipulative examples ● Preferential Seating ● Use of Graphic Organizers (charts, visual outlines, etc..) ● Repetition and clarification of directions ● Assessments and class work read aloud ● Provide checklists ● Movement breaks ● Visual representation of print version ● Use of a alarm/fimer to aide with time management, including transitional warning ● Nonverbal cue for off-task behavior ● Provide positive reinforcement ● Hands on learning activities ● Ask student to restate directions or concepts taught ● Deliver directions one step at a time, gradually increasing the number of steps delivered ● Explain the purpose of the assignment to the student ● Provide managed choices to increase on task behavior ● Allow for break passes when needed
Differentiation for English Language Learners	● Provide alternate ways for the student to respond (verbal/pictographic answers instead of written) ● Substitute a hands-on activity or use of different media in projects for a written activity ● Provide word banks / word walls ● Prepare and distribute advance notes ● Provide model sentence frames and sentence starters for both oral responses and written responses ● Provide additional time to complete assessments and assignments ● Model and use gestures to aid in understanding

	● Model tasks by giving one or two examples before releasing students to work independently ● Present instructions both verbally and visually ● Simplify written and verbal instructions
Differentiation for Enrichment	● Encourage independent studies or investigations ● Encourage creative expression by allowing students to choose how to explore a problem ● Invite students to explore points of view ● Varied levels of reading text ● Enriched hands on center that students can explore independently ● Higher order thinking tasks and questions ● Provide leadership opportunities in lab groups ● Allow opportunities to analyze and evaluate materials

Unit 3	**Biological Evaluation: Unity & Diversity**
Estimated Timeline	February- April
NGSS & Student Learning Objectives	**3-LS4-1.** Analyze and interpret data from fossils to provide evidence of the organisms and the environments in which they lived long ago. **3-LS4-2**. Use evidence to construct an explanation for how the variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing. **3-LS4-3.** Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all. **3-LS4-4.** Make a claim about the merit of a solution to a problem caused when the environment changes and the types of plants and animals that live there may change. **3-5 ETS1-1.** Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost. **3-5-ETS1-2.** Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem. **3-5-ETS1-3.** Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.
Suggested projects, activities, labs used to support content, and resources	● Compare animals of the same species with different traits to identify advantages and disadvantages of living with said traits. ● Describe why organisms with adaptive traits are more likely to survive in their environment. ● Discuss and write about environmental factors that affect the traits of living things using videos and text. ● Investigate the size and distribution of fossils to draw conclusions about how land has changed over time. ● Examine how the environment affects inherited traits of organisms. ● Compose a scientific argument and demonstrate their knowledge of what makes organisms in a population more or less likely to survive.
Suggested Assessments	Students can demonstrate competency with tasks such as: ● Generating, discussing, and analyzing data ● Constructing spoken and written explanations ● Engaging in evidence-based discussion

	● Reflecting on their own understanding ● Journal Entries ● Response/Exit Tickets ● Constructing a scientific claim supported with evidence based research and reasoning.
Differentiation for Students with IEPs, 504, and Students at Risk of Failure	● Extended time for task completion (Assignments, Assessments, etc..) ● Provide copy of accurate notes ● Breaking down and chunking assignments ● Restating and clarifying instruction ● Extra book provided to keep at home ● Organizational assistance (notebook, assignment pad, lab materials, etc.) ● Option to type instead handwriting notes ● Adjusting class schedule to alternate instruction (morning/afternoon) ● Modify test and quizzes ● Provide manipulative examples ● Preferential Seating ● Use of Graphic Organizers (charts, visual outlines, etc..) ● Repetition and clarification of directions ● Assessments and class work read aloud ● Provide checklists ● Movement breaks ● Visual representation of print version ● Use of a alarm/fimer to aide with time management, including transitional warning ● Nonverbal cue for off-task behavior ● Provide positive reinforcement ● Hands on learning activities ● Ask student to restate directions or concepts taught ● Deliver directions one step at a time, gradually increasing the number of steps delivered ● Explain the purpose of the assignment to the student ● Provide managed choices to increase on task behavior ● Allow for break passes when needed
Differentiation for English Language Learners	● Provide alternate ways for the student to respond (verbal/pictographic answers instead of written) ● Substitute a hands-on activity or use of different media in projects for a written activity ● Provide word banks / word walls ● Prepare and distribute advance notes ● Provide model sentence frames and sentence starters for both oral responses and written responses ● Provide additional time to complete assessments and assignments

	● Model and use gestures to aid in understanding ● Model tasks by giving one or two examples before releasing students to work independently ● Present instructions both verbally and visually ● Simplify written and verbal instructions
Differentiation for Enrichment	● Encourage independent studies or investigations ● Encourage creative expression by allowing students to choose how to explore a problem ● Invite students to explore points of view ● Varied levels of reading text ● Enriched hands on center that students can explore independently ● Higher order thinking tasks and questions ● Provide leadership opportunities in lab groups ● Allow opportunities to analyze and evaluate materials

Unit 4	**Earth's Systems: Weather and Climate**
Estimated Timeline	May-June
NGSS & Student Learning Objectives	**3-ESS2-1.** Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season. **3-ESS2-2.** Obtain and combine information to describe climates in different regions of the world. **3-ESS3-1.** Make a claim about the merit of a design solution that reduces the impacts of a weather-related hazard. **3-5 ETS1-1.** Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost. **3-5-ETS1-2.** Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.
Suggested projects, activities, labs used to support content, and resources	● Research and record data on the weather and climate in another region of the world. ● Measure temperature, precipitation, and wind direction using weather tools. ● Graph typical weather patterns for the region in which they live. ● Predict weather patterns based on patterns and preview year's data. ● Design solutions to prevent weather-related hazards (i.e barriers for flooding, wind resistant roofs, etc.) ● Identify hazards and problems caused by weather. ● Research recent natural disasters and the hazardous effects and identify solutions that were used to solve these issues.
Suggested Assessments	Students can demonstrate competency with tasks such as: ● Generating, discussing, and analyzing data ● Constructing spoken and written explanations ● Engaging in evidence-based discussion ● Reflecting on their own understanding ● Journal Entries ● Response/Exit Tickets ● Constructing a scientific claim supported with evidence based research and reasoning.
Differentiation for Students with IEPs, 504, and Students at Risk of Failure	● Extended time for task completion (Assignments, Assessments, etc.) ● Provide copy of accurate notes ● Breaking down and chunking assignments ● Restating and clarifying instruction

	● Extra book provided to keep at home ● Organizational assistance (notebook, assignment pad, lab materials, etc.) ● Option to type instead handwriting notes ● Adjusting class schedule to alternate instruction (morning/afternoon) ● Modify test and quizzes ● Provide manipulative examples ● Preferential Seating ● Use of Graphic Organizers (charts, visual outlines, etc..) ● Repetition and clarification of directions ● Assessments and class work read aloud ● Provide checklists ● Movement breaks ● Visual representation of print version ● Use of a alarm/fimer to aide with time management, including transitional warning ● Nonverbal cue for off-task behavior ● Provide positive reinforcement ● Hands on learning activities ● Ask student to restate directions or concepts taught ● Deliver directions one step at a time, gradually increasing the number of steps delivered ● Explain the purpose of the assignment to the student ● Provide managed choices to increase on task behavior ● Allow for break passes when needed.
Differentiation for English Language Learners	● Provide alternate ways for the student to respond (verbal/pictographic answers instead of written) ● Substitute a hands-on activity or use of different media in projects for a written activity ● Provide word banks / word walls ● Prepare and distribute advance notes ● Provide model sentence frames and sentence starters for both oral responses and written responses ● Provide additional time to complete assessments and assignments ● Model and use gestures to aid in understanding ● Model tasks by giving one or two examples before releasing students to work independently ● Present instructions both verbally and visually ● Simplify written and verbal instructions
Differentiation for Enrichment	● Encourage independent studies or investigations ● Encourage creative expression by allowing students to choose how to explore a problem ● Invite students to explore points of view ● Varied levels of reading text ● Enriched hands on center that students can explore independently ● Higher order thinking tasks and questions ● Provide leadership opportunities in lab groups

	• Allow opportunities to analyze and evaluate materials

Essex Fells Science Curriculum
Updated December 2022

I. COURSE NAME: Science 4

II. COURSE PREREQUISITES: Science 3

III. GRADE LEVEL(S): 4

IV. COURSE DESCRIPTION:

Scientific and technological advances have proliferated and now permeate most aspects of life in the 21st century. It is increasingly important that all members of our society develop an understanding of scientific and engineering concepts and processes. Learning how to construct scientific explanations and how to design evidence-based solutions provides students with tools to think critically about personal and societal issues and needs. Students can then contribute meaningfully to decision-making processes, such as discussions about climate change, new approaches to health care, and innovative solutions to local and global problems. Essex Fells school is committed to developing in all students a capacity to think critically and communicate effectively. Through this curriculum, all Essex Fells students will possess an understanding of scientific concepts and processes required for personal decision making, participation in civic life, and preparation for careers in STEM fields.

The performance expectations in fourth grade help students formulate answers
to questions such as: “What are waves and what are some things they can do? How can water, ice, wind and vegetation change the land? What patterns of Earth’s features can be determined with the use of maps? How do internal and external structures support the survival, growth, behavior and reproduction of plants and animals? What is energy and how is it related to motion? How is energy transferred? How can energy be used to solve a problem?

