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# Washington Alignment Analysis: Mathematics Washington State and Common Core State Standards

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## Background

The K-12 Common Core State Standards for English language arts and mathematics were released as final documents on June 2, 2010 by the Council of Chief State School Officers (CCSSO) and the National Governor's Association (NGA). Educators and stakeholders from across the state of Washington had opportunities throughout the development process to weigh-in and provide input on the draft standards documents during the fall of 2009 and the winter and spring of 2010. These Common Core State Standards were provisionally adopted by Superintendent Dorn on August 2, 2010, as permitted within 2010 Engrossed Second Substitute Senate Bill (E2SSB) 6696.

Engrossed Second Substitute Senate Bill 6696 requires OSPI to submit a detailed report on the Common Core State Standards to the state Legislature in January 2011. Per requirements of E2SSB 6696, the legislative report will provide a summary of how well the Common Core State Standards align with the Washington standards, an implementation plan for the Common Core State Standards, and costs associated with the implementation. This document and its companion *Washington Alignment Analysis: English Language Arts* will be included as appendices within the legislative report.

## Alignment Studies

In summer 2010, once the final Common Core State Standards were issued, OSPI moved forward in conducting two types of alignment analysis between the Common Core State Standards and the Washington standards.

1. **External Alignment Analysis:** In June 2010, OSPI initiated an external alignment analysis project by contracting with Hanover Research. Hanover Research is a membership-based full-service research organization that provides custom research for a variety of states, school districts, institutions of higher education, and other non-profit and for-profit members across the United States and internationally. Washington’s contract with them spanned the 2009 and 2010 years.

Hanover Research produced two reports that analyzed the degree to which Washington’s current standards align with the Common Core State Standards. These documents are:

1. Alignment Analysis: Common Core and Washington State Mathematics Standards; and
2. Alignment Analysis: Common Core and Washington State Reading, Writing, and Communications Grade Level Expectations

The Hanover analysis started with the Common Core State Standards and matched Washington standards to them. The front matter of each document provides an explanation of the methodology and results of this analysis. Content staff from OSPI provided input on clarity and navigation of the document, but intentionally did not provide judgment as to whether the Hanover analyses were accurate. Both Hanover documents are available online at: <https://www.k12.wa.us/Corestandards/CompareReview.aspx>.

2. **Washington Alignment Analysis:** This review was conducted in August 2010 and was facilitated by OSPI which convened a group of Washington educators who have a deep understanding of the intent of the Washington standards. All group members had been selected through an application process to participate in past state-led standards and assessment leadership efforts, reviews of instructional materials, development of teacher endorsement competencies, and/or support of our state’s most struggling schools. The members of this committee can be found in the appendix of this document. This document and its companion *Washington Alignment Analysis: English Language Arts* represent the result of the August review by Washington educators. Both documents are also available online at: <https://www.k12.wa.us/Corestandards/CompareReview.aspx>.

## Washington Analysis Details

The workgroups convened in August 2010 conducted two separate analyses (English language arts and mathematics) that analyzed the degree to which the Common Core State Standards align with Washington’s current standards. For English language arts, the reviewers aligned the Common Core English language arts standards to Washington’s K-10 learning standards (Grade Level Expectations) for reading, writing, and communication. The mathematics review aligned the Common Core mathematics standards to Washington’s mathematics learning standards (Performance Expectations). For purposes of this document, when the words ‘Washington standards’ are used in a general sense, they will be

referring to the grade-level expectations, including the evidence of learning, in the reading, writing, and communication standards or the performance expectations in the mathematics standards.

The analysis in both cases began with the Washington State standard, matching as many Common Core State Standards as necessary to cover all major parts of the Washington standard. Not all Common Core State Standards were a true match to the Washington standards. In these cases, the most closely matched Common Core State Standard(s) were included.

The same methodology was used for both the Washington English language arts and mathematics alignments, which was based on the methodology used by Hanover Research. The closeness of the match between the Washington standard and the Common Core State Standard was rated on a single rating scale from 0 – 3 which incorporated the two metrics used by Hanover Research; one which assessed the nature of the match and a second which provided a numerical rating score for the closeness of the match. The rating score was awarded without regard to grade-level alignment. Grade-level timing is addressed later in this report. For purposes of this document, the numerical metrics used for the rating scale are defined below

### ***Rating Scores***

A rating of three (3) indicates that the Common Core State Standard(s) is a *Full Match* to the Washington standard. This rating would indicate that the Common Core State Standard(s) for mathematics is a very close approximation of the Washington performance expectation for mathematics. The Common Core State Standard(s) essentially encompass what the Washington standards expect students to know and be able to do.

