PETERSBURG City Public Schools

PHYSICS: SEMESTER 2

Science

Curriculum & Pacing

2025-2026

Department of
Curriculum and Instruction

Welcome & Introduction

Greetings from the Petersburg City Public Schools Department of Curriculum and Instruction. The Curriculum and Instruction Team is excited that you are with us in our journey toward success. To ensure we reach our goal, we have put together a curriculum that will lead to academic success for our students. The Petersburg City Public Schools Curriculum is based on the Virginia Department of Education (VDOE) Standards of Learning for Virginia Public Schools and is further defined by the VDOE Standards of Learning Curriculum Framework. This Curriculum provides guidance to teachers as they develop instruction appropriate for their students. It assists teachers as they plan their lessons by identifying essential understandings, skills, and processes students need to master. The curriculum specifically outlines the minimum content that all teachers should teach and all students should learn.

Teachers should use the curriculum provided by the Department of Curriculum and Instruction as a resource for developing instruction without limiting the scope of instruction. Additional knowledge and skills that can enrich and enhance students' understanding of the content identified in the curriculum should be included as a part of quality learning experiences.

The Petersburg City Public Schools Curriculum reflects the knowledge and skills that students are accountable for on the VDOE Standards of Learning assessments that are administered each school year. Students are expected to connect and apply knowledge and skills from the curriculum presented in previous grades as they build their understanding and expertise.

The Petersburg City Public Schools Curriculum also serves as a guide for Standards of Learning assessment development. Assessment items may not and should not be a verbatim reflection of the information presented in the Curriculum Framework.

Each unit and topic in this Curriculum Guide is derived from the VDOE Standards of Learning. The format of the Curriculum Guide facilitates teacher planning by identifying the key questions, concepts, knowledge, and skills that should be the focus of instruction for each standard. The curriculum document is divided into eleven rows of content: *Standard, Key Concepts, Essential Knowledge and Practices, Enduring Understandings, Essential Questions, Academic Vocabulary (Tier 2 and 3), I Can Statements, Texts and Resources, Manipulatives, Misconceptions, Performance Task/Cross Curriculum, Gifted/Enrichment Activities, WIDA English Language Development Standards, and ESOL & SPED Strategies.*

Standard:
The overarching standard.

Substandard:
The detail standards connected to the overarching standard

Essential Knowledge and Skills:
This section provides a detailed expansion of the mathematics knowledge and skills that each student should know and be able to demonstrate. This is not meant to be an exhaustive list of student expectations.

Blooms & Question Stems:
The cognitive level that is needed to reach mastery of the overarching standard, substandard, and/or essential knowledge and skill. What students must be able to do with what they know.

Essential Questions:

Questions that identify key concepts, ideas, and relationships that all students should be able to grasp in order to demonstrate an understanding of the standard.

Academic Vocabulary (Tier 2 and 3):
This is the key vocabulary that is essential to the instruction of the new concepts and skills in the standard.

I Can Statements:
This is the learning target for the standard.

Texts & Resources:
This is a list of all text, textbook pages, links, games, activities, online interactives, and other resources that are aligned to the standard to be used for planning and instruction.

Manipulatives/Materials Needed:
This is a list of all hands-on resources that could be used during the planning and instruction of the standard.

Performance Tasks/Cross-Curriculum:
This is any learning activity or assessment that asks students to perform to demonstrate their knowledge, understanding, and proficiency. Performance tasks yield a tangible product and/or performance that serve as evidence of learning.

Gifted/Enrichment Activities
These are activities and interactive resources that extend learning and challenge students to use old concepts in new ways, while bringing new ideas to light.

WIDA English Language Development Standards:
This is the social, instructional, and academic language that students need to engage with peers, educators, and the curriculum in schools.

ESOL & SPED Strategies:
These are strategies that help meet all the needs and demands of our ESOL (English for Speakers of Other Languages) and SPED (Special-Needs Education) students.

The *2018 Virginia Science Standards of Learning Curriculum Framework* amplifies the *Science Standards of Learning for Virginia Public Schools* (SOL) and defines the content knowledge, skills, and understandings that provide a foundation in science concepts and practices. The framework provides additional guidance to school divisions and their teachers as they develop an instructional program appropriate for their students. It assists teachers as they plan their lessons by identifying enduring understandings and defining the essential science and engineering practices students need to master. This framework delineates in greater specificity the minimum content requirements that all teachers should teach and all students should learn.

