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DEPARTMENT OF EDUCATION

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 then 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

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

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Focus Areas of Instruction	PA Academic Standards
Physical Science • Plan investigations to generate evidence supporting the claim that one pure substance can be distinguished from another based on given characteristic properties. • Plan and carry out investigations to determine the effect on the total mass of a substance when the substance changes shape, phase, and/or is dissolved. • Investigate the interaction of two or more substances to determine whether a new substance is formed when materials are mixed. • Develop representations of reactants and products showing how atoms regroup during chemical reactions and have new properties. • Construct models comparing the arrangement and motion of molecules within solids, liquids and gases of the same substance. • Develop a simple model using given data that represents the relationship of gravitational interactions (force, mass, distance) and the motion of objects in space. • Communicate qualitative observations and information graphically and mathematically to represent how an object's relative position, velocity, and direction of motion are affected by forces acting on the object. • Given a scenario involving simple machines, qualitatively compare the mechanical advantage of each. Based on this analysis, argue which machine is best for the task. • Use a drawing or physical representation of wave properties to explain amplitude, frequency, and wavelength of different waves in the electromagnetic spectrum. • Through the use of models, explain the transmission of sound waves through different mediums.	**3.1.7.B** *Describe the use of models as an application of scientific or technological concepts.* **3.1.7.C** *Identify patterns as repeated processes or recurring.* **3.1.7.D** *Describe essential ideas about the composition and structure of the universe and the earth's place in it.* **3.4.7.A** *Describe concepts about the structure and properties of matter.* **3.4.7.B** *Relate energy sources and transfers to heat and temperature.* **3.4.7.C** *Identify and explain the principles of force and motion.* **3.4.7.D** *Describe essential ideas about the composition and structure of the universe and the earth's place in it.*