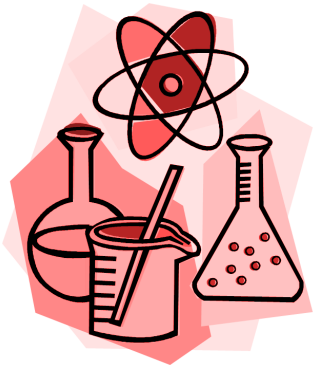
LESTER C. NOECKER SCHOOL
ROSELAND SCHOOL DISTRICT

Science Curriculum

Kindergarten - Sixth Grade

Approved by the Roseland Board of Education

August 2025



Science Education in the 21st Century

Science, engineering, and technology influence and permeate every aspect of modern life. Some knowledge of science and engineering is required to engage with the major public policy issues of today as well as to make informed everyday decisions, such as selecting among alternative medical treatments or determining how to invest public funds for water supply options. In addition, understanding science and the extraordinary insights it has produced can be meaningful and relevant on a personal level, opening new worlds to explore and offering lifelong opportunities for enriching people's lives. In these contexts, learning science is important for everyone, even those who eventually choose careers in fields other than science or engineering.

Mission: *Scientifically literate individuals possess the knowledge and understanding of scientific concepts and processes required for personal decision-making, participation in civic and cultural affairs, and economic productivity.*

Vision: The science standards are designed to help realize a vision for education in the sciences and engineering in which students, over multiple years of school, actively engage in scientific and engineering practices and apply crosscutting concepts to deepen their understanding of the core ideas in these fields. The learning experiences provided for students should engage them with fundamental questions about the world and with how scientists have investigated and found answers to those questions. Throughout grades K-12, students should have the opportunity to carry out scientific investigations and engineering design projects related to the disciplinary core ideas (pp. 8-9, NRC, 2012).

https://www.state.nj.us/education/aps/cccs/science/ (Heinz)

Effective Science Instruction: What Does Research Tell Us?

Scientific literacy means that a person can ask, find, or determine answers to questions derived from curiosity about everyday experiences. It means that a person has the ability to describe, explain, and predict natural phenomena. Scientific literacy entails being able to read with understanding articles about science in the popular press and to engage in social conversation about the validity of conclusions. Scientific literacy implies that a person can identify scientific issues underlying national and local decisions and express positions that are scientifically and technologically informed. A literate citizen should be able to evaluate the quality of scientific information on the basis of its source and the methods used to generate it. Scientific literacy also implies the capacity to pose and evaluate arguments based on evidence and to apply conclusions from such arguments appropriately (National Research Council, 1996, p. 22).

Elements of Effective Science Instruction

A debate continues over what constitutes effective science instruction. The opposing views are often labeled, somewhat simplistically, as "reform" versus "traditional" science instruction. Reform instruction is often characterized as students working in small groups and participating in hands-on activities with students, in some cases, selecting the topics. Traditional instruction is often characterized as teachers delivering information to students in lectures and readings, and students working independently on practice problems and worksheets. Often, traditional instruction includes a weekly laboratory activity in which students work to reinforce what has been taught in a prior lecture.

Debating the mode of instruction misses the point, however, as current learning theory focuses on students' conceptual change, and does not imply that one pedagogy is necessarily better than another. For example, students may be intellectually engaged with important content in a dynamic, teacher-directed lecture, or they may simply sit passively through a didactic lecture unrelated to their personal experience. Similarly, a hands-on lesson may provide students with opportunities to confront their preconceptions about scientific phenomena, or it may simply be an activity for activity's sake, stimulating students' interest but not relating to important learning goals. Lessons that engage students in scientific inquiry can be effective whether they are structured by the teacher or instructional materials, or very "open," with students pursuing answers to their own questions.

Whatever the mode of instruction, the research suggests that students are most likely to learn if teachers encourage them to think about ideas aligned to concrete learning goals and relate those ideas to real-life phenomena.

For students to learn science content, learning theory posits that they must be motivated to learn and intellectually engaged in activities and/or discussions focusing on what they already know. Further, learning theory suggests that students will best understand science content and the scientific process if teachers encourage them to use evidence to support their claims and help them make sense of new, developmentally appropriate ideas in the context of their prior thinking and their understanding of related concepts.1

Motivation

However well-designed the instruction, students are unlikely to learn if they are not motivated to learn. Lessons should "hook" students by addressing something they have wondered about, or can be induced to wonder about, possibly, but not necessarily, in a real-world context. In their analysis of middle school science programs, Kesidou and Roseman (2002) cited research support for the idea that "if students are to derive the intended learning benefits from engaging in an activity, their interest in or recognition of the value of the activity needs to be motivated" (p. 530). It is important to note that motivation needs to be maintained throughout instruction on a concept, as opposed to just the beginning; hooking students initially will have little

impact if they quickly lose interest in the lesson. Students' motivation may be either extrinsic or intrinsic. Extrinsic motivators include deadlines for research projects, classroom competitions, and tests and grades.

Intrinsic motivation, in contrast, usually stems from intellectual curiosity and a desire to learn. There is some evidence that extrinsic motivation may actually be detrimental, impeding students' intrinsic desire to learn. For example, students doing a research project might focus primarily on completing the task rather than learning the concepts (Moje et al., 2001; Nuthall, 1999, 2001). Similarly, a laboratory activity performed only to confirm a previously presented idea is unlikely to deepen students' understanding of that idea; students will likely focus more on finding the "right" answer than on understanding the underlying concepts. The reality is that there are, and will always be, extrinsic motivators (e.g., deadlines, tests, college entrance requirements). Based on research, efforts should be made to balance intrinsic and extrinsic motivators, especially for students not achieving well even with extrinsic motivators.

There are many ways for a teacher to foster intrinsic motivation. For example, students can be highly motivated by a discrepant event that contradicts their view of the world (Friedl, 1995; Suchman, 1966). When students make predictions before starting an investigation, their interest may be raised. If students' observations do not match their original predictions, they may be motivated to find out why (Lunetta et al., 2007). Students may also be stimulated to learn when they investigate a question that has meaning to them, or if they are learning about science in a context that relates to their personal experience.

Eliciting students' prior knowledge

Research has shown convincingly that students do not come to school as empty vessels. They come with ideas and beliefs—gleaned from books, television, movies, and real-life experiences—that interconnect and form complex cognitive structures (Piaget, 1952) which may facilitate or impede learning (National Research Council, 2003). In cases where students have naïve understandings, e.g., when they have made sense of the world in a way that is not consistent with what we know from science, these cognitive structures need to be undone and rebuilt. For example, many students believe the seasons are caused by the distance of Earth from the sun (perhaps because they have experienced the difference between having their hand close to and far from a heat source), or that plants get food from the soil (perhaps because they have seen advertisements for plant fertilizer that refer to the product as "plant food"). In these cases, it is important that instruction surfaces what students think about an idea and why they think it, so that subsequent instruction can provide experiences that confront these ideas. Without these opportunities, students "may fail to grasp the new concepts and information that are taught, or they may learn them for purposes of a test but revert to their preconceptions outside the classroom" (National Research Council, 2003, p. 14).

Learning theory suggests that instruction is more effective when it takes students' initial ideas into account. Eliciting students' knowledge has value even when their ideas are consistent with scientists' views. The more students connect new knowledge with pre-existing knowledge, the better they will understand that new knowledge. Instruction that ties new and existing ideas together increases the likelihood of learning, adroitness with the knowledge, and retention over time. There are different ways to elicit student ideas. Common methods include a KWL chart or open-ended teacher questions can also elicit students' ideas, especially if teachers probe for deeper explanations (Harlen, 1998).

Intellectual engagement with relevant phenomena

Research on learning suggests that effective lessons include meaningful experiences that engage students intellectually with important science content. The mode of learning may vary, as long as students have opportunities to investigate meaningful questions, engage with appropriate phenomena, and explicitly consider new experiences and knowledge in light of their prior conceptions. The important consideration is that lessons engage students in doing the intellectual work. It is not enough simply to provide students with an interesting

hands-on experience that does not connect to learning goals, such as building and flying paper airplanes with no discussion of the forces involved in flight. Although such an activity may be successful at piquing students' interest in science, it is unlikely to teach important ideas if it does not focus on a meaningful question.

Classroom activities must be explicitly linked to learning goals so that students understand the purpose of the instruction and feel motivated to engage with the ideas, not just the materials (White and Gunstone, 1992).

Sense-making

An effective science lesson requires opportunities for students to make sense of the ideas they have encountered and explored (National Research Council, 2003). Because students will probably not be able to draw appropriate conclusions on their own, regardless of how engaging the activities, it falls to the teacher to be sure that students make sense of their science experience through skillful questioning, facilitation of class discussion, and/or explanations.

There are different types of sense-making. Students may be encouraged to make connections between what they did in the lesson and what they were intended to learn so that they see a purpose to their activities. For example, in the electricity lesson described earlier, it would be important for students to make explicit connections between their data and the concept of conductivity. Students may also be asked to reflect on their initial ideas, becoming aware of how their thinking may have changed over the course of the lesson or unit. This type of sense-making is particularly important for learning concepts for which students have strong naïve conceptions to help prevent their reverting back to those naïve ideas. Another aspect of sense-making involves helping students connect the ideas to what they have learned previously, thereby placing the lesson learning goals in a larger scientific framework and helping them organize the new knowledge in their cognitive framework (National Research Council, 2003; Gallagher, 2000). Finally, students may be given opportunities to apply the concepts to new contexts; this helps reinforce their understanding of the ideas and build their reasoning skills.

Excerpts from:

Banilower, E., Cohen, K., Pasley, J. & Weiss, I. (2010). Effective science instruction: What does research tell us? Second edition. Portsmouth, NH: RMC Research Corporation, Center on Instruction

Intersection of Social Studies and 21st Century Skills

The 21st Century Skills and Social Studies Map, the first of its kind to be released, demonstrates how the integration of 21st century skills into the social studies supports teaching and prepares students to become effective and productive citizens in the 21st century. The map, developed by the Partnership for 21st Century Skills and National Council for the Social Studies, provides educators with concrete examples of how 21st century skills can be infused into classroom practices and highlights the critical connections between social studies and 21st century skills.

The skills are:

- Creativity and Innovation;
- Critical Thinking and Problem Solving;
- Communication;
- Collaboration;
- Information Literacy;
- Media Literacy;
- ICT Literacy;
- Flexibility and adaptability;
- Initiative and Self-direction;
- Social and Cross-cultural skills;
- Productivity and Accountability;
- Leadership and Responsibility.

Map Available at http://www.p21.org/storage/documents/ss_map_11_12_08.pdf

Intersection of English Language Arts Standards

The New Jersey Student Learning Standards for English Language Arts (ELA) build on the best of existing standards and reflect the skills and knowledge students need to succeed in college, career, and life.

The ELA Standards reflect the strong beliefs that

- Literature and informational (nonfiction) text are important for our students and should maintain their rightful place in our classrooms;
- Background knowledge and motivation are critical to the success of students when learning to read and when accessing complex text;
- Research by students provides the opportunity to learn more about a subject, but equally as important, provides students the opportunity to look beyond their research to questions left unanswered (new avenues for student research);
- Using evidence remains a critical skill, interspersed throughout the standards, allowing students to ground their thinking in the work of authors and experts in literature and in the content areas;
- Literacy must be recognized and guided in content areas so that students recognize the academic vocabulary, media representations, and power of language inherent in the work of scholars and experts, and
- The importance of foundational skills in the early grades, as students learn to read, cannot be overstated and calls for targeted, sustained intervention at any point of struggle for a student.

The New Jersey Student Learning Standards define general, cross-disciplinary literacy expectations that must be met for students to be prepared to enter college and workforce training programs ready to succeed. The K–12 grade-specific standards define end-of-year expectations and a cumulative progression designed to enable students to meet college and career readiness expectations no later than the end of high school.

Students advancing through the grades are expected to meet each year's grade-specific standards, retain or further develop skills and understandings mastered in preceding grades, and work steadily toward meeting the more general expectations described by the standards.

Anchor Standards: Reading

Key Ideas and Details

NJSLSA.R1. Read closely to determine what the text says explicitly and to make logical inferences and relevant connections from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.

NJSLSA.R2. Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas.

NJSLSA.R3. Analyze how and why individuals, events, and ideas develop and interact over the course of a text.

Craft and Structure

NJSLSA.R4. Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone.

NJSLSA.R5. Analyze the structure of texts, including how specific sentences, paragraphs, and larger portions of the text (e.g., a section, chapter, scene, or stanza) relate to each other and the whole.

NJSLSA.R6. Assess how point of view or purpose shapes the content and style of a text.

Integration of Knowledge and Ideas

NJSLSA.R7. Integrate and evaluate content presented in diverse media and formats, including visually and quantitatively, as well as in words.

NJSLSA.R8. Delineate and evaluate the argument and specific claims in a text, including the validity of the reasoning as well as the relevance and sufficiency of the evidence.

NJSLSA.R9. Analyze and reflect on how two or more texts address similar themes or topics in order to build knowledge or to compare the approaches the authors take.

Range of Reading and Level of Text Complexity

NJSLSA.R10. Read and comprehend complex literary and informational texts independently and proficiently with scaffolding as needed.

Anchor Standards: Writing

Text Types and Purposes

NJSLSA.W1. Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.

NJSLSA.W2. Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content.

NJSLSA.W3. Write narratives to develop real or imagined experiences or events using effective technique, well-chosen details, and well-structured event sequences.

Production and Distribution of Writing

NJSLSA.W4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

NJSLSA.W5. Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach.

NJSLSA.W6. Use technology, including the Internet, to produce and publish writing and to interact and collaborate with others.

Research to Build and Present Knowledge

NJSLSA.W7. Conduct short as well as more sustained research projects, utilizing an inquiry-based research process, based on focused questions, demonstrating understanding of the subject under investigation.

NJSLSA.W8. Gather relevant information from multiple print and digital sources, assess the credibility and accuracy of each source, and integrate the information while avoiding plagiarism.

NJSLSA.W9. Draw evidence from literary or informational texts to support analysis, reflection, and research.

Range of Writing

NJSLSA.W10. Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of tasks, purposes, and audiences.

Anchor Standards: Speaking and Listening

Comprehension and Collaboration

NJSLSA.SL1. Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.

NJSLSA.SL2. Integrate and evaluate information presented in diverse media and formats, including visually, quantitatively, and orally.

NJSLSA.SL3. Evaluate a speaker's point of view, reasoning, and use of evidence and rhetoric.

Presentation of Knowledge and Ideas

NJSLSA.SL4. Present information, findings, and supporting evidence such that listeners can follow the line of reasoning and the organization, development, and style are appropriate to task, purpose, and audience.

NJSLSA.SL5. Make strategic use of digital media and visual displays of data to express information and enhance understanding of presentations.

NJSLSA.SL6. Adapt speech to a variety of contexts and communicative tasks, demonstrating command of formal English when indicated or appropriate.

Intersection of Mathematical Practices

Standards for Mathematical Practice

The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students. These practices rest on important “processes and proficiencies” with longstanding importance in mathematics education. The first of these are the NCTM process standards of problem solving, reasoning and proof, communication, representation, and connections. The second are the strands of mathematical proficiency specified in the National Research Council’s report Adding It Up: adaptive reasoning, strategic competence, conceptual understanding (comprehension of mathematical concepts, operations and relations), procedural fluency (skill in carrying out procedures flexibly, accurately, efficiently and appropriately), and productive disposition (habitual inclination to see mathematics as sensible, useful, and worthwhile, coupled with a belief in diligence and one’s own efficacy).

CCSS.MATH.PRACTICE.MP1 Make sense of problems and persevere in solving them.
Mathematically proficient students start by explaining to themselves the meaning of a problem and looking for entry points to its solution. They analyze givens, constraints, relationships, and goals. They make conjectures about the form and meaning of the solution and plan a solution pathway rather than simply jumping into a solution attempt. They consider analogous problems, and try special cases and simpler forms of the original problem in order to gain insight into its solution. They monitor and evaluate their progress and change course if necessary. Older students might, depending on the context of the problem, transform algebraic expressions or change the viewing window on their graphing calculator to get the information they need. Mathematically proficient students can explain correspondences between equations, verbal descriptions, tables, and graphs or draw diagrams of important features and relationships, graph data, and search for regularity or trends. Younger students might rely on using concrete objects or pictures to help conceptualize and solve a problem. Mathematically proficient students check their answers to problems using a different method, and they continually ask themselves, "Does this make sense?" They can understand the approaches of others to solving complex problems and identify correspondences between different approaches.

CCSS.MATH.PRACTICE.MP2 Reason abstractly and quantitatively.
Mathematically proficient students make sense of quantities and their relationships in problem situations. They bring two complementary abilities to bear on problems involving quantitative relationships: the ability to decontextualize—to abstract a given situation and represent it symbolically and manipulate the representing symbols as if they have a life of their own, without necessarily attending to their referents—and the ability to contextualize, to pause as needed during the manipulation process in order to probe into the referents for the symbols involved. Quantitative reasoning entails habits of creating a coherent representation of the problem at hand; considering the units involved; attending to the meaning of quantities, not just how to compute them; and knowing and flexibly using different properties of operations and objects.

CCSS.MATH.PRACTICE.MP3 Construct viable arguments and critique the reasoning of others.
Mathematically proficient students understand and use stated assumptions, definitions, and previously established results in constructing arguments. They make conjectures and build a logical progression of statements to explore the truth of their conjectures. They are able to analyze situations by breaking them into

cases, and can recognize and use counterexamples. They justify their conclusions, communicate them to others, and respond to the arguments of others. They reason inductively about data, making plausible arguments that take into account the context from which the data arose. Mathematically proficient students are also able to compare the effectiveness of two plausible arguments, distinguish correct logic or reasoning from that which is flawed, and—if there is a flaw in an argument—explain what it is. Elementary students can construct arguments using concrete referents such as objects, drawings, diagrams, and actions. Such arguments can make sense and be correct, even though they are not generalized or made formal until later grades. Later, students learn to determine domains to which an argument applies. Students at all grades can listen or read the arguments of others, decide whether they make sense, and ask useful questions to clarify or improve the arguments.

CCSS.MATH.PRACTICE.MP4 Model with mathematics.
Mathematically proficient students can apply the mathematics they know to solve problems arising in everyday life, society, and the workplace. In early grades, this might be as simple as writing an addition equation to describe a situation. In middle grades, a student might apply proportional reasoning to plan a school event or analyze a problem in the community. By high school, a student might use geometry to solve a design problem or use a function to describe how one quantity of interest depends on another. Mathematically proficient students who can apply what they know are comfortable making assumptions and approximations to simplify a complicated situation, realizing that these may need revision later. They are able to identify important quantities in a practical situation and map their relationships using such tools as diagrams, two-way tables, graphs, flowcharts and formulas. They can analyze those relationships mathematically to draw conclusions. They routinely interpret their mathematical results in the context of the situation and reflect on whether the results make sense, possibly improving the model if it has not served its purpose.