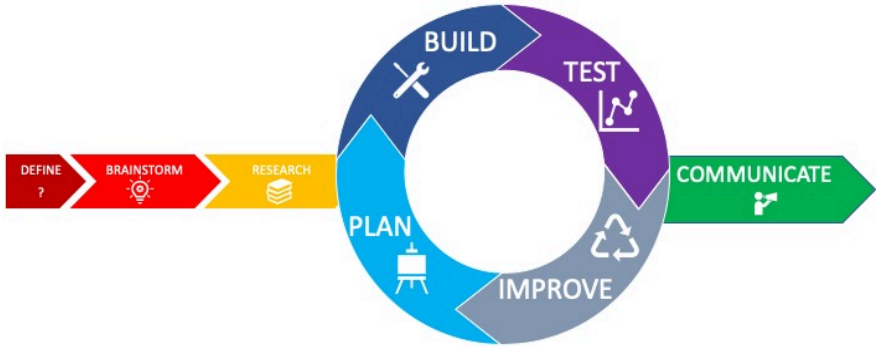
Each topic in the framework is developed around the SOL. The format of the framework facilitates teacher planning by identifying the enduring understandings and the scientific and engineering practices that should be the focus of instruction for each standard. The categories of scientific and engineering practices appear across all grade levels and content areas. Those categories are: asking questions and defining problems; planning and carrying out investigations; interpreting, analyzing, and evaluating data; constructing and critiquing conclusions and explanations; developing and using models; and obtaining, evaluating, and communicating information. These science and engineering practices are embedded in instruction to support the development and application of science content.

Science and Engineering Practices

Science utilizes observation and experimentation along with existing scientific knowledge, mathematics, and engineering technologies to answer questions about the natural world. Engineering employs existing scientific knowledge, mathematics, and technology to create, design, and develop new devices, objects, or technology to meet the needs of society. By utilizing both scientific and engineering practices in the science classroom, students develop a deeper understanding and competence with techniques at the heart of each discipline.

Engineering Design Practices

Engineering design practices are similar to those used in an inquiry cycle; both use a system of problem solving and testing to come to a conclusion. However, unlike the inquiry cycle in which students ask a question and use the scientific method to answer it, in the engineering and design process, students use existing scientific knowledge to solve a problem. Both include research and experimentation; however, the engineering design process has a goal of solving a societal problem and may have multiple solutions. More information on the engineering and design process can be found at https://www.eie.org/overview/engineering-design-process.



The Engineering Design Process:

1. Define: Define the problem, ask a question
2. Imagine: Brainstorm possible solutions
3. Research: Research the problem to determine the feasibility of possible solutions
4. Plan: Plan a device/model to address the problem or answer the question
5. Build: Build a device/model to address the problem or answer the question
6. Test: Test the device/model in a series of trials
    a) Does the design meet the criteria and constraints defined in the problem?
        i. Yes? Go to Share (#8)
        ii. No? Go to Improve (#7)
7. Improve: Using the results of the test, brainstorm improvements to the device/model; return to #3
8. Share: Communicate your results to stakeholders and the public

Computational Thinking

The term *computational thinking* is used throughout this framework. Computational thinking is a way of solving problems that involves logically organizing and classifying data and using a series of steps (algorithms). Computational thinking is an integral part of Virginia's computer science standards and is explained as such in the *Computer Science Standards of Learning*:

Computational thinking is an approach to solving problems that can be implemented with a computer. It involves the use of concepts, such as abstraction, recursion, and iteration, to process and analyze data, and to create real and virtual artifacts. Computational thinking practices such as abstraction, modeling, and decomposition connect with computer science concepts such as algorithms, automation, and data visualization. [Computer Science Teachers Association & Association for Computing Machinery]

Students engage in computational thinking in the science classroom when using both inquiry and the engineering design process. Computational thinking is used in laboratory experiences as students develop and follow procedures to conduct an investigation.

- VDOE Science Instructional Resources
- Using Statewide SOL Test Results to Guide Instruction – Examples of challenging SOL content based on statewide results
- ESS Sample Lesson Plans – align instruction with the 2018 Science SOL by providing examples of how the knowledge, skills and processes found in the SOL and curriculum framework can be presented to students in the classroom.
- Science and Engineering Progression: K-12 (Word) – The Science and Engineering Practices Progression chart identifies grade level expectations for each of the six practices as students progress through elementary school.
- K-3 Science Progression (PDF) – Shows the progression of standards from kindergarten through third grade and how they relate to reporting categories on the Grade 3 Science SOL Test Blueprint.
- VDOE Safety in Science Teaching (2023) (Word)

Physics 2025 - 2026 Year at a Glance Based on CIP											
SOL	Instructional Focus	Days	SOL	Instructional Focus	Days	SOL	Instructional Focus	Days	SOL	Instructional Focus	Days
P.H. 1a-f	Unit 1: Scientific and Engineering Practices/ Building a Science Community	9 1/16-1/29	PH.1a-f PH.3a-b	Unit 3: Laws of Motion	10 2/20-3/6	PH.1a-f PH.7a-b	Unit 5: Forces and Fields	15 3/25-4/22	PH.1a-f PH.5a-c	Unit 7: Waves: Vibrations, Sounds, and Light	10 5/6-5/19
PH.1a-f PH.2a-b	Unit 2: One-Dimensional Motion: Describing Motion	13 1/30-2/19	PH.1a-f PH.4a-b	Unit 4: Momentum and Collisions/Potential and Kinetic Energy	10 3/9-3/24	PH.1a-f PH.8a-e	Unit 6: Electrical Energy and Circuits	8 4/23-5/5	PH.1a-f PH.9a-i	Unit 8: Newtonian Physics: Beyond Newton	10 5/20-25/28
		22			20			23			21
					42 days						42 days