An example of a *Full Match* which was given a rating score of three (3) is illustrated in this example.

Washington mathematics standard K.1.F states:

Compare two sets of up to 10 objects each and say whether the number of objects in one set is equal to, greater than, or less than the number of objects in the other set.

Common Core State Standard K.CC.6 states:

Identify whether the number of objects in one group is greater than, less than, or equal to the number of objects in another group, e.g., by using matching and counting strategies.

Likewise, a *Full Match* was assigned to a group of Common Core State Standards that collectively were a very close approximation to a particular Washington standard. For example, Washington mathematics standard 7.1.G states:

Solve single- and multi-step word problems involving rational numbers and verify the solution.

Two Common Core State Standards for mathematics collectively cover this Washington standard. They are 7.NS.3 and 7.EE.3 stated, respectively, below:

Solve real-world and mathematical problems involving the four operations with rational numbers.

Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies.

A *Full Match* was also given when the Common Core State Standard content exceeded the Washington standard since it not only matched but surpassed it.

A rating score of two (2), or *Partial Match*, indicated that the Common Core State Standard(s) only partially resembles the Washington standard. This rating means that there is overlapping language and/or content between the Common Core State Standard and the Washington standard, but the Common Core State Standard is missing one or more key aspects contained in the Washington standard. For example, the Washington mathematics standard 2.1.F states:

Compare and order numbers from 0 to 1,000.

Common Core State Standard 2.NBT.4 states:

Compare two three-digit numbers based on meanings of the hundreds, tens, and ones digits, using  $>$ ,  $=$ , and  $<$  symbols to record the results of comparison.

Common Core State Standard 2.NBT.4 does not ask students to order numbers. A part of the Washington standard was missing so this was considered a *Partial Match*.

A rating score of one (1), or a *Weak Match*, indicates that major content was missing. The Common Core State Standard and the Washington standard may be related, but only generally. For example, the Washington mathematics standard 5.3.C states:

Identify, describe, and classify triangles by angle measure and number of congruent sides.

Common Core State Standard 4.G.2 states:

Classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines, or the presence or absence of angles of a specified size. Recognize right triangles as a category, and identify right triangles.

The Common Core state Standard is somewhat addressed in 4.G.2. Identifying and describing triangles was not included nor was the concept of congruency, which is not addressed until grade eight. This match was considered a *Weak Match*.

Lastly, a rating score of zero (0), or *No Match*, indicates that the Common Core State Standards are not meaningfully articulated in the Washington standards. For example, no match in the Common Core State Standards was found for the Washington mathematics standard 3.5.B:

Measure temperature in degrees Fahrenheit and degrees Celsius using a thermometer

### ***Grade- Level Timing***

As with the Hanover mathematics alignment document, when matches are drawn from outside a given grade level, they are still considered matches, even if the standard is matched in an earlier or later grade. Each match is classified into one or more of five grade-level timing designations.

**Late (L):** All those Common Core Standards that are matched to the Washington standard arrive at least one grade level late.

**Partially Late (PL):** At least one Common Core Standard that is matched to the Washington standard arrives at least one grade level late.

**On Schedule (OS):** All matching Common Core Standards are taken from the same grade level as the Washington standard.

**Partially Early (PE):** At least one Common Core Standard that is matched to the Washington standard arrives at least one grade level early.

**Early (E):** All those Common Core Standards that are matched to the Washington State standard arrive at least one grade level early.

As will be seen in this document, each of the Washington standards is given a grade-level timing designation. The Common Core State Standards for mathematics and the Washington mathematics standards were both developed with the intent of limiting the number of concepts taught each year and to teach them in depth. Therefore, for some matches, a *Partially Early (PE)* and a *Partially Late (PL)* designation was appropriate because a particular concept may have been only partially developed in an early grade level and completed in a later one.

To illustrate the complexity of the task of alignment, an example is given below. The Washington standard 5.2.A states:

Represent addition and subtraction of fractions and mixed numbers using visual and numerical models, and connect the representation to the related equation.

This is a multi-concept standard. It addresses at least the following concepts:

- addition of fractions using visual models
- subtraction of fractions using visual models
- addition of fractions using numerical models
- subtraction of fractions using numerical models
- addition of mixed numbers using visual models
- subtraction of mixed numbers using visual models
- addition of mixed numbers using numerical models
- subtraction of mixed numbers using numerical models
- connecting each of the above to the related fractional or mixed number equation

Equal complexity can be found in the Common Core State Standards. An example would be 4.OA.3 which states:

Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.