CCSS.MATH.PRACTICE.MP5 Use appropriate tools strategically.
Mathematically proficient students consider the available tools when solving a mathematical problem. These tools might include pencil and paper, concrete models, a ruler, a protractor, a calculator, a spreadsheet, a computer algebra system, a statistical package, or dynamic geometry software. Proficient students are sufficiently familiar with tools appropriate for their grade or course to make sound decisions about when each of these tools might be helpful, recognizing both the insight to be gained and their limitations. For example, mathematically proficient high school students analyze graphs of functions and solutions generated using a graphing calculator. They detect possible errors by strategically using estimation and other mathematical knowledge. When making mathematical models, they know that technology can enable them to visualize the results of varying assumptions, explore consequences, and compare predictions with data. Mathematically proficient students at various grade levels are able to identify relevant external mathematical resources, such as digital content located on a website, and use them to pose or solve problems. They are able to use technological tools to explore and deepen their understanding of concepts.

CCSS.MATH.PRACTICE.MP6 Attend to precision.
Mathematically proficient students try to communicate precisely to others. They try to use clear definitions in discussion with others and in their own reasoning. They state the meaning of the symbols they choose, including using the equal sign consistently and appropriately. They are careful about specifying units of measure, and labeling axes to clarify the correspondence with quantities in a problem. They calculate accurately and efficiently, express numerical answers with a degree of precision appropriate for the problem

context. In the elementary grades, students give carefully formulated explanations to each other. By the time they reach high school they have learned to examine claims and make explicit use of definitions.

CCSS.MATH.PRACTICE.MP7 Look for and make use of structure.
Mathematically proficient students look closely to discern a pattern or structure. Young students, for example, might notice that three and seven more is the same amount as seven and three more, or they may sort a collection of shapes according to how many sides the shapes have. Later, students will see 7×8 equals the well remembered $7 \times 5 + 7 \times 3$, in preparation for learning about the distributive property. In the expression $x^2 + 9x + 14$, older students can see the 14 as 2×7 and the 9 as $2 + 7$. They recognize the significance of an existing line in a geometric figure and can use the strategy of drawing an auxiliary line for solving problems. They also can step back for an overview and shift perspective. They can see complicated things, such as some algebraic expressions, as single objects or as being composed of several objects. For example, they can see $5 - 3(x - y)^2$ as 5 minus a positive number times a square and use that to realize that its value cannot be more than 5 for any real numbers x and y.

CCSS.MATH.PRACTICE.MP8 Look for and express regularity in repeated reasoning.
Mathematically proficient students notice if calculations are repeated, and look both for general methods and for shortcuts. Upper elementary students might notice when dividing 25 by 11 that they are repeating the same calculations over and over again, and conclude they have a repeating decimal. By paying attention to the calculation of slope as they repeatedly check whether points are on the line through (1, 2) with slope 3, middle school students might abstract the equation $(y - 2)/(x - 1) = 3$. Noticing the regularity in the way terms cancel when expanding $(x - 1)(x + 1)$, $(x - 1)(x^2 + x + 1)$, and $(x - 1)(x^3 + x^2 + x + 1)$ might lead them to the general formula for the sum of a geometric series. As they work to solve a problem, mathematically proficient students maintain oversight of the process, while attending to the details. They continually evaluate the reasonableness of their intermediate results.

Connecting the Standards for Mathematical Practice to the Standards for Mathematical Content
The Standards for Mathematical Practice describe ways in which developing student practitioners of the discipline of mathematics increasingly ought to engage with the subject matter as they grow in mathematical maturity and expertise throughout the elementary, middle and high school years. Designers of curricula, assessments, and professional development should all attend to the need to connect the mathematical practices to mathematical content in mathematics instruction.

The Standards for Mathematical Content are a balanced combination of procedure and understanding. Expectations that begin with the word "understand" are often especially good opportunities to connect the practices to the content. Students who lack understanding of a topic may rely on procedures too heavily. Without a flexible base from which to work, they may be less likely to consider analogous problems, represent problems coherently, justify conclusions, apply the mathematics to practical situations, use technology mindfully to work with the mathematics, explain the mathematics accurately to other students, step back for an overview, or deviate from a known procedure to find a shortcut. In short, a lack of understanding effectively prevents a student from engaging in the mathematical practices.

In this respect, those content standards which set an expectation of understanding are potential "points of intersection" between the Standards for Mathematical Content and the Standards for Mathematical Practice. These points of intersection are intended to be weighted toward central and generative concepts in the school mathematics curriculum that most merit the time, resources, innovative energies, and focus necessary to qualitatively improve the curriculum, instruction, assessment, professional development, and student achievement in mathematics.

<table>
<tr><td colspan="4">Grade K Science</td></tr>
<tr><td>Unit #1</td><td>Unit Name
Weather and Climate</td><td>Approximate # of days
15 days (includes initial and culminating)
*Note that tracking weather patterns is ongoing and continues throughout the year (alternates with SS)</td><td>Time of year
Intro First Trimester
Ongoing through June</td></tr>
<tr><td colspan="4">NGSS Standards
K-ESS2-1. Use and share observations of local weather conditions to describe patterns over time.
K-ESS3-2. Ask questions to obtain information about the purpose of weather forecasting to prepare for, and respond to, severe weather</td></tr>
<tr><td colspan="4">Overview of Unit:
In this unit of study, students develop an understanding of local weather patterns and the effect they have on people and climate. Students develop prediction making skills and are expected to collect, chart and analyze data based on daily weather tracking. Students compose writing pieces sharing opinions and facts about weather and the effects on people. Through the use of dramatic play, students create a weather station and explore what it is like to be a meteorologist.</td></tr>
<tr><td colspan="4">Essential Understandings:
What are the types of weather
How is weather measured
How does weather change through the seasons
How do people adapt to weather conditions
How do we collect, graph and analyze data
What is a meteorologist and what do they do</td></tr>
<tr><td>Interdisciplinary Connections:</td><td>Technology Connections:
LCN Technology Curriculum
NJSLS Technology Standards</td><td colspan="2">21st Century Skills:</td></tr>
<tr><td>Math:
Graphing and Data Collection
K.CC.A
K.MD.A.1
K.MD.B.3</td><td>SmartBoard Lessons
Reading a Thermometer
Video/Music
Navigate a Webpage
TECH.8.1.2.A.5
TECH.8.1.2.C.CS1</td><td colspan="2">Meteorologist and what they do
CAEP.9.2.4.A.1
CAEP.9.2.4.A.3</td></tr>
</table>

ELA/Literacy: Research and Informational text RI.CR.K.1 Opinion and Informative Writing W.AW.K.1 W.IW.K.2 W.RW.K.7	TECH.8.1.2.E.CS2		
Assessments	Differentiation	Resources	Notes
Formative, Summative, Benchmark, Alternative Observation (F) Note Taking (F) Journal Entries (F/S) ESGI (B)	Color Coded Thermometer w/ #s Visual pictures Music Dramatic Play Area *see differentiation strategies	ED Math Thermometer Smartboard Slides Monthly Graphs Websites and links https://kidsweatherreport.com/ https://www.youtube.com/watch?v=5-yYOpgmmp8 https://www.youtube.com/watch?v=Vk6rP_4wpvk	Daily Weather Charting using smartboard template Student made Dramatic play pieces for weather forecasting

Grade K Science			
Unit #2	Unit Name Engineering Design	Approximate # of days Initial 5 days and then ongoing (alternates with SS)	Time of year Intro First Trimester (ongoing through June)
NGSS Standard Engineering Design			

SCI.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 it function as needed to solve a given problem.
K-2-ETS1-3 Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.

Makers Art
1.3.P.D.1: Demonstrate the safe and appropriate use and care of art materials and tools.
1.3.P.D.2: Create two and three-dimensional works of art while exploring color, line, shape, form, texture, and space.
1.3.P.D.4: Demonstrate a growing ability to represent experiences, thoughts, and ideas through a variety of age-appropriate materials and visual art media using memory, observation, and imagination.
1.3.P.D.5: Demonstrate planning, persistence, and problem-solving skills while working independently, or with others, during the creative process.

Overview of Unit:
In this unit of study, students understand the practices of engineer design. Students develop skills to enhance their process of designing structures to solve a problem. Students are expected to analyze, replan and evaluate the execution of process of their designs. Students expand knowledge of design challenges in the block center.

Essential Understandings:
What is an engineer
How do engineers predict, design and solve a problem
How do engineers evaluate design or solutions
How is the shape, structure, and function of an object important when you're designing

Interdisciplinary Connections:	Technology Connections: LCN Technology Curriculum NJSLS Technology Standards	21st Century Skills:	Career Awareness OR Personal Finance:
Math Counting K.MD.A.1 K.MD.A.2 Shapes MA.K.K.G.B.4 Literacy Storybook Steam	Digital Tools Design Apps Ipad Use Videoing TECH.8.1.2.C.CS2 TECH.8.1.2.F.CS2 TECH.8.1.2.F.CS1 TECH.8.1.2.F.CS2. TECH.8.1.2.F.CS1	Gathering information, problem solving, and executing a plan 9.4.2.CT.1 9.4.2.CT.2 9.4.2.CT.3	Engineer and what they do CAEP.9.2.4.A.1 CAEP.9.2.4.A.3

Journaling Outcomes LA.W.K.1 LA.W.K.2 LA.W.K.7 K-2-ETS1-2 Homework Family STEAM Project K-2-ETS1-2	TECH.8.2.2.D.1 LS.W.K.6		
Assessments	Differentiation	Resources	Notes
Formative, Summative, Benchmark, Alternative Observation (F) Note Taking (F) Journal Entries (F)	Partner Working Design on touchscreen *see differentiation strategies Choice Boards	Books Inside the house that was Haunted How to Catch a Leprechaun Ten Apples Up On Top Gingerbread Man Gingerbread Baby Gingerbread Girl Billy Goats Gruff 3 Little Pigs Links K Launching Unit NGSS Booklist Video Clips What is an Engineer	STEAM ACTIVITIES Haunted House Billy Goats Gruff Bridge Ten Apples Challenge Gingerbread Traps Sledding Ramps Leprechaun Traps 3 Little Pigs 2d/3d Towers FAMILY STEAM Nature Names Design A Tower Design A Maze It's not a box Making Butter Create a floating Canoe Turkey Centerpieces Gingerbread Zipline Create a Shelter Bird Nest Musical Instrument Create A Game Objects in Motion

Grade K Science			
Unit # 3	Unit Name Life Science : Animals and Plants	Approximate # of days 40 Instructional days (alternates with SS)	Time of year Intro Plants First Trimester

			Intro animals Second Trimester Culminating Third Trimester
NGSS Standards K-LS1-1 Use observations to describe patterns of what plants and animals (including humans) need to survive. K-ESS2-2. Construct an argument supported by evidence for how plants and animals (including humans) can change the environment to meet their needs.			
Overview of Unit: In this unit of study, students develop an understanding of what animals and plants need to survive and the relationship between their needs and where they live. Students compare and contrast what plants and animals need to survive and the relationship between the needs of living things and where they live. Students will explore dramatic play by creating habitats and farmers markets.			
Essential Understandings: How can you tell if something is alive What do animals and plants need to survive What are the differences between needs of plants and animals Where do organisms live and why do they live there			
Interdisciplinary Connections:	Technology Connections: LCN Technology Curriculum NJSLS Technology Standards	Career Awareness OR Personal Finance:	
Literacy Journaling observations W.IW.K.2 W.WR.K.5. W.SE.K.6 RI.CI.K.2. Writing Informational (All about, How to) W.IW.K.2 Math Tracking days K.CC.A Attributes K.MD.A.2	Duke Farms Eagle Cam Videos Music Ipad Apps Design App Chatter pix 8.1.2.CS.1	Ornithologist Farmers Zoologist Entomologist CAEP.9.2.4.A.1 CAEP.9.2.4.A.3	

Dramatic Play: Create Habitats Farmers Market Penguin Parade SL.PE.K.1			
Assessments	Differentiation	Resources	Notes
Formative, Summative, Benchmark, Alternative Observation (F) Note Taking (F) Journaling (F/S) Writing Rubrics (S) ESGI (B)	Multi-Sensory Writing paper choices Center Choice Activities Partnering Seating	Links Duke Farms Eagle Cam Books Hop To The Top Leveled Informational books Planting a Rainbow Titch	Apples/Pumpkins (Sept/Oct) Turkey Unit (Nov) Penguin/ Arctic (Jan) Duke farms Eagle Study (Feb- April) Insects/Plants (May) Animal Habitats (May-June)

Grade K Science			
Unit #4	Unit Name Pushes and Pulls	Approximate # of days 10 instructional days (alternates with SS)	Time of year Third Trimester
NGSS Standards 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 of an object 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.			
Overview of Unit: During this unit of study, students analyze data collection so that they can apply an understanding of the effects of different strengths or different directions of pushes and pulls on the motion of an object. Students will plan and conduct an investigation			
Essential Understandings: What is pushing versus pulling What can affect an object's motion			
Interdisciplinary Connections:	Technology Connections: LCN Technology Curriculum NJSLS Technology Standards	21st Century Skills:	

Literacy Shared writing Charting RL.CR.K.1 W.WR.K.5 SL.ES.K.3 Math Time Number Sense K.MD.A.1 K.MD.A.2	Timed Races Ipad timer Digital Resources Design App TECH 8.1.2.F.1	Critical thinking skills asking why CRP8	
Assessments	Differentiation	Resources	Notes
Formative, Summative, Benchmark, Alternative Observation (F) Note Taking (F) Journal Entries (F/S)	Number lines Partnering Different size scooters Different size wheels Touch screen timers	Books The Boy Who Harnessed the Wind Forces that Make Things Move What is the World Made Of? What Makes a Magnet? Link Push and Pull Video Lesson Rollercoaster	Basket races Scooter Races Roller Coaster Design Magnets

Grade K Science			
Unit #5	Unit Name Day and Night Sky	Approximate # of days 25 days (alternates with SS)	Time of year Second Trimester
NGSS Standards K-ESS2-1. Use and share observations of local weather conditions to describe patterns over time. 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. K-ESS3-2. Ask questions to obtain information about the purpose of weather forecasting to prepare for, and respond to, severe weather.			

Overview of Unit:During this unit of study, students will gain understanding of the day and night sky. Students learn that the objects in the sky are an indicator of weather. Students will apply an understanding of the effects of the sun on the Earth's surface. Exploration of stars in the sky and space are introduced.

Essential Understandings:
What are the objects in the day and night sky
What do clouds tell us about the weather
What are types of severe weather
What is the sun made of
What is the effect of sunlight on the earth's surface
How can the warming effects of the sun be reduced
What are stars

Interdisciplinary Connections:	Technology Connections: LCN Technology Curriculum NJSLS Technology Standards	Career Awareness OR Personal Finance:
Math: Graphing Data Collection Shapes K.CC.A K.MD.A.1 K.MD.B.3 ELA/Literacy: All About Books Researching text Fact writing RL.CR.K.1 W.IW.K.2. W.WR.K.5.	SmartBoard Lessons Video/Music Navigate a Webpage TECH.8.1.2.C.CS1 TECH.8.1.2.E.CS2	Astrologist Astronaut NASA 9.1.2.CAP.1 CAEP.9.2.4.A.3

Assessments	Differentiation	Resources	Notes
Formative, Summative, Benchmark, Alternative Observation (F) Note Taking (F) Journal Entries (F/S) ESGI (B) Writing Rubrics (S)	SmartBoard Lessons Video/Music Navigate a Webpage Partnering	Smartboard slides of clouds Smartboard slides of ways to shade Video Time-lapse Sun Astronaut in space Link	Shade and Shadows Experiment Sunrise, Midday, Sunset Sketch a design to create shade What Produces Weather Extreme Weather Rain Cloud Experiment Constellations

		NASA for kids Books The Sun The Stars The Planets Clouds	

Grade 1 Science			
Unit # 1	Unit Name - Launching Science/Engineering	Approximate # of days: 20 (alternates with SS)	Time of year: Sept. - Nov.

NGSS Standards:
Engineering Design
K-2-ETS1-1 - [Performance Expectation] - 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-ETS1-1.ETS1.A - Defining and Delimiting Engineering Problems
K-2-ETS1-1.ETS1.A.1 - A situation that people want to change or create can be approached as a problem to be solved through engineering.
K-2-ETS1-1.ETS1.A.2 - Asking questions, making observations, and gathering information are helpful in thinking about problems.
K-2-ETS1-1.ETS1.A.3 - Before beginning to design a solution, it is important to clearly understand the problem.
K-2-ETS1-2 - 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.
K-2-ETS1-2.ETS1.B - Developing Possible Solutions
K-2-ETS1-2.ETS1.B.1 - Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a problem's solutions to other people.
K-2-ETS1-3 - Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.
K-2-ETS1-3.4.1 - Analyze data from tests of an object or tool to determine if it works as intended.
K-2-ETS1-3.ETS1.C - Optimizing the Design Solution
0xK-2-ETS1-3.ETS1.C.1 - Because there is always more than one possible solution to a problem, it is useful to compare and test designs.

Overview of Unit:
Launching Science, Engineering, and Safety. Students will understand that Science is curiosity and beginning with a question that they want to investigate. Scientists are people who investigate and explore to search for answers to their questions. Scientists follow a method, they keep good notes, and collect data. Engineers start with a question too. Engineers imagine, plan, create, and improve. Both Scientists and Engineers use tools safely and mindfully.

Essential Understandings:

Create STEAM journal/notebook-explain routine of using the notebook to keep track of observations
Understand the roles of a scientist and engineer
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.

