Course Title/Grade: Science 4

2018 - 2019 Course Syllabus
Prince George's County Public Schools

INSTRUCTOR INFORMATION		COURSE INFORMATION	
NAME:		**COURSE NUMBER:**	
E-MAIL ADDRESS:		**CLASS TIME:**	
PLANNING TIME:		**MEETING DAYS:**	
SCHOOL:		**ROOM:**	
SCHOOL PHONE NUMBER:		**STUDENT TEXTBOOK/DIGITAL RESOURCES:**	Grade 4 Science Dimensions. (2017). Orlando, FL: Houghton Mifflin Harcourt. Digital Resource: Discovery Education Techbook™ Digital Textbooks.

Prerequisites: Science 3

Course Description: Fourth grade science students are actively engaged in a comprehensive science program as they build an understanding to make sense of the natural world through phenomenon-based instruction. Students will be interacting with content from different topics to include Earth and Space Science (ES), Life Science (LS), Physical Science (PS) and Engineering Design (ETS) Disciplinary Core Ideas (DCIs) from the Next Generation Science Standards (NGSS). Students are able to use a model of waves to describe patterns of waves in terms of amplitude and wavelength, and that waves can cause objects to move. Students are expected to develop understanding of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation. They apply their knowledge of natural Earth processes to generate and compare multiple solutions to reduce the impacts of such processes on humans. In order to describe patterns of Earth's features, students analyze and interpret data from maps. Fourth graders are expected to develop an understanding that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction. By developing a model, they describe that an object can be seen when light reflected from its surface enters the eye. Students are able to use evidence to construct an explanation of the relationship between the speed of an object and the energy of that object. Students are expected to

develop an understanding that energy can be transferred from place to place by sound, light, heat, and electric currents or from object to object through collisions. They apply their understanding of energy to design, test, and refine a device that converts energy from one form to another.

The Crosscutting Concepts (CCCs) of patterns; cause and effect; energy and matter; systems and system models; interdependence of science, engineering, and technology; and influence of engineering, technology, and science on society and the natural world are called out as organizing concepts for these disciplinary core ideas. Students are expected to demonstrate grade-appropriate proficiency with Science and Engineering Practices (SEPs) by asking questions, developing and using models, planning and carrying out investigations, analyzing and interpreting data, designing solutions, engaging in argument from evidence, and obtaining, evaluating, and communicating information. Students will conduct inquiry-based investigations through hands-on, digital and virtual laboratory experiences. Students will be introduced to various STEM careers while in grades K-12.

Content from this course will prepare fourth grade students for the new upcoming Maryland Integrated Science Assessment (MISA) that will be administered in the fifth grade.

PGCPS Elementary Science Policy: Grades 2-5

Overview: The goal of grading and reporting is to provide the students with feedback that reflects their progress toward the mastery of the indicators and objectives found in the Science curriculum document.

Please note: For grades 3-5, the STEM fair process is designed for students to receive more than a single grade for the entire project. As such, various components of the STEM fair process can be used as classwork, homework and/or assessments.

Factors	Brief Description	Grade Percentage Per Quarter
Classwork	This includes but is not limited to activities that involve: • Developing and using models • Engaging in argument from evidence • Individual and whole class discussions • Planning and carrying out investigations • Projects (include parts of the STEM Fair process) • Mandatory: 10% of classwork must be relevant hands-on and lab experiences • Asking questions (for science) and defining problems (for engineering) • Obtaining, evaluating, and communicating information • Constructing scientific explanations (for science) and designing solutions (for engineering)	**45%**
Homework	This includes but is not limited to assignments that involve: • Developing and using models • Obtaining, evaluating, and communicating information • Constructing scientific explanations (for science) and designing solutions (for engineering)	**15%**
Assessment	This includes but is not limited to assessments that involve: • Pre/post assessments, final exams, quizzes, final essays/reports, portfolios • Analyzing and interpreting data, using mathematics and computational thinking • Oral or written evaluation that reflects the student's performance on a summary of a lesson, chapter or unit • Final STEM Fair projects should also be used as an assessment grade. For students that do not participate, teachers will develop an alternative assignment to assess.	**40%**

Course Title/Grade: Science 4
Course Sequence: At-A-Glance

Actual pacing may differ slightly due to individual school schedules/events, testing, and calendar modifications. In support of the shifts and demands of the Next Generation Science Standards (NGSS), the Science and Engineering Practices (SEPs) and the Crosscutting Concepts (CCCs) are integrated to deliver each topic taught.

