

# Pequannock Township School District

## Curriculum Syllabus

### STEM- Fourth Grade

#### Course Description:

The Fourth Grade science curriculum has been designed to continue to develop students' scientific practices relating to the world around them. This will be explored through formal laboratory experiences and informal demonstrations/labs. Other methods employed are reading, writing, computer searches, and other technologies that complement or enhance the topics studied. Lab reports using data gathered during experiments engenders critical thinking skills. Topics include: Pushes and Pulls, Weather, The Effects of the Sun, and Basic Needs of Living Things. Wherever possible, these topics are related to real life situations so that students see the value and importance of their studies.

#### Course Standards:

The following is a list of NJSLS that describe what students are expected to know and be able to do as a result of successfully completing this course. The following NJSLS are the basis of the assessment of student achievement. The learner will demonstrate mastery of:

- 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.
- 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.
- 4-LS4-2: Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen.
- 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-PS4-3: 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.
  - W.4.7: Conduct short research projects that build knowledge through investigation of different aspects of a topic. (4-ESS1-1)
  - W.4.8: Recall relevant information from experiences or gather relevant information from print and digital sources; take notes and categorize information, and provide a list of sources. (4-ESS2-1),(4-ESS1-1)
  - W.4.9: Draw evidence from literary or informational texts to support analysis, reflection, and research. (4-ESS1-1)
  - W.5.7: Conduct short research projects that use several sources to build knowledge through investigation of different aspects of a topic. (3-5-ETS1-3)
  - W.5.8: Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work, and provide a list of sources. (3-5-ETS1-3)
  - W.5.9: Draw evidence from literary or informational texts to support analysis, reflection, and research. (3-5-ETS1-3)
  - RI.4.1: Refer to details and examples in a text when explaining what the text says explicitly and when drawing inferences from the text. (4-ESS3-2)
  - RI.4.3: Explain events, procedures, ideas, or concepts in a historical, scientific, or technical text, including what happened and why, based on specific information in the text. (4-PS3-1)
  - RI.4.7: Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, time lines, animations, or interactive elements on Web pages) and explain how the information contributes to an understanding of the text in which it appears. (4-ESS2-2)
  - RI.4.9: Integrate information from two texts on the same topic in order to write or speak about the subject knowledgeably. (4-ESS3-2)
  - RI.5.1: Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text. (3-5-ETS1-2) Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently.

- RI.5.9: Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably. (3-5-ETS1-2)
- SL.4.5: Add audio recordings and visual displays to presentations when appropriate to enhance the development of main ideas or themes. (4-LS1-2),(4-LS4-2)
- MP.2: Reason abstractly and quantitatively. (4-ESS2-1), (4-ESS1-1)
- MP.4: Model with mathematics. (4-ESS2-1), (4-ESS1-1)
- MP.5: Use appropriate tools strategically. (4-ESS2-1)
- 4.OA.A.1: Interpret a multiplication equation as a comparison, e.g., interpret  $35 = 5 \times 7$  as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations. (4-ESS3-2)
- 4.OA.A.3: Solve multistep word problems posed with whole numbers and having whole number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding. (4-PS3-4)
- 4.G.A.1: Identify these in two-dimensional figures. (4-PS4-2)
- 4.MD.A.1: Know relative sizes of measurement units within one system of units including km, m, cm; kg, g; lb, oz.; l, ml; hr, min, sec. Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. Record measurement equivalents in a two-column table. (4-ESS2-1), (4-ESS1-1)
- 4.MD.A.2: Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale. (4-ESS2-1)
- 3.OA: Mathematics - Operations and Algebraic Thinking (3-ETS1-1),(3-ETS1-2)
- 3-5.OA: Operations and Algebraic Thinking (3-ETS1-2)

## Scope and Sequence

	Unit Title	STEM or Humanities	Weeks
	NJ Colonial Life/Government	Humanities	4 wks
	Weathering & Erosion Earth's Processes <i>(before introduce CER &amp; 5E Model)</i>	STEM	5.5 wks
	Lenape Life	Humanities	6 wks
	Structures & Functions	STEM	2 wks
	How Organisms Process Information	STEM	1 wk