*Create STEAM journal/notebook
What is Science?
What is a Scientist? What do Scientists do and use?
What is an Engineer? What is Engineering?
What is the scientific method?
-Question
-Hypothesis
-Experiment
-Observe and Record
-Analyze
-Share

Interdisciplinary Connections:	Technology Connections:	21st Century Skills	Personal Finance/Career Awareness:
*__Reading:__ NJSLSA.R1 NJSLSA.R2 NJSLSA.R3. NJSLSA.R7. NJSLSA.R8 NJSLSA.R9. *__Writing:__ NJSLSA.W7 NJSLSA.W8 NJSLSA.W9. *Poetry *Morning Meeting/Responsive Classroom __Math:__ MP.2 Reason abstractly and quantitatively. (K-2-ETS1-1),(K-2-ETS1-3) MP.4 Model with	LCN Technology Curriculum NJSLS Technology Standards 8.1.2.A.1 Identify the basic features of a digital device and explain its purpose. Select and use applications 8.1.2.A.2 Create a document using a word processing application. 8.1.2.A.4 Demonstrate developmentally appropriate navigation skills in virtual environments (i.e. games, museums). *www.brainpopjr.com *Discovery Ed *Kiddle *Scholastic Science Spin *FossWEb	CRP5. Consider the environmental, social and economic impacts of decisions. CRP6. Demonstrate creativity and innovation.	**CAEP.9.2.4.A.1** - Identify reasons why people work, different types of work, and how work can help a person achieve personal and professional goals. **CAEP.9.2.4.A.2** - [*Standard*] - Identify various life roles and civic and work - related activities in the school, home, and community.

mathematics. (K-2-ETS1-1),(K-2-ETS1-3) 2.MD.D.10 Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems using information presented in a bar graph. (K-2-ETS1-1),(K-2-ETS1-3)			
Assessments	Differentiation	Resources	Notes
Students can demonstrate competency with tasks such as (F/S): developing and refining models generating, discussing and analyzing data engaging in evidence-based argumentation reflecting on their own understanding Summative: constructing spoken and written scientific explanations Journal entries response sheets Self assessment/rubric	*see differentiation strategies	http://www.nextgenscience.org/ Engineering Design Process Self-Assessment http://speechisbeautiful.com/2017/03/10-wordless-videos-teach-problem-solving/ http://www.brainpopjr.com Foss online: http://www.fossweb.com https://www.teachingchannel.org Pbs Science Video Scholastic News (w/ online resource) Science Spin (w/ online resource)	-Science Notebooks -Observe and study apples/pumpkins -STEAM design: Creepy Carrot Traps → Use the scientific method tools to learn, design, build and create traps.

		Rosie Revere, Engineer by, Andrea Beaty Thomas Edison: Great American Inventor by, Shelley Bedik The Most Magnificent Thing by Ashley Spires..author website/blog & youtube clip The Girl Who Never Made Mistakes by Mark Pett What Do You Do With An Idea? By Kobi Yamada Those Darn Squirrels! By Adam Rubin	

Grade 1 Science			
Unit # 2	Unit Name - Earth Science	Approximate # of days: 25 (alternates with SS)	Time of year: Nov. - Jan.
NGSS Standards: 1-ESS1 - Earth's Place in the Universe 1-ESS1-1 - [Performance Expectation] - Use observations of the sun, moon, and stars to describe patterns that can be predicted. 1-ESS1-1.4 - Analyzing data in K–2 builds on prior experiences and progresses to collecting, recording, and sharing observations. ESS1-1.4.1 - [Practice] - Use observations (firsthand or from media) to describe patterns in the natural world in order to answer scientific questions. 1-ESS1-1.ESS1.A - The Universe and its Stars ESS1-1.ESS1.A.1 - [Disciplinary Core Idea] - Patterns of the motion of the sun, moon, and stars in the sky can be observed, described, and predicted. 1-ESS1-1.1 - Patterns			

ESS1-1.1.1 - [Crosscutting Concept] - Patterns in the natural world can be observed, used to describe phenomena, and used as evidence.
1-ESS1-2 - [Performance Expectation] - Make observations at different times of year to relate the amount of daylight to the time of year.
1-ESS1-2.3 - Planning and carrying out investigations to answer questions or test solutions to problems in K–2 builds on prior experiences and progresses to simple investigations, based on fair tests, which provide data to support explanations or design solutions.
ESS1-2.3.1 - [Practice] - Make observations (firsthand or from media) to collect data that can be used to make comparisons.
1-ESS1-2.ESS1.B - Earth and the Solar System
ESS1-2.ESS1.B.1 - [Disciplinary Core Idea] - Seasonal patterns of sunrise and sunset can be observed, described, and predicted.
1-ESS1-2.1 - Patterns
ESS1-2.1.1 - [Crosscutting Concept] - Patterns in the natural world can be observed, used to describe phenomena, and used as evidence.

Overview of Unit:
Students will continue being Scientists by observing the day and night sky patterns. They will specifically observe and make predictions with the sun, moon, and stars. Students will relate to seasonal patterns with changes in daylight. They will have a deeper understanding that the sun, moon, and stars are all fixed objects and Earth's movements is what creates the patterns.

Essential Understandings:

- Understand patterns of sun, moon, and stars
- Observe daylight in different times of year
- Observe moon phases
- Learn how stars and sun are visible at night, but not during the day
- Compare amount of daylight in winter to spring/fall
- Compare day and night sky

Where is the sun at night?
Why do we have longer days in Spring and Summer?
Why does the shape of the moon change?
Are the Stars and Sun in the sky at night?

Interdisciplinary Connections:	Technology Connections:	21st Century Skills
*__Reading:__ NJSLSA.R1 NJSLSA.R2 NJSLSA.R3. NJSLSA.R7. NJSLSA.R8 NJSLSA.R9. *__Writing:__ NJSLSA.W7	LCN Technology Curriculum NJSLS Technology Standards 8.1.2.A.1 Identify the basic features of a digital device and explain its purpose. Select and use applications 8.1.2.A.2	CRP7. Employ valid and reliable research strategies. CRP11. Use technology to enhance productivity.

NJSLSA.W8 NJSLSA.W9. *Poetry *Morning Meeting/Responsive Classroom	Create a document using a word processing application. 8.1.2.A.4 Demonstrate developmentally appropriate navigation skills in virtual environments (i.e. games, museums). *www.brainpopjr *Discovery Ed *Kiddle *Scholastic Science Spin *FossWeb		
Assessments *Formative, Summative, Benchmark, Alternative* **Formative** 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 **Summative** journal entries response sheets Self assessment/rubric	Differentiation *see differentiation strategies	**Resources** http://www.nextgenscience.org/ https://betterlesson.com/lesson/635856/the-predictable-patterns-of-the-sun-and-the-seasons https://betterlesson.com/lesson/613470/observing-the-sun https://betterlesson.com/lesson/613469/introduction-and-pre-assessment https://betterlesson.com/lesson/633422/let-s-observe-the-sun-day-1 https://betterlesson.com/home http://www.brainpopjr.com http://www.learn360.com	-Day and Night Sky - Phases of the moon Examples of patterns could include that the sun and moon appear to rise in one part of the sky, move across the sky and set. Oreo Cookie Moon Phases  Observing the night sky for 2 weeks for homework-draw what the night sky looks like (moon, stars) Learn about how the stars other than our sun are visible at night, but not during the day. Emphasize relative comparisons of the amount of daylight in the winter to the amount in the spring and fall.

			Foss online: http://www.fossweb.com https://www.teachingchannel.org Scholastic News (w/ online resource) Science Spin (w/ online resource) The Magic School Bus Explores the Solar System https://mysteryscience.com/sky/sun-moon-stars The Sun by Seymour Simon King Kafu and the Moon by, Trish Cooke	Make comparisons of the day and night sky. Teacherspayteachers day and night picture sort

Grade 1 Science			
Unit #3	Unit Name -Life Science Animals/Heredity Plants	Approximate # of days: 25 (alternates with SS)	Time of year: Feb-April:
NGSS Standards: 1-LS1 - From Molecules to Organisms: Structures and Processes 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-LS1-1.LS1.A - Structure and Function LS1-1.LS1.A.1 - All organisms have external parts. Different animals use their body parts in different ways to see, hear, grasp objects, protect themselves, move from place to place, and seek, find, and take in food, water and air. Plants also have different parts (roots, stems, leaves, flowers, fruits) that help them survive and grow. 1-LS1-1.LS1.D - Information Processing LS1-1.LS1.D.1 - Animals have body parts that capture and convey different kinds of information needed for growth and survival. Animals respond to these inputs with behaviors that help them survive. Plants also respond to some external inputs. 1-LS1-1.6 - Structure and Function			

LS1-1.6.1 -The shape and stability of structures of natural and designed objects are related to their function(s).
1-LS1-2 - Read texts and use media to determine patterns in behavior of parents and offspring that help offspring survive.
1-LS1-2.LS1.B - Growth and Development of Organisms
LS1-2.LS1.B.1 - Adult plants and animals can have young. In many kinds of animals, parents and the offspring themselves engage in behaviors that help the offspring to survive.
1-LS1-2.1 - Patterns
LS1-2.1.1 - Patterns in the natural world can be observed, used to describe phenomena, and used as evidence.
1-LS3 - Heredity: Inheritance and Variation of Traits
1-LS3-1 - Make observations to construct an evidence-based account that young plants and animals are like, but not exactly like, their parents.

Overview of Unit: Students observe plant and/or animals external parts to understand how they meet their basic needs of survival. Study and analyze patterns in behavior help them survive in their environment.

Essential Understandings:
How do plants and animals survive?
Are there patterns in nature?
How are families in nature the same, but different?

Interdisciplinary Connections:	Technology Connections:	21st Century Skills	Personal Finance/Career Awareness:
*__Reading:__ NJSLSA.R1 NJSLSA.R2 NJSLSA.R3. NJSLSA.R7. NJSLSA.R8 NJSLSA.R9. *__Writing:__ NJSLSA.W7 NJSLSA.W8 NJSLSA.W9. *Poetry *Morning Meeting/Responsive Classroom	LCN Technology Curriculum NJSLS Technology Standards 8.1.2.A.1 Identify the basic features of a digital device and explain its purpose. Select and use applications 8.1.2.A.2 Create a document using a word processing application. 8.1.2.A.4 Demonstrate developmentally appropriate navigation skills in virtual environments (i.e. games, museums). *www.brainpopjr *Discovery Ed *Kiddle *Scholastic Science Spin *FossWEb	CRP7. Employ valid and reliable research strategies. CRP11. Use technology to enhance productivity. CRP5. Consider the environmental, social and economic impacts of decisions.	N/A

Assessments	Differentiation	**Resources**	-Lifecycle of a plant -Lifecycle of animals • Based off of science spin editions. Ex. butterfly, mammals, etc.
Formative, Summative, Benchmark, Alternative **Formative** 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 **Summative** journal entries response sheets Self assessment/rubric	*see differentiation strategies	Next Generation Earth's System https://betterlesson.com/lesson/resource/3114245/6-animal-classes-song?from=mtp_home_feed_crowd_viewed_resource_name https://betterlesson.com/lesson/626229/engineering-solutions http://www.brainpopjr.com http://www.learn360.com Foss online: http://www.fossweb.com https://www.teachingchannel.org Scholastic News (w/ online resource) Science Spin (w/ online resource) Baby Animals by, Seymour Simon Big Tracks, Little Tracks by, Millicent Selsam https://mysteryscience.com/powers/parts-survival-growth The Curious Garden by Peter Brown	

		My Little Book of Ocean Life by Camilla de la Bedoyere What If You Had Animal Hair? What If You Had Animal Feet? What If You Had Animal Teeth?--Sandra Markle-Scholastic Books A Bird is a Bird by Lizzy Rockwell Best Foot Forward by Ingo Arndt Feathers: Not Just for Flying by Melissa Stewart Animal Faces by Penelope Arlon and Tory Gordon-Harris Born in the Wild: Baby Mammals and their Parents by Lita Judge	

Grade 1 Science			
Unit #4	Unit Name - Physical Science Waves/Light/Sound	Approximate # of days: 20 (alternates with SS)	Time of year: May/June
NGSS Standards: PS4.A.1 - Sound can make matter vibrate, and vibrating matter can make sound. 1-PS4-2. Make observations to construct an evidence-based account that objects can be seen only when illuminated. [Clarification Statement: 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.			

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.

Overview of Unit:
Students will conduct various investigations to understand the cause of sound is vibration. They will explore with experiments to observe how pitch and volume will change. They will investigate how light is affected with objects of different materials.

Essential Understandings:

Conduct investigations to provide evidence that vibrating materials can make sound
Observe how objects are seen when illuminated
Plan and conduct an investigation to determine how light is changed with placement/material of objects in its path
Utilize various tools and materials to design/build a sound device.

Interdisciplinary Connections:	Technology Connections:	21st Century Skills
***Reading:** NJSLSA.R1 NJSLSA.R2 NJSLSA.R3. NJSLSA.R7. NJSLSA.R8 NJSLSA.R9. ***Writing:** NJSLSA.W7 NJSLSA.W8 NJSLSA.W9. *Poetry *Morning Meeting/Responsive Classroom **Math:** MP.5 Use appropriate tools strategically. (1-PS4-4) 1.MD.A.1 Order three objects by length; compare the lengths of two objects indirectly by using a third object.	LCN Technology Curriculum NJSLS Technology Standards 8.1.2.A.1 Identify the basic features of a digital device and explain its purpose. Select and use applications 8.1.2.A.2 Create a document using a word processing application. 8.1.2.A.4 Demonstrate developmentally appropriate navigation skills in virtual environments (i.e. games, museums). *www.brainpopjr *Discovery Ed *Kiddle *Scholastic Science Spin *FossWEb	CRP8. Utilize critical thinking to make sense of problems and persevere in solving them. CRP6. Demonstrate creativity and innovation. CRP11. Use technology to enhance productivity. CRP5. Consider the environmental, social and economic impacts of decisions.

<table>
<tr><td>(1-PS4-4)

1.MD.A.2 Express the length of an object as a whole number of length units, by layering multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same-size length units that span it with no gaps or overlaps. (1-PS4-4)</td><td></td><td colspan="2"></td></tr>
<tr><td>Assessments

Formative, Summative, Benchmark, Alternative

<u>Formative</u>

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

**Use outdoor classroom for observation of sound!

<u>Summative</u>

journal entries

response sheets</td><td>Differentiation
*see differentiation strategies</td><td><u>Resources</u>
nce.org/
https://betterlesson.com/home
https://betterlesson.com/lesson/622032/stem-sound-day-1/
https://betterlesson.com/lesson/resource/3130569/water-and-sound-waves?from=mtp_home_feed_actor_added_resource_name
Use 5 senses Listening Walk
https://betterlesson.com/lesson/622032/stem-sound-day-1
http://www.brainpopjr.com
http://www.learn360.com
Foss online:</td><td>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</td></tr>
</table>

Self assessment/rubric		http://www.fossweb.com https://www.teachingchannel.org Scholastic News (w/ online resource) Science Spin (w/ online resource) My Light by Molly Bang Owl Moon by Jane Yolen What Are Sound Waves by Robin Johnson Sounds All Around by Wendy Pfeffer https://mysteryscience.com/light/properties-of-light-sound Magic School Bus-In The Haunted Mansion (sound)	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). Light Unit - TPT Examples of devices could include a light source to send signals, paper cup and string "telephones", and a pattern of drum beats.

Grade 2 Science			
Unit # 2.1	Unit Name: Science Launch	Approximate # of days 15 (alternates with SS)	Time of year September
NGSS Standards: 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-ETS1-3 Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.			

2-PS1-1 Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties. [Clarification Statement: Observations could include color, texture, hardness, and flexibility. Patterns could include the similar properties that different materials share.]
2-PS1-2 Analyze data obtained from testing different materials to determine which materials have the properties that are best suited for an intended purpose. [Clarification Statement: Examples of properties could include, strength, flexibility, hardness, texture, and absorbency.] [Assessment Boundary: Assessment of quantitative measurements is limited to length.]

Overview of Unit: Students will learn how to be a scientist, how to think like a scientist and how to follow procedures like a scientist.

Essential Understandings:
What are the tools scientists utilize?
What are the procedures scientists follow?
What is the Scientific Method?
What are safety rules?

Interdisciplinary Connections:	Technology Connections:	21st Century Skills:	Career Awareness OR Personal Finance:
ELA/Literacy – RI.2.1 RI.2.3 W.2.6 W.2.7 W.2.8 SL.2.2	LCN Technology Curriculum NJSLS Technology Standards Tech 8.1.2 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. BrainPop Jr. Discovery Learning YouTube	9.1.4.c.1 Practice collaborative skills in groups and explain how these skills assist in completing tasks in different settings (at home, in school and during play.) 9.1.4.F.2: Establish and follow performance goals to guide progress in assigned areas of responsibility and accountability during classroom projects and extracurricular activities	CRP1. Act as a responsible and contributing citizen and employee. CRP4. Communicate clearly and effectively and with reason.

Assessments	Differentiation	Resources	Notes
Formative, Summative, Benchmark, Alternative Teacher observations (F) Class discussions (F)	See Differentiation Sheet	-Scholastic News -Discovery Education -Brain Pop Jr. -Book Source -Next Gen Science	Suggested Activities: -Write, illustrate and present science safety rules on posters -"What is a Scientist"

Class participation (F) Classwork (F/S) Exit Slip (F/S) Response Sheets (F/S)		-Foss Web	poster

Grade 2 Science			
Unit # 2.2	Unit Name: Earth's Systems: Processes that Shape the Earth	Approximate # of days 15 (alternates with SS)	Time of year October/November
NJSLS/NGSS Standards: 2-ESS1-1 Use information from several sources to provide evidence that Earth events can occur quickly or slowly. [Clarification Statement: Examples of events and timescales could include volcanic explosions and earthquakes, which happen quickly and erosion of rocks, which occurs slowly.] [Assessment Boundary: Assessment does not include quantitative measurements of timescales.] 2-ESS2-1 Compare multiple solutions designed to slow or prevent wind or water from changing the shape of the land. [Clarification Statement: 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.] 2-ESS2-2 Develop a model to represent the shapes and kinds of land and bodies of water in an area. [Assessment Boundary: Assessment does not include quantitative scaling in models.] 2-ESS2-3 Obtain information to identify where water is found on Earth and that it can be solid or liquid. 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.			
Overview of Unit: Learners will use information from several sources to provide evidence that Earth events can occur quickly or slowly. Learners will compare multiple solutions designed to slow or prevent wind or water from changing the shape of the land. Learners will obtain information to identify where water is found on Earth and that it can be solid or liquid			
Essential Understandings: What evidence can we find to prove that Earth events can occur quickly or slowly? In what ways do humans slow or prevent wind or water from changing the shape of the land?			
Interdisciplinary Connections: ELA/Literacy – RI.2.1 RI.2.3 W.2.6 W.2.7	Technology Connections: LCN Technology Curriculum NJSLS Technology Standards	21st Century Skills: 9.1.4.A.1: Recognize a problem and brainstorm ways to solve the problem	Career Awareness OR Personal Finance: CRP1. Act as a responsible and contributing citizen and employee.