Each Unit focuses on making sense of Phenomena through the integration of 3- Dimensional teaching and learning. For purposes of our K-5 NGSS Curriculum, ***Sense-making*** *is defined as "the process by which the learner actively engages with the natural or designed world; wonders about it; and develops, tests, and refines ideas with peers and the teacher." (Schwarz, Passmore & Reiser, 2017).*

Grade 4

Quarter One
September 4, 2018 - November 2, 2018 (44 days)

Content To Be Taught:

- Observing and Measuring the Effects of Weathering or the Rate of Erosion
- Analyzing and Interpreting Data from Maps to Describe Patterns of Earth's Features
- Identifying Evidence from Patterns in Rock Formations and Fossils to Support Changes in the Landscape Over Time
- Planning and Carrying Out Fair Test with Controlled Variable to Improve a Model or Prototype *(Engineering Design)*

Quarter Two
November 3, 2018 - January 25, 2019 (47 days)

Content To Be Taught:

- Describing that Energy and Fuels Are From Natural Resources and their Effect on the Environment
- Generating and comparing Solutions to Reduce Impacts of Earth Processes on Humans
- Generating and Comparing Possible Solutions to a Program that Meet the Criteria and Constraints of the Problem *(Engineering Design)*
- Constructing an Explanation Relating the Speed and Energy of an Object
- Questioning and Predicting Outcomes About the Changes in Energy when Object Collide

Quarter Three
January 26, 2019 - March 28, 2019 (43 days)

Content To Be Taught:

- Observing Energy Transferring by Sound, Light, Heat and Electric Currents
- Defining a Simple Design Problem with Specified Criteria for Success and Constraints on Materials, Time or Cost (*Engineering Design)*
- Generating and Comparing Solutions the use Patterns to Transfer Information
- Observing Energy Transferring by Sound, Light, Heat and Electric Currents
- Generating and Comparing Possible Solutions to a Program that Meet the Criteria and Constraints of the Problem *(Engineering Design)*

Quarter Four
March 29, 2019 - June 14, 2019 (46 Days)

Content To Be Taught:

- Developing a Model to Describe Wave, Amplitude, Wavelength and Movement
- Developing a Model to Describe Vision and Reflecting Light from Objects
- Planning and Carrying Out Fair Test with Controlled Variable to Improve a Model or Prototype *(Engineering Design)*
- Constructing an Argument that Plants and Animals have Internal and External Structures for their Survival, Growth, Behavior and Reproduction
- Using a Model to Describe How Animals Use their Senses to Process Information

	• Defining a Simple Design Problem with Specified Criteria for Success and Constraints on Materials, Time or Cost (*Engineering Design)*

KIDS FOR SCIENCE (KFS) STEM FAIR For Grades 3-5

The 2019 Kids for Science (KFS) STEM Fair (county-wide) for grades 3-5, will be held at Eleanor Roosevelt High School Friday, May 17 - Saturday, May 18, 2019. Parents and guardians will have to speak with the School's STEM Fair Coordinator regarding their child's participation. Student must take part in their school-based STEM Fair in order to be considered for selection to KFS by the STEM Fair Coordinator and their committee.

Next Generation Science Standards Parents' Guide

https://www.nextgenscience.org/ and https://www.nextgenscience.org/parentguides

As the Next Generation Science Standards (NGSS) are implemented in PGCPS, they will enable students to: Develop a deeper understanding of science beyond memorizing facts, and Experience similar scientific and engineering practices as those used by professionals in the field.

How can you support your child's success?
Although this new approach to teaching and learning K–12 science is different than the past, you can still actively support your child's success in the classroom!

