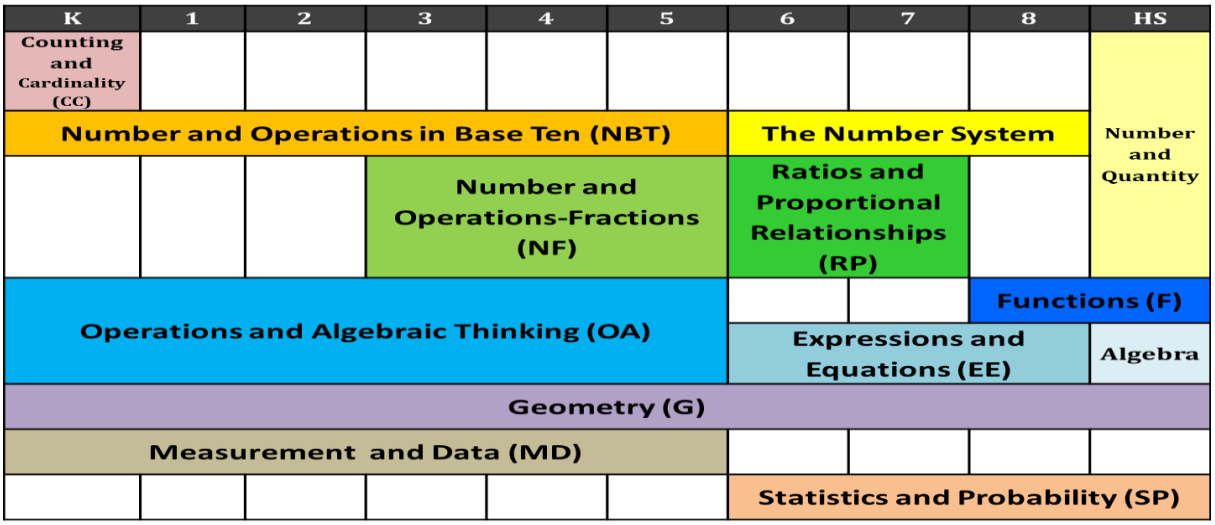
Mathematics Florida Standards (MAFS) Structure and Coding

Structure

There are several key components that comprise the basic structure of the Mathematics Florida Standards.

Domains are larger groups of related standards. It should be noted that standards from different domains may sometimes be closely related.



For each domain in kindergarten through grade 12, the shaded areas in the graphic above indicate the grade levels where it is addressed. Notice that most of the domains/conceptual categories span multiple grades level. That lends itself to the progression of mathematics and its coherence.

Clusters are groups of related standards. Please note that as with the domains, standards from different clusters may sometimes be closely related because mathematics is a connected subject.

Standards define what students should understand and be able to do. Some standards have substandards, meaning *a, b, c,* etc., all of which might not be in a course. For example, the Algebra 1 course description includes standard MAFS.912.F-IF.3.7, which has substandards *a-e*. Algebra 1 does not include substandard *d*.

In addition to the domains, clusters, and standards, the high school MAFS include conceptual categories. ***Conceptual Categories*** portray a coherent view of high school mathematics. The categories include: Number and Quantity abbreviated with an N; Algebra abbreviated with an A; Functions abbreviated with an F; Modeling abbreviated with an asterisk/star; Geometry abbreviated with a G; and Statistics and Probability abbreviated with an S. It is important to note that all the standards in the conceptual category of Algebra will not be included in, for example, the Algebra 2 course. In the same way, all the standards in the conceptual category of Geometry will not be

included in the Geometry course. High school courses are built of a combination of standards from multiple conceptual categories.

Critical Areas are the big ideas of school mathematics at each grade level. The critical areas are designed to bring focus to the standards at each grade by providing the big ideas that educators can use to build their curriculum and guide instruction. The grade level introductions (front matter of the course descriptions) include at least two and no more than four critical areas for each grade level. It is important that teachers are fully aware of the critical areas for their grade level as well as the critical areas from the prior grade level and the next grade level. This awareness is important for understanding the learning progression that contributes to the coherency of the standards.

Coding

Florida has a unique numbering scheme. There are 5 character places in the alphanumeric coding- the subject, grade level, domain and/or conceptual category, cluster, and standard.