W.2.8 SL.2.2 Mathematics – MP.2. Social Studies SOC.6.1.4.B - Geography, People, and the Environment	Tech 8.1.2 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. BrainPop Jr. Discovery Learning YouTube	individually or collaboratively. 9.1.4.c.1 Practice collaborative skills in groups and explain how these skills assist in completing tasks in different settings (at home, in school and during play.) 9.1.4.F.2: Establish and follow performance goals to guide progress in assigned areas of responsibility and accountability during classroom projects and extracurricular activities	CRP4. Communicate clearly and effectively and with reason.
Assessments	Differentiation	Resources	Notes
Formative, Summative, Benchmark, Alternative Teacher observations (F) Class discussions (F) Class participation (F) Classwork (F/S) Exit Slip (F/S) Response Sheets (F/S)	See Differentiation Sheet	-Scholastic News -Discovery Education -Brain Pop Jr. -Book Source -Next Gen Science -Foss Web -Bill Nye (Earth's Systems Episodes: Erosion, Volcanoes, Earthquakes)	Suggested Activities: -Shell Investigation -Pumpkin Investigation -Tinfoil Boat/Float or Sink -Engineering Design - Water/Landform Mobiles

Grade 2 Science			
Unit # 2.3	Unit Name: Science Structures and Properties of Matter	Approximate # of days 15 (alternates with SS)	Time of year December-January
NGSS Standards:			

2-PS1-1. Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties. [Clarification Statement: Observations could include color, texture, hardness, and flexibility. Patterns could include the similar properties that different materials share.]
2-PS1-2. Analyze data obtained from testing different materials to determine which materials have the properties that are best suited for an intended purpose.* [Clarification Statement: Examples of properties could include, strength, flexibility, hardness, texture, and absorbency.] [Assessment Boundary: Assessment of quantitative measurements is limited to length.]
2-PS1-3. Make observations to construct an evidence-based account of how an object made of a small set of pieces can be disassembled and made into a new object. [Clarification Statement: Examples of pieces could include blocks, building bricks, or other assorted small objects.]

Overview of Unit: Learners will understand the structures and properties of matter. Learners will identify the properties of solids/liquids/gases. Learners will compare and contrast the structures and properties of matter.

Essential Understandings:
How can you describe and classify different kinds of materials by their observable properties?
In what ways can you analyze data obtained from testing different materials to determine which materials have the properties that are best suited for an intended purpose?

Interdisciplinary Connections:	Technology Connections:	21st Century Skills:	Career Awareness OR Personal Finance:
ELA/Literacy – RI.2.1 RI.2.3 RI.2.8 W.2.1 W.2.7 W.2.8 Mathematics – MP.2 MP.4 MP.5 MD.D.10	LCN Technology Curriculum NJSLS Technology Standards Tech 8.1.2 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.. BrainPop Jr. Discovery Learning YouTube	9.1.4.c.1 Practice collaborative skills in groups and explain how these skills assist in completing tasks in different settings (at home, in school and during play.) 9.1.4.F.2: Establish and follow performance goals to guide progress in assigned areas of responsibility and accountability during classroom projects and extracurricular activities	CRP1. Act as a responsible and contributing citizen and employee. CRP4. Communicate clearly and effectively and with reason.

Assessments	Differentiation	Resources	Notes
Formative, Summative, Benchmark, Alternative	See Differentiation Sheet	-Scholastic News -Discovery Education -Brain Pop Jr.	Suggested Activities: -Matter Booklet -Alka Seltzer

Teacher observations (F) Class discussions (F) Class participation (F) Classwork (F/S) Exit Slip (F/S) Response Sheets (F/S)		-Book Source -Next Gen Science -Foss Web -Bill Nye (Phases of Matter Episode)	Investigation -Engineering Design: Building Bridges

Grade 2 Science			
Unit # 2.4	Unit Name: Interdependent Relationships in Ecosystems	Approximate # of days 30 (alternates with SS)	Time of year March-April
NGSS Standards: 2-LS2-1. Plan and conduct an investigation to determine if plants need sunlight and water to grow. [Assessment Boundary: Assessment is limited to testing one variable at a time.] 2-LS2-2. Develop a simple model that mimics the function of an animal in dispersing seeds or pollinating plants.* 2-LS4-1. Make observations of plants and animals to compare the diversity of life in different habitats.			
Overview of Unit: Learners will explore the Interactions, Energy and Dynamics of an Ecosystem. Learners will explore the Unity and Diversity of Biological Evolution.			
Essential Understandings: Do plants need sunlight and water to grow? What is the diversity of life in different habitats? What impact do different environments play on the growth of seeds?			
Interdisciplinary Connections: ELA/Literacy W.2.7 W.2.8 SL.2.5 Mathematics MP.2 MP.4 MP.5 2.MD.D.10 Draw a picture graph	Technology Connections: LCN Technology Curriculum NJSLS Technology Standards Tech 8.1.2 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	21st Century Skills: 9.1.4.c.1 Practice collaborative skills in groups and explain how these skills assist in completing tasks in different settings (at home, in school and during play.) 9.1.4.F.2: Establish and follow performance goals to guide progress in	Career Awareness OR Personal Finance: CRP1. Act as a responsible and contributing citizen and employee. CRP4. Communicate clearly and effectively and with reason.

	knowledge. BrainPop Jr. Discovery Learning YouTube	assigned areas of responsibility and accountability during classroom projects and extracurricular activities	
Assessments	Differentiation	Resources	Notes
Formative, Summative, Benchmark, Alternative Teacher observations (F) Class discussions (F) Class participation (F) Classwork (F/S) Exit Slip (F/S) Response Sheets (F/S)	See Differentiation Sheet	-Scholastic News -Discovery Education -Brain Pop Jr. -Book Source -Next Gen Science -Foss Web	Suggested Activities: -Endangered Animal Research Book (Interdisciplinary Language Arts) -Life Cycle of a Plant -Parts of a Plant -Bees & Pollination -Planting Investigation -Engineering Design: model of pollination -Arbor/Earth Day

Grade 2 Science			
Unit # 2.5	Unit Name Engineering Design	Approximate # of days: 15 (alternates with SS)	Time of year Ongoing
NGSS Standards: 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 it function as needed to solve a given problem. K-2-ETS1-3. Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs. The performance expectations above were developed using			
Overview of Unit: Students will participate in and conduct various engineering design projects.			
Essential Understandings: What is an engineer? How do engineers evaluate designs or solutions? How do engineers predict, design or solve their problem?			

Interdisciplinary Connections:	Technology Connections:	21st Century Skills:	Career Awareness OR Personal Finance:
ELA/Literacy – RI.2.1 2.6 W.2.8 SL.2.5 MP.2. MP.4 MP.5 2.MD.D.10	LCN Technology Curriculum NJSLS Technology Standards Tech 8.1.2 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. BrainPop Jr. Discovery Learning YouTube	9.1.4.c.1 Practice collaborative skills in groups and explain how these skills assist in completing tasks in different settings (at home, in school and during play.) 9.1.4.F.2: Establish and follow performance goals to guide progress in assigned areas of responsibility and accountability during classroom projects and extracurricular activities	CRP1. Act as a responsible and contributing citizen and employee. CRP4. Communicate clearly and effectively and with reason.

Assessments	Differentiation	Resources	Notes
Formative, Summative, Benchmark, Alternative Teacher observations (F) Class discussions (F) Class participation (F) Classwork (F/S) Exit Slip (F/S) Response Sheets (F/S)	See Differentiation Sheet	-Scholastic News -Discovery Education -Brain Pop Jr. -Book Source -Next Gen Science -Foss Web	Oct - Tin Foil Boats - Sink/Float Nov-water/landform mobiles Dec - Candy Cottages Jan - Bridge Design Feb - Can Biographies Mar - Leprechaun Traps/Read Across America STEAM Apr - recycle/reuse projects (insects) Math Explorations

Grade 3 Science		
Unit # 1	Unit Name- Forces and Motion	Approximate # of days- 40 days

Science:
NJSLS/NGSS Standards
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.

Engineering Design:
• 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.

Math:
• MP.2 Reason abstractly and quantitatively.
• MP.5 Use appropriate tools strategically.
• 3.MD.A.2 Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l). Add, subtract, multiply, or divide to solve one-step word problems involving masses or volumes that are given in the same units, e.g., by using drawings (such as a beaker with a measurement scale) to represent the problem.

ELA:
• RL.CR.3.1. Ask and answer questions and make relevant connections to demonstrate understanding of a literary text, referring explicitly to textual evidence as the basis for the answers.
• L.VL.3.2. Determine or clarify the meaning of unknown and multiple-meaning academic and domain-specific words and phrases based on grade 3 reading and content, choosing flexibly from a range of strategies.
•RI.IT.3.3. Describe the relationship between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text, using language that pertains to time, sequence, and cause/effect.
•RI.MF.3.6. Use information gained from text features (e.g., illustrations, maps, photographs) and the words in a text to demonstrate understanding of the text (e.g., where, when, why, and how key events occur).
•SL.PE.3.1. Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher

led) with diverse partners on grade 3 topics and texts, building on others' ideas and expressing their own clearly.

Overview of Unit: Students will learn about various forces, such as magnetism, gravity, and spinning and rolling motions. In the first part of the unit, students will study magnetism through experiments, reading literature, and participating in discussions. In the second part of the unit, the students will explore various types of motion, such as spinning and rolling. After experimenting, they will design their own go-carts with bearings.

Essential Understandings:

Magnetism

- What is the difference between attract and repel?
- What is a magnetic field?
- How do magnets push and pull?
- What is alike and different about magnetism and gravity?

Forces

- How do gravity and friction affect forces?
- What are balanced and unbalanced forces?
- How can we explore spinning motions?
- How can we explore rolling motions?
- How can we build a cart with wheels that roll?

Interdisciplinary Connections:	Technology Connections:	21st Century Skills and Career Awareness:
Math: MP2 MP5 - Discuss mass as it relates to changes in motion 3.MD.A.2 ELA: -Answer comprehension questions related to text RL.CR.3.1. - Define words and phrases L.VL.3.2. - Cause/effect relationships RI.IT.3.3 - Use text features to demonstrate understanding RI.MF.3.6. -Class discussions SL.PE.3.1.	NJCSDT 8.2.5.ED.2: Collaborate with peers to collect information, brainstorm to solve a problem, and evaluate all possible solutions to provide the best results with supporting sketches or models. NJCSDT 8.2.5.ED.3: Follow step by step directions to assemble a product or solve a problem, using appropriate tools to accomplish the task	CRP.K-12.CRP1- Act as a responsible and contributing citizen and employee. CRP.K-12.CRP2- Apply appropriate academic and technical skills. CRP.K-12.CRP4- Communicate clearly and effectively and with reason CRP.K-12.CRP6- Demonstrate creativity and innovation.

Assessments *Formative, Summative, Benchmark, Alternative* Experiment recording sheets (F) Class discussions (F) Activity response sheets (F) Teacher observations (F) Classwork (F) Exit Slips (F/S) Motions and Matter Test (S)	Differentiation*:* See separate document	Resources: SMART Board documents FOSS kits Experiment response sheets

Grade 3 Science		
Unit # 2	Unit Name- Climate Around the World and Weather-Related Hazards	Approximate # of days- 30 days

Science:
• 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 climate change and/or a weather-related hazard.
Math:
• MP.2 Reason abstractly and quantitatively.
• MP.4 Model with mathematics.
• MP.5 Use appropriate tools strategically.
• 3.MD.B.3 Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step “how many more” and “how many less” problems using information presented in bar graphs. (3-ESS2-1)

ELA:
• RL.CR.3.1. Ask and answer questions and make relevant connections to demonstrate understanding of a literary text, referring explicitly to textual evidence as the basis for the answers.
• L.VL.3.2. Determine or clarify the meaning of unknown and multiple-meaning academic and domain-specific words and phrases based on grade 3 reading and content, choosing flexibly from a range of strategies.
•RI.IT.3.3. Describe the relationship between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text, using language that pertains to time, sequence, and cause/effect.
•RI.MF.3.6. Use information gained from text features (e.g., illustrations, maps, photographs) and the words in a text to demonstrate understanding of the text (e.g., where, when, why, and how key events occur).
•W.SE.3.6. Use discussion, books, or media resources to gather ideas, outline them, and prioritize the information to include while planning to write about a topic.

•SL.PE.3.1. Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher led) with diverse partners on grade 3 topics and texts, building on others' ideas and expressing their own clearly.

Social Studies:
SOC.6.1.4.B.3- Explain how and when it is important to use digital geographic tools, political maps, and globes to measure distances and to determine time zones and locations using latitude and longitude.
SOC.6.1.4.B.4- Describe how landforms, climate and weather, and availability of resources have impacted where and how people live and work in different regions of New Jersey and the United States.

Engineering Design:
• 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.

Overview of Unit: Students will learn about climates around the world. Students will learn about each climate by watching videos, reading articles, and answering questions. They will choose a country to research and discover the climate of that country. Finally, students will identify weather related hazards and work as a team to complete a STEM challenge to reduce the impact of one.

Essential Understandings:

Climate Around the World
- What is the difference between climate and weather?
- What factors affect climate?
- What is the location, temperature, precipitation, and biology of each climate zone?
- What is the climate of a chosen country?

Weather Related Hazards:
-What are different types of extreme weather?
- What are some inventions to alleviate the effects of extreme weather and how do they work?
- How can I design something that will help when extreme weather hits?

Interdisciplinary Connections:	Technology Connections:	21st Century Skills and Career Awareness:
ELA: -Answer comprehension questions related to text RL.CR.3.1. - Define words and phrases L.VL.3.2. - Cause/effect relationships RI.IT.3.3 - Use text features to demonstrate understanding RI.MF.3.6.	NJCSDT 8.2.5.ED.2: Collaborate with peers to collect information, brainstorm to solve a problem, and evaluate all possible solutions to provide the best results with supporting sketches or models.	CRP.K-12.CRP1- Act as a responsible and contributing citizen and employee.

-Research the climate of a chosen climate W.SE.3.6., TECH.8.1.5.A.1 -Class discussions SL.PE.3.1. Social Studies: -How relation the the equator (latitude/longitude) affects climate SOC.6.1.4.B.3, SOC.6.1.4.B.4	STE 3.D Students build knowledge by actively exploring real-world issues and problems, developing ideas and theories and pursuing answers and solutions NJCSDT 8.2.5.ITH.4: Describe a technology/tool that has made the way people live easier or has led to a new business or career.	CRP.K-12.CRP2- Apply appropriate academic and technical skills. CRP.K-12.CRP4- Communicate clearly and effectively and with reason CRP.K-12.CRP6- Demonstrate creativity and innovation. CRP.K-12.CRP7- Employ valid and reliable research strategies
Assessments *Formative, Summative, Benchmark, Alternative* Experiment recording sheets (F) Class discussions (F) Activity response sheets (F) Teacher observations (F) Classwork (F) Exit Slips (F/S) Motions and Matter Test (S)	Differentiation*:* See separate document	Resources: SMART Board docs Laptops Response sheets

Grade 3 Science		
Unit # 3	Unit Name- Heredity	Approximate # of days- 30 days
Science: • 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. [Clarification Statement: Examples of the environment affecting a trait could include norma ELA: • RL.CR.3.1. Ask and answer questions and make relevant connections to demonstrate understanding of a		

literary text, referring explicitly to textual evidence as the basis for the answers.
• L.VL.3.2. Determine or clarify the meaning of unknown and multiple-meaning academic and domain-specific words and phrases based on grade 3 reading and content, choosing flexibly from a range of strategies.
•RI.IT.3.3. Describe the relationship between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text, using language that pertains to time, sequence, and cause/effect.
•RI.MF.3.6. Use information gained from text features (e.g., illustrations, maps, photographs) and the words in a text to demonstrate understanding of the text (e.g., where, when, why, and how key events occur).
•SL.PE.3.1. Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher led) with diverse partners on grade 3 topics and texts, building on others' ideas and expressing their own clearly.

Math:

•MA.3.MD.B.3 Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step "how many more" and "how many less" problems using information presented in scaled bar graphs.

Overview of Unit: Students will learn about heredity. Students will learn the difference between inherited traits, learned behaviors and instincts. Students will reflect upon their own traits and complete a class inventory of traits. Students will apply their knowledge of traits to complete various activities, such as making a trait monster and completing trait sorts.

Essential Understandings:
- What are types of inherited traits?
- What is the difference between inherited traits, learned traits and instincts?
- What are some traits that I have inherited?
- What are inherited traits, learned traits and instincts in other plants and animals?

Interdisciplinary Connections:	Technology Connections:	21st Century Skills and Career Awareness:
ELA: -Answer comprehension questions related to text RL.CR.3.1 - Students will engage in collaborative discussions SL.PE.3.1. - Define words and phrases L.VL.3.2. - Cause/effect relationships RI.IT.3.3 - Use text features to demonstrate understanding RI.MF.3.6. Math: Create a graph using the traits that exist in our class MA.3.MD.B.3	NJCSDT 8.2.5.ED.3: Follow step by step directions to assemble a product or solve a problem, using appropriate tools to accomplish the task. ISTE 3.D Students build knowledge by actively exploring real-world issues and problems, developing ideas and theories and pursuing answers and solutions. NJCSDT 8.1.5.DA.1: Collect, organize, and display data in order to highlight relationships or support a claim.	CRP.K-12.CRP1- Act as a responsible and contributing citizen and employee. CRP.K-12.CRP2- Apply appropriate academic and technical skills. CRP.K-12.CRP4- Communicate clearly and effectively and with reason

		CRP.K-12.CRP6- Demonstrate creativity and innovation. CRP.K-12.CRP7- Employ valid and reliable research strategies
Assessments *Formative, Summative, Benchmark, Alternative* Experiment recording sheets (F) Class discussions (F) Activity response sheets (F) Teacher observations (F) Classwork (F) Exit Slips (F/S) Motions and Matter Test (S)	Differentiation*:* See separate document	Resources: SMART Board docs Laptops Response sheets

Grade 3 Science		
Unit # 4	Unit Name- Animals Survive in Groups, Life Cycles, Fossils	Approximate # of days- 30 days

Science:
• 3-LS2-1 Construct an argument that some animals form groups that help members survive.
• 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-LS4-1 Analyze and interpret data from fossils to provide evidence of the organisms and the environments in which they lived long ago.

Math:
• MP.2 Reason abstractly and quantitatively.

• MP.5 Use appropriate tools strategically.
•MA.3.MD.A Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects.

ELA:
• RL.CR.3.1. Ask and answer questions and make relevant connections to demonstrate understanding of a literary text, referring explicitly to textual evidence as the basis for the answers.
• L.VL.3.2. Determine or clarify the meaning of unknown and multiple-meaning academic and domain-specific words and phrases based on grade 3 reading and content, choosing flexibly from a range of strategies.
•RI.IT.3.3. Describe the relationship between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text, using language that pertains to time, sequence, and cause/effect.
•RI.MF.3.6. Use information gained from text features (e.g., illustrations, maps, photographs) and the words in a text to demonstrate understanding of the text (e.g., where, when, why, and how key events occur).
•W.SE.3.6. Use discussion, books, or media resources to gather ideas, outline them, and prioritize the information to include while planning to write about a topic.
•SL.PE.3.1. Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher led) with diverse partners on grade 3 topics and texts, building on others' ideas and expressing their own clearly.