This standard could also be broken into multiple concepts and, in fact, as many as eight Washington standards can be found within the wording of this standard. Since a one-to-one correspondence between these two sets of standards doesn't exist, the mapping direction (Washington standards to Common Core State Standards vs. Common Core State Standards to Washington standards) impacts the degree of alignment. As

with the Hanover document, a degree of subjectivity was needed in determining some of the rating scores or grade-level timing. This report represents the best intentions and knowledge of the committee members that conducted the review.

### **Statistical Results**

Hanover Research did not match the Washington mathematical core processes in each grade level with the “Standards for Mathematical Practices” found in the Common Core State Standards. These Common Core State Standards of Mathematical Practices consist of over-arching mathematical goals for all students in K-12 education. As Hanover concluded, because of the organizational differences between these sets of standards the matching of the Washington core processes and the Common Core State Standards of Mathematical Practices is cumbersome and unproductive for analysis purposes. Hence, the grade level Washington mathematical core processes were not included in the statistical results represented in the tables below.

For those standards where the grade-level timing was *Partially Early* and *Partially Late*, the standard was listed in the *Partially Early* column. This was done so that the tables reflect the fact that some part of this standard is addressed earlier than in Washington standards. It is this column that represents to the mathematics educator how the shift in standards will personally affect their teaching practice. It is assumed that if standards fall in the *Partially Late* or *Late* column that mathematics educators already were able to include these standards in their teaching practice and they represent no new concepts that need to be developed at a particular grade level.

Table 1, shown below, presents a statistical summary of the analysis organized by grade level and grade level band (K-5, 6-8, high school). The last two columns, *Percent Late, Partially Late or On Schedule* and *Percent Early, Partially Early* were calculated based on the standards that matched to some degree, thereby not including the *No Match* standards. The *CCSS Partial Match* was calculated by adding the columns *CCSS Partial Match of 2* and *CCSS Partial Match of 1*.

All high school courses were matched to the traditional pathway for mathematics courses as illustrated in Appendix A of the Common Core State Standards for mathematics. These have not necessarily been agreed upon as the course standards that Washington would use in a traditional pathway if the Common Core State Standards are officially adopted, but it did provide a basis for comparison of standards. Not all high school standards were addressed. Washington does not have specifically designated STEM standards. The Common Core State Standards for STEM are for students who will take advanced courses such as calculus, advanced statistics, or discrete mathematics.

Table 1: Grade Level Statistical Summary

Grade Level	Total # of WA standards	CCSS Full Match (rating of 3)	CCSS Partial Match (rating of 2 or 1)	CCSS Partial Match (rating of 2)	CCSS Weak Match (rating of 1)	CCSS No Match (rating Of 0)	Total Percent Matched	Percent Late, Partially Late or On Schedule	Percent Early, Partially Early
Kindergarten	16	9	5	3	2	2	88%	100%	0%
1st grade	29	20	5	5	0	4	86%	84%	16%
2nd grade	25	20	5	4	1	0	100%	84%	16%
3rd grade	27	21	4	3	1	2	93%	92%	8%
4th grade	33	21	10	7	3	2	94%	71%	29%
5th grade	30	21	8	5	3	1	97%	52%	48%
<b>K-5 Band</b>	<b>160</b>	<b>112</b>	<b>37</b>	<b>27</b>	<b>10</b>	<b>11</b>	<b>93%</b>	<b>79%</b>	<b>21%</b>
6th grade	31	23	6	5	1	2	94%	72%	28%
7th grade	27	17	9	5	4	1	96%	77%	23%
8th grade	25	17	8	6	2	0	100%	72%	28%
<b>6-8 Band</b>	<b>83</b>	<b>57</b>	<b>23</b>	<b>16</b>	<b>7</b>	<b>3</b>	<b>96%</b>	<b>74%</b>	<b>26%</b>
Algebra 1	32	27	4	4	0	1	97%	81%	19%
Geometry	29	8	19	11	8	2	93%	93%	7%
Algebra 2	28	18	9	6	3	1	96%	59%	41%
<b>HS Band</b>	<b>89</b>	<b>53</b>	<b>32</b>	<b>21</b>	<b>11</b>	<b>4</b>	<b>96%</b>	<b>78%</b>	<b>22%</b>
<b>Total</b>	<b>332</b>	<b>222</b>	<b>92</b>	<b>64</b>	<b>28</b>	<b>18</b>	<b>95%</b>	<b>77%</b>	<b>23%</b>



