Appendix A:
Concept Paper

Modeling Effective Collaboration on the Alignment of Standards and Assessment Based on the Common Core Standards Among High Schools, Community Colleges and Four-Year Institutions

Context of the Work

Adopted in 2010 by the National Governors Association (NGA) and the Council of Chief State School Officers (CCSSO), forty six states, two territories and the District of Columbia are now participating in the use of the Common Core Standards (CCS). The original purpose of the CCS was to provide consistency across the states of what knowledge, skills and abilities students are expected to learn in subjects such as English language arts and mathematics in order for them to be competitive in a global economy. Much of the focus has been on the implementation of the standards in K-12 schools with the emphasis that the new standards are designed to assure students are 'college and career ready'. However, the vision of the Common Core Standards, in which higher education was an active partner, was much broader at not only ensuring the success of students in elementary and secondary education, but subsequently, in postsecondary education as a result of higher standards and aligned expectations between secondary and postsecondary education. To achieve this outcome requires that higher education not only be informed of the Common Core Standards but also engaged as a full partner in its implementation. With this in mind, the American Council on Education (ACE) recommends four key areas where actions required by higher education are needed, including:

- Aligning key school-to-college policies, including more targeted college readiness supports to help students make the transition;
- Developing assessments and aligning with placement policies;
- Aligning K-12 and higher education curricula (e.g., developmental courses, bridge courses, dual credit courses, and first-year postsecondary courses); and,
- Preparing new and existing teachers (including the inclusion of Arts and Sciences faculty).

The anticipated benefits of aligning high school standards, assessments, and cut scores are many. One benefit is a better understanding among K-12 educators, students, and parents of what are college ready expectations in math and language arts. The California State University Early Assessment Program uses the California 11th grade assessment in place of CSU's placement exams. By taking this in 11th grade, students can also identify if they need to take additional courses or supports while in high school. Another key benefit is the improvements that will occur in higher education including reduced remediation rates and increased degree completion. The increasing costs of higher education tuition coupled with increased time to degree put pressures on higher education institutions to graduate students in a timely manner.

Recognizing this, the PARCC consortium, in which Illinois is a member, has put together an Advisory Committee on College Readiness (ACCR) (see **http://www.parcconline.org/advisory-committee-college-readiness)** that includes system and institution chancellors/presidents from partnership states. The ACCR, which has been meeting since September 2011, has been charged with providing recommendations on four key issues associated with the PARCC assessments:

- The design of the high school assessments that will be used to make college- and career-ready determinations.
- The priority content and standards to be assessed.
- The name and definition of the performance level that will indicate college and career readiness and the process that will be used to determine scores that indicate that level; and,
- Determining the college- and career-ready cut score.

Recommendations for the first three bullets have been completed. In October 2012, the PARCC Governing Board and ACCR adopted a College- and Career-Ready Determination (CCRD) Policy and Policy-Level Performance Level Descriptors (PLDs) in mathematics and language arts. Following the first administration of PARCC in summer 2015, PARCC will establish the cut scores for all five performance levels. This process will include input from K-12 and higher education professionals serving on standard-setting panels, as well as a review of how students participating in PARCC assessments perform on other achievement measures. Two webinars were held in July and August 2012 outlining the work and next steps and can be accessed at: http://www.parcconline.org/highered-webinars

College- and Career-Ready Determination (CCRD) Policy

The CCRD policy defines the level of academic preparation in language arts and mathematics needed for students to be successful in entry-level, credit-bearing courses in two- and four-year public institutions of higher education. The policy specifically states:

- Students who earn a CCRD by performing at level 4 (out of 5) in language arts and enroll in College English Composition, Literature, and technical courses requiring college-level reading and writing have approximately a 0.75 probability of earning college credit by attaining at least a grade of C or its equivalent in those courses.
- Students who earn a CCRD by performing at level 4 (out of 5) in mathematics and enroll in College Algebra, Introductory College Statistics, and technical courses requiring an equivalent level of mathematics have approximately a 0.75 probability of earning college credit by attaining at least a grade of C or its equivalent in those courses.

Policy-Level Performance Level Descriptors (PLDs) in Mathematics and Language Arts

Policy-Level Performance Level Descriptors (PLDs) include two components: 1) a policy claim, which describes the educational implications for students at a particular performance level; and 2) general content claims, which describe the academic knowledge and skills students performing at a given performance level are able to demonstrate, regardless of grade level. PARCC has adopted five performance levels that classify student performance into categories that describe the knowledge, skills, and practices students in the category typically are able to demonstrate. More information on the CCRD policy and PLDs can be found at: http://www.parcconline.org/parcc-assessment-policies.

As assessments between secondary and postsecondary institutions align, the opportunity is opened for discussions among the alignment of K-12 and higher education curricula, including developmental courses, dual credit, blended learning, and first-year postsecondary courses. ACE

is working with Pearson to develop by 2014 a new, more rigorous GED Test aligned with Common Core State Standards designed to ensure career- and college-readiness. This will include a national test preparation program featuring personalized learning resources. These issues also tie into work occurring at the local districts (e.g., dual credit, blended learning, ISLE), at Heartland Community College (e.g., dual credit, developmental education) and Illinois State University (e.g., first year experience, general education).

Another critical area for examination is the integration of the common core standards into Teacher Preparation programs, including teacher preparation courses at the community college and courses taken outside of the College of Education (e.g., English and math departments). Proposed rules for elementary and middle school endorsements will be issued by ISBE early next year (anticipated for February) that will require teacher preparation programs to redesign around new content standards (aligned with the common core), Illinois Professional Teaching Standards, Social Emotional Standards, and requirements for partnerships and improved clinical experiences. Rules for the early childhood endorsement will be released later in the summer with rules for the high school endorsement to follow.

Opportunities on a Regional Level

While the paragraphs above describe the broader context of the changes happening nationally as a result of the common core standards and new PARCC assessments, the original purpose of this local work was to bring together a regional group of K-12, 2-year and 4-year institution faculty and staff with the goal of aligning remediation, curriculum, and assessment. This can be accomplished by tapping into some existing regional initiatives while also aligning to the national work by PARCC and ACCR.

As one local initiative, the Dewitt/Livingston/McLean County Regional Office of Education #17 has a group of secondary math teachers from throughout the region who have been working on aligning the common core standards. The next meeting of this group is on January 15th and at that meeting, Jeff Hill will introduce the concept of bringing higher education colleagues into this professional development group. Included could be math instructors from Illinois State University, Heartland Community College, and other community colleges or universities that are in the region of the secondary schools represented. While this will not deter from the work occurring with the secondary math teachers, it will allow in addition to this work, an examination of 1) alignment of first-year, credit-bearing postsecondary courses and postsecondary developmental courses to the CCS; and, 2) alignment of first-year credit-bearing postsecondary courses and postsecondary development courses among different higher education institutions.

By comparing first-year, credit-bearing course syllabi and outcomes with the CCS, we can examine questions such as:

- What concepts and skills required in the CCSS also appear in the first-year courses?
- Where might there be gaps between the CCSS and first-year courses?
- What priority standards are emphasized and/or missing?
- What are the current areas of emphasis, e.g., fractions, modeling, linear equations?

The alignment work will not discourage faculty from doing more rigorous work in first-year courses and offer more innovative and targeted assistance to students in need through more

effective and targeted developmental modules/courses. Integrating the work into an existing secondary math faculty workgroup will allow secondary math faculty to help postsecondary faculty with understanding and aligning to the Common Core Standards, while also helping give secondary math faculty a better idea of local postsecondary expectations and content material.

The next step – to examine alignment of similar courses among participating higher education institutions – might involve comparing sample course syllabi, instructional materials and associated outcomes for institutions' developmental modules/courses to determine the strength of vertical alignment between these courses and first-year, credit-bearing courses at the participating institutions. By doing this, we can examine questions such as:

- What are the areas of redundancy?
- What is omitted?
- How consistent are current course descriptors?
- How consistent are current expected outcomes/course objectives?
- What are the current areas of emphasis?
- Do curricula for developmental modules/courses align to the CCSS?

In preparation for the integration of higher education faculty into this work, some preliminary materials on the CCS and PARRC assessments may need to be compiled and distributed depending on the awareness of faculty members on CCS and PARRC. This might occur through the compilation of a binder of useful resources or an e-mail that directs working group members to a list of electronic resources. This work will occur with math with the intention to use a similar regional strategy with English/language arts.

In addition to the work with math (and eventually with language arts), other issues may form into work group as interest and opportunity provide, such as the following:

- Integrating common core standards into teacher preparation programs and courses taken by teacher education majors, including courses at Heartland and other Colleges at Illinois State University.
- Curriculum alignment opportunities with dual credit and blended learning
- Alignment of assessments (following work of Advisory Committee of College Readiness)
- Use of Illinois Shared Learning Environment as a tool for alignment

Overseeing the work of these work groups will be a CCS Alignment Steering Committee that will meet quarterly to be updated on the progress of the work and offer suggestions/ recommendations for next steps. Membership of the Steering Committee will include representatives from Unit #5, District #87, Olympia School District, Regional Office of Education, Heartland Community College, Illinois State University, Lincoln College, Illinois Wesleyan University, and other related stakeholders.

Resources

Common Core State Standards Initiative web site - http://www.corestandards.org/

Partnership for Assessment of Readiness for College and Careers (PARCC web site) - http://www.parcconline.org/

Useful Resources on Common Core Standards/PARCC-

- http://regents.louisiana.gov/index.cfm?md=pagebuilder&tmp=home&pid=508

Core to College Initiative - http://www.rockpa.org/page.aspx?pid=580

- Indiana Core to College Initiative – http://www.in.gov/che/2763.htm
- Louisiana Core to College Initiative - http://regents.louisiana.gov/index.cfm?md=pagebuilder&tmp=home&pid=507
- Hawaii Core to College Initiative - http://p20hawaii.org/node/128
- Washington Core to College Initiative - http://www.wsac.wa.gov/sites/default/files/HECBmtg-CommonCoreBrief4-12.pdf
- Oregon Core to College Initiative - http://www.ode.state.or.us/search/page/?id=3556 and http://lisamentz.com/drupal/
- Kentucky Core to College Initiative – http://cpe.ky.gov/news/mediaroom/releases/nr_012312.htm

ASCD web site for Common Core Standards - http://www.ascd.org/common-core-state-standards/common-core.aspx

- Free webinars on Common Core Standards - http://www.ascd.org/professional-development/webinars/common-core-webinars.aspx
- CCSSO webinar on PARRC - http://www.ccsso.org/Resources/Digital_Resources/CCSSO_Webinar_What_Teachers_Can_Learn_from_the_New_PARCC_and_Smarter_Balanced_Sample_Assessment_Items.html

Common Core Implementation Workbook for States and District Leaders - www.achieve.org/files/Common_Core_workbook.pdf

On-line Modules for Common Core - http://www.kycorestandards.org/courses/courses.aspx#_blank

American Council on Education (ACE) - http://www.acenet.edu/higher-education/topics/Pages/Common-Core.aspx

Action Agenda for Higher Education on Implementing the Common Core - http://www.acenet.edu/news-room/Documents/Implementing-the-Common-Core-State-Standards-2011.pdf

Western Interstate Commission for Higher Education - http://www.wiche.edu/commonCoreStateStandards

Alignment of GED to Common Core Standards - http://www.acenet.edu/news-room/Pages/ACE-and-Pearson-Collaborate-to-Transform-GED-Test.aspx

Tennessee Developmental Studies Redesign - http://tnredesign.org/

Appendix B:
January 24th
Meeting Agenda

AGENDA

Common Core Alignment Committee
January 24, 2013
2:00 – 3:00 p.m., Room 119, ISU Alumni Center

3:00 p.m.– 3:10 p.m.	Welcome and Introductions (Jon Rosenthal and Jeff Hill) • History of the work
3:10 p.m.– 3:30 p.m.	Proposed Work (Erika Hunt and Diane Wolf) • Review of concept paper • Feedback on math curriculum alignment work • Work focus and ideas for other initiatives • Suggestions for other partners?
3:30 p.m. – 3:45 p.m.	Committee Needs (Erika Hunt) • Research and resource needs
3:45 p.m.–4:00 p.m.	Wrap Up and Next Steps Forward (Jon Rosenthal and Jeff Hill) • Future meetings

Appendix C:
ISU Math Gap Analysis
with
Common Core Standards

COMMON CORE ALIGNMENT

Illinois State University - MAT 104

The Common Core Standards for Mathematical Practice are critical for developing students into proficient and successful mathematicians. Emphasizing these Practices at all levels will increase student success in any mathematics course:

- **CCSS.Math.Practice.MP1** Make sense of problems and persevere in solving them.
- **CCSS.Math.Practice.MP2** Reason abstractly and quantitatively.
- **CCSS.Math.Practice.MP3** Construct viable arguments and critique the reasoning of others.
- **CCSS.Math.Practice.MP4** Model with mathematics.
- **CCSS.Math.Practice.MP5** Use appropriate tools strategically.
- **CCSS.Math.Practice.MP6** Attend to precision.
- **CCSS.Math.Practice.MP7** Look for and make use of structure.
- **CCSS.Math.Practice.MP8** Look for and express regularity in repeated reasoning.

In conjunction with the Standards for Mathematical Practice, the following Common Core Content Standards have been identified by ISU's MAT 104 faculty as necessary for a student to have ***mastered*** prior to completing MAT 104.

Code	Description
N.Q.1	Reason quantitatively and use units to solve problems. Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.
N.Q.2	Reason quantitatively and use units to solve problems. Define appropriate quantities for the purpose of descriptive modeling.
N.Q.3	Reason quantitatively and use units to solve problems. Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.
A.SSE.1	Interpret the structure of expressions. Interpret expressions that represent a quantity in terms of its context.
A.SSE.1a	Interpret parts of an expression, such as terms, factors, and coefficients.
A.SSE.1b	Interpret complicated expressions by viewing one or more of their parts as a single entity. For example, interpret P(1+r)^n as the product of P and a factor not depending on P.
SSE.2	Interpret the structure of expressions. Use the structure of an expression to identify ways to rewrite it. For example, see x^4 – y^4 as (x^2)^2 – (y^2)^2, thus recognizing it as a difference of squares that can be factored as (x^2 – y^2)(x^2 + y^2).
A.SSE.3	Write expressions in equivalent forms to solve problems. Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.
A.SSE.3a	Factor a quadratic expression to reveal the zeros of the function it defines.
A.APR.1	Perform arithmetic operations on polynomials. Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.
A.APR.7	(+) Rewrite rational expressions. Understand that rational expressions form a system analogous to the rational numbers, closed under addition, subtraction, multiplication, and division by a nonzero rational expression; add, subtract, multiply, and divide rational expressions.

A.CED.1	Create equations that describe numbers or relationship. Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions.
A.CED.2	Create equations that describe numbers or relationship. Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.
A.CED.3	Create equations that describe numbers or relationship. Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or non-viable options in a modeling context. For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.
A.CED.4	Create equations that describe numbers or relationship. Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. For example, rearrange Ohm's law V = IR to highlight resistance R.
A.REI.1	Understand solving equations as a process of reasoning and explain the reasoning. Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.
A.REI.2	Understand solving equations as a process of reasoning and explain the reasoning. Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.
A.REI.3	Solve equations and inequalities in one variable. Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.
A.REI.4	Solve equations and inequalities in one variable. Solve quadratic equations in one variable.
A.REI.5	Solve systems of equations. Prove that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a multiple of the other produces a system with the same solutions.
A.REI.6	Solve systems of equations. Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.
A.REI.10	Represent and solve equations and inequalities graphically. Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).
F.IF.1	Understand the concept of a function and use function notation. Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If f is a function and x is an element of its domain, then f(x) denotes the output of f corresponding to the input x. The graph of f is the graph of the equation y = f(x).
F.IF.2	Understand the concept of a function and use function notation. Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.
F.IF.4	Interpret functions that arise in applications in terms of the context. For

	a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.
F.IF.5	Interpret functions that arise in applications in terms of the context. Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. For example, if the function h(n) gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function.
F.IF.6	Interpret functions that arise in applications in terms of the context. Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.
F.IF.7	Analyze functions using different representations. Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.
F.BF.1	Build a function that models a relationship between two quantities. Write a function that describes a relationship between two quantities.
F.BF.1a	Determine an explicit expression, a recursive process, or steps for calculation from a context.

Additionally, the following Common Core Content Standards were identified as helpful for a student to have been ***exposed to*** prior to completing MAT 104.