<table>
<tr><td colspan="3">Overview of Unit: Students will learn how various animals live and survive in groups. They will read about different types of animals and how each animal plays a role in helping their group survive. They will read articles, answer questions, and participate in activities to model some of the animals' behaviors. Students will then move to learning about life cycles of various animals. Each student will be learning about the difference between living and nonliving things as well as the life cycles of a frog, butterfly and plant. Students will be working in groups and will be creating a presentation on the life cycle of a different assigned animal. Each group will have a different animal to work on where they will be required to research details, answer questions, and create the life cycle. Each group will present their findings to the class and explain what they learned about their assigned animal. Finally, students will learn what fossils are and why they are important. They will discover the sequence of events that leads to fossil formation.</td></tr>
<tr><td colspan="3">Essential Understandings:
- How do various animals live and survive in groups?
- What adaptations or behaviors do animals have to help them to survive?
- What is a life cycle?
- How is the life cycle of a butterfly different from the life cycle of a plant?
- What is a fossil and how do they form?</td></tr>
<tr><td>Interdisciplinary Connections:.

ELA:
- Define words and phrases L.VL.3.2.</td><td>Technology Connections:
NJCSDT 8.2.5.ED.3: Follow step by step directions to assemble a product or solve a problem, using appropriate tools to accomplish the task.</td><td>21st Century Skills and Career Awareness:
CRP.K-12.CRP1- Act as a responsible and</td></tr>
</table>

- Compare and contrast how various animals live and survive in groups RI.IT.3.3 - Use text features to demonstrate understanding of concepts RI.MF.3.6. - Answer questions based on the reading of a text LA.RL.3.1 -Research to build knowledge W.SE.3.6. -Class discussions SL.PE.3.1. Math: - Determine elapsed time when timing assembly lines MA.3.MD.A	ISTE 3.D Students build knowledge by actively exploring real-world issues and problems, developing ideas and theories and pursuing answers and solutions. NJCSDT 8.1.5.DA.1: Collect, organize, and display data in order to highlight relationships or support a claim.	contributing citizen and employee. CRP.K-12.CRP2- Apply appropriate academic and technical skills. CRP.K-12.CRP4- Communicate clearly and effectively and with reason CRP.K-12.CRP6- Demonstrate creativity and innovation. CRP.K-12.CRP7- Employ valid and reliable research strategies
Assessments *Formative, Summative, Benchmark, Alternative* Experiment recording sheets (F) Class discussions (F) Activity response sheets (F) Teacher observations (F) Classwork (F) Exit Slips (F/S) Motions and Matter Test (S)	Differentiation*:* See separate document	Resources: SMART Board docs Laptops Response sheets

Grade 4 Science			
Unit #1	Unit Name **Energy**	Approximate # of days 50	Time of year September-February
NJSLS/NGSS Standards 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.
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-ETS1-1. 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.

Overview of Unit:
Students will

- Develop a model of waves to describe patterns in terms of amplitude and wavelength and that waves can cause objects to move.
- Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen.
- Generate and compare multiple solutions that use patterns to transfer information.
- Use evidence to construct an explanation relating the speed of an object to the energy in that object.
- Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents.
- Ask questions and predict outcomes about the changes in energy that occur when objects collide.
- Apply scientific ideas to design, test, and refine a device that converts energy from one form to another.

Essential Understandings:

- What is needed to light a bulb?
- What is needed to make a complete pathway for current to flow in a circuit?
- How can you get two bulbs to light at the same time?
- How can you light two bulbs brightly with one D-cell?
- Which design is better for manufacturing a long string of lights- series or parallel?
- What do we observe that provides evidence that energy is present?
- How does the starting position affect the speed of a ball rolling down a slope?
- How are waves involved in energy transfer?
- How does light travel?

Science and Engineering Practices

- **Developing and Using Models**: Students will specify qualitative relationships. Students will ask questions that can be investigated and predict reasonable outcomes based on patterns such as cause and effect relationships. Students will build and revise simple models and use models to represent events and design solutions. Students will develop a model using an analogy, example, or abstract representation to describe a scientific principle. Students will develop a model to describe phenomena.

- **Asking Questions and Defining Problems:** Students will define a simple design problem that can be solved through the development of an object, tool, process, or system and includes several criteria for success and constraints on materials, time, or cost.
- **Planning and Carrying Out Investigations:** Students will plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence, using fair tests in which variables are controlled and the number of trials considered. Students will include variables that are controlled and provide evidence to support explanations or design solutions. Students will make observations to produce data to serve as the basis for evidence for an explanation of a phenomenon or test a design solution.
- **Constructing Explanations and Designing Solutions :** Students will use evidence in constructing explanations that specify variables that describe and predict phenomena and in designing multiple solutions to design problems and solutions. Students will generate and compare multiple solutions to a problem based on how well they meet the criteria and constraints of the design problem. Students will use evidence (e.g., measurements, observations, patterns) to construct an explanation. Students will apply scientific ideas to solve design problems.

Interdisciplinary Connections:	Technology Connections:	21st Century Skills:	Career Awareness OR Personal Finance:
Write a memo to a company incorporating knowledge of series and parallel circuits. LA.4.W.4.1.A Reading activities LA.RI.4.3 Measuring distance 4.MD.l	NJSLS 8.1.5.A.2 Format a document using a word processing application to enhance text and include graphics, symbols and/ or pictures. LCN1.7 Proofread and edit writing using appropriate resources (dictionary, spell-checker, grammar resources). NJSLS 8.1.5.A.3 Use a graphic organizer to organize information about problem or issue LCN1.20 Create a series of slides and organize them to present research or convey an idea ISTE 3.A Students plan and employ effective research strategies to locate information and other resources for their	CRP1. Act as a responsible and contributing citizen and employee. CRP2. Apply appropriate academic and technical skills. CRP4. Communicate clearly and effectively and with reason. CRP6. Demonstrate creativity and innovation. CRP7. Employ valid and reliable research strategies. CRP8. Utilize critical thinking to make sense of problems and persevere in solving them. CRP11. Use technology to enhance productivity. CRP12. Work productively in teams while using cultural global competence.	9.1.4.B.3 Explain what a budget is and why it is important. **Incorporate budgeting of supplies into STEM projects.

	intellectual or creative pursuits. LCN.2.5 Work collaboratively online with other students under teacher supervision. ****Technology Projects** **-Energy Skate Park**	****Incorporate 21st Century Skills into lab group mini lessons.**	
Assessments	Differentiation	Resources	Notes
Formative, Summative, Benchmark, Alternative Students can demonstrate competency with tasks such as: ● Designing, building and refining models ● Generating, discussing and analyzing data ● Constructing spoken and written scientific explanations ● Writing arguments to support scientific evidence ● Reflecting on their own understanding These will be measured through: ● Notebook entries ● Response sheets ● Focus question answers ● Science and engineering	● Modified tests and study guides ● Graphic organizers ● Small group instruction ● Sentence starters ● Text on different reading levels ● Highlighting ● Challenge questions ● Math of the Month and Challenge Activities in classroom	● Mystery Science ● FOSS Kits ● FOSSweb.com ● FOSS Textbook ● ReadWorks ● Science Friday ● Notebook Docs ● Energy Skate Park https://phet.colorado.edu/sims/html/energy-skate-park-basics/latest/energy-skate-park-basics_en.html	STEM Projects ● Balloon Powered Race Car ● Zipline Challenge ● Roller Coaster Design ● Bobsled Challenge

practices checklist • Investigation Tests • Project rubrics			

Grade 4 Science			
Unit # 2	Unit Name **Rocks and Landforms**	Approximate # of days 40	Time of year February-June

NJSLS/NGSS Standards

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.

5-ESS3-1. Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources, environment, and address climate change issues.

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.

Overview of Unit:

Students will

- Identify evidence from patterns in rock formations and fossils in rock layers to support an explanation for changes in a landscape over time.
- Make observations and measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation.
- Analyze and interpret data from maps to describe patterns of Earth's features.
- Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment.
- Generate and compare multiple solutions to reduce the impact of natural Earth processes on humans.

Essential Understandings:

- What causes big rocks to break down into small rocks?
- How are rocks affected by acid rain?
- How do weathered rock pieces move from one place to another?
- How does slope affect erosion and deposition?

- How do floods affect erosion and deposition?
- How do fossils get in rocks and what can they tell us about the past?
- How can we represent the different elevations of landforms?
- How can we draw the profile of a mountain from a topographic map?
- What events can change Earth's surface quickly?
- What are natural resources?
- How can individual communities use science ideas to protect the Earth's resources, environment, and address climate change issues?

Science and Engineering Practice

- **Analyzing and Interpreting Data:** Students will use quantitative approaches to collecting data and conducting multiple trials of qualitative observations. When possible and feasible, digital tools should be used. Students will analyze and interpret data to make sense of phenomena using logical reasoning.
- **Asking Questions and Defining Problems:** Students will define a simple design problem that can be solved through the development of an object, tool, process, or system and includes several criteria for success and constraints on materials, time, or cost. Students will specify qualitative relationships.
- **Planning and Carrying Out Investigations:** Students will plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence, using fair tests in which variables are controlled and the number of trials considered. Students will include variables that are controlled and provide evidence to support explanations or design solutions. Students will make observations and/or measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon.
- **Constructing Explanations and Designing Solutions :** Students will use evidence in constructing explanations that specify variables that describe and predict phenomena and in designing multiple solutions to design problems. Students will generate and compare multiple solutions to a problem based on how well they meet the criteria and constraints of the design problem. Students will identify the evidence that supports particular points in an explanation.
- **Obtaining, Evaluating, and Communicating Information:** Students will evaluate the merit and accuracy of ideas and methods. Students will obtain and combine information from books and other reliable media to explain phenomena solutions to a design problem.

Interdisciplinary Connections:	Technology Connections:	21st Century Skills:	Career Awareness OR Personal Finance:
Measuring distance 4.MD.l Reading activities LA.RI.4.3 Energyville Writing Project LA.4.W.4.1.A	NJSLS 8.1.5.A.2 Format a document using a word processing application to enhance text and include graphics, symbols and/ or pictures. LCN1.7 Proofread and edit writing using appropriate resources	CRP1. Act as a responsible and contributing citizen and employee. CRP2. Apply appropriate academic and technical skills.	9.1.4.B.3 Explain what a budget is and why it is important. ****Incorporate budgeting of supplies into STEM projects.**

	(dictionary, spell-checker, grammar resources). NJSLS 8.1.5.A.3 Use a graphic organizer to organize information about problem or issue LCN1.20 Create a series of slides and organize them to present research or convey an idea ISTE 3.A Students plan and employ effective research strategies to locate information and other resources for their intellectual or creative pursuits. LCN.2.5 Work collaboratively online with other students under teacher supervision. **Technology Projects - Energyville	CRP4. Communicate clearly and effectively and with reason. CRP6. Demonstrate creativity and innovation. CRP7. Employ valid and reliable research strategies. CRP8. Utilize critical thinking to make sense of problems and persevere in solving them. CRP11. Use technology to enhance productivity. CRP12. Work productively in teams while using cultural global competence. **Incorporate 21st Century Skills into lab group mini lessons.	
Assessments	Differentiation	Resources	Notes
Formative, Summative, Benchmark, Alternative Students can demonstrate competency with tasks such as: • Designing, building and refining models • Generating, discussing and analyzing data • Constructing spoken and written scientific	• Modified tests and study guides • Graphic organizers • Small group instruction • Sentence starters • Text on different reading levels • Highlighting • Challenge questions • Math of the Month and Challenge Activities in	• Mystery Science • FOSS Kits • FOSSweb.com • FOSS Textbook • ReadWorks • Science Friday • Notebook Docs • Mapping: http://teachers.egfi-k12.org/road-warriors/ • Jello Earthquake Video: https://www.teachengineering.org/activities/view/cub_natdis_lesson03_acti	STEM Projects • Stream Table Design Investigation • Levee Project • Floodplain Modeling • Storm Surge Barrier • Save Our City • Oil Spill Cleanup • Earthquake Resistant Buildings

explanations • Writing arguments to support scientific evidence • Reflecting on their own understanding These will be measured through: • Notebook entries • Response sheets • Focus question answers • Science and engineering practices checklist • Investigation Tests • Project rubrics	classroom	vity1 • Oil Spill Lab: https://www.calacademy.org/educators/lesson-plans/slippery-shores-oil-spill-clean-up • Save Our City: https://www.teachengineering.org/activities/view/cub_natdis_lesson01_activity1 • Levees: https://www.teachengineering.org/activities/view/cub_weather_lesson05_activity1 • Floodplain Modeling: https://www.teachengineering.org/activities/view/cub_natdis_lesson07_activity1	

Grade 5 Science			
Unit # 1	Unit Name **Living Systems**	Approximate # of days 50	Time of year September- February
NJSLS/NGSS Standards 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-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 **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 brain, and respond to the information in different ways. **MS-LS1-3.** Use arguments supported by evidence for how the body is a system of interacting subsystems composed of groups of cells. **MS-LS1-4.** 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.			

MS-LS1-8. Gather and synthesize information that sensory receptors respond to stimuli by sending messages to the brain for immediate behavior or storage as memories.
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.

Overview of Unit:
Students will

- Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.
- Use a model to describe that animals receive different types of information through their senses, process the information in their brain, and respond to the information in a different way.
- Use models to describe that energy in animals' food was once energy from the sun.
- Justify that animals' food is used for body repair, growth, motion, & to maintain body warmth.
- Construct a model that represents the interdependent relationships in an ecosystem.
- Create a representation of matter and energy transfer in an ecosystem.
- Develop a model to explain how senses change energy coming from the environment (light, sound waves, chemicals in gases 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
- Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells
- 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.

Essential Understandings:

- Is planet Earth a system?
- How does energy flow through a food web?
- What organisms are both predator and prey in the kelp forest ecosystem?
- What happens when compost worms interact with organic litter?
- What does yeast need to break its dormancy?
- How do plants get the food they need?
- How do animals get the nutrients they need?
- How are nutrients transported to cells in a plant?
- How do humans transport nutrients to their cells?
- Why do people breathe?
- In dodgeball, how are you able to avoid being hit?
- What behaviors are instinctive and what behaviors are learned?
- How do animals use their senses?
- What adaptations help animals to survive?
- What adaptations do flowering plants have to accomplish pollination?

Science and Engineering Practices

- **Developing and Using Models**: Students will build and revise simple models and use models to represent events and design solutions. Students will use a model to test interactions concerning the functioning of a natural system. Students will develop a model to describe phenomena.
- **Engaging in Argument from Evidence:** Students will critique the scientific explanations or solutions proposed by peers by citing relevant evidence about the natural and designed worlds. Students will construct an argument with evidence, data, and/or a model. Students will support an argument with evidence, data, or a model.
- **Asking Questions and Defining Problems:** Students will define a simple design problem that can be solved through the development of an object, tool, process, or system and includes several criteria for success and constraints on materials, time, or cost.
- **Planning and Carrying Out Investigations:** Students will plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence, using fair tests in which variables are controlled and the number of trials considered. Students will include variables that are controlled and provide evidence to support explanations or design solutions.
- **Constructing Explanations and Designing Solutions :** Students will use evidence in constructing explanations that specify variables that describe and predict phenomena and in designing multiple solutions to design problems. Students will generate and compare multiple solutions to a problem based on how well they meet the criteria and constraints of the design problem.

Interdisciplinary Connections:	Technology Connections:	21st Century Skills:	Career Awareness OR Personal Finance:
Reading Activities LA.RI.5.1 LA.RI.5.3 LA.RI.5.10 LA.RI.5.4 LA.W.5.4 Research Projects LA.SL.5.4 LA.SL.5.5 Taking measurements MA.5.5.MD.B Finding averages MA.5.5.NBT.B Collecting data MA.5.5.MD.B	LCN.1.6 Copy and paste text and images within a document, as well as from one document to another LCN.1.7 Proofread and edit writing using appropriate resources (dictionary, spell-checker, grammar resources). NJSLS 8.1.5.A.3 Use a graphic organizer to organize information about a problem or issue. LCN.1.20 Create a series of slides and organize them to present research or convey an idea. ISTE 3.A Students plan and employ effective	CRP1. Act as a responsible and contributing citizen and employee. CRP2. Apply appropriate academic and technical skills. CRP4. Communicate clearly and effectively and with reason. CRP6. Demonstrate creativity and innovation. CRP7. Employ valid and reliable research strategies. CRP8. Utilize critical thinking to make sense of problems and persevere in solving them. CRP11. Use technology to enhance productivity.	N/A

	research strategies to locate information and other resources for their intellectual or creative pursuits. LCN.2.5 Work collaboratively online with other students under teacher supervision. ****Technology Projects:** **-Google classroom activities** **-Research projects**	CRP12. Work productively in teams while using cultural global competence. ****Incorporate 21st Century Skills into lab group mini lessons.**	
Assessments	Differentiation	Resources	Notes
Formative, Summative, Benchmark, Alternative Students can demonstrate competency with tasks such as: ● Designing, building and refining models ● Generating, discussing and analyzing data ● Constructing spoken and written scientific explanations ● Writing arguments to support scientific evidence ● Reflecting on their own understanding These will be measured through: ● Notebook entries	● Modified tests and study guides ● Graphic organizers ● Small group instruction ● Sentence starters ● Text on different reading levels ● Highlighting ● Challenge questions ● Math of the Month and Challenge Activities in classroom	● Mystery Science ● FOSS Kits ● FOSSweb.com ● FOSS Textbook ● ReadWorks ● Science Friday ● Notebook Docs	STEM Projects ● Create your own insect ● Spider web lab ● Circulatory system model Projects/Labs ● Bird beak lab ● Peppered moth lab ● Red Worm habitat

• Response sheets • Focus question answers • Science and engineering practices checklist • Investigation Tests • Project rubrics			

Grade 5 Science			
Unit # 2	Unit Name **Mixtures and Solutions**	Approximate # of days 40	Time of year February-June

NJSLS/NGSS Standards

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.

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.

Overview of Unit:

Students will

- Develop a model to describe that matter is made of particles too small to be seen.
- 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.
- Make observations and measurements to identify materials based on their properties.
- Conduct an investigation to determine whether the mixing of two or more substances results in new substances.

Essential Understandings:

- How can a mixture be separated?
- Where does the solid material go when a solution is made?
- How can you separate a mixture of dry materials?
- What is the process to develop a model of a black box?
- How does a drought-stopper system work?
- What is the difference between dissolving and melting?

- Are all solutions made with powder and water the same?
- How can you determine which salt solution is more concentrated?
- How can you determine the relative concentrations of three mystery solutions?
- What is the relationship between salt-solution concentration and density?
- Is there a limit to the amount of salt that will dissolve in 50 mL of water?
- Does it always take the same amount of solid materials to saturate 50 mL of water?
- What is the identity of the mystery substance?
- What is a design to remove salt from ocean water?
- What is the effect of mixing two substances with water?
- How can we identify the products from the baking soda and calcium chloride reaction?
- What happens when you mix substances with water in a bag?