## Alignment Analysis Crosswalk

<b>Alignment of Washington State Mathematics Standards to the Common Core State Standards</b>					
<b>Grade K</b>					
<b>K.1 Core Content: Whole numbers</b>					
<b>Number</b>	<b>WA Performance Expectation (PE)</b>	<b>Common Core State Standard (CCSS)</b>	<b>Rating</b>	<b>Grade-Level Timing</b>	<b>Comments</b>
<b>K.1.A</b>	<b>Rote count by ones forward from 1 to 100 and backward from any number in the range of 10 to 1.</b>	K.CC.1 K.CC.2	2	OS	These CCSS do not mention backward counting.
<b>K.1.B</b>	<b>Read aloud numerals from 0 to 31.</b>	K.CC.3 1.NBT.1	2	PL	The CCSS only goes to 20 in kindergarten. The CCSS do not include "read" until first grade.
<b>K.1.C</b>	<b>Fluently compose and decompose numbers to 5.</b>	K.OA.3 K.OA.4 K.OA.5	3	OS	The CCSS compose and decompose to 10.
<b>K.1.D</b>	<b>Order numerals from 1 to 10.</b>	K.CC.7	2	OS	This CCSS only compares two numbers. WA orders numbers from 1 to 10.
<b>K.1.E</b>	<b>Count objects in a set of up to 20, and count out a specific number of up to 20 objects from a larger set.</b>	K.CC.4 K.CC.5	3	OS	These CCSS are more specific.
<b>K.1.F</b>	<b>Compare two sets of up to 10 objects each and say whether the number of objects in one set is equal to, greater than, or less than the number of objects in the other set.</b>	K.CC.6	3	OS	

Number	WA Performance Expectation (PE)	Common Core State Standard (CCSS)	Rating	Grade-Level Timing	Comments
<b>K.1.G</b>	<b>Locate numbers from 1 to 31 on the number line.</b>	2.MD.6	1	L	Number lines in the CCSS are introduced with addition and subtraction in second grade.
<b>K.1.H</b>	<b>Describe a number from 1 to 9 using 5 as a benchmark number.</b>	K.OA.4	3	OS	This CCSS uses 10 as the benchmark number.
<b>K.2. Core Content: Patterns and operations</b>					
Number	WA Performance Expectation (PE)	Common Core State Standard (CCSS)	Rating	Grade-Level Timing	Comments
<b>K.2.A</b>	<b>Copy, extend, describe, and create simple repetitive patterns.</b>		0		No patterns are mentioned in the CCSS at early grade levels.
<b>K.2.B</b>	<b>Translate a pattern among sounds, symbols, movements, and physical objects.</b>		0		No patterns are mentioned in the CCSS at early grade levels.
<b>K.2.C</b>	<b>Model addition by joining sets of objects that have 10 or fewer total objects when joined and model subtraction by separating a set of 10 or fewer objects.</b>	K.OA.1 K.OA.2	3	OS	

Number	WA Performance Expectation (PE)	Common Core State Standard (CCSS)	Rating	Grade-Level Timing	Comments
<b>K.2.D</b>	<b>Describe a situation that involves the actions of joining (addition) or separating (subtraction) using words, pictures, objects, or numbers.</b>	K.OA.1	1	OS	The CCSS has students act out situations and give verbal explanations of addition and subtraction.
<b>K.3. Core Content: Objects and their locations</b>					
Number	WA Performance Expectation (PE)	Common Core State Standard (CCSS)	Rating	Grade-Level Timing	Comments
<b>K.3.A</b>	<b>Identify, name, and describe circles, triangles, rectangles, squares (as special rectangles), cubes, and spheres.</b>	K.G.1 K.G.2 K.G.3	3	OS	
<b>K.3.B</b>	<b>Sort shapes using a sorting rule and explain the sorting rule.</b>	K.G.4 K.MD.3	3	OS	
<b>K.3.C</b>	<b>Describe the location of one object relative to another object using words such as in, out, over, under, above, below, between, next to, behind, and in front of.</b>	K.G.1	3	OS	

