Iowa Core Mathematics Content and Practice Shifts

Grades 9-12

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The purpose of this document is to highlight potential Content and Practice Shifts in the high school curriculum as presented in the Iowa Core. The identified shifts may not apply to all districts. Consideration has been given to the varying course offerings by districts. The Iowa additions to the Common Core Standards are noted along with other content shifts.

It should be noted that 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. **A shift in pedagogy is an important focus of the Iowa Core Standards for Mathematics.**

The Learning Progressions are from The Common Core Standards Writing Team (http://ime.math.arizona.edu/progressions/)

+ indicates additional mathematics that students should learn in order to take advance courses such as calculus, advanced statistics, or discrete mathematics.
★indicates Modeling Standard

Conceptual Category	Content Shift (A shift may reside in more than one domain)	Contrasting Practice	Standards	Learning Progressions/ Connections
Number and Quantity	**Shift** to adding some mathematics of voting topics in higher-level courses to being for all students. (Iowa Addition) **Shift** to adding some basic mathematics of information processing and the Internet (Iowa Addition)	Typically taught in a Discrete Math course	N-Q.IA.3 N-Q.IA.4 +	Learning progressions are not available but further explanation can be found at: http://www.tinyurl.com/iamathadditions

Conceptual Category	Content Shift (A shift may reside in more than one domain)	Contrasting Practice	Standards	Learning Progressions/ Connections
Number and Quantity (con't)	**Shift** to understand and apply elementary set theory and logic as used in simple internet searches. (Iowa Addition) **Shift** to understand and apply basic number theory, including modular arithmetic, for example, as used in keeping information secure; cryptography.		N-Q.IA.5 + N-Q.IA.6 +	
Algebra	**Shift** to expecting most work with linearity to be done in grades 7 & 8 (for example, solving linear equations, solving systems of linear equations, equations of lines, linear functions, and linear models in statistics.)	Often taught in high school algebra course		Functions[3] pp. 5-6, 15 Algebra[5] pp. 1, 8, 9, 11 Expressions and Equations[1] pp. 11-13 Stats and Probability[2] pp.11,12
Statistics and Probability	**Shift** to include substantial statistics and probability for all students in core courses	Select students take an AP statistics course or a statistics course for college credit	S-ID.1-9 S-IC.1-6 S-CP.1-7	Stats and Probability[4] pp. 3-7 pp. 8-12 pp. 13-17

Conceptual Category	Content Shift (A shift may reside in more than one domain)	Contrasting Practice	Standards	Learning Progressions/ Connections
Geometry	**Shift** to visualizing and plotting three-dimensional points. (Iowa Addition) **Shift** to understand, analyze, evaluate, and apply vertex-edge graphs to model and solve problems related to paths, circuits, networks, and relationships among a finite number of elements, in real-world and abstract settings for <u>all</u> students. (Iowa Addition) **Shift** to understand congruence, similarity, and symmetry through geometric transformations.	Typically taught in an Advanced Algebra course, now for all students. Typically taught in a Discrete Math Course	G-GMD-IA.7 G-MG-IA.8-10 G-CO.2, 7, 8	Progressions document is not yet complete for 9-12 Geometry. There is not a progressions document for the Iowa Additions. http://www.tinyurl.com/iamathadditions
Functions	**Shift** to major focus in high school, including recursion and trigonometric functions, <u>for all</u> students. **Shift** to exponential function work from advanced courses to earlier algebraic experiences.	Advanced level courses contain function analysis and recursion.	F-IF.3-9 F-BF.1-4 F-LE.1-5 F-TF.1, 2, 5	Functions[3] (Trig.) pp. 17-20 Functions[3] (Recursive View) pp. 8-9, 11-12, 15-16 Statistics and Probability[4] (F-IF-7) pp.5 Algebra[5] (F-LE-5) pp. 8 Geometry Progressions not available for connections

Conceptual Category	Content Shift (A shift may reside in more than one domain)	Contrasting Practice	Standards	Learning Progressions/ Connections
Modeling	**Shift** to integrate modeling throughout the high school curriculum. **Shift** to use modeling cycle as defined by the last paragraph on p. 73 of the Iowa Core document or the fifth paragraph on the website: http://www.educateiowa.gov/index.php?option=com_content&view=article&id=2313&Itemid=4414 **Modeling Standards** *Modeling is best interpreted not as a collection of isolated topics but rather 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 (★).*	Used in isolated topics.	Modeling ★ Standards N-Q.1-3 A-SSE.1, 3, 4 A-CED.1-4 A-REI.11 F-IF.4-7 F-BF.1, 2 F-LE.1-5 F-TF.5, 7 S-ID.1-9 S-IC.1-6 S-CP.1-9 S-MD.1-7 G-SRT.8 G-GPE.7 G-GMD.3 G-MG.1-3, IA 4-6, 8-10	**Modeling Concept:** Statistics and Probability[4] pp.2 Algebra[5] pp.9-10 Functions[3] pp.3 **Modeling Standards:** Statistics and Probability[4] pp.3-20 Algebra[5] pp. 3-5, 8, 9, 12 Functions[3] pp. 8, 9, 11, 12, 15, 16, 18, 19 Draft of Progressions for Modeling was released July 2013 and addresses this topic. http://commoncoretools.me/wp-content/uploads/2013/07/ccss_progression_modeling_2013_07_04.pdf

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All Domains	**Shift** to lack of repetition of topics in multiple courses.	Many courses spend the first month reviewing materials in previous courses.		

[1]**Draft 6-8 Progression Expressions and Equations**
[2]**Draft 6-8 Progression Statistics and Probability**
[3]**Draft 8-12 Progression on Functions**
[4]**Draft HS Progression on Statistics and Probability**
[5]**Draft HS Progression on Algebra**