Science and Engineering Practices

- **Developing and Using Models**: Students will build and revise simple models and use models to represent events and design solutions. Students will develop a model to describe phenomena.
- **Use Mathematics and Computational Thinking:** Students will extend quantitative measurements to a variety of physical properties and use computation and mathematics to analyze data and compare alternative design solutions. Students will measure and graph quantities such as weight to address scientific and engineering questions and problems.
- **Asking Questions and Defining Problems:** Students will define a simple design problem that can be solved through the development of an object, tool, process, or system and includes several criteria for success and constraints on materials, time, or cost.
- **Planning and Carrying Out Investigations:** Students will plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence, using fair tests in which variables are controlled and the number of trials considered. Students will include variables that are controlled and provide evidence to support explanations or design solutions. Students will make observations and measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon.
- **Constructing Explanations and Designing Solutions :** Students will use evidence in constructing explanations that specify variables that describe and predict phenomena and in designing multiple solutions to design problems. Students will generate and compare multiple solutions to a problem based on how well they meet the criteria and constraints of the design problem.

Interdisciplinary Connections:	Technology Connections:	21st Century Skills:	Career Awareness OR Personal Finance:
Reading Activities LA.RI.5.1 LA.RI.5.3 LA.RI.5.10 LA.RI.5.4 LA.W.5.4 Research Projects LA.SL.5.4 LA.SL.5.5	LCN.1.6 Copy and paste text and images within a document, as well as from one document to another LCN.1.7 Proofread and edit writing using appropriate resources	CRP1. Act as a responsible and contributing citizen and employee. CRP2. Apply appropriate academic and technical skills.	N/A

Taking measurements MA.5.5.MD.B Finding averages and ratios MA.5.5.NBT.B Collecting data MA.5.5.MD.B	(dictionary, spell-checker, grammar resources). NJSLS 8.1.5.A.3 Use a graphic organizer to organize information about a problem or issue. LCN.1.20 Create a series of slides and organize them to present research or convey an idea. ISTE 3.A Students plan and employ effective research strategies to locate information and other resources for their intellectual or creative pursuits. LCN.2.5 Work collaboratively online with other students under teacher supervision. **Technology Projects -Google classroom study activities	CRP4. Communicate clearly and effectively and with reason. CRP6. Demonstrate creativity and innovation. CRP7. Employ valid and reliable research strategies. CRP8. Utilize critical thinking to make sense of problems and persevere in solving them. CRP11. Use technology to enhance productivity. CRP12. Work productively in teams while using cultural global competence. **Incorporate 21st Century Skills into lab group mini lessons.	
Assessments	Differentiation	Resources	Notes
Formative, Summative, Benchmark, Alternative Students can demonstrate competency with tasks such as: ● Designing, building and refining models ● Generating, discussing and analyzing data ● Constructing spoken and written scientific	● Modified tests and study guides ● Graphic organizers ● Small group instruction ● Sentence starters ● Text on different reading levels ● Highlighting ● Challenge questions ● Math of the Month and Challenge	● Mystery Science ● FOSS Kits ● FOSSweb.com ● FOSS Textbook ● ReadWorks ● Science Friday ● Notebook Docs ● Classroom Resources from AACT	STEM Projects ● Black Box model ● Drought-Stopper system ● Remove Salt from Ocean Water design project ● Salting Roads in the Winter ● Environmental Problems

explanations • Writing arguments to support scientific evidence • Reflecting on their own understanding These will be measured through: • Notebook entries • Response sheets • Focus question answers • Science and engineering practices checklist • Investigation Tests • Project rubrics	Activities in classroom		

Grade 6			
Unit # 1	Unit Name **Space**	Approximate # of days 35	Time of year September-December
NJSLS/NGSS Standards MS-ESS1-1. Develop and use a model of the Earth-sun-moon system to describe the cyclic patterns of lunar phases, eclipses of the sun and moon, and seasons. MS-ESS1-2. Develop and use a model to describe the role of gravity in the motions within galaxies and the solar system. MS-ESS1-3. Analyze and interpret data to determine scale properties of objects in the solar system. **5-PS2-1.** Support an argument that the gravitational force exerted by Earth on objects is directed down. **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. MS-ETS1-1. Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions. MS-ETS1-2. Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.			

MS-ETS1-3. Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.
MS-ETS1-4. Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.
NJSLSA.R1. Read closely to determine what the text says explicitly and to make logical inferences and relevant connections from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.
NJSLSA.R7. Integrate and evaluate content presented in diverse media and formats, including visually and quantitatively, as well as in words.
NJSLSA.R10. Read and comprehend complex literary and informational texts independently and proficiently with scaffolding as needed.
NJSLSA.W7. Conduct short as well as more sustained research projects, utilizing an inquiry-based research process, based on focused questions, demonstrating understanding of the subject under investigation.
NJSLSA.W8. Gather relevant information from multiple print and digital sources, assess the credibility and accuracy of each source, and integrate the information while avoiding plagiarism.
NJSLSA.W9. Draw evidence from literary or informational texts to support analysis, reflection, and research.

Overview of Unit:
Students will

- Support an argument that the gravitational force exerted by Earth on objects is directed down towards the planet's center.
- Support an argument that differences in the apparent brightness of the sun compared to other stars is due to their relative distance from Earth.
- 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.
- 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.

Essential Understandings:

- How and why does your shadow change during the day?
- What can be learned by studying the length and direction of shadows?
- What causes day and night?
- What causes seasons?
- How would you describe the size of and distance between Earth, the Moon, and the Sun?
- How does the shape of the Moon change over 4 weeks and what causes this?
- What causes solar and lunar eclipses to occur?
- What causes tides on Earth?
- How do the parts of the solar system interact?
- How do we study the solar system?

- What determines the gravitational pull of an object?
- Why do stars appear to move across the night sky?

Science and Engineering Practices

- **Asking Questions and Defining Problems:** Students will specify relationships between variables and clarify arguments and models. Students will define a design problem that can be solved through the development of an object, tool, process, or system and includes multiple criteria and constraints, including scientific knowledge that may limit possible solutions.
- **Developing and Using Models**: Students will build and revise simple models and use models to represent events and design solutions. Students will develop a model using an example to describe a scientific principle or phenomena. Students will develop, use, and revise models to describe, test, and predict more abstract phenomena and design systems. Students will develop a model to generate data to test ideas about designed systems, including those representing inputs and outputs.
- **Using Mathematics and Computational Thinking:** Students will extend quantitative measurements to a variety of physical properties and use computation and mathematics to analyze data and compare alternative design solutions. Students will describe and graph quantities such as area and volume to address scientific questions.
- **Engage in Argument from Evidence:** Students will critique the scientific explanations or solutions proposed by peers by citing relevant evidence about the natural and designed worlds. Students will support an argument with evidence, data, or a model. Students will construct a convincing argument that supports or refutes claims for either explanations or solutions about the natural and designed world. Students will evaluate completing design solutions based on jointly developed and agreed-upon design criteria.
- **Analyzing and Interpreting Data:** Students will use quantitative analysis to investigate, distinguish between correlation and causation, and basic statistical techniques of data and error analysis. Students will analyze and interpret data to determine similarities and differences in findings. Students will represent data in graphical displays to reveal patterns that indicate relationships.
- **Constructing Explanations and Designing Solutions:** Students will construct explanations and design solutions supported by multiple sources of evidence consistent with scientific ideas, principles, and theories. Students will construct a scientific explanation based on valid and reliable evidence obtained from sources (including the students' own experiments) and the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future.

Interdisciplinary Connections:	Technology Connections:	21st Century Skills:	Career Awareness OR Personal Finance:
Reading Activities LA.RST.6-8.1 LA.RST.6-8.2 LA.WHST.6-8.1.B Eclipse Jigsaw LA.RI.6.1 LA.RI.6.2	LCN 1.24 Create a multimedia presentation using various media as appropriate (audio, video, animations, etc.) LCN.1.25 Use a variety of technology tools	CRP1. Act as a responsible and contributing citizen and employee.	****Aerospace Careers** http://www.scholastic.com/talentfortomorrow/?eml=SNP/e/20190205///AIA///////&ET_CID=20190205_SNP_AIA_TEA_ACQ_24994&ET_RI

Claims, Evidence, Reasoning LA.W.6.1.A LA.W.6.1.B Constellation Myth LA.WHST.6-8.5 LA.W.6.3 Graphing MA.6.6.2 Ratios MA.6.6.1 Conversions MA.6.6.2	(dictionary, thesaurus, grammar-checker, calculator) to maximize the accuracy of work. NJSLS 8.1.8.E.1 Effectively use a variety of search tools and filters in professional public databases to find information to solve a real world problem. **Technology Projects -Eclipse Interactive -Moon Match game -James Webb vs. Hubble Telescope project -Google Classroom activities	CRP2. Apply appropriate academic and technical skills. CRP4. Communicate clearly and effectively and with reason. CRP6. Demonstrate creativity and innovation. CRP7. Employ valid and reliable research strategies. CRP8. Utilize critical thinking to make sense of problems and persevere in solving them. CRP11. Use technology to enhance productivity. CRP12. Work productively in teams while using cultural global competence. **Incorporate 21st Century Skills into lab group mini lessons.	D=1799351635
Assessments	Differentiation	Resources	Notes
Formative, Summative, Benchmark, Alternative Students can demonstrate competency with tasks such as: • Designing, building and refining models • Generating, discussing and analyzing data • Constructing spoken and written scientific explanations • Writing	• Modified tests and study guides • Graphic organizers • Small group instruction • Sentence starters • Text on different reading levels • Highlighting • Challenge questions • Math of the Month and Challenge Activities in classroom	• Mystery Science • FOSS Kits • FOSSweb.com • FOSS Textbook • ReadWorks • Science Friday • Notebook Docs • James Webb Facts: http://www.jwst.nasa.gov/facts.html • James Webb vs. Hubble: http://www.jwst.nasa.gov/comparison_about.html • Comparing Mirror Size: http://amazingspace.org/resources/exp	STEM Projects • Build a Moon Lander • Build a Pasta Rover https://www.jpl.nasa.gov/edu/teach/activity/planetary-pasta-rover/ • Martian Rover Arm • Design an Astronaut Glove Math Project • Explore tide data https://tidesandcurrents.noaa.gov/

arguments to support scientific evidence • Reflecting on their own understanding These will be measured through: • Notebook entries • Response sheets • Focus question answers • Science and engineering practices checklist • Investigation Tests • Project rubrics		lorations/groundup/lesson/basics/g51/ • James Webb NASA: http://www.jwst.nasa.gov/ • Hubble NASA: http://hubblesite.org/ • Space Telescope Science Institute (Click Current Missions): http://www.stsci.edu/portal/ • Moon Match Https://matchthememory.com/BESTclass • Eclipse Interactive Link http://highered.mheducation.com/olcweb/cgi/pluginpop.cgi?it=swf::640::480::/sites/dl/free/0072991811x/220730/eclipse_interactive.swf::Eclipse%20Interactive	

Grade 6			
Unit # 2	Unit Name **Cells and Genetics**	Approximate # of days 30	Time of year January-March

NJSLS/NGSS Standards

MS-LS1-1. Conduct an investigation to provide evidence that living things are made of cells; either one cell or many different numbers and types of cells.

MS-LS1-2. Develop and use a model to describe the function of a cell as a whole and ways parts of cells contribute to the function.

MS-LS1-3. Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells.

MS-LS1-4. 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.

MS-LS1-5. Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms.

MS-LS4-5. Gather and synthesize information about the technologies that have changed the way humans influence the inheritance of desired traits in organisms.
MS-LS3-1. Develop and use a model to describe why structural changes to genes (mutations) located on chromosomes may affect proteins and may result in harmful, beneficial, or neutral effects to the structure and function of the organism.
MS-LS3-2. 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.
MS-ETS1-1. Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.
MS-ETS1-2. Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.
MS-ETS1-3. Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.
MS-ETS1-4. Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.
NJSLSA.R1. Read closely to determine what the text says explicitly and to make logical inferences and relevant connections from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.
NJSLSA.R7. Integrate and evaluate content presented in diverse media and formats, including visually and quantitatively, as well as in words.
NJSLSA.R10. Read and comprehend complex literary and informational texts independently and proficiently with scaffolding as needed.
NJSLSA.W7. Conduct short as well as more sustained research projects, utilizing an inquiry-based research process, based on focused questions, demonstrating understanding of the subject under investigation.
NJSLSA.W8. Gather relevant information from multiple print and digital sources, assess the credibility and accuracy of each source, and integrate the information while avoiding plagiarism.
NJSLSA.W9. Draw evidence from literary or informational texts to support analysis, reflection, and research.

Overview of Unit:
Students will

- 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 argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells
- 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.

Essential Understandings:

- How do you know if something is living?
- What are the parts of a plant cell and animal cell?
- How are single-celled organisms different from multicellular organisms?
- What is the difference between asexual and sexual reproduction?
- How does DNA copy itself?
- How do we determine traits?
- How can you improve the chances of having offspring with a particular trait?
- How do the structural adaptations of seeds help them survive?
- How do environmental factors affect the germination and early growth of different food crops?
- What is the purpose of a flower?

Science and Engineering Practices

- **Asking Questions and Defining Problems:** Students will specify relationships between variables and clarify arguments and models. Students will define a design problem that can be solved through the development of an object, tool, process, or system and includes multiple criteria and constraints, including scientific knowledge that may limit possible solutions.
- **Developing and Using Models:** Students will develop, use, and revise models to describe, test, and predict more abstract phenomena and design systems. Students will develop a model to generate data to test ideas about designed systems, including those representing inputs and outputs. Students will develop and use a model to describe phenomena. Students will develop a model to describe unobservable mechanisms.
- **Planning and Carrying Out Investigations:** Students will use multiple variables and provide evidence to support explanations or solutions. Students will conduct an investigation to produce data to serve as the basis for evidence that meet the goals of an investigation.
- **Constructing Explanations and Designing Solutions:** Students will construct explanations and design solutions supported by multiple sources of evidence consistent with scientific knowledge, principles, and theories. Students will construct a scientific explanation based on valid and reliable evidence obtained from sources (including the students' own experiments) and the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future. Students will apply scientific ideas to construct an explanation for real-world phenomena, examples, or events. Students will construct an explanation that includes qualitative or quantitative relationships between variables that describe phenomena.
- **Analyzing and Interpreting Data:** Students will use quantitative analysis to investigate, distinguish between correlation and causation, and basic statistical techniques of data and error analysis. Students will analyze and interpret data to determine similarities and differences in findings. Students will analyze displays of data to identify linear and nonlinear relationships.
- **Using Mathematics and Computational Thinking:** Students will identify patterns in large data sets and use mathematical concepts to support explanations and arguments. Students will use mathematical representations to support scientific conclusions and design solutions.
- **Engaging in Argument from Evidence:** Students will construct a convincing argument that supports or refutes claims for either explanations or solutions about the natural and designed world.

Students will evaluate completing design solutions based on jointly developed and agreed-upon design criteria. Students will use an oral and written argument supported by evidence to support or refute an explanation or a model for a phenomenon. Students will use an oral and written argument supported by empirical evidence and scientific reasoning to support or refute an explanation or a model for a phenomenon or a solution to a problem.

- **Obtaining, Evaluating, and Communicating Information:** Students will evaluate the merit and validity of ideas and methods. Students will gather, read, and synthesize information from multiple appropriate sources and assess the credibility, accuracy, and possible bias of each publication and methods used, and describe how they are supported or not supported by evidence.

Interdisciplinary Connections:	Technology Connections:	21st Century Skills:	Career Awareness OR Personal Finance:
Reading Activities LA.RST.6-8.1 LA.RST.6-8.2 LA.WHST.6-8.1.B Breed a Better Bulldog LA.RST.6-8.1 LA.RST.6-8.2 LA.WHST.6-8.1.B Claims, Evidence, Reasoning LA.W.6.1.A LA.W.6.1.B Punnett Square Probability MA.6.6.1	LCN 1.24 Create a multimedia presentation using various media as appropriate (audio, video, animations, etc.) LCN.1.25 Use a variety of technology tools (dictionary, thesaurus, grammar-checker, calculator) to maximize the accuracy of work. NJSLS 8.1.8.E.1 Effectively use a variety of search tools and filters in professional public databases to find information to solve a real world problem. ****Technology Projects** **-Cell World Project** **-Google classroom activities**	CRP1. Act as a responsible and contributing citizen and employee. CRP2. Apply appropriate academic and technical skills. CRP4. Communicate clearly and effectively and with reason. CRP6. Demonstrate creativity and innovation. CRP7. Employ valid and reliable research strategies. CRP8. Utilize critical thinking to make sense of problems and persevere in solving them. CRP11. Use technology to enhance productivity. CRP12. Work productively in teams while using cultural global competence. ****Incorporate 21st Century Skills into lab group mini lessons.**	N/A
Assessments	Differentiation	Resources	Notes

Formative, Summative, Benchmark, Alternative Students can demonstrate competency with tasks such as: • Designing, building and refining models • Generating, discussing and analyzing data • Constructing spoken and written scientific explanations • Writing arguments to support scientific evidence • Reflecting on their own understanding These will be measured through: • Notebook entries • Response sheets • Focus question answers • Science and engineering practices checklist • Investigation Tests • Project rubrics	• Modified tests and study guides • Graphic organizers • Small group instruction • Sentence starters • Text on different reading levels • Highlighting • Challenge questions • Math of the Month and Challenge Activities in classroom	• FOSS Kits • FOSSweb.com • FOSS Textbook • ReadWorks • Science Friday • Notebook Docs • DNA Extraction Lab • Genes and Mutations Lab • Healthier Bulldog https://medium.com/science-friday-spoonfuls/is-it-possible-to-breed-a-healthier-bulldog-8780e4884032	STEM Projects • Cell World Project • Lima Bean Dissection • Flower Dissection

Grade 6			
Unit #3	Unit Name **Weather and Water**	Approximate # of days 30	Time of year April-June
NJSLS/NGSS Standards			

MS-ESS2-5. Collect data to provide evidence for how the motions and complex interactions of air masses results in changes in weather conditions.
MS-ESS2-6. Develop and use a model to describe how unequal heating and rotation of the Earth cause patterns of atmospheric and oceanic circulation that determine regional climates.
5-ESS2-2. Describe and graph the amounts of saltwater and fresh water in various reservoirs to provide evidence about the distribution of water on Earth.
5-ESS2-1. Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact.
MS-ETS1-1. Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.
MS-ETS1-2. Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.
MS-ETS1-3. Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.
MS-ETS1-4. Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.
NJSLSA.R1. Read closely to determine what the text says explicitly and to make logical inferences and relevant connections from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.
NJSLSA.R7. Integrate and evaluate content presented in diverse media and formats, including visually and quantitatively, as well as in words.
NJSLSA.R10. Read and comprehend complex literary and informational texts independently and proficiently with scaffolding as needed.
NJSLSA.W7. Conduct short as well as more sustained research projects, utilizing an inquiry-based research process, based on focused questions, demonstrating understanding of the subject under investigation.
NJSLSA.W8. Gather relevant information from multiple print and digital sources, assess the credibility and accuracy of each source, and integrate the information while avoiding plagiarism.
NJSLSA.W9. Draw evidence from literary or informational texts to support analysis, reflection, and research.