Fourth grade performance expectations include PS3, PS4, LS1, ESS1, ESS2, ESS3, and ETS1 Disciplinary Core Ideas from the NRC Framework. Students are able to use a model of waves to describe patterns of waves in terms of amplitude and wavelength , and that waves can cause objects to move.

Students are expected to develop understanding of the effects of weathering or the rate of erosion by water,ice,wind, and vegetation. They apply their knowledge of natural Earth processes to generate and compare multiple solutions to reduce the impacts of such processes on humans. In order to describe patterns of earth;s features, students analyze and interpret data from maps. Fourth grade students are expected to develop an understanding that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction. By developing a model, they describe that an object can be seen when a light reflected from its surface enters the eye. Students are able to use evidence to construct an explanation of the relationship between the speed of an object and the energy of that object. Students are expected to develop an understanding that energy can be transferred from place to place by sound, light, heat, and electric currents or from object to object through collisions. They apply their understanding of energy to design, test, and refine a device that converts energy from one form to another. The crosscutting concepts of patterns; cause and effect; energy and matter; systems and system models; interdependence of science on society and the natural world are called out as organizing concepts for these disciplinary core ideas.

IV. COURSE OBJECTIVES:

In the fourth grade performance expectations, students are expected to demonstrate grade-appropriate proficiency in asking questions, developing and using models, planning and carrying out investigations, analyzing and interpreting data, constructing explanations and designing solutions, engaging in argument from evidence, and obtaining, evaluating, and communicating information. Students are expected to use these practices to demonstrate understanding of the core ideas.

VI. NEW JERSEY ADMINISTRATIVE CODE SUMMARY AND STATUTES

Curriculum Development: Integration of 21st Century Skills and Themes and Interdisciplinary Connections

District boards of education shall be responsible for the review and continuous improvement of curriculum and instruction based upon changes in knowledge, technology, assessment results, and modifications to the NJSLS, according to N.J.A.C. 6A:8-2.

1. District boards of education shall include interdisciplinary connections throughout the K–12 curriculum.

2. District boards of education shall integrate into the curriculum 21st century themes and skills (N.J.A.C. 6A:8-3.1(c)2).

21st century themes and skills integrated into all content standards areas (N.J.A.C. 6A:8-1.1(a)3).

"Twenty-first century themes and skills" means themes such as global awareness; financial, economic, business, and entrepreneurial literacy; civic literacy; health literacy; learning and innovation skills, including creativity and innovation, critical thinking and problem solving, and communication and collaboration; information, media, and technology skills; and life and career skills, including flexibility and adaptability, initiative and self-direction, social and cross-cultural skills, productivity and accountability, and leadership and responsibility.

Dissection Law

N.J.S.A. 18A:35-4.25 and N.J.S.A. 18A:35-4.24 authorize parents or guardians to assert the right of their children to refuse to dissect, vivisect, incubate, capture or otherwise harm or destroy animals or any parts thereof as part of a course of instruction.

Amistad Law: N.J.S.A. 18A 52:16A-88

Every board of education shall incorporate the information regarding the contributions of African-Americans to our country in an appropriate place in the curriculum of elementary and secondary school students.

Diversity and Inclusion Law: N.J.S.A. 18A:35-4.36a

Each school district shall incorporate instruction on diversity and inclusion in an appropriate place in the curriculum of students in grades kindergarten through 12 as part of the district's implementation of the New Jersey Student Learning Standards.

Holocaust Law: N.J.S.A. 18A:35-28

Every board of education shall include instruction on the Holocaust and genocides in an appropriate place in the curriculum of all elementary and secondary school pupils. The instruction shall further emphasize the personal responsibility that each citizen bears to fight racism and hatred whenever and wherever it happens.

LGBT and Disabilities Law: N.J.S.A. 18A:35-4.35

A board of education shall include instruction on the political, economic, and social contributions of persons with disabilities and lesbian, gay, bisexual, and transgender people, in an appropriate place in the curriculum of middle school and high school students as part of the district's implementation of the New Jersey Student Learning Standards (N.J.S.A.18A:35-4.36).

A board of education shall have policies and procedures in place pertaining to the selection of instructional materials to implement the requirements of N.J.S.A. 18A:35-4.35.

VII. TEXT/ TECHNOLOGY RESOURCES

A. Textbook
B. www.Amplify.com
C. Science journal
D. www.NSTA.org
E. www.nextgenscience.org
F. BrainPop
G. Generation Genius
H. Freckle
I. EdPuzzle
J. IXL.com
K. www.MysteryScience.com

VIII. EVALUATIONS/ASSESSMENTS:

Students can demonstrate competency with tasks such as developing and refining models; generating, discussing and analyzing data; constructing spoken and written scientific explanations; engaging in evidence-based argumentation; and reflecting on their own understanding. A combination of formative and summative assessments will be utilized in thai course including, but not limited to teacher observations, student work and reflections, projects, quizzes and tests, and writing tasks.

IX. SCOPE AND SEQUENCE: (see table below)

This course had been designed with respect to and in compliance with the expectations set forth in the state-approved standards**.**

Unit 1	**Energy**
Estimated Timeline	September-November
NGSS & Student Learning Objective	**4-PS3-1.** Use evidence to construct an explanation relating the speed of an object to the energy of that object. **4-PS3-2.** Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents. **4-PS3-3.** Ask questions and predict outcomes about the changes in energy that occur when objects collide. **4-PS3-4.** Apply scientific ideas to design, test, and refine a device that converts energy from one form to another. **3-5-ETS1-1** Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost. **3-5-ETS1-2** Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.
Suggested	● Design an experiment to test the energy in a moving object

projects, activities, labs used to support content, and resources	by measuring and evaluating the impact the moving object has on a second, stationary object. ● Construct model circuits converting energy in a battery into light. ● Observe evidence of light, motion, sound and thermal energy. ● Explore the parts of a system needed to transfer electrical energy effectively. ● Examine the differences between sound energy in solids, liquids and gasses. ● Develop a supported claim utilizing information gathered through investigations.
Suggested Assessments	Students can demonstrate competency with tasks such as: ● Generating, discussing, and analyzing data ● Constructing spoken and written explanations ● Engaging in evidence-based discussion ● Reflecting on their own understanding ● Journal Entries ● Response/Exit Tickets ● Constructing a scientific claim supported with evidence based research and reasoning.
Differentiation for Students with IEPs, 504, and Students at Risk of Failure	● Extended time for task completion (Assignments, Assessments, etc..) ● Provide copy of accurate notes ● Breaking down and chunking assignments ● Restating and clarifying instruction ● Extra book provided to keep at home ● Organizational assistance (notebook, assignment pad, lab materials, etc.) ● Option to type instead handwriting notes ● Adjusting class schedule to alternate instruction (morning/afternoon) ● Modify test and quizzes ● Provide manipulative examples ● Preferential Seating ● Use of Graphic Organizers (charts, visual outlines, etc..) ● Repetition and clarification of directions ● Assessments and class work read aloud ● Provide checklists ● Movement breaks ● Visual representation of print version ● Use of a alarm/fimer to aide with time management, including transitional warning ● Nonverbal cue for off-task behavior ● Provide positive reinforcement ● Hands on learning activities ● Ask student to restate directions or concepts taught ● Deliver directions one step at a time, gradually increasing the number of steps delivered

	● Explain the purpose of the assignment to the student ● Provide managed choices to increase on task behavior ● Allow for break passes when needed
Differentiation for English Language Learners	● Provide alternate ways for the student to respond (verbal/pictographic answers instead of written) ● Substitute a hands-on activity or use of different media in projects for a written activity ● Provide word banks / word walls ● Prepare and distribute advance notes ● Provide model sentence frames and sentence starters for both oral responses and written responses ● Provide additional time to complete assessments and assignments ● Model and use gestures to aid in understanding ● Model tasks by giving one or two examples before releasing students to work independently ● Present instructions both verbally and visually ● Simplify written and verbal instructions
Differentiation for Enrichment	● Encourage independent studies or investigations ● Encourage creative expression by allowing students to choose how to explore a problem ● Invite students to explore points of view ● Varied levels of reading text ● Enriched hands on center that students can explore independently ● Higher order thinking tasks and questions ● Provide leadership opportunities in lab groups ● Allow opportunities to analyze and evaluate materials

Unit 2	**Molecules to Organisms: Structures and Processes**
Estimated Timeline	December-February
NGSS and Student Learning Objectives	**4-LS1-1.** Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction. **4-LS1-2.** Use a model to describe that animals receive different types of information through their senses, process the information in their brains, and respond to the information in different ways. **3-5-ETS1-1** Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost. **3-5-ETS1-2** Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem. **3-5-ETS1-3** Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.
Suggested projects, activities, labs used to support content, and resources	● Identify structures useful to animals and describe their functions in survival. ● Develop models (conceptual, digital, physical and/or drawing)to represent plant structures. ● Examine various animal structures that facilitate survival. ● Develop a supported claim utilizing information gathered through investigations. ● Design an experiment consisting of multiple variables to investigate the structures of a plant.
Suggested Assessments	Students can demonstrate competency with tasks such as: ● Generating, discussing, and analyzing data ● Constructing spoken and written explanations ● Engaging in evidence-based discussion ● Reflecting on their own understanding ● Journal Entries ● Response/Exit Tickets ● Constructing a scientific claim supported with evidence based research and reasoning.
Differentiation for Students with IEPs, 504, and Students at Risk of Failure	● Extended time for task completion (Assignments, Assessments, etc..) ● Provide copy of accurate notes ● Breaking down and chunking assignments ● Restating and clarifying instruction ● Extra book provided to keep at home