Code	Description
N.RN.1	Extend the properties of exponents to rational exponents. Explain how the definition of the meaning of rational exponents follows from extending the properties of integer exponents to those values, allowing for a notation for radicals in terms of rational exponents. For example, we define 5^(1/3) to be the cube root of 5 because we want [5^(1/3)]^3 = 5^[(1/3) x 3] to hold, so [5^(1/3)]^3 must equal 5.
N.RN.2	Extend the properties of exponents to rational exponents. Rewrite expressions involving radicals and rational exponents using the properties of exponents.
A.APR.2	Understand the relationship between zeros and factors of polynomial. Know and apply the Remainder Theorem: For a polynomial p(x) and a number a, the remainder on division by x – a is p(a), so p(a) = 0 if and only if (x – a) is a factor of p(x).
A.APR.3	Understand the relationship between zeros and factors of polynomials. Identify zeros of polynomials when suitable factorizations are available, and use the zeros to construct a rough graph of the function defined by the polynomial.
A.REI.7	Solve systems of equations. Solve a simple system consisting of a linear equation and a quadratic equation in two variables algebraically and graphically. For example, find the points of intersection between the line y = –3x and the circle x^2 + y^2 = 3.
F.IF.7a	Graph linear and quadratic functions and show intercepts, maxima, and minima.
S.ID.6c	Fit a linear function for a scatter plot that suggests a linear association.
S.ID.7	Interpret linear models. Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.

COMMON CORE PREREQUISITE STANDARDS

Illinois State University - MAT 113

The Common Core Standards for Mathematical Practice are critical for developing students into proficient and successful mathematicians. Emphasizing these Practices at all levels will increase student success in any mathematics course:

- **CCSS.Math.Practice.MP1** Make sense of problems and persevere in solving them.
- **CCSS.Math.Practice.MP2** Reason abstractly and quantitatively.
- **CCSS.Math.Practice.MP3** Construct viable arguments and critique the reasoning of others.
- **CCSS.Math.Practice.MP4** Model with mathematics.
- **CCSS.Math.Practice.MP5** Use appropriate tools strategically.
- **CCSS.Math.Practice.MP6** Attend to precision.
- **CCSS.Math.Practice.MP7** Look for and make use of structure.
- **CCSS.Math.Practice.MP8** Look for and express regularity in repeated reasoning.

In conjunction with the Standards for Mathematical Practice, the following Common Core Content Standards have been identified by ISU's MAT 119 faculty as "needed" or "helpful" for a student to have ***mastered*** prior to taking MAT 119.

Code	Description
A-REI.1	**Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.**
A-REI.3	**Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.**
A-REI.4	**Solve quadratic equations in one variable.**
S.ID.7	**Interpret linear models. Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.**

Additionally, the following Common Core Content Standards were identified as helpful for a student to have been ***exposed to*** prior to taking MAT 119.

Code	Description
N-RN.1	**Explain how the definition of the meaning of rational exponents follows from extending the properties of integer exponents to those values, allowing for a notation for radicals in terms of rational exponents.**
N-RN.2	**Rewrite expressions involving radicals and rational exponents using the properties of exponents.**
N-RN.3	**Explain why the sum or product of two rational numbers is rational; that the sum of a rational number and an irrational number is irrational; and that the product of a nonzero rational number and an irrational number is irrational.**
N-Q.1	**Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.**
N-Q.2	**Define appropriate quantities for the purpose of descriptive modeling.**
N-Q.3	**Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.**
A.SSE.1	**Interpret the structure of expressions. Interpret expressions that represent a quantity in terms of its context.**
A.SSE.1a	**Interpret parts of an expression, such as terms, factors, and coefficients.**
A.SSE.1b	**Interpret complicated expressions by viewing one or more of their parts as a single entity. For example, interpret P(1+r)^n as the product of P and a factor not depending on P.**
A.SSE.2	**Interpret the structure of expressions. Use the structure of an expression to identify ways to rewrite it. For example, see x^4 – y^4 as (x^2)^2 – (y^2)^2, thus recognizing it as a difference of squares that can be factored as (x^2 – y^2)(x^2 + y^2).**
A-SSE.3	**Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.**
A-SSE.3c	**Use the properties of exponents to transform expressions for exponential functions.**
A.SSE.4	**Write expressions in equivalent forms to solve problems. 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.**
A-APR.1	**Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.**
A-CED.1	**Create equations and inequalities in one variable and use them to solve problems.**
A-CED.2	**Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels**

	and scales.
A-CED.3	**Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or non-viable options in a modeling context.**
A-CED.4	**Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations.**
A-REI.2	**Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.**
F-IF.1	**Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If f is a function and x is an element of its domain, then f(x) denotes the output of f corresponding to the input x. The graph of f is the graph of the equation y = f(x).**
F-IF.2	**Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.**
F.IF.5	**Interpret functions that arise in applications in terms of the context. Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. For example, if the function h(n) gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function.**
F.IF.6	**Interpret functions that arise in applications in terms of the context. Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.**
F-IF.7a	**Graph linear and quadratic functions and show intercepts, maxima, and minima.**
F.IF.8b	**Use the properties of exponents to interpret expressions for exponential functions. For example, identify percent rate of change in functions such as y = (1.02)^t, y = (0.97)^t, y = (1.01)^(12t), y = (1.2)^(t/10), and classify them as representing exponential growth and decay.**
F.IF.9	**Analyze functions using different representations. Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). For example, given a graph of one quadratic function and an algebraic expression for another, say which has the larger maximum.**
F.BF.1	**Build a function that models a relationship between two quantities. Write a function that describes a relationship between two quantities.**
F.BF.1a	**Determine an explicit expression, a recursive process, or steps for calculation from a context.**
F.BF.1b	**Combine standard function types using arithmetic operations. For example, build a function that models the temperature of a cooling body by adding a constant function to a decaying exponential, and relate these functions to the model.**
F.BF.1c (+)	**Compose functions. For example, if T(y) is the temperature in the**

	atmosphere as a function of height, and h(t) is the height of a weather balloon as a function of time, then T(h(t)) is the temperature at the location of the weather balloon as a function of time.
F.BF.5 (+)	**Build new functions from existing functions. Understand the inverse relationship between exponents and logarithms and use this relationship to solve problems involving logarithms and exponents.**
F.LE.1	**Construct and compare linear, quadratic, and exponential models and solve problems. Distinguish between situations that can be modeled with linear functions and with exponential functions.**
F-LE.1a	**Prove that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals.**
F-LE.1b	**Recognize situations in which one quantity changes at a constant rate per unit interval relative to another.**
F-LE.1c	**Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another.**
F-LE.4	**For exponential models, express as a logarithm the solution to ab to the ct power = d where a, c, and d are numbers and the base b is 2, 10, or e; evaluate the logarithm using technology.**
F-LE.5	**Interpret the parameters in a linear or exponential function in terms of a context.**
G.MG.1	**Apply geometric concepts in modeling situations. Use geometric shapes, their measures, and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder).**
S.ID.1	**Summarize, represent, and interpret data on a single count or measurement variable. Represent data with plots on the real number line (dot plots, histograms, and box plots).**
S.ID.2	**Summarize, represent, and interpret data on a single count or measurement variable. Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets.**
S.ID.3	**Summarize, represent, and interpret data on a single count or measurement variable. Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).**
S.ID.4	**Summarize, represent, and interpret data on a single count or measurement variable. Use the mean and standard deviation of a data set to fit it to a normal distribution and to estimate population percentages. Recognize that there are data sets for which such a procedure is not appropriate. Use calculators, spreadsheets, and tables to estimate areas under the normal curve.**
S.ID.5	**Summarize, represent, and interpret data on two categorical and quantitative variables. Summarize categorical data for two categories in two-way frequency tables. Interpret relative frequencies in the context of the data (including joint, marginal, and conditional relative frequencies). Recognize possible associations and trends in the data.**
S.ID.6	**Summarize, represent, and interpret data on two categorical and**

	quantitative variables. Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.
S.ID.6a	**Fit a function to the data; use functions fitted to data to solve problems in the context of the data. Use given functions or choose a function suggested by the context. Emphasize linear, quadratic, and exponential models.**
S.ID.6c	**Fit a linear function for a scatter plot that suggests a linear association.**
S.ID.8	**Interpret linear models. Compute (using technology) and interpret the correlation coefficient of a linear fit.**
S.ID.9	**Interpret linear models. Distinguish between correlation and causation.**
S.IC.1	**Understand and evaluate random processes underlying statistical experiments. Understand statistics as a process for making inferences about population parameters based on a random sample from that population.**
S.IC.2	**Understand and evaluate random processes underlying statistical experiments. Decide if a specified model is consistent with results from a given data-generating process, e.g., using simulation. For example, a model says a spinning coin falls heads up with probability 0. 5. Would a result of 5 tails in a row cause you to question the model?**
S.IC.3	**Make inferences and justify conclusions from sample surveys, experiments, and observational studies. Recognize the purposes of and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each.**
S.IC.4	**Make inferences and justify conclusions from sample surveys, experiments, and observational studies. Use data from a sample survey to estimate a population mean or proportion; develop a margin of error through the use of simulation models for random sampling.**
S.IC.5	**Make inferences and justify conclusions from sample surveys, experiments, and observational studies. Use data from a randomized experiment to compare two treatments; use simulations to decide if differences between parameters are significant.**
S.IC.6	**Make inferences and justify conclusions from sample surveys, experiments, and observational studies. Evaluate reports based on data.**
S.CP.2	**Understand independence and conditional probability and use them to interpret data. Understand that two events A and B are independent if the probability of A and B occurring together is the product of their probabilities, and use this characterization to determine if they are independent.**
S.CP.3	**Understand independence and conditional probability and use them to interpret data. Understand the conditional probability of A given B as P(A and B)/P(B), and interpret independence of A and B as saying that the conditional probability of A given B is the same as the probability of A, and the conditional probability of B given A is the same as the probability of B.**
S.CP.6	**Use the rules of probability to compute probabilities of compound**

	events in a uniform probability model. Find the conditional probability of A given B as the fraction of B's outcomes that also belong to A, and interpret the answer in terms of the model.
S.CP.7	**Use the rules of probability to compute probabilities of compound events in a uniform probability model. Apply the Addition Rule, P(A or B) = P(A) + P(B) – P(A and B), and interpret the answer in terms of the model.**
S.CP.8 (+)	**Use the rules of probability to compute probabilities of compound events in a uniform probability model. Apply the general Multiplication Rule in a uniform probability model, P(A and B) = [P(A)]x[P(B|A)] =[P(B)]x[P(A|B)], and interpret the answer in terms of the model.**
S.CP.9 (+)	Use the rules of probability to compute probabilities of compound events in a uniform probability model. Use permutations and combinations to compute probabilities of compound events and solve problems.
S.MD.2 (+)	Calculate expected values and use them to solve problems. Calculate the expected value of a random variable; interpret it as the mean of the probability distribution.
S.MD.3 (+)	Calculate expected values and use them to solve problems. Develop a probability distribution for a random variable defined for a sample space in which theoretical probabilities can be calculated; find the expected value. For example, find the theoretical probability distribution for the number of correct answers obtained by guessing on all five questions of a multiple-choice test where each question has four choices, and find the expected grade under various grading schemes.
S.MD.4 (+)	Calculate expected values and use them to solve problems. Develop a probability distribution for a random variable defined for a sample space in which probabilities are assigned empirically; find the expected value. For example, find a current data distribution on the number of TV sets per household in the United States, and calculate the expected number of sets per household. How many TV sets would you expect to find in 100 randomly selected households?
S.MD.5a (+)	Find the expected payoff for a game of chance. For example, find the expected winnings from a state lottery ticket or a game at a fast-food restaurant.

COMMON CORE PREREQUISITE STANDARDS

Illinois State University - MAT 119

The Common Core Standards for Mathematical Practice are critical for developing students into proficient and successful mathematicians. Emphasizing these Practices at all levels will increase student success in any mathematics course:

- **CCSS.Math.Practice.MP1** Make sense of problems and persevere in solving them.
- **CCSS.Math.Practice.MP2** Reason abstractly and quantitatively.
- **CCSS.Math.Practice.MP3** Construct viable arguments and critique the reasoning of others.
- **CCSS.Math.Practice.MP4** Model with mathematics.
- **CCSS.Math.Practice.MP5** Use appropriate tools strategically.
- **CCSS.Math.Practice.MP6** Attend to precision.
- **CCSS.Math.Practice.MP7** Look for and make use of structure.
- **CCSS.Math.Practice.MP8** Look for and express regularity in repeated reasoning.

In conjunction with the Standards for Mathematical Practice, the following Common Core Content Standards have been identified by ISU's MAT 119 faculty as "needed" or "helpful" for a student to have ***mastered*** prior to taking MAT 119.

Code	Description
N-RN.1	**Explain how the definition of the meaning of rational exponents follows from extending the properties of integer exponents to those values, allowing for a notation for radicals in terms of rational exponents.**
N-RN.2	**Rewrite expressions involving radicals and rational exponents using the properties of exponents.**
N-RN.3	**Explain why the sum or product of two rational numbers is rational; that the sum of a rational number and an irrational number is irrational; and that the product of a nonzero rational number and an irrational number is irrational.**
N-Q.1	**Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.**
N-Q.2	**Define appropriate quantities for the purpose of descriptive modeling.**
N-Q.3	**Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.**
A-APR.1	**Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.**
A-APR.7	**Understand that rational expressions form a system analogous to the rational numbers, closed under addition, subtraction, multiplication, and division by a nonzero rational expression; add, subtract, multiply, and divide rational expressions.**
A-CED.1	**Create equations and inequalities in one variable and use them to solve problems.**
A-CED.2	**Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.**
A-CED.3	**Represent constraints by equations or inequalities, and by systems**

	of equations and/or inequalities, and interpret solutions as viable or non-viable options in a modeling context.
A-CED.4	**Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations.**
A-REI.1	**Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.**
A-REI.3	**Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.**
A-REI.4	**Solve quadratic equations in one variable.**
A-REI.10	**Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).**
A-REI.11	**Explain why the x-coordinates of the points where the graphs of the equations y = f(x) and y = g(x) intersect are the solutions of the equation f(x) = g(x); find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where f(x) and/or g(x) are linear, polynomial, rational, absolute value, exponential, and logarithmic functions.**
A-REI.12	**Graph the solutions to a linear inequality in two variables as a half-plane (excluding the boundary in the case of a strict inequality), and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes.**
F-IF.1	**Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If f is a function and x is an element of its domain, then f(x) denotes the output of f corresponding to the input x. The graph of f is the graph of the equation y = f(x).**
F-IF.7a	**Graph linear and quadratic functions and show intercepts, maxima, and minima.**
F-IF.7b	**Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.**
F-IF.7d	**Graph rational functions, identifying zeros and asymptotes when suitable factorizations are available, and showing end behavior.**
F-LE.1b	**Recognize situations in which one quantity changes at a constant rate per unit interval relative to another.**
F-LE.5	**Interpret the parameters in a linear or exponential function in terms of a context.**
G-GPE.5	**Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems (e.g., find the equation of a line parallel or perpendicular to a given line that passes through a given point).**
G-GMD.3	**Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.**

Additionally, the following Common Core Content Standards were identified as helpful for a student to have been ***exposed to*** prior to taking MAT 119.

Code	Description
N-CN.1	**Know there is a complex number i such that $i^2 = -1$, and every complex number has the form a + bi with a and b real.**
N-CN.2	**Use the relation $i^2 = -1$ and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers.**
A-SSE.3	**Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.**
A-SSE.3a	**Factor a quadratic expression to reveal the zeros of the function it defines.**
A-SSE.3c	**Use the properties of exponents to transform expressions for exponential functions.**
A-APR.3	**Identify zeros of polynomials when suitable factorizations are available, and use the zeros to construct a rough graph of the function defined by the polynomial.**
A-APR.4	**Prove polynomial identities and use them to describe numerical relationships.**
A-REI.2	**Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.**
A-REI.4a	**Use the method of completing the square to transform any quadratic equation in x into an equation of the form $(x - p)^2 = q$ that has the same solutions. Derive the quadratic formula from this form.**
A-REI.4b	**Solve quadratic equations by inspection (e.g., for $x^2 = 49$), taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as a ± bi for real numbers a and b.**
F-IF.2	**Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.**
F-IF.7	**Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.**
F-IF.8a	**Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context.**
F-BF.3	**Identify the effect on the graph of replacing f(x) by f(x) + k, k f(x), f(kx), and f(x + k) for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology.**
F-BF.4	**Find inverse functions.**
F-LE.1a	**Prove that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals.**

F-LE.1c	**Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another.**
F-LE.2	**Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).**
F-LE.4	**For exponential models, express as a logarithm the solution to ab to the ct power = d where a, c, and d are numbers and the base b is 2, 10, or e; evaluate the logarithm using technology.**

Appendix D:
Gap Analysis of
Heartland Developmental
Math Courses and
Math Common Core Standards

COMMON CORE GAP ANALYSIS MATRIX: MATHEMATICS DEVELOPMENTAL COURSES

Directions for Completing this Matrix:

Listed vertically along the left hand side of the chart are the 53+ Common Core Math Content Standards and the 8 Standards for Math Practice. Listed horizontally along the top of the chart are the titles of typical developmental math courses.