Overview of Unit:
Students will

- Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact.
- Describe and graph the amounts of saltwater and freshwater in various reservoirs to provide evidence about the distribution of water on Earth.
- 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.

Essential Understandings:

- What is air?
- How does pressure affect air?
- What happens when two areas of air have different pressures?
- What is Earth's atmosphere?
- How do meteorologists measure and record weather variables?
- How does the Sun affect the temperature of locations on Earth?
- How does energy transfer to the air?
- How does heat affect density of fluids?
- How does energy from the Sun affect wind on Earth?
- What causes condensation to form?
- What causes clouds to form?
- What is the water cycle?
- What factors determine the climate of an area?
- What information can you get from a weather map?

Science and Engineering Practices

- **Asking Questions and Defining Problems:** Students will specify relationships between variables and clarify arguments and models. Students will define a design problem that can be solved through the development of an object, tool, process, or system and includes multiple criteria and constraints, including scientific knowledge that may limit possible solutions. Students will ask questions to identify and clarify evidence of an argument.
- **Planning and Carrying Out Investigation:** Students will use multiple variables and provide evidence to support explanations or solutions. Students will collect data to produce data to serve as the basis for evidence to answer scientific questions or test design solutions under a range of conditions.
- **Developing and Using Models:** Students will develop, use, and revise models to describe, test, and predict more abstract phenomena and design systems. Students will develop a model to generate data to test ideas about designed systems, including those representing inputs and outputs. Students will develop and use a model to describe phenomena and unobservable mechanisms.
- **Using Mathematics and Computational Thinking:** Students will extend quantitative measurements to a variety of physical properties and use computation and mathematics to analyze data and compare alternative design solutions. Students will describe and graph quantities such as area and volume to address scientific questions.
- **Analyzing and Interpreting Data:** Students will use quantitative analysis to investigate, distinguish between correlation and causation, and basic statistical techniques of data and error analysis. Students will analyze and interpret data to determine similarities and differences in findings. Students will analyze and interpret data to provide evidence for phenomena.
- **Constructing Explanations and Designing Solutions:** Students will construct explanations and design solutions supported by multiple sources of evidence consistent with scientific ideas, principles, and theories. Students will construct a scientific explanation based on valid and reliable evidence obtained from sources (including the students' own experiments) and the assumption that

theories and laws that describe nature operate today as they did in the past and will continue to do so in the future.

- **Engaging in Argument from Evidence:** Students will construct a convincing argument that supports or refutes claims for either explanations or solutions about the natural and designed world. Students will evaluate completing design solutions based on jointly developed and agreed-upon design criteria. Students will construct an oral and written argument supported by empirical evidence and scientific reasoning to support or refute an explanation or a model for a phenomenon or a solution to a problem.

Interdisciplinary Connections:	Technology Connections:	21st Century Skills:	Career Awareness OR Personal Finance:
Reading Activities LA.RST.6-8.1 LA.RST.6-8.2 LA.WHST.6-8.1.B Claims, Evidence, Reasoning LA.W.6.1.A LA.W.6.1.B Calculating Density MA.6.6.2 Temperature Range MA.6.6.2 Graphing MA.6.6.2	LCN 1.24 Create a multimedia presentation using various media as appropriate (audio, video, animations, etc.) LCN.1.25 Use a variety of technology tools (dictionary, thesaurus, grammar-checker, calculator) to maximize the accuracy of work. NJSLS 8.1.8.E.1 Effectively use a variety of search tools and filters in professional public databases to find information to solve a real world problem. ****Technology Projects** **-Google classroom activities**	CRP1. Act as a responsible and contributing citizen and employee. CRP2. Apply appropriate academic and technical skills. CRP4. Communicate clearly and effectively and with reason. CRP6. Demonstrate creativity and innovation. CRP7. Employ valid and reliable research strategies. CRP8. Utilize critical thinking to make sense of problems and persevere in solving them. CRP11. Use technology to enhance productivity. CRP12. Work productively in teams while using cultural global competence. ****Incorporate 21st Century Skills into lab group mini lessons.**	N/A

Assessments	Differentiation	Resources	Notes
Formative, Summative,	• Modified tests	• Mystery Science	STEM Projects

Benchmark, Alternative Students can demonstrate competency with tasks such as: ● Designing, building and refining models ● Generating, discussing and analyzing data ● Constructing spoken and written scientific explanations ● Writing arguments to support scientific evidence ● Reflecting on their own understanding These will be measured through: ● Notebook entries ● Response sheets ● Focus question answers ● Science and engineering practices checklist ● Investigation Tests ● Project rubrics	and study guides ● Graphic organizers ● Small group instruction ● Sentence starters ● Text on different reading levels ● Highlighting ● Challenge questions ● Math of the Month and Challenge Activities in classroom	● FOSS Kits ● FOSSweb.com ● FOSS Textbook ● ReadWorks ● Science Friday ● Notebook Docs	● Layering Liquids Challenge ● Design a Hurricane Safe Building ● Air Vortex Cannon

Suggested Differentiation Strategies

<u>Needing Support /ELL/I&RS</u>

- Preferential seating
- Highlight key vocabulary
- Repeated directions
- Leveled text
- Pair students strategically/partnerships

- Study Guides
- Small Group Instruction
- Conferring/Individual Instruction
- Variety of Modalities (visual, auditory, spatial)
- Use of manipulatives
- Graphic Organizers
- Technology Supports

504/Special Education

- Extended time on tests and assignments
- Reduced homework or classwork
- Small group instruction/strategy groups
- Verbal, visual, or technology aids
- Modified textbooks or audio-video materials
- Use of manipulatives
- Verbal and visual cues for redirection
- Preferential seating
- Modify the work a student is given
- Extended time for test/quizzes
- Provide multiple choice for tests and quizzes
- Have test read out loud
- Have student provide answers verbally
- Study guides a week before tests/quizzes
- Graphic organizers
- Highlight key vocabulary
- Leveled text
- Content of assignment based on ability levels
- Conferring/Individual Instruction
- Varied assessment/projects
- Collaborative/inclusive instruction

High Achieving/Gifted and Talented

- Use of higher level questioning techniques
- Assessments that require higher level thinking/application
- Appropriately leveled resources
- Increased production in writing assignments
- Small group instruction/strategy groups
- Student directed learning/independent studies
- STEAM activities related to the unit of study
- Inquiry based project opportunities
- Opportunities to apply understanding of concepts in novel ways
- Hybrid (multiple grade level) units
- Self-pacing

Suggested Strategies for Assessment

Using Oral Language (Formative):

- Accountable Talk
- Retelling
- Nonverbal clues: Thumbs up/down; “round” of applause; “pat” on the back
- Think-Pair-Share: Think, discuss with partner, whole class share
- Misconception analysis: KWL Chart/preconceived notions
- Value Lineups
- Whip Around: Have students list three items in response to a question and stand up. Call for one item at a time. Students must sit when all their ideas have been shared.

Asking Questions (Formative):

- Hand Signals: Thumbs up/down
- Non-verbal support: Maintain eye contact with students as they respond
- Constructing effective questions: “wait time”
- Response Cards: Wipe boards
- ReQuest: Reciprocal questioning about portions of the text, Teacher and students take turns being the questioners
- Developing authentic Questions: require deeper thinking of students; not recall questions
- Audience response systems: Use electronic response systems
- Socratic Seminar: Lead discussion based on open-ended questions

Using Writing (Formative/Summative):

- Interactive writing: Draw picture – use labels
- Read-Write-Pair-Share: Have students read or listen to a text, write a response or draw a picture, discuss with a partner, share with class.
- Summary Writing: Students summarize the text in their own words and pictures
- Generate a list

Developing Metacognition (Formative/Summative/Benchmark/Alternative):

- Rubric: one to five chart (rating scale)
- Peer Response Group: small group discussion
- Reflective Journals: foster self-awareness of how they are doing
- Teacher interviews: Probe students’ understanding by asking pertinent questions and encouraging students to talk about what and how they have learned.
- Exit Slips: Ask students to write a few brief comments reacting to how a particular lesson or assignment has affected their progress toward the learning goal

Using Projects and Performances (Formative/Summative/Benchmark/Alternative):

- Reader’s Theatre: Have students turn text into a script, then perform it as a reading.
- Visual Displays: Listing of rules, response charts, KidPix – other pictures
- Public Performances (role play)

- Multimedia presentations: Let students summarize their learning using text, graphics, video, sound, etc. (PowerPoint)
- Electronic and paper portfolios: Ask students to choose evidence that demonstrates their understanding of selected learning goals.
- Experiments/Labs
- Performance Based Assessment Clearinghouse

Using Tests (Formative/Summative/Benchmark/Alternative)

- Multiple Choice, short-answer, dichotomous-choice tests, match test item format with the instructional targets in both content and thought process required.
- Checklists: Student (Self-monitor for behavior, writing, etc.)
- Teacher evaluation (checklist, informal observation, anecdotal notes)
- Oral Testing: Circle time discussion
- Essays: Design prompts that match instructional targets in both content and thought processes required.

Integrated Accommodations and Modifications

Special Education Students	English Language Learners	At Risk of Failure	Gifted and Talented	504 Plans
Accommodations:	Accommodations:	Accommodations:	Accommodations:	Accommodations:
Provide extended time for assignments and tests.	Use bilingual dictionaries or translation apps.	Implement frequent progress monitoring and feedback.	Provide opportunities for independent study or self-directed projects.	Allow extended time on tests, assignments, and projects.
Offer audio versions of textbooks or other reading materials.	Allow additional time for completing tasks or assessments.	Break assignments into smaller, manageable parts with clear deadlines.	Offer access to advanced or accelerated coursework.	Provide a quiet testing environment or alternative testing locations.
Use visual aids, charts, and diagrams to support instruction.	Pair students with a peer buddy or mentor for support.	Provide visual schedules or checklists to help with task organization.	Use tiered assignments to provide more challenging options.	Permit the use of assistive devices (e.g., calculators, note-taking tools).
Allow for the use of assistive technology (e.g., speech-to-text software, communication devices).	Provide sentence starters or writing templates.	Offer additional tutoring or small-group instruction.	Facilitate peer discussions and debates to deepen understanding.	Offer preferential seating to minimize distractions or meet physical needs.
Provide preferential seating (e.g., near the teacher or away from	Simplify language and use clear, concise instructions.	Use graphic organizers to support writing and planning tasks.	Incorporate technology and online resources for enrichment.	Adjust homework policies to accommodate health

distractions).				or learning challenges.
Break tasks into smaller, more manageable steps.	Incorporate visuals, gestures, and realia to clarify meaning.	Allow for alternative ways to demonstrate learning (e.g., projects, oral presentations).	Provide flexible grouping for collaborative projects with intellectual peers.	Provide visual aids, step-by-step instructions, or additional examples.
Offer frequent breaks to reduce fatigue.	Allow for oral responses instead of written ones when appropriate.	Establish a supportive and structured classroom environment with clear expectations.		Allow for breaks during lessons or tests to manage focus and energy.
Provide alternative formats for assignments (e.g., oral responses instead of written).	Provide subtitles or closed captions for video content.	Provide a quiet workspace to reduce distractions.		Make all materials accessible (e.g., large print, digital text, or audiobooks).
Modifications:	Modifications:	Modifications:	Modifications:	Modifications:
Simplify the complexity of assignments or reduce the number of questions.	Focus on vocabulary development with simplified texts or glossaries.	Adjust workload by reducing the number of problems or tasks required.	Design tasks requiring higher-order thinking (e.g., analysis, synthesis, evaluation).	Simplify assignments to focus on mastery of essential skills.
Provide alternative assignments that align with a student's ability level.	Adjust assignments to prioritize understanding of main ideas over details.	Simplify instructions and focus on essential concepts or skills.	Replace standard assignments with open-ended problems or creative tasks.	Adjust grading policies (e.g., focus on completion rather than accuracy).
Modify the curriculum to focus on key concepts rather than all content.	Reduce the number of tasks while maintaining instructional goals.	Align learning goals with the student's current level of understanding.	Introduce interdisciplinary projects that integrate multiple subject areas.	Use a pass/fail grading system when appropriate.
Adjust grading criteria to account for effort or individual progress.	Create language-focused goals alongside content learning objectives.	Use adaptive instructional materials or leveled readers to match ability.	Allow for acceleration in specific subject areas where the student excels.	Adapt content to align with functional or developmental levels as needed.
		Incorporate real-world applications of content to boost engagement and relevance.	Set personalized learning goals that extend beyond the grade-level curriculum.	Create an individualized curriculum plan focusing on key learning outcomes.

Definitions
Accommodations (Changes to how a student learns)
Modifications (changes to what a student learns)

Additional Assessment Resources for the New Jersey Student Learning Standards for Science

- New Jersey Student Learning Assessment for Science (NJSLA-S): The NJSLA-S is the state science test for New Jersey public school students in grade 5, grade 8, and grade 11. This link provides access to detailed information about these assessments.

How do we create local 3-D Assessments?

- SHORT COURSE: How to Develop 3D Formative Assessments for the Science Classroom: Formative assessment in the classroom is crucial because everyone engaged in complex learning benefits from timely and focused feedback. The process also promotes important processes of self-explanation, reflection, and learning (metacognition). This short course will help you learn how to develop and use 3D formative assessments in the classroom.
- Developing Assessments for the NGSS: Classroom Assessment National Research Council. (2013).
- Seeing Students Learn Science: Integrating Assessment and Instruction in the Classroom (2017).
- The Stanford NGSS Assessment Project (SNAP): SNAP is focusing on ways that high-quality performance assessment can support the implementation of new NGSS/NJSLS-S. Their resources include research and reports, exemplar assessment tasks, and professional development resources

Tools for developing local 3-D Assessments

- Integrating Science Practices into Assessment Tasks
- Integration Crosscutting Concepts into Assessment Tasks
- Assessment Development Template
- Rubric for Science Assessment Items, Tasks, and Prompts

Examples of High Quality Science Assessments

- Next Generation Science Assessment (NGSA) Task Portal: The portal provides access to classroom-ready assessments for teachers to use formatively to gain insights into their students' progress on achieving the NJSLS-S performance expectations.
- National Center for Education Statistics: Explore NAEP Questions US Department of Education. National Center for Education Statistics (2014).
- PISA Sample Items, The Organization for Economic Co-operation and Development (OECD) (2007).

Featured Resources

- Science Model Curriculum Framework: provides concrete examples and resources for the development of local science curriculum. The courses and units were developed through the work of consortia of practicing teachers, science supervisors, and higher education faculty.

Resources

Outstanding Science Trade Books for Students K–12
Reading science trade books is the perfect way for students to build literacy skills while learning science content. The books that appear in these lists were selected as outstanding children's science trade books. They were chosen by a book review panel appointed by the National Science Teachers Association (NSTA) and assembled in cooperation with the Children's Book Council (CBC). NSTA and CBC have joined forces on this bibliographic project since 1973, when the list was known as Outstanding Science Trade Books for Children and was primarily targeted at grades K through 8. Beginning in 2002, the list has been expanded to include high school as well.

Science is passion, science is wonder. The best books about science stir the minds and hearts of readers in very special ways; and when they do, the impressions they make can last for years. To make sure the treasures we share in this list are truly wonderful, an intent group of science educators and bibliophiles continue to gather together to identify the best in science trade books for young readers.

Outstanding Science Trade Books for Students K–12
To see a list of all the winners since 1999: http://static.nsta.org/pdfs/2018OSTB.pdf

Best STEM Books K–12
Since 2017, the National Science Teachers Association (NSTA), in cooperation with the Children's Book Council (CBC), has selected its annual list of Best STEM Books, chosen by volunteer educators.

Learn more about the Best STEM Books K–12 https://www.nsta.org/publications/stembooks/

Additional Resources via the New Jersey Student Learning Standards for Science

Science Engineering Practices

- Science Engineering Practices Grades K-2 Quick Reference
- Science Engineering Practices Grades 3-5 Quick Reference
- Science Engineering Practices Grades 6-8 Quick Reference
- Science Engineering Practices Grades 9-12 Quick Reference

Disciplinary Core Ideas

- Earth and Space Sciences: A Compilation of the Framework and the NJSLS-S
- Life Sciences: A Compilation of the Framework and the NJSLS-S
- Physical Sciences: A Compilation of the Framework and the NJSLS-S

Matrices of Learning Progressions

- Science and Engineering Practices
- Disciplinary Core Ideas
- Crosscutting Concepts

Resources

A Framework for K-12 Science Education: Practices, Crosscutting Concepts, and Core Ideas. National Research Council. (2012).Washington, DC: National Academy of Sciences.

- *Quick Reference Guide to the Framework for K-12 Science Education,* NJDOE. (2016). This quick reference document hyperlinks the user to specific sections of the *Framework*.

Next Generation Science Standards. NGSS Lead States. (2013).Washington, DC: The National Academies Press.

Guide to Implementing the Next Generation Science Standards. National Research Council. (2015).Washington, DC: National Academy of Sciences

Professional Learning Resources

Primer on Science Instruction: This two-page document highlights some of the essential characteristics of evidence-based teaching practices.

Student Talk and Flowchart Protocols

STEM Teaching Tools: This site has tools that can help you teach science, technology, engineering and math (STEM). They focused on supporting the teaching of the Next Generation Science Standards (NGSS). Each tool is focused on a specific issue and leverages the best knowledge from research and practice.

Integrating Language Arts/ Literacy in the Science Classroom

- Integration of English Language Arts and Science and Engineering Practices in Grades 3 through 5
- Integration of English Language Arts and Science and Engineering Practices in Grades 6 through 8
- Integration of English Language Arts and Science and Engineering Practices in Grades 9 through 12

Understanding Language: Language, Literacy, and Learning in the Content Areas Stanford University, Graduate School of Education. (2014). Language, Literacy, and Learning in the Content Areas.