K-8 Example

MAFS.K.CC.2.5

Subject	*MAFS*	Mathematics Florida Standards
Grade	*K*	Kindergarten
Domain	*CC*	Counting and Cardinality
Cluster	*2*	Count to tell the number of objects.
Standard	*5*	Count to answer "how many" questions about as many as 20 things arranged in a line, a rectangular array, or a circle, or as many as 10 things in a scattered configuration; given a number from 1-20, count out that many objects.

9-12 Example

MAFS.912.A-SSE.2.4

Subject	*MAFS*	Mathematics Florida Standards
Grade	*912*	High School
Conceptual Category and Domain	*A-SSE*	Algebra- Seeing Structures in Expressions
Cluster	*2*	Write expressions in equivalent forms to solve problems.
Standard	*4*	Derive the formula for the sum of a finite geometric series (when the common ratio is not 1), and use the formula to solve problems. *For example, calculate mortgage payments.* ★

You will notice a star/asterisk at the end of the standard. This denotes that it is a modeling standard from the ***Modeling*** conceptual category. Modeling is best interpreted not as a collection of isolated topics but in relation to other standards. Making mathematical models is a Standard for Mathematical Practice, and specific modeling standards appear throughout the high school standards indicated by a star symbol (★). It is important to note that there are 30 specific modeling standards throughout the high school standards. Look for a star/asterisk in the course descriptions to delineate.

One of the insights provided by mathematical modeling is that essentially the same mathematical or statistical structure can sometimes model seemingly different situations. Models can also shed light on the mathematical structures themselves, for example, as when a model of bacterial growth makes more vivid the explosive growth of the exponential function.

The basic modeling cycle involves (1) identifying variables in the situation and selecting those that represent essential features, (2) formulating a model by creating and selecting geometric, graphical, tabular, algebraic, or statistical representations that describe relationships between the variables, (3) analyzing and performing operations on these relationships to draw conclusions, (4) interpreting the results of the mathematics in terms of the original situation, (5) validating the conclusions by comparing them with the situation, and then either improving the model or, if it is acceptable, (6) reporting on the conclusions and the reasoning behind them. Choices, assumptions, and approximations are present throughout this cycle.

In descriptive modeling, a model simply describes the phenomena or summarizes them in a compact form. Graphs of observations are a familiar descriptive model— for example, graphs of global temperature and atmospheric CO_2 over time. Analytic modeling seeks to explain data on the basis of deeper theoretical ideas, albeit with parameters that are empirically based; for example, exponential growth of bacterial colonies (until cut-off mechanisms such as pollution or starvation intervene) follows from a constant reproduction rate. Functions are an important tool for analyzing such problems. Graphing utilities, spreadsheets, computer algebra systems, and dynamic geometry software are powerful tools that can be used to model purely mathematical phenomena (e.g., the behavior of polynomials) as well as physical phenomena.

Standards for Mathematical Practice Example

MAFS.K12.MP.5.1

Subject	*MAFS*	Mathematics Florida Standards
Grade	*K12*	Kindergarten through Grade 12
Domain	*MP*	Mathematical Practice
	5	Use appropriate tools strategically.
	1	**no meaning**

The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students. These practices rest on important "processes and proficiencies" with longstanding importance in mathematics education.

"The Standards for Mathematical Practice are unique in that they describe how teachers need to teach to ensure their students become mathematically proficient. We were purposeful in calling them standards because then they won't be ignored." ~Bill McCallum

Jason Zimba states that the Standards for Mathematical Practice develop dispositions and habits of mind that are *"characteristic of an educated person"*. Educated people are precise in thought, precise in the use of language and terms, and show precision of argument. Zimba continues to share that sense-making happens through conversation.

These standards will be repeated throughout the year and across all grade levels. You may notice that the standards are not unique to mathematics. For example, scientists and historians must also be able to construct viable arguments and critique the reasoning of others in their everyday work. Thus, these standards are found throughout all the disciplines and are comparable to the K-12 science and engineering practices in which you might be familiar. ***Note: the science and engineering practices are not adopted by Florida as standards, but they are naturally seen in STEM and CTE courses.***

It is important to note that the 5th place will always be a "1" for the Standards for Mathematical Practice. The "1" has no meaning but serves as a placeholder in fulfilling Florida's unique coding.