Based on the assumption that the highest level of Math developmental courses should closely align with the CCSS standards for 11/12 grade, Math Task Force members are asked to assess how closely related each of the standards are to the desired outcomes (objectives) of the developmental math course listed at the top of the page, using the following rubric:

- **Highly Correlated= 2**
- **Correlated= 1**
- **Not Correlated= 0**

If a course requires knowledge or skills not listed in the CCSS, please list the name of the course and the required knowledge or skill not contained in the CCSS standards in the space below or on an attachment:

Respondent Name:_____

11/12 Grade Standards for Math Content

1.Number/Quantity Overview	Pre-Algebra	Beginning Algebra	Intermediate Algebra I	Intermediate Algebra II	MATH 131
a. Extend properties of exponents to rational exponents	0	0	2	0	0,0
b. Use properties of rational & irrational numbers	2	1	0	0	
c. Reason quantitatively & use units to solve problems*	1	2	0	0	
d. Perform arithmetic operations with complex numbers	0	0	0	2	0,0
e. Represent complex numbers & their operation on the complex plane	0	0	0	0	0,0
f. Use complex numbers in polynomial identities and equations	0	0	0	1	0,0
g. Represent & model with vector quantities	0	0	0	0	0,0
h. Perform operations on vectors	0	0	0	0	0,0
i. Perform operations on matrices and use matrices in applications	0	0	0	0	
2. Algebra					
a. Interpret the structure of expressions*	0	2	0	0	
b. Write expressions in equivalent form to solve problems	0	1	1	2	
c. Perform arithmetic operations on polynomials	0	2	1	0	
d. Understand the relationship between zeros and factors of polynomial	0	2	1	1	
e. Use polynomials identities to solve problems	0	0	0	0	0,0
f. Rewrite rational expressions	0	0	1	0	0,0
g. Create equations that describe numbers or relationships*	0	2	1	0	
h. Understand solving equations as a process of reasoning and explain the reasoning	0	0	0	0	0,0
i. Solve equations and inequalities in one variable	0	2	0	0	
j. Solve systems of equations	0	0	2	0	
k. Represent and solve equations & inequalities graphically	0	1	1	0	
3. Functions					
a. Understand concept of function & use function notation	0	0	2	0	
b. Interpret functions that arise in applications in terms of the context*	0	0	2	0	
	Pre-Algebra	Beginning Algebra	Intermediate Algebra I	Intermediate Algebra II	MATH 131
c. Analyze functions using different representations*	0	0	2	0	

d. Build a function that models a relationship between two quantities*	0	0	0	0	
e. Build new functions from existing functions	0	0	2	0	
f. Construct and compare linear and exponential models and solve problems*	0	1	0	0	
g. Interpret expressions for functions in terms of the situation they model*	0	1	1	0	0,0
h. Extend the domain of trigonometric functions using the unit circle	0	0	0	0	0,0
i. Model periodic phenomena with trigonometric functions*	0	0	0	0	0,0
j. Prove and apply trigonometric identities	0	0	0	0	0,0
4. Modeling					
Modeling is best interpreted not as collection of isolated topics, but in relation to other standards. These are indicated by a star symbol(*)	0	1	0	0	
5. Geometry					
a. Experiment with transformations in the plane	0	0	0	0	0,0
b. Understand congruence in terms of rigid motions	0	0	0	0	0,0
c. Prove geometric theorems	0	0	0	0	0,0
d. Make geometric constructions	0	0	0	0	0,0
e. Understand similarity in terms of similarity transformations	1	0	0	0	0,0
f. Prove theorems involving similarity	0	0	0	0	0,0
g. Define trigonometric ratios and solve problems involving right triangles	1	0	0	0	0,0
h. Apply trigonometry to general triangles	0	0	0	0	0,0
i. Understand and apply theorems about circles	0	1	0	1	0,0
j. Find arc lengths and areas of sectors of circles	0	0	0	0	0,0
k. Translate between the geometric description and the equation for a conic section	0	0	0	0	0,0
l. Use coordinates to prove simple geometric theorems algebraically*	0	0	0	0	0,0
	Pre-Algebra	Beginning Algebra	Intermediate Algebra I	Intermediate Algebra II	MATH 131
m. Explain volume formulas and use them to solve problems*	0	1	0	0	0,0
n. Apply geometric concepts in modeling situations*	0	0	0	0	0,0
6. Statistics and Probability					
a. Summarize, represent, and interpret data on a single count or measurement variable	1	0	0	0	0,2
b. Summarize, represent, and interpret	0	0	0	0	0,0

data on two categorical and quantitative variables.					
c. Interpret linear models	0	1	0	0	
d. Understand and evaluate random processes underlying statistical experiments	0	0	0	0	0,1
e. Make inferences and justify conclusions from surveys, experiments, and observational studies	0	0	0	0	0,1
f. Understand independence and conditional probability; use them to interpret data	0	0	0	0	0,1
g. Use the rules of probability to compute probabilities of compound events in a uniform probability model	0	0	0	0	0,1
h. Calculate expected values and use them to solve problems	0	0	0	0	0,1
I. Use probability to evaluate Outcomes of decisions	0	0	0	0	0,2
Standards for Math Practice					
1.Make sense of problems & persevere in solving them	**2**	2	**2**	**2**	**2**
2.Reason abstractly & quantitatively	**2**	2	**2**	**2**	**2**
3.Construct viable arguments, critiques reasoning of others	**0**	0	**0**	**0**	**1**
4.Model with mathematics	**0**	1	**1**	**0**	**1**
5.Use appropriate tools strategically	**1**	1	**1**	**1**	**1**
6. Attend to Precision	**2**	2	**2**	**2**	**2**
7. Look for & make use of structure	**2**	2	**2**	**2**	**2**
8.Look for & express regularity in repeated reasoning	**2**	2	**2**	**2**	**2**

JRN/12-10-12

Appendix E:
Common Core
Pre-requisite Standards

COMMON CORE PREREQUISITE STANDARDS

Illinois State University & Heartland Community College – College Readiness

The Common Core Standards for Mathematical Practice are critical for developing students into proficient and successful mathematicians. Emphasizing these Practices at all levels will increase student success in any mathematics course:

- **CCSS.Math.Practice.MP1** Make sense of problems and persevere in solving them.
- **CCSS.Math.Practice.MP2** Reason abstractly and quantitatively.
- **CCSS.Math.Practice.MP3** Construct viable arguments and critique the reasoning of others.
- **CCSS.Math.Practice.MP4** Model with mathematics.
- **CCSS.Math.Practice.MP5** Use appropriate tools strategically.
- **CCSS.Math.Practice.MP6** Attend to precision.
- **CCSS.Math.Practice.MP7** Look for and make use of structure.
- **CCSS.Math.Practice.MP8** Look for and express regularity in repeated reasoning.

In conjunction with the Standards for Mathematical Practice, the following Common Core Content Standards have been identified by ISU's MAT 113 and MAT 119 faculty as "needed" or "helpful" for a student to have ***mastered*** in order to be "college ready."

Code	Description	ISU Credit Bearing Math Courses	HCC Credit Bearing Math courses	Compass Test
N-RN.1	**Explain how the definition of the meaning of rational exponents follows from extending the properties of integer exponents to those values, allowing for a notation for radicals in terms of rational exponents.**			
N-RN.2	**Rewrite expressions involving radicals and rational exponents using the properties of exponents.**			
N-RN.3	**Explain why the sum or product of two rational numbers is rational; that the sum of a rational number and an irrational number is irrational; and that the product of a nonzero rational number and an irrational number is irrational.**			
N-Q.1	**Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.**			
N-Q.2	**Define appropriate quantities for the purpose of descriptive modeling.**			
N-Q.3	**Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.**			
A-APR.1	**Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.**			

Code	Description	ISU Credit Bearing Math Courses	HCC Credit Bearing Math courses	Compass Test
A-APR.7	**Understand that rational expressions form a system analogous to the rational numbers, closed under addition, subtraction, multiplication, and division by a nonzero rational expression; add, subtract, multiply, and divide rational expressions.**			
A-CED.1	**Create equations and inequalities in one variable and use them to solve problems.**			
A-CED.2	**Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.**			
A-CED.3	**Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or non-viable options in a modeling context.**			
A-CED.4	**Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations.**			
A-REI.1	**Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.**			
A-REI.3	**Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.**			
A-REI.4	**Solve quadratic equations in one variable.**			
A-REI.10	**Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).**			
A-REI.11	**Explain why the x-coordinates of the points where the graphs of the equations y = f(x) and y = g(x) intersect are the solutions of the equation f(x) = g(x); find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where f(x) and/or g(x) are linear, polynomial, rational, absolute value, exponential, and logarithmic functions.**			

Code	Description	ISU Credit Bearing Math Courses	HCC Credit Bearing Math courses	Compass Test
A-REI.12	**Graph the solutions to a linear inequality in two variables as a half-plane (excluding the boundary in the case of a strict inequality), and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes.**			
A-SSE.1a	**Interpret parts of an expression, such as terms, factors, and coefficients.**			
A-SSE.1b	**Interpret complicated expressions by viewing one or more of their parts as a single entity. For example, interpret P(1+r)^n as the product of P and a factor not depending on P.**			
F-IF.1	**Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If f is a function and x is an element of its domain, then f(x) denotes the output of f corresponding to the input x. The graph of f is the graph of the equation y = f(x).**			
F-IF.2	**Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.**			
F-IF.4	**For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship.**			
F-IF.7a	**Graph linear and quadratic functions and show intercepts, maxima, and minima.**			
F-IF.7b	**Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.**			
F-IF.7d	**Graph rational functions, identifying zeros and asymptotes when suitable factorizations are available, and showing end behavior.**			
F-IF.8b	**Use the properties of exponents to interpret expressions for exponential functions. For example, identify percent rate of change in functions such as y = (1.02)^t, y = (0.97)^t, y = (1.01)^(12t), y = (1.2)^(t/10), and classify them as representing exponential growth and decay.**			
F-LE.1b	**Recognize situations in which one quantity changes at a constant rate per unit interval relative to another.**			

Code	Description	ISU Credit Bearing Math Courses	HCC Credit Bearing Math courses	Compass Test
F-LE.5	**Interpret the parameters in a linear or exponential function in terms of a context.**			
G-GPE.5	**Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems (e.g., find the equation of a line parallel or perpendicular to a given line that passes through a given point).**			
G-GMD.3	**Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.**			
S.ID.7	**Interpret linear models. Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.**			

Appendix F:

August 14th
Building Relationships
Common Core Meeting

Spirit of Common Core:

Building Relationships and Developing Strong Partnerships to

Strengthen Our Art of Teaching while

Supporting the Future Generation of Teachers

Agenda

TIME	ACTIVITY	WHO
4:30	Welcome and Introductions *Please introduce yourself by name, school, position and years in education*	Diane Wolf, Regional Office of Education 17 Dr. Barbara Myer, ISU's School of Teaching and Learning Dr. Deb Garrahy, ISU's Cecilia J Lauby Teacher Education Center
4:50	The Student Teaching Experience	Dr. Deb Garrahy
5:00	**What role do you have in supporting the student teacher in regards to CCSS?**	*Table Talk*
5:30	Dinner *Please see discussion topics on tables*	
6:00	**What do you believe a student teacher needs to understand regarding CCSS at the beginning of their experience?**	*Table Talk then record common ideas*
6:30	**Collaboration is the Key**	Dr. Barbara Myer
7:00	Paperwork, next steps, exit slips	Diane Wolf

This workshop supported by the Illinois Board of Higher Education

and the Center for the Study of Education Policy.

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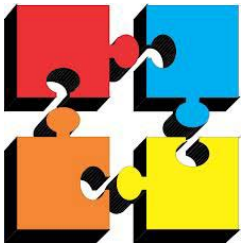
Putting the Pieces Together



How can we, in each of our roles, support the student teacher in the journey of common core knowledge and implementation? What is our piece of the puzzle?

Cooperating Teacher	University Supervisor	University Professor	District Administrator

In a one sentence summary, what is the central theme of how our roles fit together?

Talking Circle:

Our Roles in Supporting Student Teachers with Common Core State Standards:

Purpose of a talking circle:

- To give everyone's voice equal weight
- To discover what we have in common and how the pieces fit together
- To hear the themes of our collaborative work
- To learn to listen with intent
- To build stamina for listening with an ear towards understanding
-

Directions:

- One person talks at a time
- Person across the table summarizes speakers response on the recording form
- Everyone else listens with the purpose of understanding how each individual role fits together and the common themes in our collaborative work
- When a person is finished, the next person speaks as well as the next person records (move around the table in a clockwise motion for both speaker and recorder)
- Be conscious of time (1-3 minutes per person)
- If you choose not to speak, just say "pass"

Documented Responses from Spirit of Common Core Activities
August 14, 2013

Lessons:

- Align lessons with standards
- Be able to give an example of the students expectations
- ELA has an emphasis on analysis
- How to scaffold teaching to meet needs
- Some key vocabulary used within CCSS
- It is the guiding force behind every lesson we teach
- They need to understand that they are cross curricular collaboration
- They effect instruction curriculum and assessment
- ELA standard incorporate reading, writing, speaking, listening, technology and vocabulary
- They should understand the practical standards and how they affect teaching
- What curricular areas have CC standards
- That they exist and many states use them to drive curriculum

Where to find information:

- Understand where to go to find the CCSS
- That they exist
- Awareness
- How they are structured
- Where to access and find the standards as well as resources

Work with students (standards):

- Getting to think about common core in terms of student teachers
- Less teacher led- more student led
- They need to understand what the students need to go beyond the basic knowledge type questions
- CCSS are skills/concepts students should master by the end of the school year
- Understand that all students need to work towards the CCSS
- CCSS are college/employment readiness skills that span birth to college
- Glad you announced that more is planned. I worry about students with disabilities
- That they need to emphasize students providing evidence from text
- They need to understand how a student's knowledge of the standards effects their students
- CCSS require exploring work on the part of the students
- I am learning tonight with several concrete ideas of what I am going to do for myself and w/my student teacher concerning CCSS
- The significance of them- how can they be utilized to prepare students to become responsible contributors and active citizens
- Should know CCSS regard what/how students learn- as opposed to what teachers teach

Familiarization with Standards

- Be familiar with the standards
- How many are there for ELA?
- Awareness and purpose: the align states level playing field

- Allows teachers to teach for depth instead of breadth
- Familiar with common core
- Be able to look at CC standards book and find a standard to fit lesson plan
- Read and familiarize themselves with my grade level
- I expect her to be familiar with the standards
- How to use the standards
- That they are progressive (build on each other)
- Understand that the standards are used to design instruction
- Creating common understanding (a start)
- The breakdown of ELA standards Example: Literature, informational writing, speaking list and language
- Mastery is expected
- Builds from year to year
- I now have a "buy in" and I wasn't buying it before. I now understand why CC is important
- She needs to know that there is a continuum to follow
- What they are and how they are organized
- Need to have a familiarity with the standards one year below and one year above the ST grade level
- ST should be able to include standards with their lesson planning
- A firm grasp of what they are
- Concepts vs. facts
- That they should familiarize themselves with the CC at their grade level
- The domains needed for their particular placement
- Should know the CC standards are included in every grade level

Meeting New People

- Talking with other educators! Sharing thoughts and common visions. Thank you!
- To meet new educators and understand different perspectives on CCSS
- Meeting new people from university, cooperating and supervisors & sharing our ideas
- Learning from others
- Talking with colleagues from across the area
- Meeting and collaborating with teachers from different areas
- Meeting people from different districts and areas of teaching
- Making us sit with other
- I really enjoyed collaboration between K-12 and college level
- Meeting teachers from the area
- Meeting other teachers in the area and collaborating
- Working with wonderful professionals
- Met new people in education
- Collaborating and meeting new friends
- Meeting a variety of people
- Connecting with other educators
- Talking to practicing teachers
- Conversation/Dialogue and meeting new people in education
- The opportunity to network
- Meeting fellow teachers who share my concerns about the standards

- Finding out that on all levels of education we feel the same on the CC and student teachers
- Meeting people from other schools
- Really enjoyed talking "shop" with others who share a love of teaching and learning. Good Job!
- Meeting new people and sharing and knowing that ISU is really interested in us
- Passionate teachers
- Meeting new friends in education
- Meeting new people! Collaborating.
- It was great meeting with educators from all facets of education
- Liked that you mixed higher ed., school administrators and K-12 teachers at the tables
- Meeting good people
- Meeting a literacy coach
- Meeting new colleagues and discussing CC experiences
- Meeting the new people
- Networking with a new and interesting group of educators
- Meeting new people and sharing ideas
- Being "forced" to sit with people we don't know
- Sharing with a variety of educators
- Meeting other educators interested in CC
- Opportunity to chat with people in so many different roles in teaching
- Sitting with different people
- Meeting people

Working Together/Talking

- The ability to talk with teachers, administrators and supervising professors
- Great conversation for learning ☺
- Collaboration
- Meeting and discussions with such wonderful teachers- just being able to talk
- Collaborating with other professionals
- Time to talk with other teachers
- Talking to other teachers
- Collaboration with teachers/faculty at ISU/ROE
- Discussions that were meaningful with people who wanted to be there
- Collaborating with other professionals
- Time to collaborate with colleagues
- Talking with other educators
- Sharing with other teachers and professors
- Networking with rich conversation
- I enjoyed taking with others about CC
- Discussing what qualities make good teachers with qualified professionals. I understand what teachers go through better and I can do my best to help and lead
- Meeting with colleagues and administrators as colleagues
- Collaborating and learning from colleagues
- Enjoyed talking with others about CC- being injuviated for this school year- excited to work with my student teacher this year!
- Conversation with other teachers regarding common core- all in it together

- Open dialogue- good idea about seating everyone with strangers, even though I was annoyed at first! ☺
- Table talk!
- Being more prepared for student teachers- provide the best experience possible
- The discussion with all different levels of administrators and teachers from numerous areas
- Seeing people I've worked with before/collaboration
- Best thing- talking with educators from different areas: CT's, Adm., Sup.
- Discussing with others
- Table talk activities
- Collaborating with great colleagues. Making connections with practitioners in K-12. The potato chips that we never leave at home.
- The opportunity to talk with colleagues about CCSS and impact to higher Ed.
- Motivation for momentum to help others learn this year
- Collaboration with supervising teachers ☺
- Learning many different perspectives on CCSS
- To hear where others are with the CC
- Collaborating with such a variety of teachers and higher education
- Teachers getting together to talk about teaching- ALWAYS a good time ☺
- Getting the opportunity to hear what others think. Engaging conversation
- Networking. Seeing what's going on at different levels of education. Elem. though higher Ed.
- To find out that we are all in the same boat with CCSS
- The beginning of a conversation with people I've never met
- Being able to express expectations to university supervisors
- Talking with other teachers and sharing about CCSS
- Knowing we are all in this together
- Networking and sharing and understanding
- Having a meaningful conversation with new friends
- Knowing I'm not alone!
- The conversations on CC and sharing our knowledge
- Collaboration! There is never enough time to talk together.
- Great communication with informal atmosphere
- The opportunity to communicate with other levels of education
- I valued the discussion on what the ISU student should know
- We all need to work together to be the best student and cooperating teacher
- The whole night was excellent! I like how the university has initiated conversation on this. Please continue ☺
- Collaborating and talking with educators from a variety of backgrounds
- Conversation
- Ability to talk about making student teachers better!!
- The conversation with the cooperating teachers
- Conversations with cooperating teachers
- Spirit of collaboration
- Groups- collaborative conversations
- Time to collaborate and the thought that we may get additional opportunities to work on CCSS with the ROE.