Appendixes to the NJSLS-S

- Appendix A: Conceptual Shifts Learn more about the conceptual shifts that make the NJSLS-S new and different.
- Appendix B: Responses to Public Drafts Describes the feedback on the draft NJSLS-S during each of the two public review periods, along with the writers' response to it.
- Appendix C: College and Career Readiness Learn about why student success in postsecondary education and careers will require a strong K-12 preparation in science.
- Appendix D: All Standards, All Students / Case Studies The Appendix and its case studies about diverse student groups address what classroom teachers can do to ensure that the NJSLS-S are accessible to all students.
- Appendix E: Disciplinary Core Idea Progressions Describes the DCI progressions across K-12, summarizing the main focus of the science disciplinary content at each grade band.
- Appendix F: Science and Engineering Practices Describes the progression of the practices across K-12, detailing the specific elements of each practice that are targets for students at each grade band.
- Appendix G: Crosscutting Concepts Describes the progression of the Crosscutting Concepts (CCC) across K-12, detailing the specific elements of each CCC that are targets for students at each grade band.
- Appendix H: Nature of Science Describes rationale for and research on the nature of science in the context of the NJSLS-S, and discusses how to emphasize the nature of science in school programs.
- Appendix I: Engineering Design in the NJSLS-S Describes the framing of Engineering Design concepts and practices throughout the NJSLS-S.
- Appendix J: Science, Technology, Society, and the Environment Learn how the interactions between science, technology, society, and the environment are addressed in the NJSLS-S.
- Appendix K: Model Course Mapping in Middle and High School Describes examples of ways to arrange the NJSLS-S into middle and high school courses or years.
- Appendix L: Connections to Mathematics Learn about the connections to Mathematics standards

- Appendix M: Connections to Literacy in Science and Technical Subjects Learn about the connections to Literacy in Science and Technical Subjects in the NJSLS-S.

Technology and Trade Books Resources

- https://www.wastatelaser.org/science-notebooks/
- www.NSTA.org
- www.nextgenscience.org
- www.njctl.org
- www.eie.org Engineering is Elementary
- http://www.learn360.com
- Foss online: http://www.fossweb.com
- https://www.teachingchannel.org
- Scholastic News (w/ online resource)
- Science Spin (w/ online resource)
- The Boy Who Harnessed the Wind by, William Kamkwamba & Brian Mealer
- Forces that Make Things Move by, Kimberly Bradley
- What Makes a Magnet? By, Franklyn M. Branley
- Lesson Plan for Push and Pull Unit
  http://www.harmonydc.org/Curriculum/pdf/kindersample.pdf
- Forces Unit
  https://eucaps.wsu.edu/wp-content/uploads/sites/731/2015/04/Kindergarten-Force-Motion-Lessons.pdf
- The Boy Who Harnessed the Wind by, William Kamkwamba & Brian Mealer
- Forces that Make Things Move by, Kimberly Bradley
- What is the World Made Of? By, Kathleen Weidner Zoehfeld
- What Makes a Magnet? By, Franklyn M. Branley
- Air is All Around You by, Franklyn M. Branley
- The Boy Who Harnessed the Wind by, William Kamkwamba & Brian Mealer
- Forces that Make Things Move by, Kimberly Bradley
- My Light by Molly Bang
- What is the World Made Of? By, Kathleen Weidner Zoehfeld
- What Makes a Magnet? By, Franklyn M. Branley
- Magic School Bus: Lost in the Solar System
- Water! Water! Water! By, Nancy Elizabeth Wallace
- What is the World Made Of? By, Kathleen Weidner Zoehfeld
- What Makes a Magnet? By, Franklyn M. Branley
- Magic School Bus Inside the Earth
- Rosie Revere Engineer by, Andrea Beaty
- NGSS Book Source Book List
  http://www.booksource.com/Products/NGSS-Kindergarten-Complete__NGK-ALL-spc-16.aspx?CategoryBvin=b124d8b2-763d-4fcb-920e-2cbf61800150&SubCategoryBvin=b34aa90f-9a8d-4de8-b82d-41d31a4fbc84&CollectionBvin=bf7031f3-e73b-4b77-81b5-e1aa8110cb7e
- https://betterlesson.com/lesson/resource/3070763/the-engineering-design-process?from=lessonsecti

on_narrative
- https://betterlesson.com/home
- http://speechisbeautiful.com/2017/03/10-wordless-videos-teach-problem-solving/
- https://nj.pbslearningmedia.org/resource/75e3c673-b02d-4d7b-a490-8a943c013662/75e3c673-b02d-4d7b-a490-8a943c013662/#.WRnD3-srLcs
- Rosie Revere, Engineer by, Andrea Beaty
- Thomas Edison: Great American Inventor by, Shelley Bedik
- The Most Magnificent Thing by Ashley Spires..author website/blog & youtube clip
- The Girl Who Never Made Mistakes by Mark Pett
- What Do You Do With An Idea? By Kobi Yamada
- Those Darn Squirrels! By Adam Rubin
- https://betterlesson.com/lesson/635856/the-predictable-patterns-of-the-sun-and-the-seasons
- https://betterlesson.com/lesson/613470/observing-the-sun
- https://betterlesson.com/lesson/613469/introduction-and-pre-assessment
- https://betterlesson.com/lesson/633422/let-s-observe-the-sun-day-1
- https://mysteryscience.com/sky/sun-moon-stars
- The Sun by Seymour Simon
- King Kafu and the Moon by, Trish Cooke
- https://betterlesson.com/lesson/622032/stem-sound-day-1/
- https://betterlesson.com/lesson/resource/3130569/water-and-sound-waves?from=mtp_home_feed_actor_added_resource_name
- https://betterlesson.com/lesson/resource/3064186/5-senses-poster?from=mtp_home_feed_crowd_favorited_resource_name
- https://betterlesson.com/lesson/resource/3120274/the-listening-walk-work-sample?from=mtp_home_feed_actor_added_resource_name
- https://betterlesson.com/lesson/622032/stem-sound-day-1
- My Light by Molly Bang
- Owl Moon by Jane Yolen
- What Are Sound Waves by Robin Johnson
- Sounds All Around by Wendy Pfeffer
- https://mysteryscience.com/light/properties-of-light-sound
- Magic School Bus-In The Haunted Mansion (sound)
- https://betterlesson.com/lesson/resource/3114245/6-animal-classes-song?from=mtp_home_feed_crowd_viewed_resource_name
- https://betterlesson.com/lesson/626229/engineering-solutions
- Baby Animals by, Seymour Simon
- Big Tracks, Little Tracks by, Millicent Selsam
- https://mysteryscience.com/powers/parts-survival-growth
- The Curious Garden by Peter Brown
- My Little Book of Ocean Life by Camilla de la Bedoyere
- What If You Had Animal Hair? What If You Had Animal Feet? What If You Had Animal Teeth?--Sandra Markle- Scholastic Books

- A Bird is a Bird by Lizzy Rockwell
- Best Foot Forward by Ingo Arndt
- Feathers: Not Just for Flying by Melissa Stewart
- Animal Faces by Penelope Arlon and Tory Gordon-Harris
- Born in the Wild: Baby Mammals and their Parents by Lita Judge
- Steve Spangler Science: Easy Science Experiments, Science Toys ...
- https://www.stevespanglerscience.com/
- McGraw Hill Science Text S1-4
- Related video clips:
- https://www.youtube.com/watch?v=IRhjGeRP9zM
- https://www.youtube.com/watch?v=owHF9iLyxic
- McGraw Hill Science Text S5-8
- Related activities:
- file:///Users/intentz152/Downloads/Classroom_Science_Notebooks_Presentation_revised.ppt
- file:///Users/intentz152/Downloads/Setting%20Up%20Your%20Science%20Notebook%20Teacher%20Guide.pdf
- Notebook video clip: https://www.youtube.com/watch?v=NVdRfuWe4YM
- Interactive Science Notebooks
- Setting Up Your Science Notebook
- "The Science Penguin"
- www.sciencenotebooks.org PPT
- Pencil/ Marker investigation
- "The Beautiful Oops"
- https://betterlesson.com
- What is a Scientist? https://betterlesson.com/lesson/613405/what-is-a-scientist

- Creating a Science Journal https://betterlesson.com/lesson/614612/creating-the-science-journal
- Safety in Science https://betterlesson.com/lesson/617181/safety-in-science
- Conducting Investigations https://betterlesson.com/lesson/614613/conducting-investigations
- Systems - https://betterlesson.com/lesson/614614/systems

- Tools not Toys! https://betterlesson.com/lesson/614615/tools-not-toys
- Seeing in Science: The Skill of Observation https://betterlesson.com/lesson/622982/seeing-in-science-the-skill-of-observation
- Classifying in Science: The Skill of Sorting https://betterlesson.com/lesson/626371/classifying-in-science-the-skill-of-sorting
- Predictions: The Skill of Why? https://betterlesson.com/lesson/626372/predictions-the-skill-of-thinking-why
- Inferences: The Skill of Scientific Metacognition
- https://betterlesson.com/lesson/626374/inferences-the-skill-of-scientific-metacognition

- Documenting with Drawing: Sketches-Diagrams and Labels https://betterlesson.com/lesson/626375/documenting-with-drawing-sketches-diagrams-and-labels

- What Do You Do With A Problem by Kobi Yamada
- What Do You Do With An Idea by Kobi Yamada
- Stuck by Oliver Jeffers
- Rosie Revere Engineer by Andrea Beaty
- The Most Magnificent Thing by Ashley Spires
- The Curious Garden by Peter Brown
- Those Darn Squirrels by Adam Rubin
- Dot by Peter Reynolds
- Ish by Peter Reynolds
- National Geographic Readers: Water by Melissa Stewart
- Coastal Erosion https://betterlesson.com/lesson/636745/coastal-erosion
- Bill Nye - Erosion Season 5 Episode 14
- Bill Nye- Volcanoes Season 4 Episode 14
- Bill Nye - Earthquakes Season 4 Episode 4
- https://jr.brainpop.com/science/land/fastlandchanges/
- https://jr.brainpop.com/science/land/slowlandchanges/
- What is the World Made Of? By Kathleen Weidner Zoehfeld
- Changing Matter (Science Readers) by Karen Larson
- Bill Nye - Phases of Matter
- https://jr.brainpop.com/science/matter/changingstatesofmatter/
- A Fruit is a Suitcase for Seeds by Jean Richards
- Air is All Around You by, Franklyn M. Branley
- Animal Eyes by, Mary Holland
- Antarctica by, Helen Cowcher
- Arctic Ocean by, John F. Prevost
- Army Ants by, Sandra Markle
- Baby Animals by, Seymour Simon
- Big Tracks, Little Tracks by, Millicent Selsam
- Flip, Float, Fly: Seeds on the Move by JoAnn Early Macken and Pam Paparone
- Get the Scoop on Animal Poop by, Dawn Cusick
- Owl Moon by, Jane Yolen
- Snowflake Bentley by, Jacqueline Briggs Martin
- Seeds and Fruits (Plant Parts) by Melanie Waldron
- A Tree for All Seasons by Robin Bernard
- Up in the Garden and Down in the Dirt by Kate Messner
- Water! Water! Water! By Nancy Elizabeth Wallace
- What Animals Eat by Brenda Stones
- http://betterlesson.com
- Bill Nye - Plants Season 3 Episode 3
- Bill Nye - Life Cycles Season 5 Episode 6
- Bill Nye - Flowers Season 4 Episode 10
- Bill Nye - Lakes and Ponds Season 5 Episode Episode 10

- Bill Nye - Ocean Exploration Season 5 Episode 9
- Bill Nye - Desert Season 4 Episode 12
- Bill Nye - Wetlands Season 3 Episode 17
- https://jr.brainpop.com/science/habitats/arctichabitats/
- https://jr.brainpop.com/science/habitats/freshwaterhabitats/
- https://jr.brainpop.com/science/habitats/oceanhabitats/
- https://jr.brainpop.com/science/plants/partsofaplant/
- https://jr.brainpop.com/science/plants/plantlifecycle/
- https://jr.brainpop.com/science/habitats/desert/
- https://jr.brainpop.com/science/habitats/rainforests/
- https://jr.brainpop.com/science/plants/plantadaptations/
- https://jr.brainpop.com/science/habitats/forests/
- Rosie Revere, Engineer by, Andrea Beaty
- Thomas Edison: Great American Inventor by, Shelley Bedik
- NSTA Resources and Lesson Plans:

http://ngss.nsta.org/classroom-resources-results.aspx?CoreIdea=2

- Design a car investigation:

http://static.nsta.org/files/sc1501_34.pdf

- Movement lab

http://serc.carleton.edu/sp/mnstep/activities/48587.html

- Static electricity lab

https://www.scientificamerican.com/article/bring-science-home-static-electricity-attraction/

- Magnet lab (distance)

http://serc.carleton.edu/sp/mnstep/activities/26850.html

- Build your own ramp challenge

https://stemplayground.org/activities/ramp-race/

- Improve an object using a magnet

https://betterlesson.com/lesson/resource/3228140/situations

- Inertia trajectory investigation

https://betterlesson.com/lesson/637934/the-law-of-inertia

- Make Magnetic Slime

http://frugalfun4boys.com/2014/03/06/make-magnetic-slime/

- Reading passages on survival in groups

https://betterlesson.com/lesson/632399/animal-groups-benefits-and-disadvantages

- Surviving in groups activity

https://betterlesson.com/lesson/632602/animal-groups-what-purpose-do-they-serve

- Observing animals in groups videos

https://betterlesson.com/lesson/632602/animal-groups-what-purpose-do-they-serve

- Writing the relationship between predator and prey (coyote/rabbit)

https://betterlesson.com/lesson/631543/predator-and-prey-act-it-out

- Amazing group behaviors in insects

https://betterlesson.com/lesson/632312/amazing-ants-group-behavior-in-insects

- Talents of ants

https://betterlesson.com/lesson/635052/social-insects-the-many-talents-of-ants

- Gorilla survival

https://betterlesson.com/lesson/631906/introduction-to-mountain-gorillas

- Animal Adaptations

http://stem-works.com/subjects/30-the-animal-kingdom/activities/620

- Animal Life Cycles Video

http://stem-works.com/subjects/30-the-animal-kingdom/activities/620

- NSTA Resources and Lesson Plans: http://ngss.nsta.org/DisplayStandard.aspx?view=topic&id=32
- Inventory of Traits: http://teach.genetics.utah.edu/content/heredity/files/InventoryOfTraits.pdf, http://learn.genetics.utah.edu/content/inheritance/observable/
- Effect of Environment on Plant Growth: http://www.apsnet.org/edcenter/K-12/TeachersGuide/PlantBiotechnology/Pages/Activity7.aspx
- Mutations and Variations: http://www.cosee-west.org/AprilLectureMaterials/Activities/Mutations&Variation.pdf
- Reproduction Lesson: http://ca.pbslearningmedia.org/resource/tdc02.sci.life.repro.lp_reproduce/reproduction/
- Human Traits
- https://drive.google.com/drive/folders/0ByFBd0Ins-tSYTRsSU5Oc0tVRFE
- Monster Traits activity
- Difference between weather and climate: http://www3.epa.gov/climatechange/kids/documents/weather-climate.pdf
- Weather vs Climate & video from NatGeo https://www.ck12.org/earth-science/Weather-versus-Climate/lesson/Weather-versus-Climate/?referrer=concept_details
- Multiple topics under weather and climate http://climatekids.nasa.gov/next-generation-standards/review/
- Climate change over time http://www3.epa.gov/climatechange/kids/documents/temp-and-co2.pdf
- Analyzing tree rings to look at climate change over time http://www3.epa.gov/climatechange/kids/documents/tree-rings.pdf And http://climate.nasa.gov/climate_resources/25/
- https://api.betterlesson.com/mtp/lesson/636909/print
- Researching Climate
- https://betterlesson.com/lesson/636484/researching-climate-data
- Make Your own Barometer http://www.weatherwizkids.com/experiments-barometer.htm
- Blue Sky Experiment http://www.weatherwizkids.com/experiments-bluesky.htm
- Make Fog in a Jar http://stem-works.com/external/activity/418
- Make a Rain Gauge http://stem-works.com/external/activity/247
- Magic School Bus weather http://stem-works.com/external/activity/137
- Make it Rain Experiment http://stem-works.com/external/activity/225

Building a Bridge - http://www.playdoughtoplato.com/stem-project-straw-bridges/

Flood protection design

- https://betterlesson.com/lesson/634338/protect-my-home
- Building an earthquake resistant structure
- https://betterlesson.com/lesson/636080/building-an-earthquake-resistant-structure
- https://betterlesson.com/lesson/635940/designing-an-earthquake-resistant-structure
- http://teachers.egfi-k12.org/activity-earthquake-proof-structure/
- Tacoma Narrows Bridge Collapse "Gallopin' Gertie"
    - https://www.youtube.com/watch?v=j-zczJXSxnw
    - http://ngss.nsta.org/classroom-resources-results.aspx?CoreIdea=5
- http://www.earthsciweek.org/classroom-activities/ngss (general resource)

Field Trip Resources

NJ School Field Trips
http://www.classtrips.com/region-landing/2054/school-field-trips-in-new-jersey

Class Trip Guide
http://www.aplnj.org/assets/pdf/Class%20Trip%20Guide.pdf

Maple Sugaring trips in NJ
http://www.jerseyfamilyfun.com/maple-sugaring-new-jersey/

Monmouth County Parks
https://www.monmouthcountyparks.com/page.aspx?Id=2490

Environmental Center | Facilities | Essex County Parks
https://www.essexcountyparks.org/facilities/environmental-center
ECP- Field Trips
https://www.essexcountyparks.org/_media/_data/EssexResource/ecec-field-trip-programs-brochure-2016.pdf

KIDS DAY TRIPS NJ - Unusual Kids attractions in NJ - Off the beaten ...
http://www.funnewjersey.com/upload_user/fun_with_kids/DAY_TRIPS_KIDS_ATTRACTIONS_NJ.HTM

Treetop Adventure Course | Turtle Back Zoo
http://turtlebackzoo.com/discover/treetop-adventure-course/

Featured STEM/STEAM Enrichment | New Jersey | Field Trips
http://www.classtrips.com/detail/2054/2572/field-trips-in-new-jersey-to-stemsteam-enrichment

Somerset County Environmental Center: Grade 2
http://www.somersetcountyparks.org/brochFlyers/EEC_ProgramsForSchools.pdf
Wildlife Grades: Pre-K to 2 1 Hour Program available year-round/maximum 30 participants per program In this program we will explore marshes, ponds, fields, and forests to introduce young children to the natural world. We will search for signs of wildlife while we discuss what every living thing needs to survive and how humans can affect the wildlife around them. NJCCCS* - 3.4 A, 3.5 A, 4.2 A, 4.4 C, 4.5 B, 5.5 A,B&C, 5.7 A, 5.8 B, 5.9 A, 5.10 A&B Field Trips to Somerset

County Parks Pondering Life Grades: 2 to 4 1.5 Hour minimum Program available April-mid October/maximum 45 participants per program Learn about life in and around a pond as we investigate this unique environment. Students will first be introduced to the concepts of community, habitat, food chains, and the adaptations needed for aquatic life. Then take a first hand look at pond life with the use of dip nets and field guides. Adult chaperones are required with a 6:1 ratio. NJCCCS* - 3.4 A, 3.5 A, 4.2 A&D, 4.4 A&C, 5.1 B&C, 5.4 A&B, 5.5 A,B&C, 5.7 A&B, 5.8 B, 5.9 A, 5.10 A&B, 6.1 A, 6.6 C,D&E Basically Bugs Grades: 2 to 5