	● Organizational assistance (notebook, assignment pad, lab materials, etc.) ● Option to type instead handwriting notes ● Adjusting class schedule to alternate instruction (morning/afternoon) ● Modify test and quizzes ● Provide manipulative examples ● Preferential Seating ● Use of Graphic Organizers (charts, visual outlines, etc..) ● Repetition and clarification of directions ● Assessments and class work read aloud ● Provide checklists ● Movement breaks ● Visual representation of print version ● Use of a alarm/fimer to aide with time management, including transitional warning ● Nonverbal cue for off-task behavior ● Provide positive reinforcement ● Hands on learning activities ● Ask student to restate directions or concepts taught ● Deliver directions one step at a time, gradually increasing the number of steps delivered ● Explain the purpose of the assignment to the student ● Provide managed choices to increase on task behavior ● Allow for break passes when needed
Differentiation for English Language Learners	● Provide alternate ways for the student to respond (verbal/pictographic answers instead of written) ● Substitute a hands-on activity or use of different media in projects for a written activity ● Provide word banks / word walls ● Prepare and distribute advance notes ● Provide model sentence frames and sentence starters for both oral responses and written responses ● Provide additional time to complete assessments and assignments ● Model and use gestures to aid in understanding ● Model tasks by giving one or two examples before releasing students to work independently ● Present instructions both verbally and visually ● Simplify written and verbal instructions
Differentiation for Enrichment	● Encourage independent studies or investigations ● Encourage creative expression by allowing students to choose how to explore a problem ● Invite students to explore points of view ● Varied levels of reading text ● Enriched hands on center that students can explore independently ● Higher order thinking tasks and questions ● Provide leadership opportunities in lab groups ● Allow opportunities to analyze and evaluate materials

Unit 3	**Earth's Systems and Place in the Universe**
Estimated Timeline	February- April
NGSS and Student Learning Objectives	**4-ESS1-1.** Identify evidence from patterns in rock formations and fossils in rock layers to support an explanation for changes in a landscape over time. **4-ESS2-1.** Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation. **4-ESS2-2.** Analyze and interpret data from maps to describe patterns of Earth's features. **4-ESS3-1** Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment. **4-ESS3-2**. Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans. **3-5-ETS1-1** Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost. **3-5-ETS1-2** Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.
Suggested projects, activities, labs used to support content, and resources	● Examine samples of fossils to conclude that sedimentary rock layers transform over time. ● Interpret how rocks provide information about what a specific environment was like in the past. ● Examine maps of the Earth and its features to identify patterns. ● Collect information on the impact of erosion on natural landforms. ● Develop a supported claim utilizing information gathered through investigations. ● Decipher the difference between wind, water, plant and ice erosion.
Suggested Assessments	Students can demonstrate competency with tasks such as: ● Generating, discussing, and analyzing data ● Constructing spoken and written explanations ● Engaging in evidence-based discussion

	● Reflecting on their own understanding ● Journal Entries ● Response/Exit Tickets ● Constructing a scientific claim supported with evidence based research and reasoning.
Differentiation for Students with IEPs, 504, and Students at Risk of Failure	● Extended time for task completion (Assignments, Assessments, etc..) ● Provide copy of accurate notes ● Breaking down and chunking assignments ● Restating and clarifying instruction ● Extra book provided to keep at home ● Organizational assistance (notebook, assignment pad, lab materials, etc.) ● Option to type instead handwriting notes ● Adjusting class schedule to alternate instruction (morning/afternoon) ● Modify test and quizzes ● Provide manipulative examples ● Preferential Seating ● Use of Graphic Organizers (charts, visual outlines, etc..) ● Repetition and clarification of directions ● Assessments and class work read aloud ● Provide checklists ● Movement breaks ● Visual representation of print version ● Use of a alarm/fimer to aide with time management, including transitional warning ● Nonverbal cue for off-task behavior ● Provide positive reinforcement ● Hands on learning activities ● Ask student to restate directions or concepts taught ● Deliver directions one step at a time, gradually increasing the number of steps delivered ● Explain the purpose of the assignment to the student ● Provide managed choices to increase on task behavior ● Allow for break passes when needed
Differentiation for English Language Learners	● Provide alternate ways for the student to respond (verbal/pictographic answers instead of written) ● Substitute a hands-on activity or use of different media in projects for a written activity ● Provide word banks / word walls ● Prepare and distribute advance notes ● Provide model sentence frames and sentence starters for both oral responses and written responses ● Provide additional time to complete assessments and assignments ● Model and use gestures to aid in understanding

	● Model tasks by giving one or two examples before releasing students to work independently ● Present instructions both verbally and visually ● Simplify written and verbal instructions
Differentiation for Enrichment	● Encourage independent studies or investigations ● Encourage creative expression by allowing students to choose how to explore a problem ● Invite students to explore points of view ● Varied levels of reading text ● Enriched hands on center that students can explore independently ● Higher order thinking tasks and questions ● Provide leadership opportunities in lab groups ● Allow opportunities to analyze and evaluate materials

Unit 4	**Waves and their Applications in Technologies for Information Transfer**
Estimated Timeline	May-June
NGSS and Student Learning Objectives	**4-PS4-1.** Develop a model of waves to describe patterns in terms of amplitude and wavelength and that waves can cause objects to move. ***4-PS4-2*** *Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen.* **4-PS4-3.** Generate and compare multiple solutions that use patterns to transfer information. **3-5-ETS1-2** Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem. **3-5-ETS1-3** Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.
Suggested projects, activities, labs used to support content, and resources	● Illustrate how sound/light transfer from one place to another. ● Explain how sound energy travels and what it can travel through. ● Recognize how humans use patterns to communicate information and use technology to communicate those patterns across long distances. ● Investigate particles and how collisions between those particles affect the way sound travels. ● Develop a supported claim utilizing information gathered through investigations.
Suggested Assessments	Students can demonstrate competency with tasks such as: ● Generating, discussing, and analyzing data ● Constructing spoken and written explanations ● Engaging in evidence-based discussion ● Reflecting on their own understanding ● Journal Entries ● Response/Exit Tickets ● Constructing a scientific claim supported with evidence based research and reasoning.
Differentiation for Students with IEPs, 504, and Students at Risk of Failure	● Extended time for task completion (Assignments, Assessments, etc..) ● Provide copy of accurate notes ● Breaking down and chunking assignments ● Restating and clarifying instruction ● Extra book provided to keep at home

	● Organizational assistance (notebook, assignment pad, lab materials, etc.) ● Option to type instead handwriting notes ● Adjusting class schedule to alternate instruction (morning/afternoon) ● Modify test and quizzes ● Provide manipulative examples ● Preferential Seating ● Use of Graphic Organizers (charts, visual outlines, etc..) ● Repetition and clarification of directions ● Assessments and class work read aloud ● Provide checklists ● Movement breaks ● Visual representation of print version ● Use of a alarm/fimer to aide with time management, including transitional warning ● Nonverbal cue for off-task behavior ● Provide positive reinforcement ● Hands on learning activities ● Ask student to restate directions or concepts taught ● Deliver directions one step at a time, gradually increasing the number of steps delivered ● Explain the purpose of the assignment to the student ● Provide managed choices to increase on task behavior ● Allow for break passes when needed
Differentiation for English Language Learners	● Provide alternate ways for the student to respond (verbal/pictographic answers instead of written) ● Substitute a hands-on activity or use of different media in projects for a written activity ● Provide word banks / word walls ● Prepare and distribute advance notes ● Provide model sentence frames and sentence starters for both oral responses and written responses ● Provide additional time to complete assessments and assignments ● Model and use gestures to aid in understanding ● Model tasks by giving one or two examples before releasing students to work independently ● Present instructions both verbally and visually ● Simplify written and verbal instructions
Differentiation for Enrichment	● Encourage independent studies or investigations ● Encourage creative expression by allowing students to choose how to explore a problem ● Invite students to explore points of view ● Varied levels of reading text ● Enriched hands on center that students can explore independently ● Higher order thinking tasks and questions ● Provide leadership opportunities in lab groups ● Allow opportunities to analyze and evaluate materials

Essex Fells Science Curriculum
Updated December 2022

I. COURSE NAME: Science 5

II. COURSE PREREQUISITES: Science 4

III. GRADE LEVEL(S): 5

IV. COURSE DESCRIPTION:

Scientific and technological advances have proliferated and now permeate most aspects of life in the 21st century. It is increasingly important that all members of our society develop an understanding of scientific and engineering concepts and processes. Learning how to construct scientific explanations and how to design evidence-based solutions provides students with tools to think critically about personal and societal issues and needs. Students can then contribute meaningfully to decision-making processes, such as discussions about climate change, new approaches to health care, and innovative solutions to local and global problems. Essex Fells school is committed to developing in all students a capacity to think critically and communicate effectively. Through this curriculum, all Essex Fells students will possess an understanding of scientific concepts and processes required for personal decision making, participation in civic life, and preparation for careers in STEM fields.

The performance expectations in fifth grade help students formulate answers to questions such as: “When matter changes, does its weight change? How much water can be found in different places on Earth? Can new substances be created by combining other substances? How does matter cycle through ecosystems? Where does the energy in food come from and what is it used for? How do lengths and directions of shadows or relative lengths of day and night change from day to day, and how does the appearance of some stars change in different seasons?”