Appendix G:

August 1st General Education Faculty Workshop

Modeling Effective Collaboration on Common Core Standards Initiative

A G E N D A

August 1, 2013

Instructional Technology and Development Center (CTLT building at corner of South Main and Dry Grove Streeets)

Goals:

- To introduce college-level faculty with teaching and administrative responsibilities for General Education to the Common Core standards in Math, English Language Arts and Science
- To provide an opportunity for college faculty to meet with secondary practitioners to gain insight into the different preparation and assessments incoming first-year students will have
- To better understand the timing of CCSS and the PARCC assessment and begin conversations on any changes to general education courses that may be desirable to ensure a smooth transition to college.
- To understand how general education contributes to the training of future teachers.

9:00 Welcome and Introductions by:

- Jon Rosenthal, ISU Associate Provost for Undergraduate Education;
- Jeremy McClure, Heartland Community College Chair of Math, STEM and Business;
- Dr. Jeffrey Hill, Superintendent of ISU Lab Schools,
- Dr. Barbara Myer, Director of the School of Teaching and Learning

9:15 A brief overview of Common Core Standards and PARCC assessment

- Christine Paxson, Curriculum Director ISU Lab Schools
  - History, Timelines &PARCC Assessment
  - Common Vocabulary

9:45 English Language Arts

- Debra Honegger, Regional Office of Education
  - Big Shift in ELA –nonfiction, fiction and complex text
  - Reading the standards

10:30 Break

10:45 Math

- Carly Morales, Regional Office of Education
  - Big Shift in Math & New Paths for High School
  - Reading the Standards

11:30: Digging Deep into the Standards

- Dana Karraker, ISU Center for Teaching and Learning
  - What will students be expected to know & do
  - Timeline for transition

12:15 Lunch

1:00 What does this mean to Higher Education?

- Jon Rosenthal, Jeremy McClure and Dana Karraker
  - How will these shifts effect incoming freshmen?
  - Responses from Higher Educators
  - Next steps

2:30 Adjourn

Sponsored by a grant from Illinois Board of Higher Education

Supported by the Center for the Study of Education Policy

Common Core State Standards
and the
PARCC Assessment

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1

THE COMMON CORE STATE STANDARDS

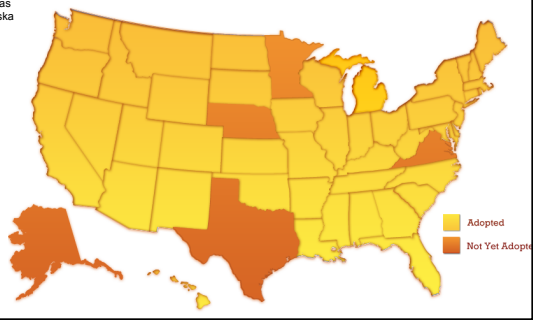
2010

- Grade-specific standards in Math and English Language Arts for Illinois classrooms
- Higher, clearer, deeper and based on what students must learn to succeed in college and modern careers
- Creating the same expectations for all students so families can understand exactly what every student should learn
- Emphasizing skills students will need for the modern workplace: collaboration, critical thinking, communication and creativity
- Built upon strengths and lessons from the highest-performing states and countries

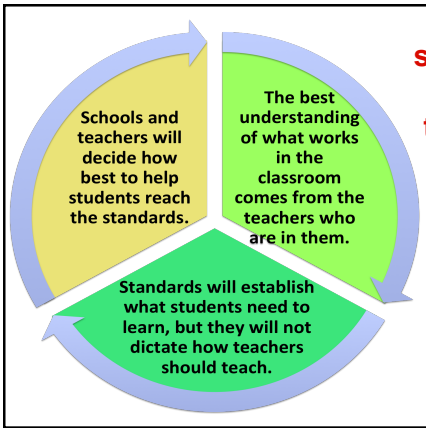
August 2013

45 States + DC Have Adopted the Common Core State Standards

Minnesota
Nebraska
Virginia
Texas
Alaska



Do the standards tell teachers what to teach?



Standards

Common Core State Standards: English Language Arts (K-12)

- **Reading**
- **Writing**
- **Speaking & Listening**
- **Language**
- **Grades 6-12: Literacy in History, Social**

Common Core State Standards: Math (K-12)

Next Generation Science Standards (K-12)

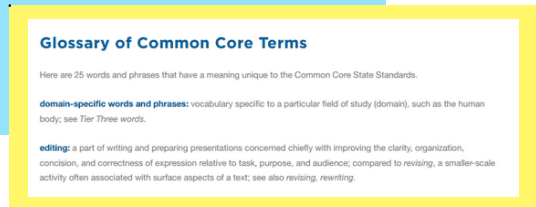
Appendix A

Common Language

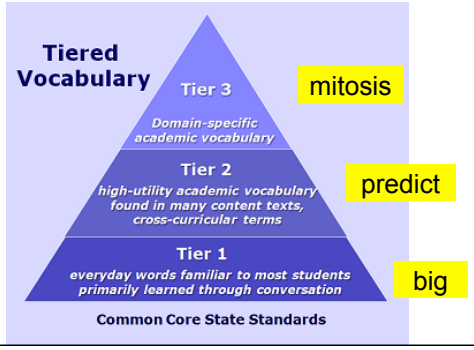
Glossary of Terms

Common Sense for the Common Core:

http://goo.gl/A1ldl Scholastic.com



Tiered Vocabulary



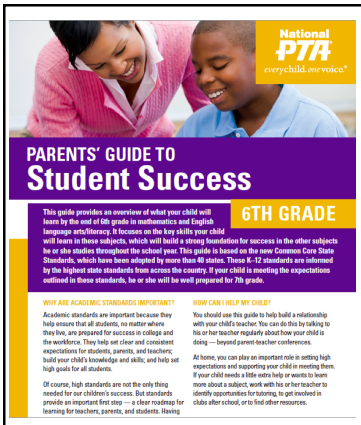
Resources

- http://commoncoreil.org/resources/

COMMON CORE
REAL LEARNING FOR REAL LIFE

- Common Core State Standards by Mastery Connect

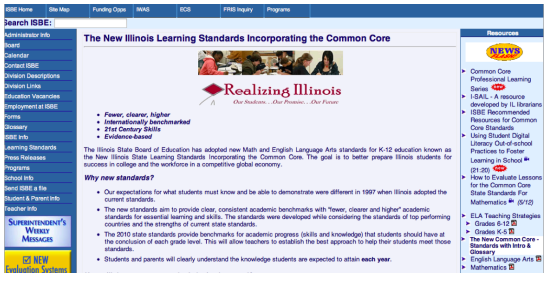
CORE



PTA Parent Guide to the Common Core

Illinois State Board of Education

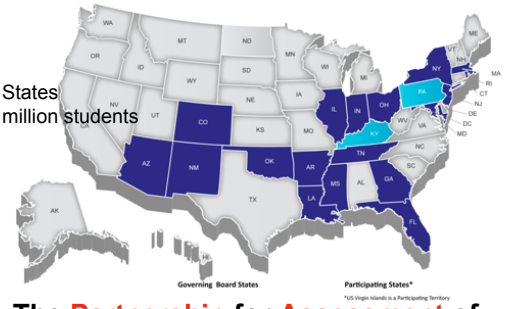
Newsletter



PARCC Assessment

www.PARCConline.org

21 States
16 million students



The Partnership for Assessment of Readiness for College and Careers

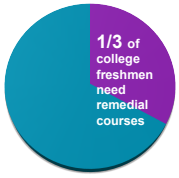
Why New Assessments *Now*?

www.PARCConline.org

We have to prepare all students for college or other postsecondary opportunities:

- A high school diploma isn't enough in our 21st century economy

- Our K–12 system is not adequately preparing students for college



How will PARCC be Different?

www.PARCConline.org

Students: Will know if they are **on track** to graduate ready for college/ careers

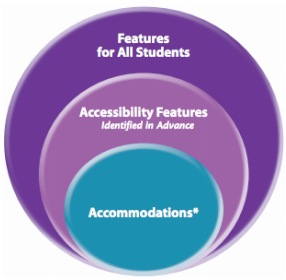
Teachers: Will have access to **timely data** to guide learning and instruction

Parents: Will have **clear and timely information** about student progress

States: Will have **valid results** that are comparable across borders

Accessibility Features and Accommodations Manual

www.PARCConline.org



* For students with disabilities, English learners, and English learners with disabilities

Features for All Students

Highlighter Tool	Writing and editing notes
Having test directions read aloud	Using writing tools: copy, paste
Enlarging text	Flagging items that you want to come back later
Using a pop-up glossary	Raising and lowering the volume
Using a spell checker	Crossing out answers: multiple choice items

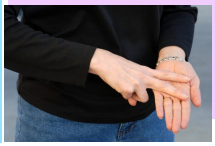
Accessibility Features

Changing the background color	Features must be "**turned on**" for a particular student by a test administrator
Font color	
Using a screen reader for the math test	

Presentation Accommodations

- Additional assistive technology
- Braille edition of ELA/Math
- Closed captioning
- Descriptive video
- Paper/Pencil version
- Tactile graphics

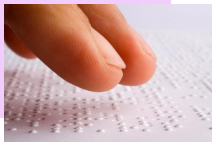
- Text to Speech or Video of Human Interpreter for ELA/ Math
- ASL video for test directions



Response Accommodations

- Braille note taker
- Calculation device
- Scribing or speech to text for ELA and math selected response assessments
- Scribing or speech to text for constructed responses ELA assessments

- Word prediction
- Extended time



Expanding Access

www.PARCConline.org

Accessibility Features and Accommodations for Students with Disabilities in PARCC Assessments

- A Parent's Guide on the PARCC Assessment

http://goo.gl/mk1GQE

Getting All Students College and Career Ready

www.PARCConline.org

Ongoing student support/interventions

K–2 → Grades 3–8 → High School → **Success in first-year, credit-bearing, postsecondary coursework**

- **Voluntary K–2 assessment** being developed, aligned to the Common Core State Standards
- **Timely data** showing whether ALL students are on track for college and career readiness
- **College readiness score** to identify who is ready for college-level coursework
- **Targeted interventions and supports:** •State-developed 12th-grade bridge courses

Professional development for educators

Assessments ELA/Literacy and Mathematics, Grades 3–11

www.PARCConline.or

Beginning of School Year — *End of School Year*

Flexible administration

- Diagnostic Assessment
- Mid-Year Assessment
- Speaking and Listening Assessment
- Performance-Based Assessment
- End-of-Year Assessment

Key: Optional / Required

- Field Tested in 2014
- Available in the summer of 2015

Two Required Assessments Yield Overall Score

www.PARCConline.or g

Beginning of School Year — *End of School Year*

Performance-Based Assessment

- After 75 percent of the school year
- Extended tasks, applications of concepts and skills
  - **ELA/literacy:** Writing effectively when analyzing text, research simulation
  - **Math:** Solving multi-step problems requiring abstract reasoning, precision, perseverance and strategic use of tools

End-of-Year Assessment

- After 90 percent of the school year
- Innovative, short-answer items
  - **ELA/literacy:** Reading comprehension
  - **Math:** Short items that address both concepts and skills

Number of Sessions

20 day testing window

9 sessions

Performanced Based Assessment (PBA): 5 sessions
- 3 sessions ELA
- 2 sessions Math

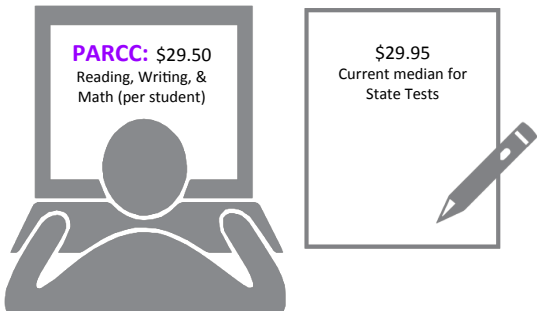
End of Year Assessment (EOY): 4 sessions
- 2 sessions ELA
- 2 sessions Math

Cannot take more than one session per day

Transition to Computer-Based Tests

- PARCC will have a pencil-and-paper test for 2014-2015
- Investments in new technology should be for learning first – assessment is a secondary use.
- Access to 21st-century technology is important for helping students prepare for college, careers and citizenship.

Estimated Cost



Reason for Test Costs

- Development of test questions
- Online delivery of assessment
- Scoring, including hand scoring essay questions
- Data analysis
- Reporting

ELA/Literacy: Grade 7 Sample Item

www.PARCConline.org

- Students read the text that introduces the topic
- Items are designed to help students gather information from the texts to lead to the final writing prompt
- Items require different types of responses to allow students to demonstrate a command of evidence with complex texts

SAMPLE ITEM

Student Directions

Based on the information in the text "Biography of Amelia Earhart," write an essay that summarizes and explains the challenges Earhart faced throughout her life.

Remember to use textual evidence to support your ideas.

Answer:

Font Size... Font Family.

ELA/Literacy: Grade 7 Sample Item

www.PARCConline.org

SAMPLE ITEM

Below are three claims that one could make based on the article "Earhart's Final Resting Place Believed Found."

Claims
Earhart and Noonan lived as castaways on Nikumaroro Island.
Earhart and Noonan's plane crashed into the Pacific Ocean
People don't really know where Earhart and Noonan died.

Part A: Highlight the claim that is supported by the most relevant and sufficient facts within "Earhart's Final Resting Place Believed Found."

Part B: Click on two facts within the article that best provide evidence to support the claim selected in Part A.

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ELA/Literacy: Grade 7 Sample Item

SAMPLE ITEM

STUDENT DIRECTIONS

You have read three texts describing Amelia Earhart. All three include the claim that Earhart was a brave, courageous person. The three texts are:

- "Biography of Amelia Earhart"
- "Earhart's Final Resting Place Believed Found"
- "Amelia Earhart's Life and Disappearance"

Consider the argument each author uses to demonstrate Earhart's bravery.

Write an essay that analyzes the strength of the arguments about Earhart's bravery in at least two of the texts. Remember to use textual evidence to support your ideas.

Please feel free to contact me.

