COURSE TITLE

Science 3

LENGTH

Full Year

DEPARTMENT

STEM Department

SCHOOL

Lincoln School
Washington School

DATE

September 10, 2018

Initial BOE Approval Date (Born on): 6/15/2015

Science 3

I. Introduction/Overview/Philosophy

The best way for students to appreciate the scientific enterprise, learn important scientific concepts, and develop the ability to think well is to actively construct ideas through their own inquiries, investigations, and analyses. Science is an active enterprise, made active by our human capacity to think. Scientific knowledge advances when scientists observe objects and events, think about how they relate to what is known, test their ideas in logical ways, and generate explanations that integrate the new information into the established order. Thus the scientific enterprise is both what we know (content) and how we come to know it (process).

The performance expectations in third grade help students formulate answers to questions such as: "What is typical weather in different parts of the world and during different times of the year? How can the impact of weather-related hazards be reduced? How do organisms vary in their traits? How are plants, animals, and environments of the past similar or different from current plants, animals, and environments? What happens to organisms when their environment changes? How do equal and unequal forces on an object affect the object? How can magnets be used?" (NGSS).

II. Objectives

Course Outline:

1. Plants and Animals
    a. Animal habitats, Heredity, and Change Over Time
    b. Plant Life Cycle, Traits, and Heredity
2. Forces
    a. Push and Pull
    b. Forces and Engineering
    c. Friction and Motion
    d. Magnets and Engineering
3. Weather
    a. Weather Prediction
    b. Climate
    c. Water Cycle

Student Outcomes:

After successfully completing this course, the student will:

- Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object.
- Make observations and/or measurements of an object's motion to provide evidence that a pattern can be used to predict future motion.
- Ask questions to determine cause and effect relationships of electric or magnetic interactions between two objects not in contact with each other
- Define a simple design problem that can be solved by applying scientific ideas about magnets.

- Construct an argument that some animals form groups that help members survive.
- Analyze and interpret data from fossils to provide evidence of the organisms and the environments in which they lived long ago.
- 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.
- 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.
- Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death.
- 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.
- Use evidence to support the explanation that traits can be influenced by the environment.
- 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.
- Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season.
- Obtain and combine information to describe climates in different regions of the world.
- Make a claim about the merit of a design solution that reduces the impacts of a weather-related hazard.

New Jersey Student Learning Standards

CAREER READY PRACTICES

CRP1 Act as a responsible and contributing citizen and employee.

Career-ready individuals understand the obligations and responsibilities of being a member of a community, and they demonstrate this understanding every day through their interactions with others. They are conscientious of the impacts of their decisions on others and the environment around them. They think about the near-term and long-term consequences of their actions and seek to act in ways that contribute to the betterment of their teams, families, community and workplace. They are reliable and consistent in going beyond the minimum expectation and in participating in activities that serve the greater good.

CRP2 Apply appropriate academic and technical skills.

Career-ready individuals readily access and use the knowledge and skills acquired through experience and education to be more productive. They make connections between abstract concepts with real-world applications, and they make correct insights about when it is appropriate to apply the use of an academic skill in a workplace situation

CRP4 Communicate clearly and effectively and with reason.

Career-ready individuals communicate thoughts, ideas, and action plans with clarity, whether using written, verbal, and/or visual methods. They communicate in the workplace with clarity and purpose to make maximum use of their own and others' time. They are excellent writers; they master conventions, word choice, and organization, and use effective tone and presentation skills to articulate ideas. They are skilled at interacting with others; they are active listeners and speak clearly and with purpose. Career-ready individuals think about the audience for their communication and prepare accordingly to ensure the desired outcome.

CRP6. Demonstrate creativity and innovation.

Career-ready individuals regularly think of ideas that solve problems in new and different ways, and they contribute those ideas in a useful and productive manner to improve their organization. They can consider

unconventional ideas and suggestions as solutions to issues, tasks or problems, and they discern which ideas and suggestions will add greatest value. They seek new methods, practices, and ideas from a variety of sources and seek to apply those ideas to their own workplace. They take action on their ideas and understand how to bring innovation to an organization.

CRP7. Employ valid and reliable research strategies.
Career-ready individuals are discerning in accepting and using new information to make decisions, change practices or inform strategies. They use reliable research process to search for new information. They evaluate the validity of sources when considering the use and adoption of external information or practices in their workplace situation.

CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.
Career-ready individuals readily recognize problems in the workplace, understand the nature of the problem, and devise effective plans to solve the problem. They are aware of problems when they occur and take action quickly to address the problem; they thoughtfully investigate the root cause of the problem prior to introducing solutions. They carefully consider the options to solve the problem. Once a solution is agreed upon, they follow through to ensure the problem is solved, whether through their own actions or the actions of others.

CRP11. Use technology to enhance productivity.
Career-ready individuals find and maximize the productive value of existing and new technology to accomplish workplace tasks and solve workplace problems. They are flexible and adaptive in acquiring new technology. They are proficient with ubiquitous technology applications. They understand the inherent risks-personal and organizational-of technology applications, and they take actions to prevent or mitigate these risks.