Fifth grade performance expectations include PS1, PS2, PS3, LS1, LS2, ESS1, ESS2, and ESS3 Disciplinary Core Ideas from the NRC Framework. Students are able to describe that matter is made of particles too small to be seen through the development of a model. Students develop an understanding of the idea that regardless of the type of change that matter undergoes, the total weight of matter is conserved. Students determine whether the mixing of two or more substances results in new substances. Through the development of a model using an example, students are able to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact. They describe and graph data to provide evidence about the distribution of water on Earth.

Students develop an understanding of the idea that plants get the materials they need for growth chiefly from air and water. Using models, students can describe the movement of matter among plants, animals, decomposers, and the environment and that energy in animals’ food was once energy from the sun. Students are expected to develop an understanding of patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky. The crosscutting concepts of patterns; cause and effect; scale, proportion, and quantity; energy and matter; and systems and systems models are called out as organizing concepts for these disciplinary core ideas.

V. COURSE OBJECTIVES:

In the fifth grade performance expectations, students are expected to demonstrate grade-appropriate proficiency in developing and using models, planning and carrying out investigations, analyzing and interpreting data, using mathematics and computational thinking, engaging in argument from evidence, and obtaining, evaluating, and communicating information; and to use these practices to demonstrate understanding of the core ideas.

VI. NEW JERSEY ADMINISTRATIVE CODE SUMMARY AND STATUTES

Curriculum Development: Integration of 21st Century Skills and Themes and Interdisciplinary Connections

District boards of education shall be responsible for the review and continuous improvement of curriculum and instruction based upon changes in knowledge, technology, assessment results, and modifications to the NJSLS, according to N.J.A.C. 6A:8-2.

1. District boards of education shall include interdisciplinary connections throughout the K–12 curriculum.
2. District boards of education shall integrate into the curriculum 21st century themes and skills (N.J.A.C. 6A:8-3.1(c)2).

21st century themes and skills integrated into all content standards areas (N.J.A.C. 6A:8-1.1(a)3).

"Twenty-first century themes and skills" means themes such as global awareness; financial, economic, business, and entrepreneurial literacy; civic literacy; health literacy; learning and innovation skills, including creativity and innovation, critical thinking and problem solving, and communication and collaboration; information, media, and technology skills; and life and career skills, including flexibility and adaptability, initiative and self-direction, social and cross-cultural skills, productivity and accountability, and leadership and responsibility.

Dissection Law
N.J.S.A. 18A:35-4.25 and N.J.S.A. 18A:35-4.24 authorize parents or guardians to assert the right of their children to refuse to dissect, vivisect, incubate, capture or otherwise harm or destroy animals or any parts thereof as part of a course of instruction.

Amistad Law: N.J.S.A. 18A 52:16A-88
Every board of education shall incorporate the information regarding the contributions of African-Americans to our country in an appropriate place in the curriculum of elementary and secondary school students.

Diversity and Inclusion Law: N.J.S.A. 18A:35-4.36a
Each school district shall incorporate instruction on diversity and inclusion in an appropriate place in the curriculum of students in grades kindergarten through 12 as part of the district's implementation of the New Jersey Student Learning Standards.

Holocaust Law: N.J.S.A. 18A:35-28
Every board of education shall include instruction on the Holocaust and genocides in an appropriate place in the curriculum of all elementary and secondary school pupils. The instruction shall further emphasize the personal responsibility that each citizen bears to fight racism and hatred whenever and wherever it happens.

LGBT and Disabilities Law: N.J.S.A. 18A:35-4.35
A board of education shall include instruction on the political, economic, and social contributions of persons with disabilities and lesbian, gay, bisexual, and transgender people, in an appropriate place in the curriculum of middle school and high school students as part of the district's implementation of the New Jersey Student Learning Standards (N.J.S.A.18A:35-4.36).

A board of education shall have policies and procedures in place pertaining to the selection of instructional materials to implement the requirements of N.J.S.A. 18A:35-4.35.

VII. TEXTS/ TECHNOLOGY RESOURCES

A. Textbook
B. www.Amplify.com
C. Science journal
D. www.NSTA.org
E. www.nextgenscience.org
F. BrainPop
G. Generation Genius
H. Freckle
I. EdPuzzle

J. IXL.com

K. www.MysteryScience.com

VIII. EVALUATIONS/ASSESSMENTS

Students can demonstrate competency with tasks such as developing and refining models; generating, discussing and analyzing data; constructing spoken and written scientific explanations; engaging in evidence-based argumentation; and reflecting on their own understanding. A combination of formative and summative assessments will be utilized in thai course including, but not limited to teacher observations, student work and reflections, projects, quizzes and tests, and writing tasks.

IX. SCOPE AND SEQUENCE (see table below)

This course has been designed with respect to and in compliance with the expectations set forth in the state-approved standards.

Unit 1	**Ecosystems: Interactions, Energy, and Dynamics**
Estimated Timeline	September-November
NGSS & Student Learning Objectives	**5-LS1-1.** Support an argument that plants get the materials they need for growth chiefly from air and water. **5-LS2-1.** Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment. **5-PS3-1.** Use models to describe that energy in animals' food (used for body repair, growth, motion, and to maintain body warmth) was once energy from the sun. **5-ESS3-1.** Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.
Suggested projects, activities, labs used to support content, and resources	● Observe that plants get the materials they need for growth mainly from air and water. ● Develop models (conceptual, physical, digital, and/or drawing) to represent food webs in various ecosystems ● Evaluate how living and nonliving organisms interact in an ecosystem. ● Design a model ecosystem and observe interactions between organisms. ● Describe where food molecules in an ecosystem come from and explain their relation to plants and the energy from the sun. ● Develop a supported claim utilizing information gathered through investigations.
Suggested Assessments	Students can demonstrate competency with tasks such as: ● Generating, discussing, and analyzing data ● Constructing spoken and written explanations ● Engaging in evidence-based discussion ● Reflecting on their own understanding ● Journal Entries ● Response/Exit Tickets ● Construct a scientific claim supported with evidence based research and reasoning.
Differentiation for Students with IEPs, 504, and/or students at risk for failure	● Extended time for task completion (Assignments, Assessments, etc..) ● Provide copy of accurate notes ● Breaking down and chunking assignments ● Restating and clarifying instruction ● Extra book provided to keep at home ● Organizational assistance (notebook, assignment pad, lab materials, etc..) ● Option to type instead handwriting notes

	● Adjusting class schedule to alternate instruction (morning/afternoon) ● Modify test and quizzes ● Provide manipulative examples ● Preferential Seating ● Use of Graphic Organizers (charts, visual outlines, etc..) ● Repetition and clarification of directions ● Assessments and class work read aloud ● Provide checklists ● Movement breaks ● Visual representation of print version ● Use of a alarm/fimer to aide with time management, including transitional warning ● Nonverbal cue for off-task behavior ● Provide positive reinforcement ● Hands on learning activities ● Ask student to restate directions or concepts taught ● Deliver directions one step at a time, gradually increasing the number of steps delivered ● Explain the purpose of the assignment to the student ● Provide managed choices to increase on task behavior ● Allow for break passes when needed
Differentiation for English Language Learners	● Provide alternate ways for the student to respond (verbal/pictographic answers instead of written) ● Substitute a hands-on activity or use of different media in projects for a written activity ● Provide word banks / word walls ● Prepare and distribute advance notes ● Provide model sentence frames and sentence starters for both oral responses and written responses ● Provide additional time to complete assessments and assignments ● Model and use gestures to aid in understanding ● Model tasks by giving one or two examples before releasing students to work independently ● Present instructions both verbally and visually ● Simplify written and verbal instructions
Differentiation for Enrichment	● Encourage independent studies or investigations ● Encourage creative expression by allowing students to choose how to explore a problem ● Invite students to explore points of view ● Varied levels of reading text ● Enriched hands on center that students can explore independently ● Higher order thinking tasks and questions ● Provide leadership opportunities in lab groups ● Allow opportunities to analyze and evaluate materials

Unit 2	**Earth's Systems**
Estimated Timeline	December-February
NGSS & Student Learning Objectives	**5-ESS2-1.** Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact. **5-ESS2-2.** Describe and graph the amounts and percentages of water and fresh water in various reservoirs to provide evidence about the distribution of water on Earth. **5-ESS3-1.** Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment. **3-5-ETS1-1**. Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost. **3-5-ETS1-2.** Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.
Suggested projects, activities, labs used to support content, and resources	● Analyze data to determine the relationship of humans and the earth's natural resources. ● Compare and explain amounts and percentages of water in various parts of the earth ● Create a model illustrating distribution of Earth's water. ● Environmental Concerns Project/presentation ● Develop a supported claim utilizing information gathered through investigations. ● Investigate how water droplets form ● Observe how water shortages affect different parts of the world
Suggested Assessments	Students can demonstrate competency with tasks such as: ● Generating, discussing, and analyzing data ● Constructing spoken and written explanations ● Engaging in evidence-based discussion ● Reflecting on their own understanding ● Journal Entries ● Response/Exit Tickets ● Construct a scientific claim supported with evidence based research and reasoning.
Differentiation for Students with IEPs, 504, and/or students at risk for failure	● Extended time for task completion (Assignments, Assessments, etc..) ● Provide copy of accurate notes ● Breaking down and chunking assignments ● Restating and clarifying instruction ● Extra book provided to keep at home ● Organizational assistance (notebook, assignment pad, lab materials, etc..)