Christine Paxson
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Illinois State University
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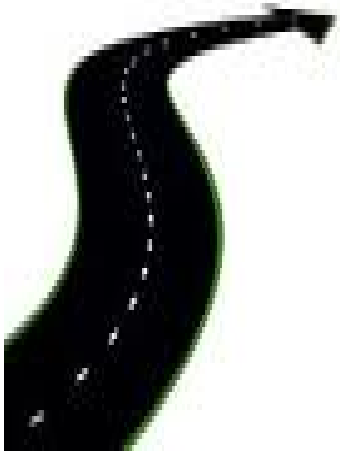
COMMON CORE STATE STANDARDS
English Language Arts

Debra Honegger,
Regional Office of Education 17

Journey into:

- Key Ideas
- Structure of the document
- Shifts in Thinking



College and Career Ready Students

- Establish independence
- Acquire a strong content knowledge base
- Adapt communication to audience, task, purpose or discipline
- Comprehend, critique and question
- Cite and evaluate evidence
- Use technology and digital media thoughtfully
- Understand other perspectives and cultures

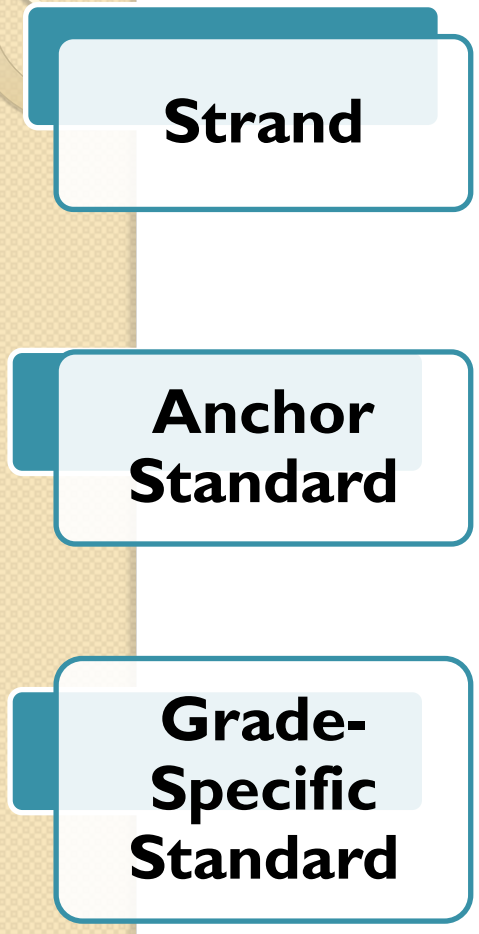
National Governors Association/Chief State School Officers (2010)

Key Ideas

- Text complexity
- Balance of informational and narrative text
- Content area literacy
- Writing to argue or explain
- Academic discussion
- Academic vocabulary
- Integration of research and media skills

National Governors Association/Chief State School Officers (2010)

Structure of Common Core English Language Arts Standards



- Strands
  - Reading, writing, speaking and listening, language
- Sections
  - K-5 ELA , 6-12 ELA , 6-12 history/social studies, science and technical subjects
- Text complexity
- Appendices

National Governors Association/Chief State School Officers (2010)

College and Career Readiness Anchor Standards for Reading

The K–5 standards on the following pages define what students should understand and be able to do by the end of each grade. They correspond to the College and Career Readiness (CCR) anchor standards below by number. The CCR and grade-specific standards are necessary complements—the former providing broad standards, the latter providing additional specificity—that together define the skills and understandings that all students must demonstrate.

Key Ideas and Details

1. Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.
2. Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas.
3. Analyze how and why individuals, events, and ideas develop and interact over the course of a text.

Craft and Structure

4. Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone.
5. Analyze the structure of texts, including how specific sentences, paragraphs, and larger portions of the text (e.g., a section, chapter, scene, or stanza) relate to each other and the whole.
6. Assess how point of view or purpose shapes the content and style of a text.

Integration of Knowledge and Ideas

7. Integrate and evaluate content presented in diverse media and formats, including visually and quantitatively, as well as in words.*
8. Delineate and evaluate the argument and specific claims in a text, including the validity of the reasoning as well as the relevance and sufficiency of the evidence.
9. Analyze how two or more texts address similar themes or topics in order to build knowledge or to compare the approaches the authors take.

Range of Reading and Level of Text Complexity

10. Read and comprehend complex literary and informational texts independently and proficiently.

*Please see "Research to Build and Present Knowledge" in Writing and "Comprehension and Collaboration" in Speaking and Listening for additional standards relevant to gathering, assessing, and applying information from print and digital sources.

Note on range and content of student reading

To build a foundation for college and career readiness, students must read widely and deeply from among a broad range of high-quality, increasingly challenging literary and informational texts. Through extensive reading of stories, dramas, poems, and myths from diverse cultures and different time periods, students gain literary and cultural knowledge as well as familiarity with various text structures and elements. By reading texts in history/social studies, science, and other disciplines, students build a foundation of knowledge in these fields that will also give them the background to be better readers in all content areas. Students can only gain this foundation when the curriculum is intentionally and coherently structured to develop rich content knowledge within and across grades. Students also acquire the habits of reading independently and closely, which are essential to their future success.

Reading Standards: Foundational Skills (K–5)

Grade 3 students:	Grade 4 students:	Grade 5 students:
Phonics and Word Recognition		
3. Know and apply grade-level phonics and word analysis skills in decoding words. a. Identify and know the meaning of the most common prefixes and derivational suffixes. b. Decode words with common Latin suffixes. c. Decode multisyllable words. d. Read grade-appropriate irregularly spelled words.	3. Know and apply grade-level phonics and word analysis skills in decoding words. a. Use combined knowledge of all letter-sound correspondences, syllabication patterns, and morphology (e.g., roots and affixes) to read accurately unfamiliar multisyllabic words in context and out of context.	3. Know and apply grade-level phonics and word analysis skills in decoding words. a. Use combined knowledge of all letter-soun correspondences, syllabication patterns, an morphology (e.g., roots and affixes) to reac accurately unfamiliar multisyllabic words in context and out of context.
Fluency		
4. Read with sufficient accuracy and fluency to support comprehension. a. Read grade-level text with purpose and understanding. b. Read grade-level prose and poetry orally with accuracy, appropriate rate, and expression on successive readings c. Use context to confirm or self-correct word recognition and understanding, rereading as necessary.	4. Read with sufficient accuracy and fluency to support comprehension. a. Read grade-level text with purpose and understanding. b. Read grade-level prose and poetry orally with accuracy, appropriate rate, and expression on successive readings. c. Use context to confirm or self-correct word recognition and understanding, rereading as necessary.	4. Read with sufficient accuracy and fluency to support comprehension. a. Read grade-level text with purpose and understanding. b. Read grade-level prose and poetry orally w accuracy, appropriate rate, and expression successive readings. c. Use context to confirm or self-correct word recognition and understanding, rereading a necessary.

Anchor Standard 6 for Reading:

Assess how point of view or purpose shapes the content and style of a text.

toward a resolution.

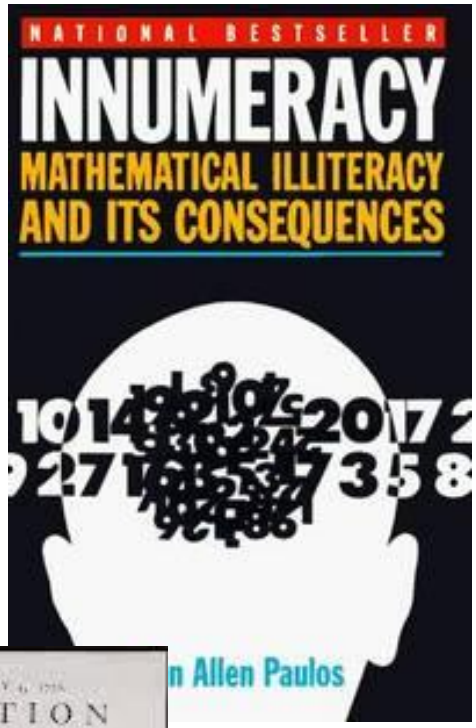
Craft and Structure

4. Determine the meaning of words and phrases as they are used in a text, including figurative and connotative meanings; analyze the impact of a specific word choice on meaning and tone.	4. Determine the meaning of words and phrases as they are used in a text, including figurative and connotative meanings; analyze the impact of rhymes and other repetitions of sounds (e.g., alliteration) on a specific verse or stanza of a poem or section of a story or drama.	4. Determine the meaning of words and phrases as they are used in a text, including figurative and connotative meanings; analyze the impact of specific word choices on meaning and tone, including analogies or allusions to other texts.
5. Analyze how a particular sentence, chapter, scene, or stanza fits into the overall structure of a text and contributes to the development of the theme, setting, or plot.	5. Analyze how a drama's or poem's form or structure (e.g., soliloquy, sonnet) contributes to its meaning.	5. Compare and contrast the structure of two or more texts and analyze how the differing structure of each text contributes to its meaning and style.
6. Explain how an author develops the point of view of the narrator or speaker in a text.	6. Analyze how an author develops and contrasts the points of view of different characters or narrators in a text.	6. Analyze how differences in the points of view of the characters and the audience or reader (e.g., created through the use of dramatic irony) create such effects as suspense or humor.

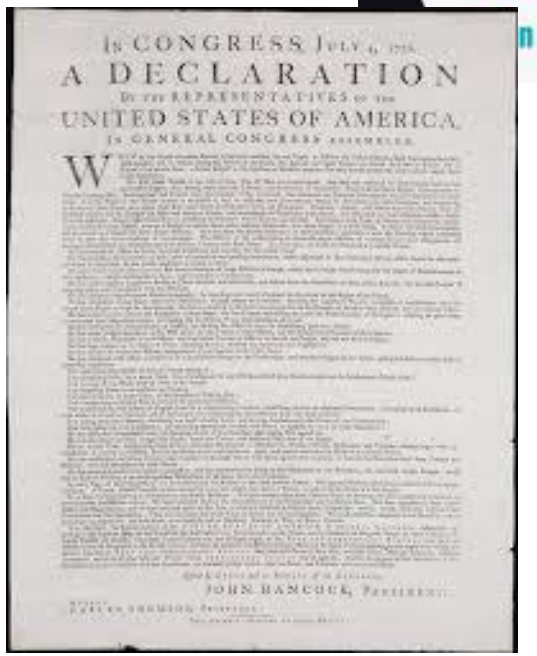
Shift #1: Building Knowledge Through Content-Rich Nonfiction: Why?

- Non-fiction makes up the vast majority of required reading in college/workplace.
- Informational text is harder for students to comprehend than narrative text. Students need to learn the strategies for reading informational text with a critical lens.
- Reading informational text is essential in building background knowledge which as long been connected to comprehension.
- Supports students learning how to read different types of informational text.

Shift #1: **Building knowledge** through **content-rich nonfiction**



- 50/50 balance K-5
- 55/45 by grade 8
- 70/30 by grade12



Shift #2:
Reading, Writing, and Speaking Grounded in Evidence From Text, Both Literary and Informational

Why:

Most college and workplace writing requires evidence

Research indicates that being able to locate and deploy evidence are hallmarks of strong readers and writers

Writing About Biology

The Double Helix

The following excerpts are from The Double Helix, James Watson's account of the discovery of the structure of DNA.

The α-helix had not been found by staring at X-ray pictures; the essential trick, instead, was to ask which atoms like to sit next to each other. In place of pencil and paper, the main working tools were a set of molecular models superficially resembling the toys of preschool children. . . .

I went ahead spending most evenings at the films, vaguely dreaming that at any moment the answer would suddenly hit me. . . .

Not until the middle of the next week, however, did a nontrivial idea emerge. It came while I was drawing the fused rings of adenine on paper. Suddenly I realized the potentially profound implications of a DNA structure in which the adenine residue formed hydrogen bonds similar to those found in crystals of pure adenine. If DNA was like this, each adenine residue would form two hydrogen bonds to an adenine residue related to it by a 180-degree rotation. Most important, two symmetrical hydrogen bonds could also hold together pairs of guanine, cytosine, or thymine.

I thus started wondering whether each DNA molecule consisted of two chains with identical base sequences held together by hydrogen bonds between pairs of identical bases. There was the complication, however, that such a structure could not have a regular backbone since the purines (adenine and guanine) and the pyrimidines (thymine and cytosine) have different shapes.

Despite the messy backbone, my pulse began to race. . . . The existence of two intertwined chains with identical base sequences could not be a chance matter. Instead it would strongly suggest that one chain in each molecule had at some earlier stage served as the template for the synthesis of the other chain. . . .

[One day elapsed during which American crystallographer Jerry Donahue convinced Watson that his model was incorrect.]

When I got to our still empty office the following morning, I quickly cleared away the papers from my desk top so that I would have a large, flat surface on which to form pairs of bases held together by hydrogen bonds. Though I initially went back to my like-with-like prejudices, I saw all too well that they led nowhere. When Jerry came in I looked up, saw that it was not Francis, and began shifting the bases in and out of various other pairing possibilities. Suddenly I became aware that an adenine-thymine pair held together by two hydrogen bonds was identical in shape to a guanine-cytosine pair held together by at least two hydrogen bonds. All the hydrogen bonds seemed to form naturally; no fudging was required to make the two types of base pairs identical in shape. Quickly I called Jerry over to ask him whether this time he had any objection to my new base pairs. When he said no, my morale skyrocketed. . . .

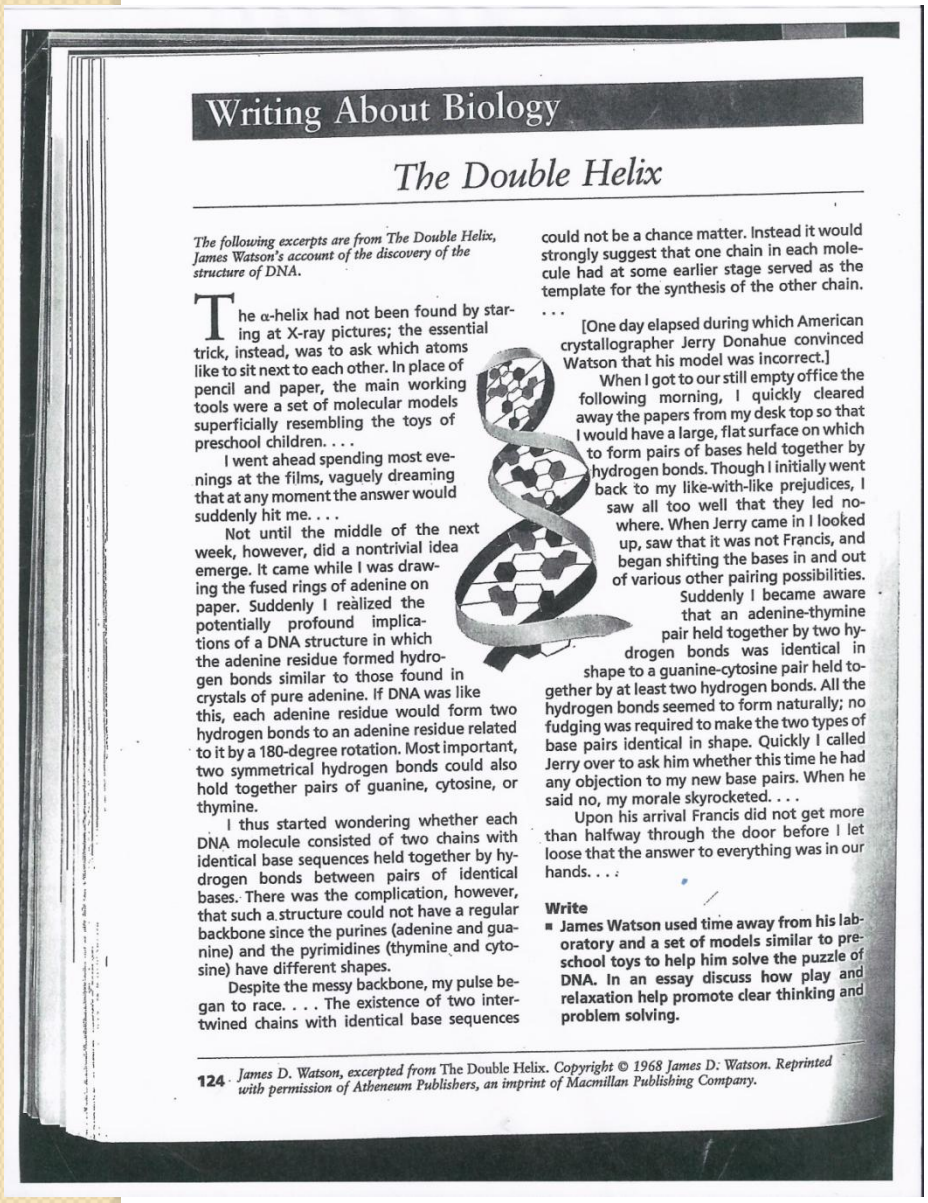
Upon his arrival Francis did not get more than halfway through the door before I let loose that the answer to everything was in our hands. . . .

Write

- **James Watson used time away from his laboratory and a set of models similar to preschool toys to help him solve the puzzle of DNA. In an essay discuss how play and relaxation help promote clear thinking and problem solving.**

Example?

