

PENNSYLVANIA DEPARTMENT OF EDUCATION
About the Mathematics Assessment Anchors

Introduction

This is a brief introduction to the Mathematics Assessment Anchors. For more information on the Assessment Anchors and how they were developed, please read the *General Introduction* provided on the website and the *Frequently Asked Questions*.

How the Assessment Anchors Connect to the Standards

The PA Academic Standards for Mathematics are:

- 2.1 Numbers, Number Systems and Number Relationships
- 2.2 Computation and Estimation
- 2.3 Measurement and Estimation
- 2.4 Mathematical Reasoning and Connections
- 2.5 Mathematical Problem Solving and Communication
- 2.6 Statistics and Data Analysis
- 2.7 Probability and Predictions
- 2.8 Algebra and Functions
- 2.9 Geometry
- 2.10 Trigonometry
- 2.11 Concepts of Calculus

All of the Mathematics Standards categories are still included on the PSSA but the Assessment Anchors tighten the focus of what is assessed. The Assessment Anchors also clarify what is expected from grade level to grade level. There is a clear vertical alignment in the Assessment Anchors that did not exist in the standards. Teachers will be able to see how concepts build on one another from year to year. In addition, the Assessment Anchors have fewer Reporting Categories to help create more valid scores (there are more items per reporting category). Rather than report student results in all 11 standards, the reports will be organized into five major categories.

How the Assessment Anchors are Organized

These categories are similar to the five NCTM (National Council of Teachers of Mathematics) Standards and the five NAEP (National Assessment of Educational Progress) Reporting Categories. Each PA Standard Category was examined and then placed in the appropriate Reporting Category. Some of the specific Standards Statements cut across different Reporting Categories (e.g., 2.11- Concepts of Calculus, which occurs in different categories rather than being a separate category). The following is a general summary of where the bulk of the PA Mathematics Standards can be found in the Reporting Categories:

Reporting Category	Standard
A. Numbers & Operations	2.1 (Numbers) & 2.2 (Computation)
B. Measurement	2.3 (Measurement)
C. Geometry	2.9 (Geometry) & 2.10 (Trigonometry)
D. Algebraic Concepts	2.8 (Algebra)
E. Data Analysis & Probability	2.6 (Statistics & Data) & 2.7 (Probability)