	● Option to type instead handwriting notes ● Adjusting class schedule to alternate instruction (morning/afternoon) ● Modify test and quizzes ● Provide manipulative examples ● Preferential Seating ● Use of Graphic Organizers (charts, visual outlines, etc..) ● Repetition and clarification of directions ● Assessments and class work read aloud ● Provide checklists ● Movement breaks ● Visual representation of print version ● Use of a alarm/fimer to aide with time management, including transitional warning ● Nonverbal cue for off-task behavior ● Provide positive reinforcement ● Hands on learning activities ● Ask student to restate directions or concepts taught ● Deliver directions one step at a time, gradually increasing the number of steps delivered ● Explain the purpose of the assignment to the student ● Provide managed choices to increase on task behavior ● Allow for break passes when needed
Differentiation for English Language Learners	● Provide alternate ways for the student to respond (verbal/pictographic answers instead of written) ● Substitute a hands-on activity or use of different media in projects for a written activity ● Provide word banks / word walls ● Prepare and distribute advance notes ● Provide model sentence frames and sentence starters for both oral responses and written responses ● Provide additional time to complete assessments and assignments ● Model and use gestures to aid in understanding ● Model tasks by giving one or two examples before releasing students to work independently ● Present instructions both verbally and visually ● Simplify written and verbal instructions
Differentiation for Enrichment	● Encourage independent studies or investigations ● Encourage creative expression by allowing students to choose how to explore a problem ● Invite students to explore points of view ● Varied levels of reading text ● Enriched hands on center that students can explore independently ● Higher order thinking tasks and questions ● Provide leadership opportunities in lab groups ● Allow opportunities to analyze and evaluate materials

Unit 3	**Earth's Place in the Universe/Space**
Estimated Timeline	February- April
NGSS	**5-ESS1-1.** Support an argument that differences in the apparent brightness of the sun compared to other stars is due to their relative distances from Earth. **5-ESS1-2.** Represent data in graphical displays to reveal patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky. **5-PS2-1.** Support an argument that the gravitational force exerted by Earth on objects is directed down. **3-5-ETS1-1**. Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost. **3-5-ETS1-2.** Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem. **3-5-ETS1-3.** Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.
Suggested projects, activities, labs used to support content, and resources	● Construct a size-distance scale model of the solar system (distance scale limited to distance from the sun to Earth). ● Locate Earth's distance from the sun. ● Utilize a light and moon model to determine the phases of the moon and create a phases of the moon chart to summarize their results. ● Shadow Shifting: Students will trace shadows in the morning and afternoon, and compare tracings. They will use this information to determine the position of the Sun as it appears to move throughout the day. ● Sun Tracking: Students will construct Sun trackers. ● Develop a kinesthetic model to investigate what causes the daily pattern of sun and stars that can be seen from Earth ● Develop a supported claim utilizing information gathered through investigations.
Suggested Assessments	● Students can demonstrate competency with tasks such as: ● Generating, discussing, and analyzing data ● Constructing spoken and written explanations ● Engaging in evidence-based discussion ● Reflecting on their own understanding ● Journal Entries ● Response/Exit Tickets ● Construct a scientific claim supported with evidence based research and reasoning.

Differentiation for Students with IEPs, 504, and/or students at risk for failure	● Extended time for task completion (Assignments, Assessments, etc..) ● Provide copy of accurate notes ● Breaking down and chunking assignments ● Restating and clarifying instruction ● Extra book provided to keep at home ● Organizational assistance (notebook, assignment pad, lab materials, etc..) ● Option to type instead handwriting notes ● Adjusting class schedule to alternate instruction (morning/afternoon) ● Modify test and quizzes ● Provide manipulative examples ● Preferential Seating ● Use of Graphic Organizers (charts, visual outlines, etc..) ● Repetition and clarification of directions ● Assessments and class work read aloud ● Provide checklists ● Movement breaks ● Visual representation of print version ● Use of a alarm/fimer to aide with time management, including transitional warning ● Nonverbal cue for off-task behavior ● Provide positive reinforcement ● Hands on learning activities ● Ask student to restate directions or concepts taught ● Deliver directions one step at a time, gradually increasing the number of steps delivered ● Explain the purpose of the assignment to the student ● Provide managed choices to increase on task behavior ● Allow for break passes when needed
Differentiation for English Language Learners	● Provide alternate ways for the student to respond (verbal/pictographic answers instead of written) ● Substitute a hands-on activity or use of different media in projects for a written activity ● Provide word banks / word walls ● Prepare and distribute advance notes ● Provide model sentence frames and sentence starters for both oral responses and written responses ● Provide additional time to complete assessments and assignments ● Model and use gestures to aid in understanding ● Model tasks by giving one or two examples before releasing students to work independently ● Present instructions both verbally and visually ● Simplify written and verbal instructions
Differentiation for Enrichment	● Encourage independent studies or investigations ● Encourage creative expression by allowing students to choose how to explore a problem ● Invite students to explore points of view

	● Varied levels of reading text ● Enriched hands on center that students can explore independently ● Higher order thinking tasks and questions ● Provide leadership opportunities in lab groups ● Allow opportunities to analyze and evaluate materials

Unit 4	**Matter & Its Interactions**
Estimated Timeline	May-June
NGSS & Student Learning Objectives	**5-PS1-1.** Develop a model to describe that matter is made of particles too small to be seen. **5-PS1-2.** Measure and graph quantities to provide evidence that regardless of the type of change that occurs when heating, cooling, or mixing substances, the total weight of matter is conserved. **5-PS1-3.** Make observations and measurements to identify materials based on their properties. **5-PS1-4.** Conduct an investigation to determine whether the mixing of two or more substances results in new substances. **3-5-ETS1-1**. Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost. **3-5-ETS1-2.** Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.
Suggested projects, activities, labs used to support content, and resources	● Utilize filtering and evaporation to separate the products of the chemical reactions ● Investigate how different molecules make certain liquids separate ● Conservation of Mass: Students will use a balance and mass pieces to show that matter is conserved when making a salt water solution. ● Categorize different images of matter. The goal is to get students to identify solid, liquid, and gas. ● Conduct experiments to tell if mixing two or more substances will result in a new substance. ● Identify the difference between physical and chemical changes. ● Develop a supported claim utilizing information gathered through investigations.
Suggested Assessments	Students can demonstrate competency with tasks such as: ● Generating, discussing, and analyzing data ● Constructing spoken and written explanations ● Engaging in evidence-based discussion ● Reflecting on their own understanding ● Journal Entries ● Response/Exit Tickets ● Construct a scientific claim supported with evidence based research and reasoning.
Differentiation for Students with IEPs, 504, and/or	● Extended time for task completion (Assignments, Assessments, etc..) ● Provide copy of accurate notes

students at risk for failure	● Breaking down and chunking assignments ● Restating and clarifying instruction ● Extra book provided to keep at home ● Organizational assistance (notebook, assignment pad, lab materials, etc..) ● Option to type instead handwriting notes ● Adjusting class schedule to alternate instruction (morning/afternoon) ● Modify test and quizzes ● Provide manipulative examples ● Preferential Seating ● Use of Graphic Organizers (charts, visual outlines, etc..) ● Repetition and clarification of directions ● Assessments and class work read aloud ● Provide checklists ● Movement breaks ● Visual representation of print version ● Use of a alarm/fimer to aide with time management, including transitional warning ● Nonverbal cue for off-task behavior ● Provide positive reinforcement ● Hands on learning activities ● Ask student to restate directions or concepts taught ● Deliver directions one step at a time, gradually increasing the number of steps delivered ● Explain the purpose of the assignment to the student ● Provide managed choices to increase on task behavior ● Allow for break passes when needed
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Differentiation for Enrichment	● Encourage independent studies or investigations ● Encourage creative expression by allowing students to choose how to explore a problem ● Invite students to explore points of view ● Varied levels of reading text ● Enriched hands on center that students can explore independently

	● Higher order thinking tasks and questions ● Provide leadership opportunities in lab groups ● Allow opportunities to analyze and evaluate materials

Essex Fells Science Curriculum
Updated December 2022

I. COURSE NAME: Science 6

II. COURSE PREREQUISITES: Science 5

III. GRADE LEVEL(S): 6

IV. COURSE DESCRIPTION:

The performance expectations in **Space Systems** help students formulate answers to the questions: “What is Earth’s place in the universe?” and “What makes up our solar system and how can the motion of Earth explain seasons and eclipses?” Two sub-ideas from the NRC Framework are addressed in these performance expectations: ESS1.A and ESS1.B. Middle school students can examine Earth’s place in relation to the solar system, Milky Way galaxy, and universe. There is a strong emphasis on a systems approach, using models of the solar system to explain astronomical and other observations of the cyclic patterns of eclipses, tides, and seasons. There is also a strong connection to engineering through the instruments and technologies that have allowed us to explore the objects in our solar system and obtain data that support the theories that explain the formation and evolution of the universe. The crosscutting concepts of patterns; scale, proportion, and quantity; systems and system models; and interdependence of science, engineering, and technology are called out as organizing concepts for these disciplinary core ideas. In the MS. Space Systems performance expectations, students are expected to demonstrate proficiency in developing and using models and analyzing and interpreting data and to use these practices to demonstrate understanding of the core ideas.