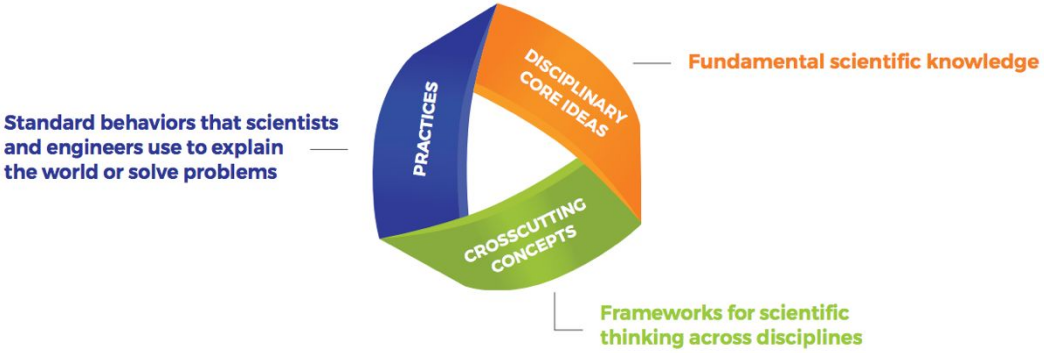
1. Speak to your child's teacher(s) or principal about how these important changes affect your school.	2. Ask your child's teacher thoughtful questions based on the information provided in this syllabus.	3. Learn how you can help the teacher(s) reinforce classroom instruction at home.

Next Generation Science Standards Performance Expectations (PEs)

Performance Expectations state what students should be able to do in order to demonstrate that they have met the standard, thus providing the same clear and specific targets for curriculum, instruction, and assessment.

Three Dimensional Learning (3D Learning)

The NGSS emphasizes three distinct, yet equally important dimensions that help students learn science. Each dimension is integrated into the NGSS and—combined—the three dimensions build a powerful foundation to help students build a cohesive understanding of science over time.



Dimension 1: Science and Engineering Practices (SEPs): *The practices describe behaviors that scientists engage in as they investigate and build models and theories about the natural world and the key set of engineering practices that engineers use as they design and build models and systems. This dimension emphasizes that engaging in scientific investigation requires not only skill but also knowledge that is specific to each practice.*

1. Asking questions (for science) and defining problems (for engineering)

2. Developing and using models
3. Planning and carrying out investigations
4. Analyzing and interpreting data
5. Using mathematics and computational thinking
6. Constructing explanations (for science) and designing solutions (for engineering)
7. Engaging in argument from evidence
8. Obtaining, evaluating, and communicating information

Dimension 2: Crosscutting Concepts (CCCs): *Crosscutting concepts describe concepts that bridge disciplinary boundaries, having explanatory value throughout much of science and engineering. These crosscutting concepts have application across all domains of science; they are a way of linking the different domains of science. The Framework emphasizes that these concepts need to be made explicit for students because they provide an organizational schema for interrelating knowledge from various science fields into a coherent and scientifically based view of the world.*

1. Patterns
2. Cause and effect: Mechanism and explanation
3. Scale, proportion, and quantity
4. Systems and system models
5. Energy and matter: Flows, cycles, and conservation
6. Structure and function
7. Stability and change

Dimension 3: Disciplinary Core Ideas (DCIs): *Disciplinary core ideas have the power to focus K–12 science curriculum, instruction, and assessments on the most important aspects of science. To be considered core, the ideas met at least two of the following criteria and ideally all four:*

- *Have **broad importance** across multiple sciences or engineering disciplines or be a key organizing concept of a single discipline;*
- *Provide a **key tool** for understanding or investigating more complex ideas and solving problems;*
- *Relate to the **interests and life experiences of students** or be connected to societal or personal concerns that require scientific or technological knowledge;*
- *Be teachable and learnable over multiple grades at increasing levels of depth and sophistication.*
- *Disciplinary ideas are grouped in four major domains: physical sciences; the life sciences; the earth and space sciences; and engineering, technology and applications of science.*

Physical Sciences (PS)	***Life Sciences (LS)***
PS1: Matter and its interactions PS2: Motion and stability: Forces and interactions PS3: Energy PS4: Waves and their applications in technologies for information transfer	LS1: From molecules to organisms: Structures and processes LS2: Ecosystems: Interactions, energy, and dynamics LS3: Heredity: Inheritance and variation of traits LS4: Biological evolution: Unity and diversity

Earth and Space Sciences (ESS) ESS1: Earth's place in the universe ESS2: Earth's systems ESS3: Earth and human activity	***Engineering, Technology, and Applications of Science (ETS)*** ETS1: Engineering design ETS2: Links among engineering, technology, science, and society

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Parents please sign this page and return to the classroom teacher.

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Student's Name	Parent's/Guardian's Signature	Date