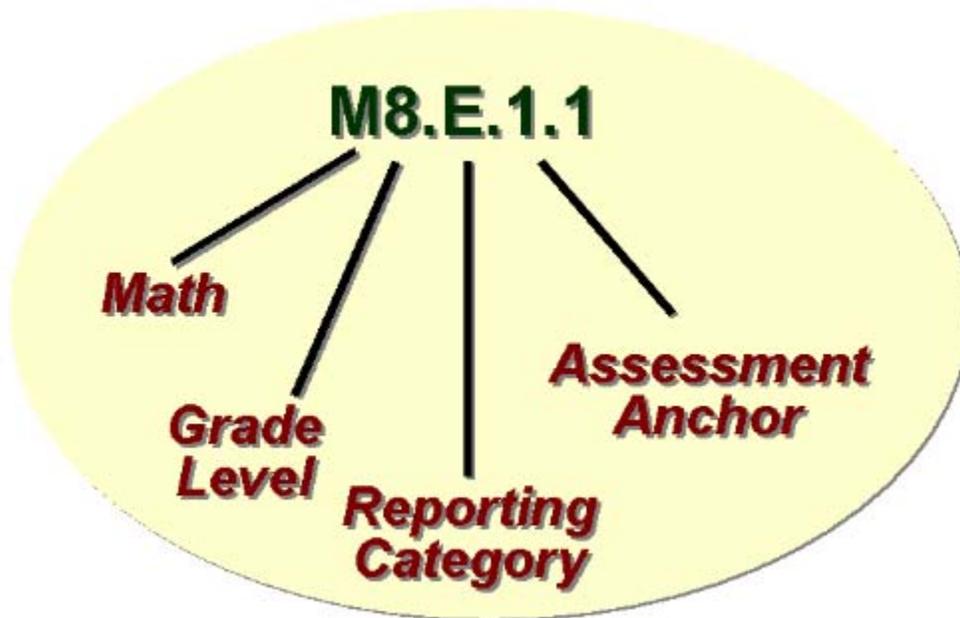
Important Patterns

The PA Mathematics Standards 2.4 (Reasoning) and 2.5 (Problem Solving) are not listed in the chart above. These two standards are not included because the above Reporting Categories focus on **content** (not **process**) and both Reasoning and Problem Solving are processes. However, knowing how to perform these processes is a very important part of the PSSA. Most of the multiple-choice items and all of the open-ended items will require students to know how to reason and solve problems, in addition to being knowledgeable about the content area being assessed. Even though Problem Solving is not one of the five content Reporting Categories, the PSSA will still show a separate score for the open-ended items on the school report, reflecting students' problem solving performance.

How to Read the Assessment Anchors

The Mathematics Assessment Anchors begin with an “M” to distinguish them from the Reading Assessment Anchors “R”. The number after the “M” in the label is the grade level (e.g., M8 would be Mathematics at eighth grade). The second letter in the labeling system is the Reporting Category (A through E). The same reporting categories continue across all Grade levels, 3 through 8 and 11. The final number in the label is the actual Assessment Anchor. (e.g., 1.1, 1.2, 1.3 etc.) Essentially, you read the Assessment Anchors like an outline, with the Assessment Anchor shaded across the top of the page and more specific details underneath.

For example, M8.E.1.1 is a Mathematics Assessment Anchor (M stands for Math) at 8th Grade (8). The E indicates that this Anchor is in the Data Analysis and Probability Reporting Category and the 1.1 means that it is the first Assessment Anchor in the Data Analysis and Probability Reporting Category (1.1). (*See below*)



NOTE: Below each specific descriptor of the Assessment Anchor is a reference in italics. This reference relates to the Pennsylvania Academic Standards and helps you cross-walk the Anchors to the Standards.

Eligible Content and Sample Items

Two other important features appear in this document:

Eligible Content. The column on the right-hand side of the page underneath each Assessment Anchor is the Eligible Content. This is often known as the “assessment limits” and helps teachers identify how the anchor will be assessed. Not all of the Eligible Content is assessed on the PSSA, but it shows the range of knowledge drawn upon to design the test.

Sample Items. The sample items appear on the bottom half of the page. These are examples of how the Assessment Anchor might appear on the PSSA. Some of the pages may not have any sample items because we only created three per Assessment Anchor. We will be continually adding to the sample items. For other sample items teachers should consult the released items on the state website.

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Overview of Mathematics Assessment Anchors

**Note that on this overview document, the grade level does not appear because these anchors occur at all Grade levels 3 through 8 and 11.*

MA. Numbers and Operations

MA.1 Demonstrate an understanding of numbers, ways of representing numbers, relationships among numbers and number systems.

MA.2 Understand the meanings of operations, use operations and understand how they relate to each other.

MA.3 Compute accurately and fluently and make reasonable estimates.

MB. Measurement

MB.1 Demonstrate an understanding of measurable attributes of objects and figures, and the units, systems and processes of measurement (not assessed at Grade 11).

MB.2 Apply appropriate techniques, tools and formulas to determine measurements.

MC. Geometry

MC.1 Analyze characteristics and properties of two- and three- dimensional geometric shapes and demonstrate understanding of geometric relationships.

MC.2 Identify and/or apply concepts of transformations or symmetry (not assessed at Grades 6, 7 or 11).

MC.3 Locate points or describe relationships using the coordinate plane (not assessed at Grade 3).

MD. Algebraic Concepts

MD.1 Demonstrate an understanding of patterns, relations and functions.

MD.2 Represent and/or analyze mathematical situations using numbers, symbols, words, tables and/or graphs.

MD.3 Analyze change in various contexts (not assessed at Grades 3, 4 or 8).

MD.4 Describe or use models to represent quantitative relationships (not assessed at Grade 3, 4, 5, 6 or 7).

ME. Data Analysis and Probability

ME.1 Formulate or answer questions that can be addressed with data and/or organize, display, interpret or analyze data.

ME.2 Select and/or use appropriate statistical methods to analyze data (not assessed at Grade 3).

ME.3 Understand and/or apply basic concepts of probability or outcomes.

ME.4 Develop and/or evaluate inferences and predictions or draw conclusions based on data or data displays (not assessed at Grades 3, 4, 5 or 6).