The performance expectations in **Weather and Climate** help students formulate an answer to the question, “What factors interact and influence weather and climate?” Three sub-ideas from the NRC Framework are addressed in these performance expectations: ESS2.C, ESS2.D, and ESS3.D. Students can construct and use models to develop an understanding of the factors that control weather and climate. A systems approach is also important here, examining the feedbacks between systems as energy from the sun is transferred between systems and circulates through the oceans and atmosphere. The crosscutting concepts of cause and effect, systems and system models, and stability and change are called out as organizing concepts for these disciplinary core ideas. In the MS. Weather and Climate performance expectations, students are expected to demonstrate proficiency in asking questions, developing and using models, and planning and carrying out investigations and to use these practices to demonstrate understanding of the core ideas.

The Performance Expectations in **Structure, Function, and Information Processing** help students formulate an answer to the question, “How do the structures of organisms contribute to life’s functions?” Middle school students can plan and carry out investigations to develop evidence that living organisms are made of cells and to determine the relationship of organisms to the environment. Students can use understanding of cell theory to develop physical and conceptual models of cells. They can construct explanations for the interactions of systems in cells and organisms and for how organisms gather and use information from the environment. By the end of their studies, students understand that all organisms are made of cells, that special structures are responsible for particular functions in organisms, and that for many organisms the body is a system of multiple interacting subsystems that form a hierarchy from cells to the body. Crosscutting concepts of cause and effect, structure and function, and matter and energy are called out as organizing concepts for these core ideas.

The Performance Expectations in **Growth, Development, and Reproduction of Organisms** help students formulate an answer to the question, “How do organisms grow, develop, and reproduce?” Students understand how the environment and genetic factors determine the growth of an individual organism. They also demonstrate understanding of the genetic 81 implications for sexual and asexual reproduction. Students can develop evidence to support their understanding of the structures and behaviors that increase the likelihood of successful reproduction by organisms. They have a beginning understanding of the ways in which humans can select for specific traits, the role of technology, genetic modification, and the nature of ethical responsibilities related to selective breeding. At the end of middle school, students can explain how select structures, functions, and behaviors of organisms change in predictable ways as they progress from birth to old age. Students can use the practices of analyzing and interpreting data, using models, conducting investigations, and communicating information. Crosscutting concepts of structure and function, change and stability, and matter and energy flow in organisms support understanding across this topic.

V. COURSE OBJECTIVES:

In Science 6, performance expectations focus on students developing an understanding of several scientific practices. These include asking questions and defining problems, planning and carrying out investigations, analyzing and interpreting data, developing and using models, constructing explanations and designing solutions, engaging in argument from evidence, using mathematics and computational thinking, and obtaining, evaluating, and communicating information. Students will use these practices to demonstrate understanding of the core ideas. Students are also expected to demonstrate understanding of several engineering practices, including design and evaluation.

VI. NEW JERSEY ADMINISTRATIVE CODE SUMMARY AND STATUTES

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21st century themes and skills integrated into all content standards areas (N.J.A.C. 6A:8-1.1(a)3).

"Twenty-first century themes and skills" means themes such as global awareness; financial, economic, business, and entrepreneurial literacy; civic literacy; health literacy; learning and innovation skills, including creativity and innovation, critical thinking and problem solving, and communication and collaboration; information, media, and technology skills; and life and career skills, including flexibility and adaptability, initiative and self-direction, social and cross-cultural skills, productivity and accountability, and leadership and responsibility.

Dissection Law

N.J.S.A. 18A:35-4.25 and N.J.S.A. 18A:35-4.24 authorize parents or guardians to assert the right of their children to refuse to dissect, vivisect, incubate, capture or otherwise harm or destroy animals or any parts thereof as part of a course of instruction.

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Every board of education shall incorporate the information regarding the contributions of African-Americans to our country in an appropriate place in the curriculum of elementary and secondary school students.

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Each school district shall incorporate instruction on diversity and inclusion in an appropriate place in the curriculum of students in grades kindergarten through 12 as part of the district's implementation of the New Jersey Student Learning Standards.

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Every board of education shall include instruction on the Holocaust and genocides in an appropriate place in the curriculum of all elementary and secondary school pupils. The instruction shall further emphasize the personal responsibility that each citizen bears to fight racism and hatred whenever and wherever it happens.

LGBT and Disabilities Law: N.J.S.A. 18A:35-4.35

A board of education shall include instruction on the political, economic, and social contributions of persons with disabilities and lesbian, gay, bisexual, and transgender people, in an appropriate place in the curriculum of middle school and high school students as part of the district's implementation of the New Jersey Student Learning Standards (N.J.S.A.18A:35-4.36).

A board of education shall have policies and procedures in place pertaining to the selection of instructional materials to implement the requirements of N.J.S.A. 18A:35-4.35.

VII. TEXTS/ TECHNOLOGY RESOURCES

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C. www.nextgenscience.org
D. BrainPop
E. Generation Genius
F. Freckle
G. EdPuzzle
H. IXL.com
I. www.ck12.org
J. www.openscied.org

VIII. EVALUATIONS/ASSESSMENTS

Students can demonstrate competency with tasks such as developing and refining models; generating, discussing and analyzing data; constructing spoken and written scientific explanations; engaging in evidence-based argumentation; and reflecting on their own understanding. A combination of formative and summative assessments will be utilized in thai course including, but not limited to teacher observations, student work and reflections, projects, quizzes and tests, and writing tasks.

IX. SCOPE AND SEQUENCE (see table below)

This course has been designed with respect to and in compliance with the expectations set forth in the state-approved standards.

Scope and Sequence of Content and Skills for Science 6

Unit 1	Space Systems
Estimated Timeline	September - October
Essential Questions	• Why does the Sun's position change over time? • What causes the Sun's position to change during the year? • How does the position of the Earth and Sun affect seasonal patterns? • What causes the phases of the moon? • What causes solar and lunar eclipses? • What determines the gravitational pull on an object? • How does gravity hold planets in orbit? • How do objects in our solar system compare? • How do scientists study our solar system?
NGSS & Interdisciplinary Connections	MS-ESS1-1 MS-ESS1-2 MS-ESS1-3 RST.6-8.1 RST.6-8.3 RST.6-8.7
Student Learning Objectives	• Generate and analyze evidence to explain why the Sun's apparent motion across the sky changes over the course of the year. • 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.

	● Develop and use a model that shows how gravity causes smaller objects to orbit around larger objects at increasing scales, including the gravitational force of the sun causes the planets and other bodies to orbit around it holding together the solar system. ● Analyze and interpret data to determine scale properties of objects in the solar system. ● Develop and use a model to describe the role of gravity in the motions within galaxies and the solar system.
Suggested projects, activities, labs used to support content, and resources	● Students will use models to predict the lunar phase given the positions of Earth, Moon, and the Sun. Students will manipulate their models to show locations where a solar or lunar eclipse will take place. ● Students will trace their shadows in the morning and afternoon, and compare the tracings. They will use this information to determine the position of the Sun as it appears to move throughout the day. ● Students will use a light and moon model to determine the phases of the moon, and make a phases of the moon chart to summarize their results. ● Winter Olympics Project - Students will use their knowledge relating to seasons, earth's tilt, and solar energy to determine which location would be the best option for the 2026 Winter Olympics. ● Students will use a model to describe that gravity is an inward pulling force that can keep smaller/less massive objects in orbit around larger/more massive objects. Given different scenarios, students will determine which scenario would have the greatest gravitational pull. ● Students will calculate how much they would weigh on other planets and how far they could jump on other plants. They will use this data to come to a conclusion about gravitational pull and mass. ● Students will design a model or diagram that shows two ways gravitational pull exists between Earth and the Moon. ● Students will organize data on solar system objects to design diagrams, graphs, or physical models. ● Students will use quantitative analyses to describe similarities and differences among solar system objects by describing patterns of features. ● Students will identify advances in solar system science made possible by improved engineering. ● Students will interpret quantitative and qualitative data to draw their own conclusions about patterns in the solar system (ex.: outer planets have the greatest size).
Suggested Assessments	Students can demonstrate competency with tasks such as: ● Generating, discussing, and analyzing data ● Constructing spoken and written explanations ● Engaging in evidence-based discussion ● Reflecting on their own understanding ● Journal Entries ● Response/Exit Tickets ● Construct a scientific claim supported with evidence based research and reasoning
Differentiation for	● Extended time for task completion (Assignments, Assessments, etc..) ● Provide copy of accurate notes