James Watson used time away from his laboratory and a set of models similar to preschool toys to help him solve the puzzle of DNA. In an essay discuss how play and relaxation help promote clear thinking and problem solving.



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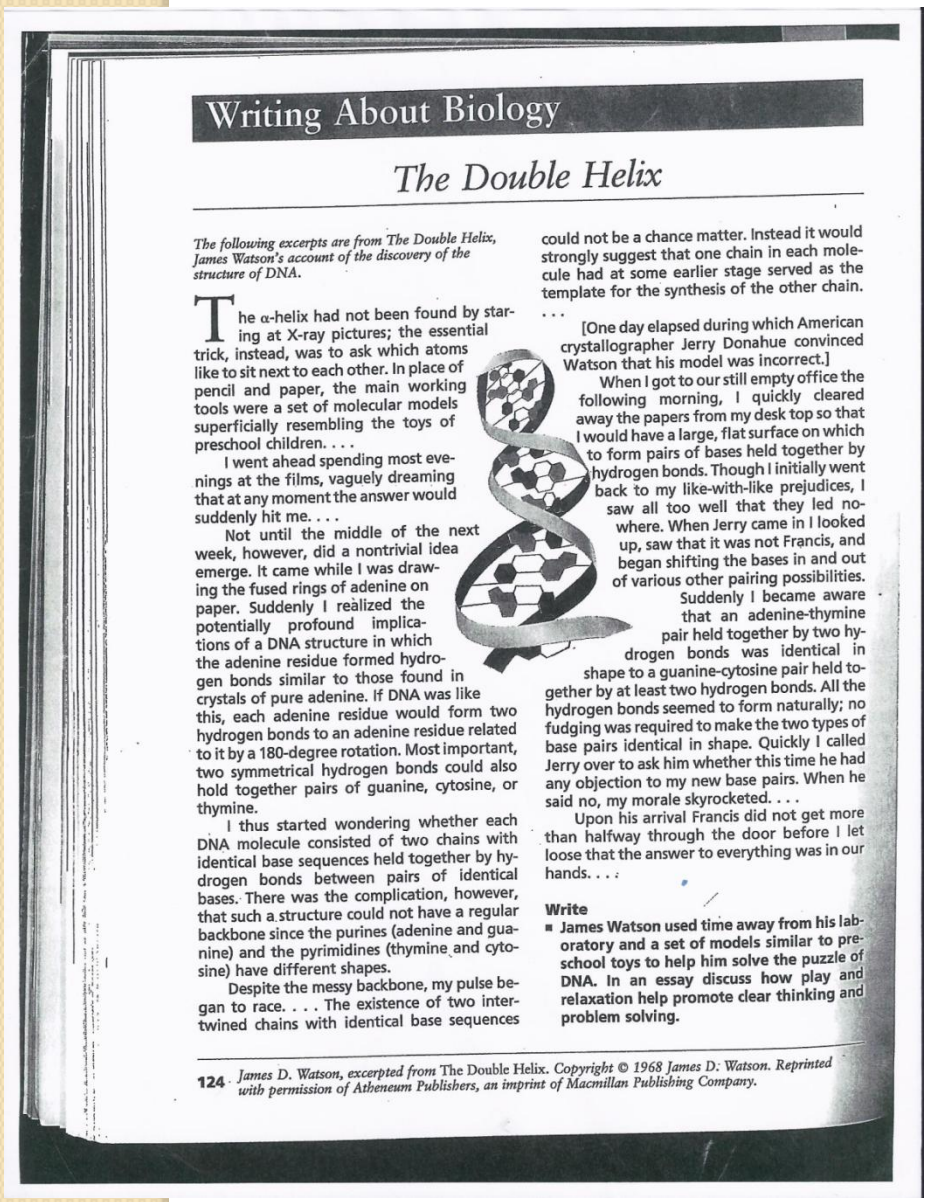
124 *James D. Watson, excerpted from* The Double Helix. *Copyright © 1968 James D. Watson. Reprinted with permission of Atheneum Publishers, an imprint of Macmillan Publishing Company.*

Example?

- *By the end of this article, James Watson felt that "the answer to everything was in our hands."*
- *What was the answer? What problem was Watson trying to solve? What steps or process did he use to discover the answer?*



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Write

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Example?

Describe Watson's response to his mistakes along the way and how those responses supported or hindered his discovery.

•

Non-Examples and Examples

Not Text-Dependent	Text-Dependent
● In "Casey at the Bat," Casey strikes out. Describe a time when you failed at something.	
● In "Letter from a Birmingham Jail," Dr. King discusses nonviolent protest. Discuss, in writing, a time when you wanted to fight against something that you felt was unfair.	
● In "The Gettysburg Address" Lincoln says the nation is dedicated to the proposition that all men are created equal. Why is equality an important value to promote?	

Non-Examples and Examples

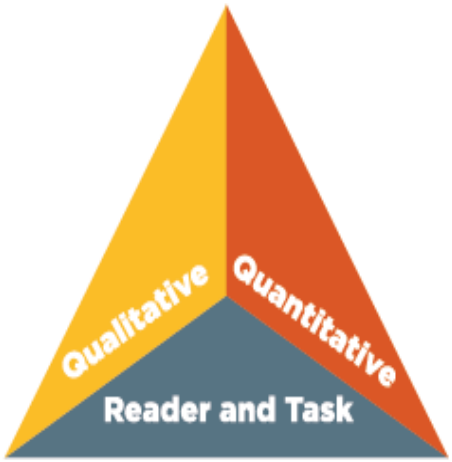
Not Text-Dependent	Text-Dependent
In "Casey at the Bat," Casey strikes out. Describe a time when you failed at something.	What makes Casey's experiences at bat humorous?
In "Letter from a Birmingham Jail," Dr. King discusses nonviolent protest. Discuss, in writing, a time when you wanted to fight against something that you felt was unfair.	What can you infer from King's letter about the letter that he received?
In "The Gettysburg Address" Lincoln says the nation is dedicated to the proposition that all men are created equal. Why is equality an important value to promote?	"The Gettysburg Address" mentions the year 1776. According to Lincoln's speech, why is this year significant to the events described in the speech?

Shift #3:Regular Practice with Complex Text and Its Academic Language

- Staircase of complexity
- Each grade level, another step of growth
- More time for close and careful reading
- Appropriate and necessary scaffolding and supports for students reading below grade level

Standard 10: Range, Quality, and Complexity of Student Reading 6–12

Measuring Text Complexity: Three Factors



Qualitative evaluation of the text: Levels of meaning, structure, language conventionality and clarity, and knowledge demands

Quantitative evaluation of the text: Readability measures and other scores of text complexity

Matching reader to text and task: Reader variables (such as motivation, knowledge, and experiences) and task variables (such as purpose and the complexity generated by the task assigned and the questions posed)

Note: More detailed information on text complexity and how it is measured is contained in Appendix A.

Range of Text Types for 6–12

Students in grades 6–12 apply the Reading standards to the following range of text types, with texts selected from a broad range of cultures and periods.

Literature			Informational Text
Stories	**Drama**	**Poetry**	**Literary Nonfiction**
Includes the subgenres of adventure stories, historical fiction, mysteries, myths,	Includes one-act and multi-act plays, both in written form and on film	Includes the subgenres of narrative poems, lyrical poems, free verse poems, sonnets,	Includes the subgenres of exposition, argument, and functional t the form of personal essays, speeches, opinion pieces, essays ab art or literature, biographies, memoirs, journalism, and historical

Which text is more complex?

Text 1

- Lincoln was shaken by the presidency. Back in Springfield, politics had been a sort of exhilarating game; but in the White House, politics was power, and power was responsibility. Never before had Lincoln held executive office. In public life he had always been an insignificant legislator whose votes were cast in concert with others and whose decisions in themselves had neither finality nor importance. As President he might consult with others, but innumerable grave decisions were in the end his own, and with them came a burden of responsibility terrifying in its dimensions.

Text 2

- According to those who knew him, Lincoln was a man of many faces. In repose, he often seemed sad and gloomy. But when he began to speak, his expression changed. "The dull, listless features dropped like a mask," said a Chicago newspaperman. "The eyes began to sparkle, the mouth to smile, the whole countenance was wreathed in animation, so that a stranger would have said, 'Why, this man, so angular and solemn a moment ago, is really handsome.'"

"As challenging as it must have been to write and finesse the adoption of the Common Core State Standards, that accomplishment is nothing compared to the work of teaching in ways that bring all students to these ambitious expectations. The goal is clear. The pathway is not."

-Lucy Calkins, Mary Ehrenworth and Christopher Lehman,

Pathways to the Common Core: Accelerating Achievement

Slides were modified from:

- www.achievethecore.org
- http://www.isbe.net/common_core/htmls/resources.htm

- Additional information:
  - Pathways to Common Core by Lucy Calkins, Mary Ehrenworth and Christopher Lehman

COMMON CORE STATE STANDARDS
Mathematics

Carly Morales
Regional Office of Education

Journey into:

- Structure of Standards
- Key Shifts

The CCSS Requires Three Shifts in Mathematics

1. **Focus:** Focus strongly where the standards focus.
2. **Coherence**: *Think* across grades, and *link* to major topics
3. **Rigor:** In major topics, pursue *conceptual* **understanding,** procedural skill and *fluency*, and *application*

Shift #1: Focus Strongly where the Standards Focus

- Significantly narrow the scope of content and deepen how time and energy is spent in the math classroom.
- Focus deeply on what is emphasized in the standards, so that students gain strong foundations.

Focus

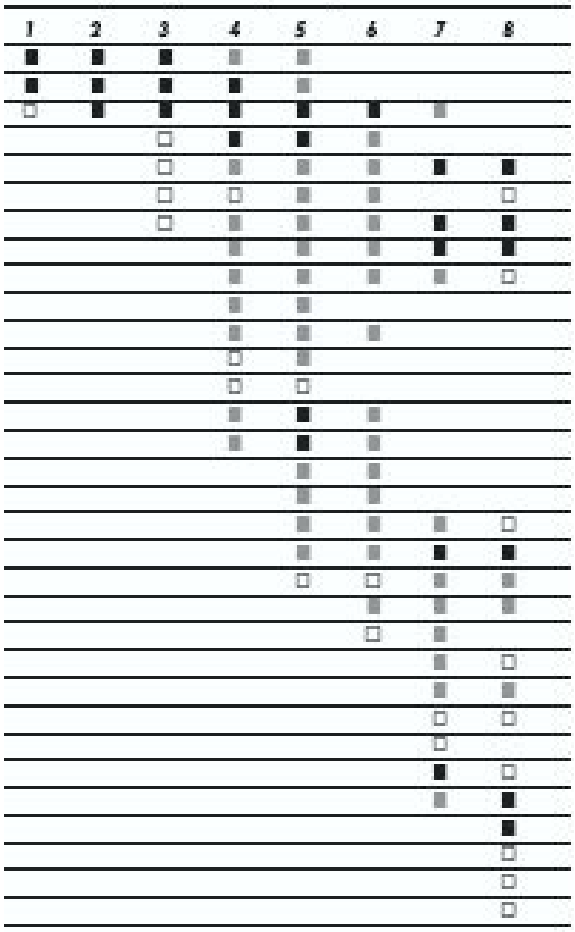
- Move away from **"mile wide, inch deep"** curricula identified in TIMSS.
- Learn from international comparisons.
- Teach less, learn more.

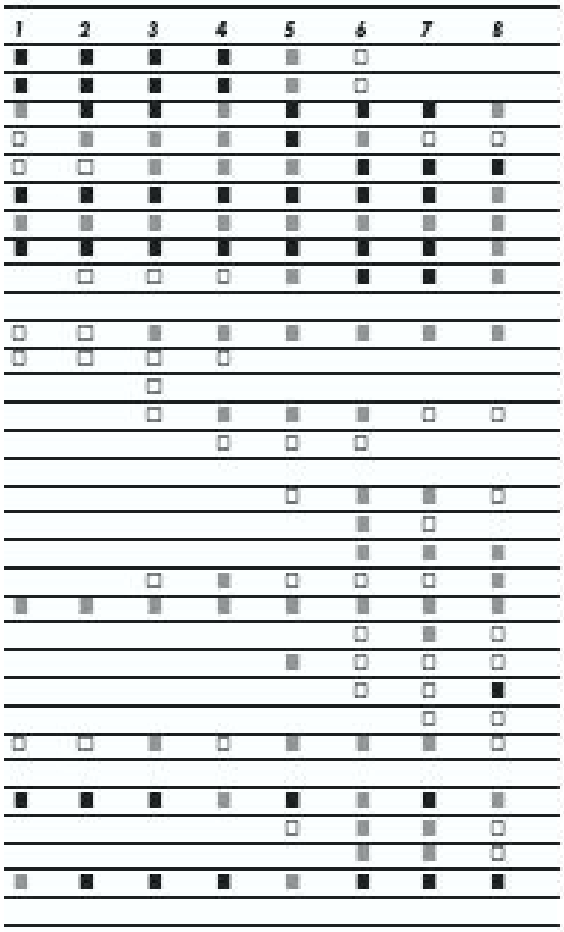
“Less topic coverage can be associated with higher scores on those topics covered because students have more time to master the content that is taught.”