CRP12. Work productively in teams while using cultural global competence.
Career-ready individuals positively contribute to every team, whether formal or informal. They apply an awareness of cultural difference to avoid barriers to productive and positive interaction. They find ways to increase the engagement and contribution of all team members. They plan and facilitate effective team meetings.

TECHNOLOGY

Standard 8.1 Educational Technology: All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.
Strand A. Technology Operations and Concepts: Students demonstrate a sound understanding of technology concepts, systems and operations.
8.1.5.A.1- Select and use the appropriate digital tools and resources to accomplish a variety of tasks including solving problems.
8.1.5.A.3- Use a graphic organizer to organize information about problem or issue.
Strand E: Research and Information Fluency: Students apply digital tools to gather, evaluate, and use information.
8.1.8.E.1- Use digital tools to research and evaluate the accuracy of, relevance to and appropriateness of using print and non-print electronic information sources to complete a variety of tasks
Strand F: Critical thinking, problem solving, and decision making: Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.
8.1.5.F.1- Apply digital tools to collect, organize, and analyze data that support a scientific finding.

Standard 8.2 Technology Education, Engineering, Design, and Computational Thinking - Programming: All students will develop an understanding of the nature and impact of technology, engineering, technological design, computational thinking and the designed world as they relate to the individual, global society, and the environment.
8.2.5.B.4- Research technologies that have changed due to society's changing needs and wants.
8.2.5.B.6- Compare and discuss how technologies have influenced history in the past century.
Strand C. Design: The design process is a systematic approach to solving problems.
8.2.5.C.1- Collaborate with peers to illustrate components of a designed system.
8.2.5.C.4- Collaborate and brainstorm with peers to solve a problem evaluating all solutions to provide the best results with supporting sketches or models.

21ST CENTURY LIFE AND CAREERS

9.2 Career Awareness, Exploration, and Preparation

Strand A: Career Awareness

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.
9.2.4.A.4 Explain why knowledge and skills acquired in the elementary grades lay the foundation for future academic and career success.

NEW JERSEY STUDENT LEARNING STANDARDS- SCIENCE

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.
3-LS1-1. Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death.
3-LS2-1. Construct an argument that some animals form groups that help members survive.
3-LS3-1. Analyze and interpret data to provide evidence that plants and animals have traits inherited from parents and that variation of these traits exists in a group of similar organisms.
3-LS3-2. Use evidence to support the explanation that traits can be influenced by the environment.
3-LS4-1. Analyze and interpret data from fossils to provide evidence of the organisms and the environments in which they lived long ago.
3-LS4-2. Use evidence to construct an explanation for how the variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing.
3-LS4-3. Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all.
3-LS4-4. Make a claim about the merit of a solution to a problem caused when the environment changes and the types of plants and animals that live there may change.
3-ESS2-1. Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season.
3-ESS2-2. Obtain and combine information to describe climates in different regions of the world.
3-ESS3-1. Make a claim about the merit of a design solution that reduces the impacts of a weather-related hazard.

3-5-ETS1-1. Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.
3-5-ETS1-2. Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.
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.

III. Proficiency Levels

This is a full year course for Grade 3 students.

IV. Methods of Assessment

Student Assessment
Even though at this level students are not formally assessed in science, progress is monitored both formatively and summatively. Scientific questioning about what they see and experience allows both student and teacher to monitor their understanding of science concepts. Journal writing is introduced to record student progress.

Curriculum/Teacher Assessment
The teacher will provide the subject area supervisor with suggestions for changes on an ongoing basis.

V. Grouping

This is a required Grade 3 full year course.

VI. Articulation/Scope & Sequence/Time Frame

Course length is one year.

VII. Resources

Texts/Supplemental Reading/References

Resources may include but are not limited to:

1. www.mysteryscience.com
2. Bill Nye Videos
3. https://newsela.com/
4. www.brainpop.com
5. Science World Magazine

VIII. Suggested Activities

Appropriate activities are listed in the curriculum map.

IX. Methodologies

Appropriate methodologies include hands-on active learning, inquiry, integration of disciplines and content areas, and multi-sensory methods. Lessons created by the elementary science specialist serve to coordinate with and enhance the content area topics. Technology plays an important part in learning science as well.

X. Interdisciplinary Connections

At this grade level, connections to many other disciplines are appropriate and natural. Reading and writing become an integral part of the science process. Connections with mathematics are frequent throughout the curricula.

XI. Differentiating Instruction for Students with Special Needs: Students with Disabilities, Students at Risk, English Language Learners, and Gifted & Talented Students

Differentiating instruction is a flexible process that includes the planning and design of instruction, how that instruction is delivered, and how student progress is measured. Teachers recognize that students can learn in multiple ways as they celebrate students' prior knowledge. By providing appropriately challenging learning, teachers can maximize success for all students.