Students with IEPs, 504, and/or students at risk for failure	● Breaking down and chunking assignments ● Restating and clarifying instruction ● Extra book provided to keep at home ● Organizational assistance (notebook, assignment pad, lab materials, etc..) ● Option to type instead handwriting notes ● Adjusting class schedule to alternate instruction (morning/afternoon) ● Modify test and quizzes ● Provide manipulative examples ● Preferential Seating ● Use of Graphic Organizers (charts, visual outlines, etc..) ● Repetition and clarification of directions ● Assessments and class work read aloud ● Provide checklists ● Movement breaks ● Visual representation of print version ● Use of a alarm/fimer to aide with time management, including transitional warning ● Nonverbal cue for off-task behavior ● Provide positive reinforcement ● Hands on learning activities ● Ask student to restate directions or concepts taught ● Deliver directions one step at a time, gradually increasing the number of steps delivered ● Explain the purpose of the assignment to the student ● Provide managed choices to increase on task behavior ● Allow for break passes when needed
Differentiation for English Language Learners	● Provide alternate ways for the student to respond (verbal/pictographic answers instead of written) ● Substitute a hands-on activity or use of different media in projects for a written activity ● Provide word banks / word walls ● Prepare and distribute advance notes ● Provide model sentence frames and sentence starters for both oral responses and written responses ● Provide additional time to complete assessments and assignments ● Model and use gestures to aid in understanding ● Model tasks by giving one or two examples before releasing students to work independently ● Present instructions both verbally and visually ● Simplify written and verbal instructions
Differentiation for Enrichment	● Encourage independent studies or investigations ● Encourage creative expression by allowing students to choose how to explore a problem ● Invite students to explore points of view ● Varied levels of reading text ● Enriched hands on center that students can explore independently ● Higher order thinking tasks and questions ● Provide leadership opportunities in lab groups ● Allow opportunities to analyze and evaluate materials

Unit 2	Weather and Climate
Estimated Timeline	November - January
Essential Questions	● What is the difference between weather and climate? ● What is the sun's role in the water cycle and how does that affect us? ● How does energy from the Sun affect wind on Earth? ● What is air? ● What is the atmosphere? ● How does pressure affect air? ● What happens when two areas of air have different pressures? ● What factors do meteorologists use to forecast the weather? Why can't meteorologists predict weather with 100% certainty? ● What is density? ● What affects the direction that ocean water flows? ● How does the weather differ between locations? ● How does the ocean affect climate on land? ● How does energy from the Sun affect weather and climate on Earth? ● How does latitude affect an area's weather and climate? ● How has the climate changed over time? ● How do greenhouse gases in the atmosphere affect Earth's temperature? ● What can we do to prevent the continuation of global warming?
NGSS & Interdisciplinary Connections	MS-ESS2-5 MS-ESS2-6 MS-ESS3-5 RST.6-8.8 RST.6-8.9 WHST.6-8.1 NJSLSA.R6
Student Learning Objectives	● Develop a conceptual model to explain the mechanisms for the Sun's energy to drive wind and the hydrologic cycle. ● Collect data to provide evidence for how the motions and complex interactions of air masses results in changes in weather conditions. ● Explain how variations in density result from variations in temperature and salinity drive a global pattern of interconnected ocean currents. ● Use a model to explain the mechanisms that cause varying daily temperature ranges in a coastal community and in a community located in the interior of the country. ● 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. ● Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century.
Suggested projects, activities, labs used to support content, and resources	● After watching a video of severe weather, students discuss in small groups and whole class reaches a consensus on the factors that constitute weather. Students begin monitoring local weather conditions, using tools. ● Students review local weather reports and determine the factors that combine to produce what we know as weather. They are introduced to,

	and use, a thermometer, barometer, hygrometer, compass, and anemometer. outdoors and develop a plan for acquiring daily data and sharing them with the class. ● Students work with syringes and tubing to discover that air takes up space and is compressible. They work in small groups to design demonstrations to show that air has mass. They study the atmosphere, a mixture of gases, using diagrams, photos, and a reading. ● Students investigate how the shape of Earth and its relationship to the Sun affect the weather around the world. They use light sources and globes to model the length of the day throughout the year. ● Students investigate what happens to different earth materials (sand, soil, water, air) when placed in sunshine and then in shade to show radiation. They set up an experiment and collect and analyze the data by observing the differential heating of earth materials, one factor that contributes to weather. ● Students observe two examples of heat transfer by conduction: movement of heat from a container of hot water to a container of cold water, and movement of heat from one end of a metal strip to the other. ● Students make a density column to investigate density of fluids by layering colored salt solutions in a straw. They determine the relative densities of the salt solutions by comparing the masses of equal volumes. They calculate the density of each solution, using the ratio of mass to volume. ● Students observe the interaction of colored water of different temperatures to determine that warm water rises and cold water descends. ● Students design investigations to show that water vapor is in the air around them. Materials are provided, and each group plans an investigation, conducts it, and reports to the class in a short presentation. ● Students measure temperature change that occurs during evaporation, using wet- and dry-bulb thermometers to be introduced to humidity as the measure of water vapor in the air. ● To explore the temperature at which water vapor condenses into drops of liquid water, students determine the dew-point temperature for their classroom and use wet-bulb and dry-bulb thermometers and a hygrometer to measure humidity. ● Students investigate the relationship between pressure and temperature, using 2-liter soda bottles and thermometer strips. They discover that, the greater the pressure in a gas, the higher the temperature. They use this understanding of pressure and temperature to explore cloud formation. ● Students observe a demonstration that shows how Earth's water is distributed. They participate in a game that simulates the travels of a water molecule through the water cycle. They compare the results of the game to their understanding of how the water cycle operates on Earth. ● Students investigate the relationship between changing air pressure and wind. They assemble and explore a pressure indicator and learn about barometers. Using knowledge developed in previous investigations, they come up with models of wind. They build an anemometer to measure local wind and use pressure maps to make weather predictions. ● Students observe a solar hot-air balloon and consider it as a model for a warm air mass to introduce the concept of how air masses form. ● Students consider severe weather in relation to air masses and fronts.

	Climate is introduced and climate regions are discussed. Students compare a water-cycle multimedia simulation with the global- warming variation, in which Earth's average temperature has increased 2–5°C. They analyze the results and make predictions of the continued effect of global warming on Earth. ● They compare different climate regions around the world, using a multimedia database. ● Students will model the Coriolis Effect to explain its influence on the wind and water current on earth, by using a balloon and a marker. One student turns the balloon, while the other tries to draw a straight line from the North Pole to the equator, and South Pole to the equator. ● Analyze an air pressure map. ● Research and analyze data for two cities of similar lat/long, one coastal, one inland. Look for patterns and draw a conclusion. ● Research and analyze data for groups of cities at different latitudes. Look for patterns and draw a conclusion. ● Students investigate the effect of the ocean on climate by observing the effects of the layering of warm and cold water and water that is more or less saline than the normal. They will do this by creating saline solutions of different colors that mimic ocean salinity, are more saline than ocean water, and are less saline than ocean water and pouring the different solutions into a basin that shows how the different solutions can model layering in the ocean. The student will combine the results of the two separate exercises and predict which of the conditions might prevail. ● Students map greenhouse gas emissions where they live by researching what greenhouse gasses are and using an online resource (website of the EPA) to find the most common greenhouse gasses for where they live and their sources. They will graph the data. They will use their knowledge to determine ways that facilities can reduce their emissions
Suggested Assessments	Students can demonstrate competency with tasks such as: ● Generating, discussing, and analyzing data ● Constructing spoken and written explanations ● Engaging in evidence-based discussion ● Reflecting on their own understanding ● Journal Entries ● Response/Exit Tickets ● Construct a scientific claim supported with evidence based research and reasoning
Differentiation for Students with IEPs, 504, and/or students at risk for failure	● Extended time for task completion (Assignments, Assessments, etc..) ● Provide copy of accurate notes ● Breaking down and chunking assignments ● Restating and clarifying instruction ● Extra book provided to keep at home ● Organizational assistance (notebook, assignment pad, lab materials, etc..) ● Option to type instead handwriting notes ● Adjusting class schedule to alternate instruction (morning/afternoon) ● Modify test and quizzes ● Provide manipulative examples ● Preferential Seating

	• Use of Graphic Organizers (charts, visual outlines, etc..) • Repetition and clarification of directions • Assessments and class work read aloud • Provide checklists • Movement breaks • Visual representation of print version • Use of a alarm/fimer to aide with time management, including transitional warning • Nonverbal cue for off-task behavior • Provide positive reinforcement • Hands on learning activities • Ask student to restate directions or concepts taught • Deliver directions one step at a time, gradually increasing the number of steps delivered • Explain the purpose of the assignment to the student • Provide managed choices to increase on task behavior • Allow for break passes when needed
Differentiation for English Language Learners	• Provide alternate ways for the student to respond (verbal/pictographic answers instead of written) • Substitute a hands-on activity or use of different media in projects for a written activity • Provide word banks / word walls • Prepare and distribute advance notes • Provide model sentence frames and sentence starters for both oral responses and written responses • Provide additional time to complete assessments and assignments • Model and use gestures to aid in understanding • Model tasks by giving one or two examples before releasing students to work independently • Present instructions both verbally and visually • Simplify written and verbal instructions
Differentiation for Enrichment	• Encourage independent studies or investigations • Encourage creative expression by allowing students to choose how to explore a problem • Invite students to explore points of view • Varied levels of reading text • Enriched hands on center that students can explore independently • Higher order thinking tasks and questions • Provide leadership opportunities in lab groups • Allow opportunities to analyze and evaluate materials

Unit 3	Structure, Function, and Information Processing
Estimated Timeline	February - March
Essential Questions	● What are the building blocks of life? ● How does each part of a cell function? ● How is the body a system of interacting subsystems composed of groups of cells? ● What are the fundamental differences between animal and plant cells pertaining to cell reproduction? ● How do our sensory receptors send information to our brain?
NGSS & Interdisciplinary Connections	MS-LS1-1 MS-LS1-2 MS-LS1-3 MS-LS1-8 RST.6-8.3 RST.6-8.6 WHST.6-8.2
Student Learning Objectives	● Conduct an investigation to provide evidence that living things are made of cells: either one cell or many different numbers of cells. ● Develop and use a model to describe the function of a cell as a whole and ways parts of cells contribute to the function. ● Use arguments supported by evidence for how the body is a system of interacting subsystems composed of groups of cells. ● Develop a model to explain how senses change energy coming from the environment (light, sound waves, chemicals in gasses or food, heat or touch/pressure) into electrical signals in the nerves that go into the brain and spinal cord. ● Gather and synthesize information that sensory receptors respond to stimuli by sending messages to the brain for immediate behavior or storage as memories.