– Ginsburg et al., 2005

The shape of math in A+ countries

Mathematics topics intended at each grade by at least two-thirds of A+ countries

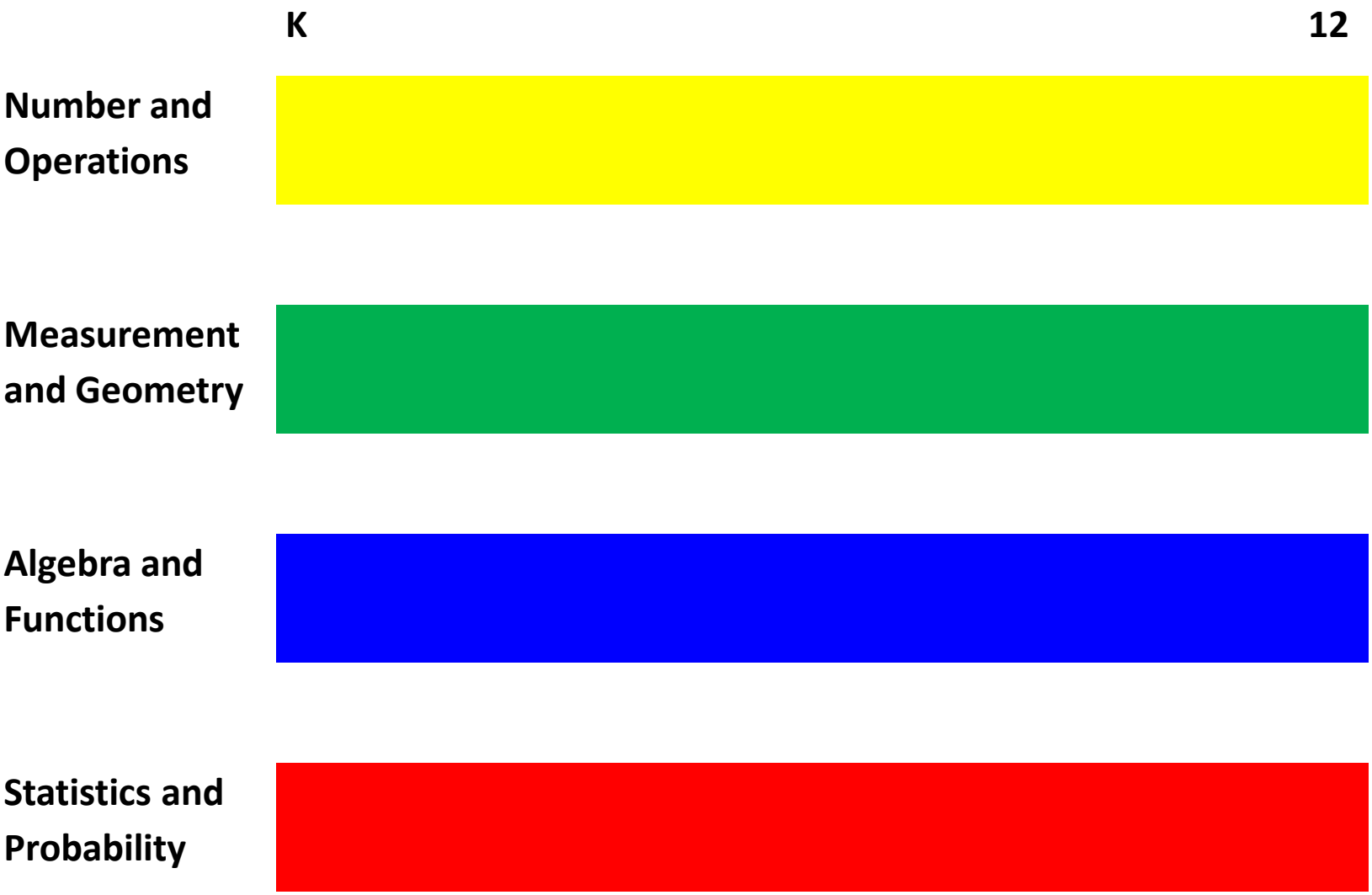




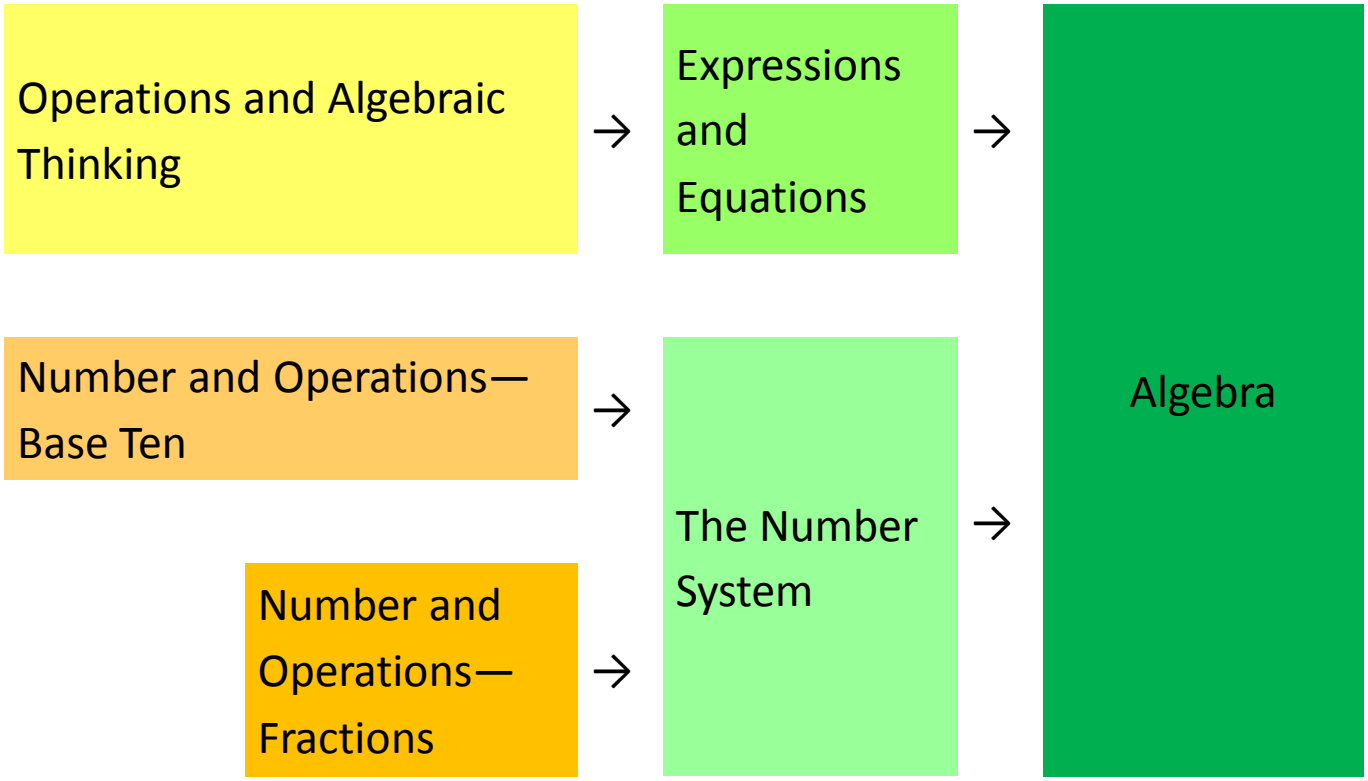
Mathematics topics intended at each grade by at least two-thirds of 21 U.S. states

[1] *Schmidt, Houang, & Cogan, "A Coherent Curriculum: The Case of Mathematics." (2002).*

Traditional U.S. Approach



Focusing Attention Within Number and Operations



Key Areas of Focus in Mathematics

Grade	Focus Areas in Support of Rich Instruction and Expectations of Fluency and Conceptual Understanding
K–2	Addition and subtraction - concepts, skills, and problem solving and place value
3–5	Multiplication and division of whole numbers and fractions – concepts, skills, and problem solving
6	Ratios and proportional reasoning; early expressions and equations
7	Ratios and proportional reasoning; arithmetic of rational numbers
8	Linear algebra

Shift #2: Coherence: Think Across Grades, and Link to Major Topics Within Grades

- Carefully connect the learning within and across grades so that students can build new understanding on foundations built in previous years.
- Begin to count on solid conceptual understanding of core content and build on it. Each standard is not a new event, but an extension of previous learning.

Alignment in Context: Neighboring Grades and Progressions

One of several staircases to algebra designed in the OA domain.

Expressions and Equations 6.EE

3. Apply the properties of operations to generate equivalent expressions. *For example, apply the distributive property to the expression 3 (2 + x) to produce the equivalent expression 6 + 3x; apply the distributive property to the expression 24x + 18y to produce the equivalent expression 6 (4x + 3y); apply properties of operations to y + y + y to produce the equivalent expression 3y.*

Operations and Algebraic Thinking 5.OA

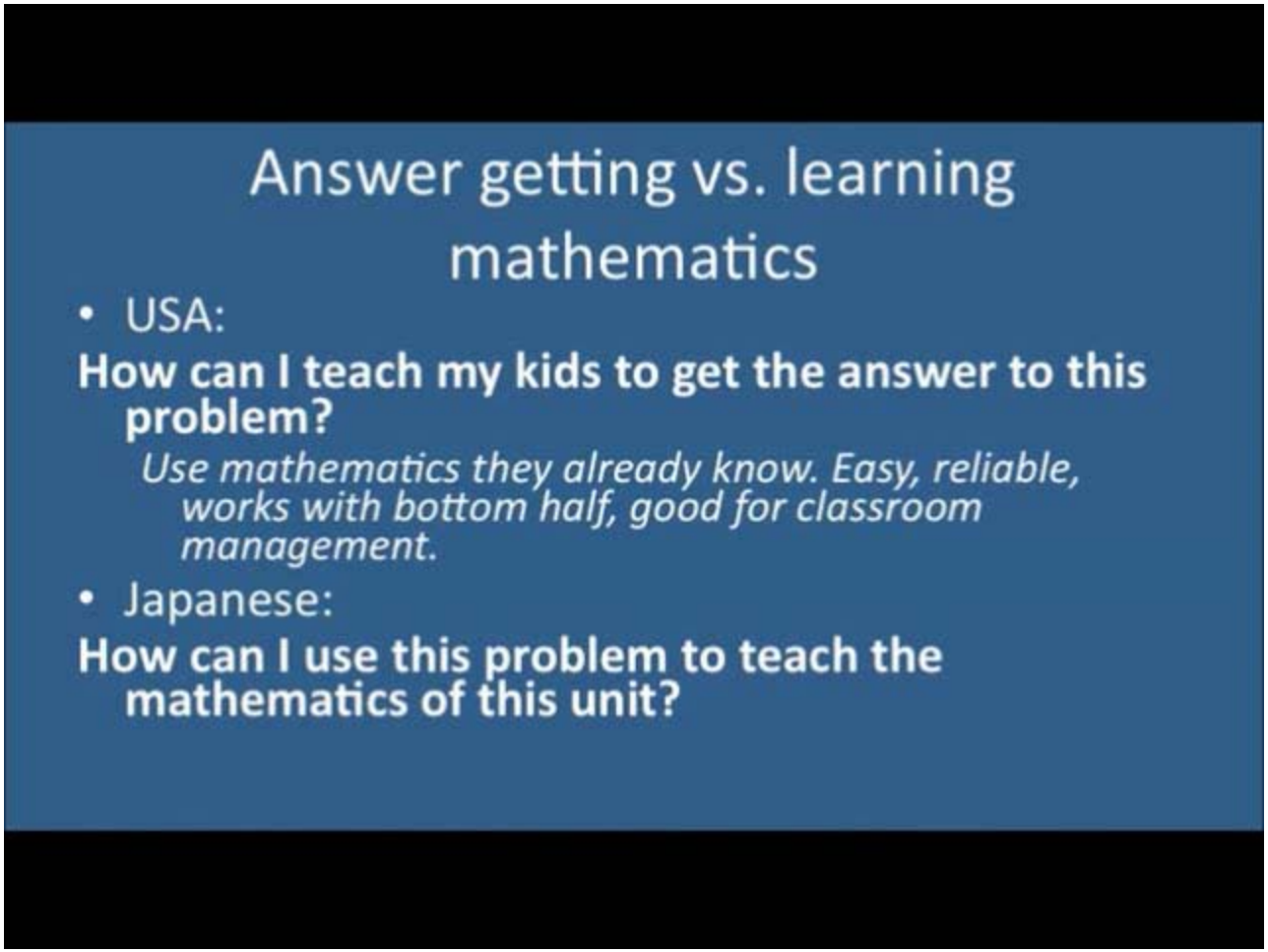
2. Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them. *For example, express the calculation "add 8 and 7, then multiply by 2" as 2 x (8 + 7). Recognize that 3 x (18932 + 921) is three times as large as 18932 + 921, without having to calculate the indicated sum or product.*

Operations and Algebraic Thinking 3.OA

5. Apply properties of operations as strategies to multiply and divide.[2] *Examples: If 6 x 4 = 24 is known, then 4 x 6 = 24 is also known. (Commutative property of multiplication.) 3 x 5 x 2 can be found by 3 x 5 = 15, then 15 x 2 = 30, or by 5 x 2 = 10, then 3 x 10 = 30. (Associative property of multiplication.) Knowing that 8 x 5 = 40 and 8 x 2 = 16, one can find 8 x 7 as 8 x (5 + 2) = (8 x 5) + (8 x 2) = 40 + 16 = 56. (Distributive property.)*

Operations and Algebraic Thinking 1.OA

3. Apply properties of operations as strategies to add and subtract.[3] *Examples: If 8 + 3 = 11 is known, then 3 + 8 = 11 is also known. (Commutative property of addition.) To add 2 + 6 + 4, the second two numbers can be added to make a ten, so 2 + 6 + 4 = 2 + 10 = 12. (Associative property of addition.)*


Answer getting vs. learning mathematics
• USA:
How can I teach my kids to get the answer to this problem?
Use mathematics they already know. Easy, reliable, works with bottom half, good for classroom management.
• Japanese:
How can I use this problem to teach the mathematics of this unit?

Key Instructional Shifts in Mathematics

- The Common Core State Standards emphasize *coherence* at each grade level – making connections across content and between content and mathematical practices in order to promote deeper learning.
- The standards *focus* on key topics at each grade level to allow educators and students to go deeper into the content.
- The standards also emphasize *progressions* across grades, with the end of progression calling for *fluency* – or the ability to perform calculations or solving problems quickly and accurate.
- The *Standards for Mathematical Practice* describe mathematical "habits of mind" or mathematical *applications* and aim to foster reasoning, problem solving, modeling, decision making, and engagement among students.
- Finally, the standards require students to demonstrate *deep conceptual understanding* by applying them to new situations.

Source:

Standards for Mathematical Practice

Eight Standards for Mathematical Practice

- Make sense of problems and persevere in solving them
- Reason abstractly and quantitatively
- Construct viable arguments and critique the understanding of others
- Model with mathematics
- Use appropriate tools strategically
- Attend to precision
- Look for and make use of structure
- Look for and express regularity in repeated reasoning

Shift 3: Rigor

- The CCSSM require a balance of:
  - Solid conceptual understanding
  - Procedural skill and fluency
  - Application of skills in problem solving situations
- Pursuit of all threes requires equal intensity in time, activities, and resources.

Solid Conceptual Understanding

- Teach more than “how to get the answer” and instead support students’ ability to access concepts from a number of perspectives
- Students are able to see math as more than a set of mnemonics or discrete procedures
- Conceptual understanding supports the other aspects of rigor (fluency and application)

Math Practice Standards

- Math practices = student processes and proficiencies

Organization of Common Core State Standards - Content

Grade-Level Standards

- K-8 grade-by-grade standards organized by domain
- 9-12 high school standards organized by conceptual categories

Standards for Mathematical Practice

- Describe mathematical “habits of mind”
- Connect with content standards in each grade

Overview of **K-8** Mathematics Standards

Each grade includes an overview of cross-cutting themes and critical areas of study

Grade 1 Overview

Operations and Algebraic Thinking

- Represent and solve problems involving addition and subtraction.
- Understand and apply properties of operations and the relationship between addition and subtraction.
- Add and subtract within 20.
- Work with addition and subtraction equations.

Number and Operations in Base Ten

- Extend the counting sequence.
- Understand place value.
- Use place value understanding and properties of operations to add and subtract.

Measurement and Data

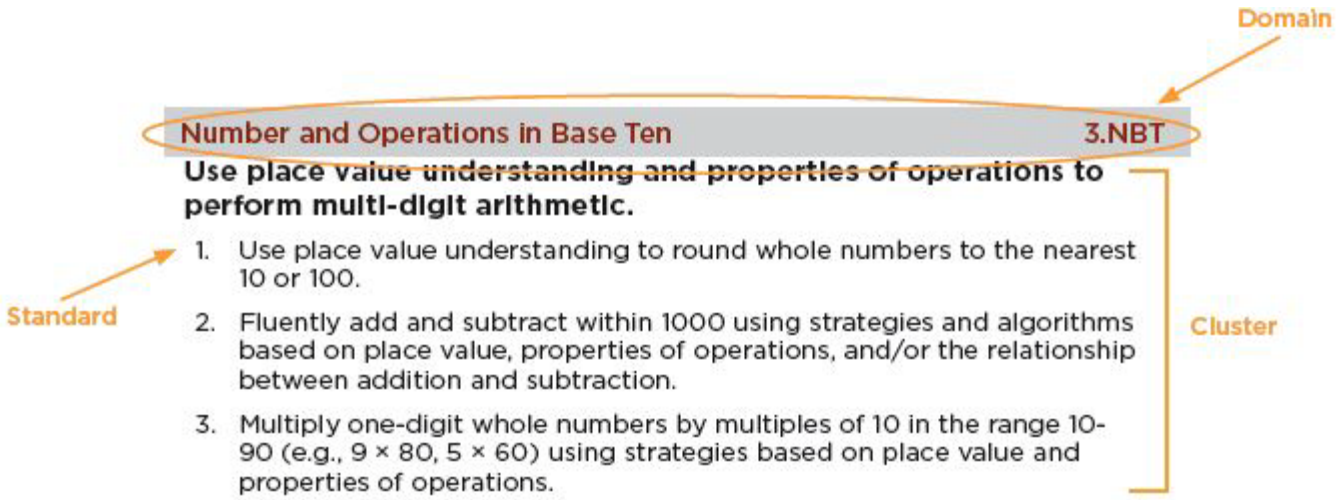
- Measure lengths indirectly and by iterating length units.
- Tell and write time.
- Represent and interpret data.

Mathematical Practices

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

Format of **K-8** Mathematics Standards

- **Domains:** overarching ideas that connect topics across the grades
- **Clusters:** illustrate progression of increasing complexity from grade to grade
- **Standards:** define what students should know and be able to do at each grade level



Overview of High School Mathematics Standards

The high school mathematics standards:

- Call on students to practice *applying mathematical ways of thinking* to real world issues and challenges
- Require students to develop a *depth of understanding and ability to apply mathematics to novel situations*, as college students and employees regularly are called to do
- Emphasize *mathematical modeling*, the use of mathematics and statistics to *analyze empirical situations*, understand them better, and improve decisions
- Identify the mathematics that all students should study in order to be *college and career ready*

Format of High School Mathematics Standards

- **Content/Conceptual categories:** overarching ideas that describe strands of content in high school
- **Domains/Clusters:** groups of standards that describe coherent aspects of the content category
- **Standards:** define what students should know and be able to do at each grade level
- High school standards are organized around five conceptual categories: *Number and Quantity, Algebra, Functions, Geometry,* and *Statistics and Probability*
- Modeling standards are distributed under the five major headings and are indicated with a (★) symbol
- Standards indicated as (+) are beyond the college and career readiness level but are necessary for advanced mathematics courses, such as calculus, discrete mathematics, and advanced statistics. Standards with a (+) may still be found in courses expected for all students

Format of **High School** Mathematics Standards

Each content category includes an overview of the content found within it

Number and Quantity Overview

The Real Number System

- Extend the properties of exponents to rational exponents
- Use properties of rational and irrational numbers.

Quantities

- Reason quantitatively and use units to solve problems

The Complex Number System

- Perform arithmetic operations with complex numbers
- Represent complex numbers and their operations on the complex plane
- Use complex numbers in polynomial identities and equations

Vector and Matrix Quantities

- Represent and model with vector quantities.
- Perform operations on vectors.
- Perform operations on matrices and use matrices in applications.

