

## PA Core Standards: Mathematics

### 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, remediating with precision 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.<sup>1</sup>

Assessing students at the start of the year will identify learning gaps and provide data to inform grade level instruction — as well as incorporating both remediation and acceleration along the way. 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, informal reading assessments, surveys, initial writing prompts, 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 Mathematics 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 mathematics grade levels. More time in these areas is also necessary for students to meet the Standards for Mathematical Practice (MP).

---

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

## GRADE 8 FOCUS OF INSTRUCTION (2020-2021)

This guidance document is designed to identify and define areas of high-level focus in Mathematics 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 skill and understanding and may leave students unprepared for the challenges of later grades.

Focus Areas of Instruction	PA Academic Standards
<p><b>Numbers and Operations</b></p> <ul style="list-style-type: none"> <li>• <b>Rational Numbers and Irrational Numbers:</b> Distinguish between rational and irrational numbers using their properties.</li> </ul>	<p><b>CC.2.1.8.E.4</b> <i>Estimate irrational numbers by comparing them to rational numbers.</i></p> <p><b>CC.2.2.8.B.1</b> <i>Apply concepts of radicals and integer exponents to generate equivalent expressions.</i></p>
<p><b>Algebraic Concepts</b></p> <ul style="list-style-type: none"> <li>• <b>Expressions:</b> Apply concepts of integer exponents to generate equivalent expressions. Use and evaluate square roots and cube roots to represent solutions to equations.</li> <li>• <b>Linear Equations:</b> Analyze and describe linear relationships between two variables, using slope. Make connections between slope, lines and linear equations. Analyze, model and solve linear equations, Analyze and solve pairs of simultaneous equations. Interpret solutions to a linear equation and systems of two linear equations.</li> <li>• <b>Functions:</b> Define, interpret, and compare functions displayed algebraically, graphically, numerically in tables, or by verbal descriptions. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values.</li> </ul>	<p><b>CC.2.2.8.B.2</b> <i>Understand the connections between proportional relationships, lines, and linear equations.</i></p> <p><b>CC.2.2.8.B.3</b> <i>Analyze and solve linear equations and pairs of simultaneous linear equations.</i></p> <p><b>CC.2.2.8.C.1</b> <i>Define, evaluate, and compare functions.</i></p> <p><b>CC.2.2.8.C.2</b> <i>Use concepts of functions to model relationships between quantities.</i></p> <p><b>CC.2.3.8.A.2</b> <i>Understand and apply congruence, similarity, and geometric transformations using various tools.</i></p> <p><b>CC.2.3.8.A.3</b> <i>Understand and apply the Pythagorean Theorem to solve problems.</i></p> <p><b>CC.2.4.8.B.1</b> <i>Analyze and/or interpret bivariate data displayed in multiple representations.</i></p>
<p><b>Geometry</b></p> <ul style="list-style-type: none"> <li>• <b>Geometric Relationships:</b> Use various tools to understand and apply geometric transformations to geometric figures. Apply the Pythagorean Theorem and its converse to solve mathematical problems in two and three dimensions.</li> </ul>	<p><b>Standards for Mathematics Practices</b></p> <p><b>MP1: Make sense of problems and persevere in solving them.</b> <i>Embed a systems and routines that allow students to engage in productive struggle and take ownership in their progress and growth toward intended learning outcomes.</i></p> <p><b>MP4: Model with mathematics.</b> <i>Include regular collaborative opportunities for students to work together with others as a team on modeling tasks that provide multiple pathways for success and that require reasoning and problem solving.</i></p>
<p><b>Measurement, Data and Probability</b></p> <ul style="list-style-type: none"> <li>• <b>Data and Distributions:</b> Construct, analyze, and interpret bivariate data displayed in scatter plots, Identify and use linear models to describe bivariate measurement data. Use frequencies to analyze patterns of association seen in bivariate data.</li> </ul>	<p><b>MP5: Use appropriate tools strategically.</b> <i>Provide opportunities for students to consider tools they may use to solve a problem and justify its appropriateness.</i></p>