Differentiating in this course includes but is not limited to:

Differentiation for Support (ELL, Special Education, Students at Risk)

- Peer mentoring on problems
- Differentiated teacher feedback on assignments
- Modeling out problems on whiteboard
- Visual aids as we project problems on whiteboard
- Study guides
- Tiered assignments
- Scaffolding of materials and assignments
- Re-teaching and review
- Guided note taking
- Exemplars of varied performance levels
- Multi-media approach to accommodating various learning styles

Differentiation for Enrichment

- Supplemental reading material for independent study
- Flexible grouping
- Tiered assignments
- Topic selection by interest
- Enhanced expectations for independent study
- Elevated questioning techniques using Webb's Depth of Knowledge matrix

XII. Professional Development

The teacher will continue to improve expertise through participation in a variety of professional development opportunities.

XII. Curriculum Map/Pacing Guide

Unit Topic	Time Allocated	Differentiating Instruction for Students with Disabilities, Students at Risk, English Language Learners, & Gifted & Talented Students	Standards	Assessments
Animals Through Time • Animal habitats • Structures and Adaptations • Fossils	10 weeks	*For Support:* • Break down multi-step directions when conducting an experiment • Provide a hands on experience to further investigate *For Enhancement:* • Dissect a flower to locate parts of a plant • Research other plant-eating and meat-eating dinosaurs	3-LS1-1 3-LS2-1 3-LS3-1 3-LS4-1 3-LS4-2 3-LS4-3 3-LS4-4 CRP1,2,4,6,7,8,11,12 8.1.5.A.1, 8.1.5.A.3, 8.1.5.E.1, 8.1.5.F.1 8.2.5.B.4, 8.2.5.B.6, 8.2.5.C.1, 8.2.5.C.4 9.2.4.A.1, 9.2.4.A.4	• Using fossils, identify how environments have changed over time • Analyze traits that animals have in common • Simulate predator – prey relationships

Unit Topic	Time Allocated	Differentiating Instruction for Students with Disabilities, Students at Risk, English Language Learners, & Gifted & Talented Students	Standards	Assessments
Forces • Push and Pull • Forces and Engineering • Friction and Motion • Magnets and Engineering	10 weeks	*For Support:* • Peer collaboration to help design and carry out investigations • Provide a graphic organizer to help plan steps in a process • Provide a hands on experience to further investigate *For Enhancement*: • Research other famous bridges • Create a game using magnets	3-PS2-1 3-PS2-2 3-PS2-3 3-PS2-4 3-5-ETS1-1 3-5-ETS1-2 3-5-ETS1-3 CRP1,2,4,6,7,8,11,12 8.1.5.A.1, 8.1.5.A.3, 8.1.5.E.1, 8.1.5.F.1 8.2.5.B.4, 8.2.5.B.6, 8.2.5.C.1, 8.2.5.C.4 9.2.4.A.1, 9.2.4.A.4	• Explain how forces act upon an object • Define a problem and design a bridge to solve it • Identify the cause and effect of friction • Demonstrate the cause and effect of two magnets on one another

Unit Topic	Time Allocated	Differentiating Instruction for Students with Disabilities, Students at Risk, English Language Learners, & Gifted & Talented Students	Standards	Assessments
Weather • Weather Prediction • Climate • Water Cycle	10 weeks	*For Support:* • Use technology to provide examples of different types of clouds • Provide a graphic organizer to organize findings from investigation • Peer collaboration to help design and carry out investigations *For Enhancement:* • Observe and record clouds and weather for a given amount of time • Create a travel poster for different climates Research the effects of hurricane or tornado winds	3-ESS2-1 3-ESS2-2 3-5-ETS1-1 3-5-ETS1-2 3-5-ETS1-3 CRP1,2,4,6,7,8,11,12 8.1.5.A.1, 8.1.5.A.3, 8.1.5.E.1, 8.1.5.F.1 8.2.5.B.4, 8.2.5.B.6, 8.2.5.C.1, 8.2.5.C.4 9.2.4.A.1, 9.2.4.A.4	• Identify weather associated with clouds • Describe the process of evaporation and condensation • Analyze and interpret data to identify climate patterns • Design a structure to withstand strong winds
Powers of Flowers • Flowering • Reproduction • Traits • Inheritance	10 weeks	*For Support:* • Provide a graphic organizer to organize findings from investigation • Peer collaboration to help design and carry out investigations *For Enhancement:* • Dissect a flower to locate parts of a plant	3-LS1-1 3-LS3-1 CRP1,2,4,6,7,8,11,12 8.1.5.A.1, 8.1.5.A.3, 8.1.5.E.1, 8.1.5.F.1 8.2.5.B.4, 8.2.5.B.6, 8.2.5.C.1, 8.2.5.C.4 9.2.4.A.1, 9.2.4.A.4	• Simulate the job of pollinators • Explain how plants reproduce