Mathematical Practices

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

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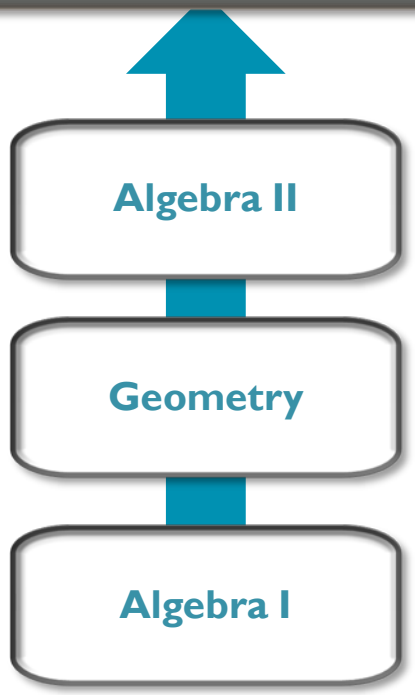
Model Course Pathways

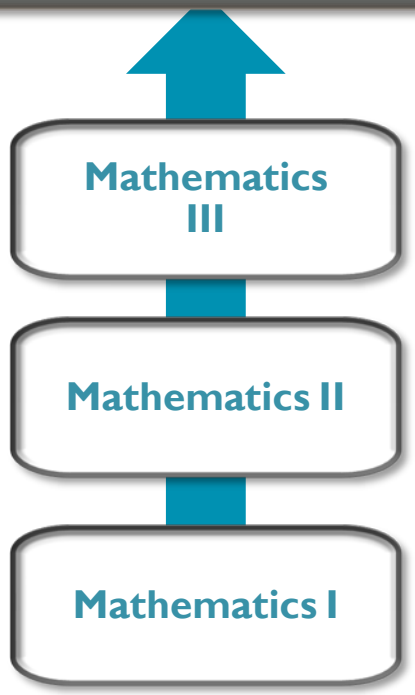
Mathematics

Courses in higher level mathematics: Precalculus, Calculus (upon completion of Precalculus), Advanced Statistics, Discrete Mathematics, Advanced Quantitative Reasoning, or other courses to be designed at a later date, such as additional career technical courses.



Pathway A

Traditional in U.S.



Pathway B

International Integrated approach (typical outside of U.S.)

Dan Meyer – Rethinking Math Education

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Implementing the Common Core State Standards:

An Action Agenda for Higher Education

Jacqueline E. King, American Council on Education

The Common Core State Standards

Recent years have seen the pace of change in education accelerate at all levels as educators and policy makers instigate reforms aimed at raising academic achievement in the United States to a world-class level. Perhaps nowhere has the pace and scale of change been more dramatic than in the realm of K–12 academic standards. In 2009, 48 states, two territories, and the District of Columbia signed a memorandum of agreement with the National Governors Association (NGA) and Council of Chief State School Officers (CCSSO), committing to a state-led process—the Common Core State Standards Initiative—to produce a set of K–12 standards in the foundational subjects of English language arts and mathematics designed to prepare high school graduates to succeed in college and careers. On June 2, 2010, the Common Core State Standards (CCSS) were released.

The standards are grounded in evidence, including: the best work of states and high-performing nations, frameworks developed for the National Assessment of Educational Progress (NAEP), the Benchmarks of the American Diploma Project, academic research, curriculum surveys, assessment data on college- and career-ready performance, and input from educators at all levels and on a variety of subjects. Based on research by Achieve, ACT, and others which found that the core knowledge and skills in mathematics and English language arts necessary for success in college and in good jobs have converged, the CCSS make no distinction between college and career readiness. As of December 2010, 41 states and the District of Columbia have formally adopted the CCSS. Most states will begin implementing the standards in schools in 2011–2012.

To develop the standards, CCSSO and NGA worked with representatives from participating states, as well as a wide range of educators, content experts, researchers, national organizations, and community groups. According to NGA and CCSSO, the standards were developed to achieve the following outcomes:

- To align with college and work expectations.
- To include rigorous content *and* application of knowledge through higher-order skills.
- To build upon strengths and lessons of current state standards.
- To reflect expectations of top-performing countries so that all U.S. students are prepared to succeed in our global economy.
- To be evidence and/or research-based.

Representative panels of postsecondary faculty, convened by leading scholarly societies in partnership with the American Council on Education, helped review and shape the standards. Within the states, college and university faculty were typically called upon to review the standards as well.

The CCSS, because they are anchored in college- and career-ready expectations, will ensure that students graduate from high school ready to enter and succeed in entry-level, credit-bearing college courses *without the need for remediation*. Improved academic preparation in high schools is expected to contribute to increasing college completion. For these outcomes to occur, states need a careful and thoughtful plan for implementing the CCSS, including the development of integrated and aligned K–12 and postsecondary policies and practices. As a result, the higher education community must be not only informed about the CCSS, but also engaged as a full partner in their implementation. While public colleges and universities may be most fully engaged in implementing the CCSS, independent and for-profit institutions also have an important role to play and are encouraged to participate to the extent they choose to do so.

This issue brief describes key areas that will require active participation from higher education leaders and faculty from a broad array of disciplines, in the following areas:

- Defining college readiness and aligning key policies for the school-to-college transition.
- Developing K–12 assessments and aligning college placement policies with these assessments.
- Aligning K–12 and higher education curricula.
- Teacher preparation and in-service professional development.

The issue brief also suggests structures at the state and local levels that can help facilitate collaboration between K–12 and higher education. It concludes with links to detailed information about the standards and related assessments.

Key Areas for Higher Education Engagement

Aligning Key Policies for College Readiness. While the CCSS represent an important step, they are only one part of a broader agenda to align key policies for the school-to-college transition. For example, students and schools also need to understand college expectations in key academic areas beyond mathematics and English language arts, such as science, social studies, and foreign language. At the state level, K–12 and public higher education must fill in the gaps left by the CCSS by developing a more holistic definition of college readiness, including but not limited to mastery of the common standards. Such a definition may include establishing a model college-preparatory curriculum, defining standards in other academic areas, and specifying the other key skills students must develop to be college-ready. Statewide agreement on this definition will help frame subsequent discussions about key policies for the school-to-college transition, such as high school graduation requirements, course requirements for college admission, and college-level course placement standards, all of which send clear signals about expectations for college readiness.

It is important to note that, while the CCSS define the knowledge and skills that students must possess in mathematics and English language arts in order to be ready for college-level work, they do not set—or even suggest—minimum standards for college or university admission. Even if students are eventually unable to earn a high school diploma without meeting the CCSS benchmarks, there will still be considerable variation in student performance above that minimum standard. It will be up to higher education leaders and faculty to determine the standards of performance that are necessary for admission, separate from placement requirements.

Development of K–12 Assessments and Alignment with College Placement Policies. There is general agreement that the CCSS will not result in appreciable learning gains unless they are accompanied by state-of-the-art assessments, a means of holding students and schools accountable, and aligned curricula and instruction.

The U.S. Department of Education's Race to the Top grant competition included $362 million to fund a new generation of common assessments tied to the CCSS. In order for these assessments to have credibility as measures of college readiness, they must be developed with the participation of, and have significant buy-in from, the higher education community. To signal the importance of having higher education present and involved, the Department of Education made agreement by colleges and universities to participate in the design and development of the new assessments, with the goal of using the new tests to measure students' readiness for credit-bearing coursework, a major criterion for the Race to the Top assessment competition.

Two multi-state consortia, the Partnership for the Assessment of Readiness for College and Careers (PARCC) and the SMARTER Balanced Assessment Consortium, were awarded grants in September 2010. As shown in the table on the next page, as of December 2010, 44 states and the District of Columbia had agreed to participate in at least one of the two

consortia. Work is just beginning to design new assessment systems for grades 3 through 8 and high school, with the mandate that these assessments become operational in 2014–15. To establish a consistent standard for adults who have left school and seek an equivalency credential such as that offered by passing the GED® tests, the American Council on Education plans to align the next generation of the GED® assessment to the CCSS along a similar time frame.

Although each consortium will take a somewhat different approach to engaging higher education in its member states, a goal common to both consortia is that public colleges and universities will ultimately recognize an agreed-upon score on a summative 11th grade

Common Core State Standards: Assessment Consortia Participation (as of December 2010)

	Partnership for the Assessment of Readiness for College and Careers (PARCC)	SMARTER Balanced Assessment Consortium
Governing States	Arizona Arkansas District of Columbia Florida Georgia Illinois Indiana Louisiana Maryland Massachusetts New York Rhode Island Tennessee	Connecticut Hawaii Idaho Kansas Maine Michigan Missouri Montana Nevada New Mexico North Carolina Oregon Utah Vermont Washington West Virginia Wisconsin
Participating/ Advisory States	Alabama California Colorado Delaware Kentucky Mississippi New Jersey North Dakota Ohio Oklahoma Pennsylvania South Carolina	Alabama Colorado Delaware Iowa Kentucky New Hampshire New Jersey North Dakota Ohio Oklahoma Pennsylvania South Carolina South Dakota

Note: These lists reflect state participation as of December 2010; state-level participation, especially for participating/advisory states, will continue to evolve over time. Governing states may belong to only one consortium and commit to using the assessments in 2014–15. Participating/advisory states may join more than one consortium and make no firm commitment to use the assessments. See For More Information at the end of this paper for additional details.

assessment as indication that a student is ready for entry-level credit-bearing courses, and thereby exempt those students from remediation in mathematics and/or English. This approach is modeled on the Early Assessment Program in California, which exempts students who meet a set score on that state's 11th grade assessment from taking placement exams at either the California Community Colleges or California State University, and certifies that these students are ready for those institutions' entry-level, credit-bearing math and English courses. Importantly, this system gives an early warning to students if they are not ready for credit-bearing college coursework in English and math *while they are still in high school* and have an opportunity to correct deficiencies during their senior year, thereby decreasing the need for remediation.

Of course, placement is more complicated than just certifying that students are ready for a single course. Students who meet the standard in the 11th grade may be required to take additional courses in the 12th grade, and could still need to take an institutional placement exam in order to determine appropriate placement within that institution's array of credit-bearing courses. Institutions may debate the feasibility and even the advisability of standardizing placement policies at the system or state level. However, given the commitment many institutions have already made as part of the Race to the Top assessment competition, colleges and universities need to seriously consider creating consistent placement standards for similar entry-level courses, aligned with the new Common Core standards and K–12 assessments. Doing so will provide a clear, consistent, and meaningful signal to school leaders, teachers, students, and parents about the expectations of higher education. Faculty, academic administrators, and registrars will need to be deeply involved in these discussions.

Perhaps the greatest benefit of the new assessments will accrue not to the students who are deemed college-ready, but rather to those students who are not yet ready and can access additional assistance during their senior year of high school. Here too, higher education faculty can work closely with their K–12 colleagues to design interventions that help struggling students reach the college-ready level while still in high school.

Development and Alignment of Curricula and Instructional Materials. Just as states will be working hard to develop new assessments aligned to Common Core State Standards, there will be a tremendous need for new curricula and instructional materials aligned to the new standards. Already, textbook publishers and other content providers are rushing to update their materials. Higher education faculty can play a valuable role by collaborating with teachers as they develop new instructional materials, and by helping states and school districts evaluate curricula and instructional materials for alignment with the CCSS.

As high schools align their curricula to the CCSS, higher education institutions will face questions about their own courses. Will students who successfully complete a college-ready curriculum transition seamlessly into first-year college courses? Do those courses assume mathematics or English language arts knowledge and skills that are not part of the CCSS? Do curricula for relevant remedial and adult

education courses align to the common core? The CCSS thus opens up two types of exciting opportunities for higher education faculty: to work in collaboration with K–12 educators to create seamless transitions between sectors, and to reassess their own curricula for adult, developmental, and general education in light of these new common state benchmarks.

Teacher Preparation and In-Service Professional Development. As states move toward implementation of the CCSS, perhaps no issue looms larger for higher education than teacher preparation and professional development. Will current and new teachers be ready to teach to the new higher standards? What must colleges and universities do—both in their colleges of education and in their schools of arts and sciences—to prepare teachers to be effective?

In reaction to or parallel with the CCSS, there has been recent national activity on teacher preparation and professional development. In October 2010, the Council of Chief State School Officers (CCSSO) released a draft of new model teaching standards that are aligned to the CCSS to guide state policy in areas such as program approval and teacher certification and licensure. The American Association of Colleges of Teacher Education (AACTE) has called for the creation of teacher performance assessments and professional development programs linked to the CCSS. At the discipline level, the Conference Board on the Mathematical Sciences (CBMS) recently held a national conference on content-based professional development for teachers of mathematics. Clearly, K–12 and higher education will have to collaborate closely—with support from national organizations like these—in order to help current and future teachers succeed.

Avenues for Collaboration

Many states have mechanisms in place that can facilitate collaboration across K–12 and higher education on the agenda described. The most common of these are state or regional P–20 councils. While some of these bodies are very effective, many lack a clear action agenda, do not enjoy active support from key stakeholders such as the governor or business leaders, and operate under a model of passive information-sharing rather than engaged collaboration and shared decision making. The CCSS present the opportunity to invigorate or restructure these councils around a clear and urgent action agenda.

Whether or not a state chooses to utilize the structure of a P–20 council for this work, the professionals who typically staff these councils can play a crucial role as hubs of information, conveners, and catalysts for action. Existing—or newly developed—collaborative relationships between state agency leaders in higher education (SHEEOs) and K–12 education (Chief State School Officers) may be leveraged as another setting for cross-sector dialogue and action. Regardless of the venue that leaders use, the CCSS present higher education and K–12 leaders with the opportunity to forge consensus on key policies and set expectations for collaboration that can then filter throughout both education systems.

Another important structure for collaboration is statewide groups in the academic disciplines. For example, Maryland has a statewide mathematics group that includes faculty from all types of institutions as well as K–12

teachers. Such groups will be invaluable as states wrestle with implementation in the areas such as assessment, curriculum, and teacher preparation and professional development. Likewise, state- or system-wide groups that bring together chief academic officers and/or deans can be important vehicles for disseminating information and engaging campus participation.

Finally, a number of cities, such as El Paso and San Diego, have already developed close partnerships among colleges, universities, and school districts. These existing partnerships can take implementation of Common Core to the local level, ensuring that the right teachers and faculty are engaged in key conversations.

Conclusion

In a recent speech to the Conference Board on the Mathematical Sciences, University System of Maryland Chancellor William "Brit" Kirwan said:

> *Closing the gap between high school completion requirements and college entrance expectations is arguably the single most important thing to fix, if we are to address our college completion problem. I feel strongly that higher education must step forward and exercise leadership at this moment in time . . . A lot is at stake for our nation and the well-being of future generations. Much will depend on how we in higher education respond to the challenge and this moment of opportunity.*

Clearly, the Common Core State Standards present a great opportunity for education in general—and for higher education in particular. It is incumbent on faculty and administrators at institutions across the nation to seize this historic moment.

Acknowledgments

Colleagues who helped craft this document include Paul Lingenfelter, Sharmila Basu Conger, Charlie Lenth, and Julie Carnahan at SHEEO; Margaret Horn, Sandy Boyd, and Allison Jones at Achieve; and Mikyung Ryu at ACE. The author also is grateful to ACE's designers and editors for their production assistance.

For More Information

The following sites provide access to the standards documents, assessment plans, and an array of additional information:

www.corestandards.org: Official Common Core site, with access to the full standards documents and a map tracking state adoption.

www.achieve.org: A wealth of supplemental information, including comparison of the CCSS to American Diploma Project benchmarks.

www.achieve.org/PARCC/: Information on the Partnership for the Assessment of Readiness for College and Careers (PARCC), one of two state consortia awarded Race to the Top funds to create assessments linked to the CCSS. Achieve was chosen by the PARCC states as its project management partner.

www.k12.wa.us/smarter/: Information on the SMARTER Balanced Assessment Consortium, the second Race to the Top grant recipient.

www.acenet.edu/programs/policy: Materials from two webinars on CCSS for the higher education community.

Appendix H:

Common Core Associate Training

COMMON CORE ASSOCIATE TRAINING

Teacher Education faculty and **teacher candidates** are invited to apply to participate in a set of six workshops that will teach about the Common Core State Standards:

What are the Common Core State Standards?
How do we deconstruct the standards?
What do we look for in teaching to the standards?
What is standards based grading?
How is technology integrated into the standards?

A **$1000 honorarium** is available for those faculty (stipend) and students (applied to student account) who are selected for this training, payable at the end of October and in December. In order to receive the honorarium, faculty and students must attend all class sessions and complete any online activities between classes.

Meetings will be held on the following dates on Tuesdays from

3:15 – 5:15:

September 10, 24
October 8, 22
November 5, 19

Applications are available from 8/19 until 8/30 at the following website:

www.xxxxxxxxxx.edu [QR code here]

Questions? Contact bbmeyer@ilstu.edu or cdpaxso@ilstu.edu