	African American History	Humanities	6 wks
	Transfer of Energy	STEM	2 wks
	Force & Motion	STEM	2 wks
	Using Engineering Design with Force & Motion System	STEM	2 wks
	NJ & Road to Revolution	Humanities	5 wks
	Waves & Information	STEM	3 wks

## Assessments

Evaluation of student achievement in this course will be based on the following:

**Formative Monitoring (Questioning / Discussion):** Class/Group Discussion, Investigations, Simulations, Graphic Organizers, Teacher Observation

**Summative Assessment (Quiz / Project / Report):** CER writing, Quiz, Unit Assessment, Labs, Models

## Curriculum Resources

Brain Pop

<https://www.youtube.com/watch?v=guTek7ipD4U>

<https://www.youtube.com/watch?v=ETRK0tUKMjA>

<http://www.weatherwizkids.com/weather-earthquake.htm>

<http://www.kidsgeo.com/geology-for-kids/0044-plate-boundaries.php>

[https://i0.wp.com/planetprinceton.com/wp-content/uploads/2016/04/DSC\\_7202.jpg?resize=700%2C464](https://i0.wp.com/planetprinceton.com/wp-content/uploads/2016/04/DSC_7202.jpg?resize=700%2C464)

<https://www.youtube.com/watch?v=DrdMmtgpcG8>

<http://daffodilusa.org/wp-content/uploads/2013/10/Innersecretsrevealed.pdf>

<http://daffodilusa.org/wp-content/uploads/2013/10/Daffodil-Biology-Lab-Text.pdf>

<http://www.bbsrc.ac.uk/bbsrc/cache/file/277CD3E7-6173-4352-931C3364FA5CED83.swf>

<http://www.sciencekids.co.nz/gamesactivities/plantsgrow.html>

<http://www.kcedventures.com/images/plantbubbles.jpg>

<https://www.schooltube.com/video/fb2610637d894ba3825b/Energy>

[https://www.youtube.com/watch?v=2UHS883\\_P60](https://www.youtube.com/watch?v=2UHS883_P60)

<http://www.youtube.com/watch?v=XNqUnGT1qDE>

<https://www.youtube.com/watch?v=N6NIgPIh7HU>

<https://external-wiki.terc.edu/display/EnergyLens/Marble+Collisions>

<https://www.youtube.com/watch?v=dOBmBfb-bz0>

<http://www.ducksters.com/science/physics/waves.php>

[http://www.classzone.com/books/ml\\_science\\_share/vis\\_sim/wslm05\\_pg18\\_graph/wslm05\\_pg18\\_graph.html](http://www.classzone.com/books/ml_science_share/vis_sim/wslm05_pg18_graph/wslm05_pg18_graph.html)

<http://www.youtube.com/watch?v=aIcLzDB8NR8>

[http://www.youtube.com/watch?v=tRz17Z\\_VC08](http://www.youtube.com/watch?v=tRz17Z_VC08)

[http://www.ehow.com/about\\_6590474\\_history-data-communications.html](http://www.ehow.com/about_6590474_history-data-communications.html)

[http://www.youtube.com/watch?v=oo0hSZ9R\\_Xk&safe=active](http://www.youtube.com/watch?v=oo0hSZ9R_Xk&safe=active)

<http://www.radio-electronics.com/info/formulae/radio-operation/morse-code.php>

<https://spweb.tbaisd.k12.mi.us/sites/home/instructionalresources/science/pk8resources/3rd%20Grade/3rd%20Grade%20Unit%20%20Light%20and%20Sound%20-%20Color%20and%20Heat%20Absorption%20Teacher%20Version.doc>

## **Home and School Connection**

The following are suggestions and/or resources that will help parents support their children:

- Engage in reading with your child
- Visit a science museum
- Explore the outdoors
- Watch Bill Nye The Science Guy
- Plant a garden
- Measure Rainfall