

PA Core Standards: Science

Introduction

The 2020–21 school year presents a unique set of opportunities and challenges due to the disruption to instruction in spring 2020 as well as the uncertainty as the school year unfolds. Educators know that every school year there are students who require support in addressing unfinished learning from prior grades; a challenge that will be felt more prominently in the 2020–21 school year. It is vitally important that educators are supported to make deliberate instructional choices that allow all students to effectively engage with grade-level work.

The most effective and equitable way to support students in their learning is to ensure that the vast majority of time is spent engaging with grade-level content and accelerating as needed. It is entirely possible to hold high expectations for all students while addressing unfinished learning in the context of grade-level work. Since time is a scarce commodity in classrooms — made more limited by anticipated closures and remote or hybrid learning models in the fall of 2020 — strategic instructional choices about which content to prioritize must be made.¹

Assessing students at the start of the year will identify learning gaps and provide data to inform instruction. Diagnostic Assessments determine student strengths, weaknesses, knowledge, and skills. Administering diagnostic assessments permits the instructor to intervene at the point where students begin to struggle or when they are performing below grade level expectations (running record, Classroom Diagnostic Tests [CDT]). Diagnostic assessments allow teachers to adjust the curriculum to meet the unique needs of all students. While some concepts have greater emphasis in a particular year, all standards deserve a defined level of instruction. Neglecting concepts may result in learning gaps in student skill and understanding and may leave students unprepared for the challenges of a later grade.

This guidance document is designed to identify and define areas of high-level focus in Science instruction supported by key PA Academic Standards. Note that while all standards deserve a defined level of instruction, neglecting key concepts may result in learning gaps in student skill and understanding and may leave students unprepared for the challenges of a later grade. Not all content in a given grade is emphasized equally in the standards. Some focus areas require greater emphasis than others based on the depth of the ideas, the time taken to master, and/or their importance to the future science grade levels. More time in these areas is also necessary for students to meet the Standards for Inquiry and Design and Unifying Themes.

¹ Adapted from 2020–21 Priority Instructional Content in English Language Arts/literacy and Mathematics, Student Achievement Partners/Achieve the Core. May 2020

GRADE 6 – 8 FOCUS OF INSTRUCTION (2020-2021)

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Focus Areas of Instruction	PA Academic Standards
<p>Earth and Space Science</p> <ul style="list-style-type: none"> Identify and explain monthly patterns in the phases of the Moon. Use models of the Earth-Sun-Moon system to support explanations and predict the cyclic patterns of eclipses. Use models of Earth's orientation and motion to explain how changes in intensity and duration of daily sunlight lead to seasons. Construct and use scale models to describe the relationship of Earth to the rest of the solar system, the Milky Way Galaxy, and the universe. Construct and analyze models to describe systems interactions among the geosphere, hydrosphere, atmosphere, and biosphere. Plan and carry out investigations that investigate models of the chemical and physical processes that cycle earth materials and form rocks. Compare and contrast various soil types and their characteristics found in different biomes and explain how they were formed. Develop models for the movement of water within the Earth's spheres (i.e., geosphere, hydrosphere, biosphere, atmosphere). Compare and contrast characteristics of freshwater and saltwater systems on the basis of their physical characteristics. Investigate water systems to identify seasonal and annual variations in precipitation and streamflow and the causes of those variations. Construct and use models to support the explanation of how the uneven distribution of solar energy affects global patterns in atmospheric and oceanic circulation. Analyze weather patterns using cloud types, wind directions, and barometric pressure. Use geologic evidence to construct patterns and determine the relative ages and sequence of geologic events in Earth's 4.6 billion year history. Construct an explanation based on evidence for how various processes have changed Earth's surface at varying time and spatial scales (e.g., short-term deposition vs. mountain building; short-term weathering and erosion vs. canyon or valley formation). Develop and use models of past plate motions to support explanations of existing patterns in the fossil record, rock record, continental shapes and sea floor structures. Use models to explain how the flow of energy (convection of heat) drives the cycling of matter between Earth's surface and deep interior. Use maps and other data to explain how geologic processes have led to the uneven distribution of Earth's natural resources. 	<p>3.1.7.A Explain the parts of a simple system and their relationship to each other.</p> <p>3.1.7.B Describe the use of models as an application of scientific or technological concepts.</p> <p>3.1.7.C Identify patterns as repeated processes or recurring elements in science and technology.</p> <p>3.1.7.D Explain scale as a way of relating concepts and ideas to one another by some measure.</p> <p>3.2.7.A Explain and apply scientific and technological knowledge.</p> <p>3.2.7.B Apply process knowledge to make and interpret observations.</p> <p>3.2.7.C Identify and use the elements of scientific inquiry to solve problems.</p> <p>3.2.7.D Know and use the technological design process to solve problems.</p> <p>3.4.7.D Describe essential ideas about the composition and structure of the universe and the earth's place in it.</p> <p>3.5.7.A Describe earth features and processes.</p> <p>3.4.7.B Describe essential ideas about the composition and structure of the universe and the earth's place in it.</p> <p>3.5.7.C Describe basic elements of meteorology.</p> <p>3.5.7.D Explain the behavior and impact of the earth's water systems.</p>