Suggested projects, activities, labs used to support content, and resources	● Students investigate cells using a compound microscope ● Students use microscopes to explore unicellular and multicellular organisms, and plant and animal cells. ● Students use interactive website to explore the components within a cell and how they work together ● Develop a model in which they identify the parts (components: nucleus, chloroplast, cell wall, mitochondria, cell membrane, the function of a cell as a whole) of cells ● Project: "A cell is like a _____ " Students create a poster/model to display their analogy relating each organelle to something in their project (ex.city, park, school, etc) ● Students describe the relationships between the parts of cells in terms of their contributions to overall cellular function and the structure of the cell membrane or cell wall and its relationship to the function of the organelles and the whole cell. ● Students use the model to identify key differences between plant and animal cells based on structure and function. Build models of both a plant and animal cell and be able to demonstrate key characteristics that define both ● Students use interactive website to "Build an organ" using different tissues ● Lab: "Dissecting a Chicken Wing"- Students will dissect a chicken wing to observe the different types of tissues present in a wing ● Project: Body Systems- Each group will research an assigned body system in order to create an informative poster about the body system and its function and display it on poster. Each group will then use what they've learned to determine how body systems interact with each other. ● Lab: "Can You Trust Your Senses?"- Students will explore three of your sensory receptors: chemoreceptors (taste and smell) and photoreceptors (sight) ● Lab: Response Time: Students will conduct an experiment to test visual, auditory, and tactile reaction times using one ruler. ● Online Interactive: Students explore the process of synapse and how the brain receives and transmits messages.
Suggested Assessments	Students can demonstrate competency with tasks such as: ● Generating, discussing, and analyzing data ● Constructing spoken and written explanations ● Engaging in evidence-based discussion ● Reflecting on their own understanding ● Journal Entries ● Response/Exit Tickets ● Construct a scientific claim supported with evidence based research and reasoning
Differentiation for Students with IEPs, 504, and/or students at risk for failure	● Extended time for task completion (Assignments, Assessments, etc..) ● Provide copy of accurate notes ● Breaking down and chunking assignments ● Restating and clarifying instruction ● Extra book provided to keep at home ● Organizational assistance (notebook, assignment pad, lab materials, etc..)

	• Option to type instead handwriting notes • Adjusting class schedule to alternate instruction (morning/afternoon) • Modify test and quizzes • Provide manipulative examples • Preferential Seating • Use of Graphic Organizers (charts, visual outlines, etc..) • Repetition and clarification of directions • Assessments and class work read aloud • Provide checklists • Movement breaks • Visual representation of print version • Use of a alarm/fimer to aide with time management, including transitional warning • Nonverbal cue for off-task behavior • Provide positive reinforcement • Hands on learning activities • Ask student to restate directions or concepts taught • Deliver directions one step at a time, gradually increasing the number of steps delivered • Explain the purpose of the assignment to the student • Provide managed choices to increase on task behavior • Allow for break passes when needed
Differentiation for English Language Learners	• Provide alternate ways for the student to respond (verbal/pictographic answers instead of written) • Substitute a hands-on activity or use of different media in projects for a written activity • Provide word banks / word walls • Prepare and distribute advance notes • Provide model sentence frames and sentence starters for both oral responses and written responses • Provide additional time to complete assessments and assignments • Model and use gestures to aid in understanding • Model tasks by giving one or two examples before releasing students to work independently • Present instructions both verbally and visually • Simplify written and verbal instructions
Differentiation for Enrichment	• Encourage independent studies or investigations • Encourage creative expression by allowing students to choose how to explore a problem • Invite students to explore points of view • Varied levels of reading text • Enriched hands on center that students can explore independently • Higher order thinking tasks and questions • Provide leadership opportunities in lab groups • Allow opportunities to analyze and evaluate materials

Unit 4	Growth, Development, and Reproduction of Organisms
Estimated Timeline	April - June
Essential Questions	● How do organisms reproduce? ● What is the difference between sexual and asexual reproduction? ● How can an organism's behavior increase its chance of survival and reproduction? ● What structures or mechanisms aid in plant reproduction? ● How does the environment contribute to successful reproduction or growth? ● How do genetic factors influence the growth of organisms? ● How do natural differences in organisms increase survival and reproduction?
NGSS & Interdisciplinary Connections	MS-LS1-4 MS-LS1-5 MS-LS3-1 MS-LS3-2 MS-LS4-5 RST.6-8.2 RST.6-8.7 NJSLSA.W7
Student Learning Objectives	● Use arguments based on empirical evidence and scientific reasoning to support an explanation for how characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction of animals and plants respectively. ● Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms. ● 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. ● Develop and use a model to describe why asexual reproduction results in offspring with identical genetic information and sexual reproduction results in offspring with genetic variation. ● Gather and synthesize information about the technologies that have changed the way humans influence the inheritance of desired traits in organisms.
Suggested projects, activities, labs used to support content, and resources	● Students make a claim to support a given explanation of an adaptation/behavior (ex.: nest building, colorful plumage to attract mates, bright flowers). In their claim, students will include the idea that characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction of animals and plants respectively.Students will identify evidence, evaluate the evidence, and use reasoning to connect appropriate evidence to claim. ● Students will articulate a statement that relates the given phenomenon to a scientific idea, including the idea that both environmental and genetic factors influence the growth of organisms.Students identify and describe evidence (e.g., from students' own investigations, observations, reading

	material, archived data) necessary for constructing the explanation. ● Students will research and develop a model to show how a mutation can have harmful, beneficial, or neutral effects. ● Students will develop a model (e.g., Punnett squares, diagrams, simulations) for a given phenomenon involving the differences in genetic variation that arise from sexual and asexual reproduction. In the model, students identify and describe the relevant components. Students use the model to describe an account for why sexual and asexual reproduction result in different amounts of genetic variation in offspring relative to their parents. ● Students will use cause-and-effect relationships found in the model between the type of reproduction and the resulting genetic variation to predict that more genetic variation occurs in organisms that reproduce sexually compared to organisms that reproduce asexually. ● Students will gather information about at least two technologies that have changed the way humans influence the inheritance of desired traits in plants and animals through artificial selection by choosing desired parental traits determined by genes, which are then often passed onto offspring. Examples could include gene therapy, genetic modification, and selective breeding of plants and animals. ● Students will dissect lima beans to explore structural adaptations of seeds that allow them to survive. ● Students will investigate how increasing salinity affects the germination and growth of food crops. They will compare four grains to determine that the different grains have varying levels of salt tolerance (genetic factors). ● Students will dissect flowers to learn about flower structures and sexual reproduction. ● Students will observe flowers to identify adaptations that plants help to aid in pollination.
Suggested Assessments	Students can demonstrate competency with tasks such as: ● Generating, discussing, and analyzing data ● Constructing spoken and written explanations ● Engaging in evidence-based discussion ● Reflecting on their own understanding ● Journal Entries ● Response/Exit Tickets ● Construct a scientific claim supported with evidence based research and reasoning
Differentiation for Students with IEPs, 504, and/or students at risk for failure	● Extended time for task completion (Assignments, Assessments, etc..) ● Provide copy of accurate notes ● Breaking down and chunking assignments ● Restating and clarifying instruction ● Extra book provided to keep at home ● Organizational assistance (notebook, assignment pad, lab materials, etc..) ● Option to type instead handwriting notes ● Adjusting class schedule to alternate instruction (morning/afternoon) ● Modify test and quizzes ● Provide manipulative examples

	● Preferential Seating ● Use of Graphic Organizers (charts, visual outlines, etc..) ● Repetition and clarification of directions ● Assessments and class work read aloud ● Provide checklists ● Movement breaks ● Visual representation of print version ● Use of a alarm/fimer to aide with time management, including transitional warning ● Nonverbal cue for off-task behavior ● Provide positive reinforcement ● Hands on learning activities ● Ask student to restate directions or concepts taught ● Deliver directions one step at a time, gradually increasing the number of steps delivered ● Explain the purpose of the assignment to the student ● Provide managed choices to increase on task behavior ● Allow for break passes when needed
Differentiation for English Language Learners	● Provide alternate ways for the student to respond (verbal/pictographic answers instead of written) ● Substitute a hands-on activity or use of different media in projects for a written activity ● Provide word banks / word walls ● Prepare and distribute advance notes ● Provide model sentence frames and sentence starters for both oral responses and written responses ● Provide additional time to complete assessments and assignments ● Model and use gestures to aid in understanding ● Model tasks by giving one or two examples before releasing students to work independently ● Present instructions both verbally and visually ● Simplify written and verbal instructions
Differentiation for Enrichment	● Encourage independent studies or investigations ● Encourage creative expression by allowing students to choose how to explore a problem ● Invite students to explore points of view ● Varied levels of reading text ● Enriched hands on center that students can explore independently ● Higher order thinking tasks and questions ● Provide leadership opportunities in lab groups ● Allow opportunities to analyze and evaluate materials