<b>K.4. Additional Key Content</b>					
Number	WA Performance Expectation (PE)	Common Core State Standard (CCSS)	Rating	Grade-Level Timing	Comments
<b>K.4.A</b>	<b>Make direct comparisons using measurable attributes such as length, weight, and capacity.</b>	K.MD.1 K.MD.2	3	OS	These CCSS do not specifically mention capacity or weight at this level.
<b>Grade 1</b>					
<b>1.1. Core Content: Whole number relationships</b>					
Number	WA Performance Expectation (PE)	Common Core State Standard (CCSS)	Rating	Grade-Level Timing	Comments
<b>1.1.A</b>	<b>Count by ones forward and backward from 1 - 120, starting at any number, and count by twos, fives, and tens to 100.</b>	1.NBT.1 2.NBT.2	2	PL	The CCSS omit counting backward. Skip counting is delayed until second grade.
<b>1.1.B</b>	<b>Name the number that is one less or one more than any number given verbally up to 120.</b>	1.NBT.1	2	OS	This CCSS reads that students can count on from any number, but does not ask students to name one less.
<b>1.1.C</b>	<b>Read aloud numerals from 0 to 1,000.</b>	1.NBT.1 2.NBT.3	3	PL	In the CCSS, students only read to 120 in first grade and to 1,000 in second grade.
<b>1.1.D</b>	<b>Order objects or events using ordinal numbers.</b>		0		There is no mention of ordinal numbers in the CCSS.

Number	WA Performance Expectation (PE)	Common Core State Standard (CCSS)	Rating	Grade-Level Timing	Comments
1.1.E	Write, compare, and order numbers to 120.	1.NBT.1 2.NBT.3	2	OS	These CCSS do not address ordering numbers.
1.1.F	Fluently compose and decompose numbers to 10.	K.OA.4	3	E	
1.1.G	Group numbers into tens and ones in more than one way.	1.NBT.2	3	OS	
1.1.H	Group and count objects by tens, fives, and twos.	2.NBT.2 2.OA.3	3	L	
1.1.I	Classify a number as odd or even and demonstrate that it is odd or even.	2.OA.3	2	L	This CCSS focuses on determining if a "group of objects" is even or odd. The WA PE focuses on determining if a "number" is even or odd.
<b>1.2. Core Content: Addition and subtraction</b>					
Number	WA Performance Expectation (PE)	Common Core State Standard (CCSS)	Rating	Grade-Level Timing	Comments
1.2.A	Connect physical and pictorial representations to addition and subtraction equations.	1.OA.1 1.OA.2	3	OS	
1.2.B	Use the equal sign (=) and the word <i>equals</i> to indicate that two expressions are equivalent.	1.OA.7	3	OS	The WA PE specifies understanding the equal sign and the word, the CCSS only focuses on the symbol.
1.2.C	Represent addition and subtraction on the number line.	2.MD.6	3	L	

Number	WA Performance Expectation (PE)	Common Core State Standard (CCSS)	Rating	Grade-Level Timing	Comments
1.2.D	Demonstrate the inverse relationship between addition and subtraction by undoing an addition problem with subtraction and vice versa.	1.OA.4 1.OA.8	3	OS	
1.2.E	Add three or more one-digit numbers using the commutative and associative properties of addition.	1.OA.3	3	OS	
1.2.F	Apply and explain strategies to compute addition facts and related subtraction facts for sums to 18.	1.OA.5 1.OA.6	3	OS	
1.2.G	Quickly recall addition facts and related subtraction facts for sums equal to 10.	1.OA.6	3	OS	
1.2.H	Solve and create word problems that match addition or subtraction equations.	1.OA.1 1.OA.2	2	OS	These CCSS have students solving word problems, not creating them.
1.2.I	Recognize, extend, and create number patterns.		0		No number patterns are mentioned until fourth grade in the CCSS.

<b>1.3. Core Content: Geometric attributes</b>					
Number	WA Performance Expectation (PE)	Common Core State Standard (CCSS)	Rating	Grade-Level Timing	Comments
1.3.A	Compare and sort a variety of two- and three-dimensional figures, including those in real-world contexts, regardless of size or orientation.	K.G.4 1.G.1	3	PE	
1.3.B	Identify and name two-dimensional figures, including those in real-world contexts, regardless of size or orientation.	K.G.1 K.G.2	3	E	
1.3.C	Combine known shapes to create shapes and divide known shapes into other shapes.	K.G.6 1.G.2	3	PE	CCSS address composite shapes at kindergarten while the WA PEs do not.
<b>1.4. Core Content: Concepts of measurement</b>					
Number	WA Performance Expectation (PE)	Common Core State Standard (CCSS)	Rating	Grade-Level Timing	Comments
1.4.A	Recognize that objects used to measure an attribute (length, weight, capacity) must be consistent in size.	1.MD.2	3	OS	

Number	WA Performance Expectation (PE)	Common Core State Standard (CCSS)	Rating	Grade-Level Timing	Comments
1.4.B	Use a variety of non-standard units to measure length.	1.MD.2	3	OS	
1.4.C	Compare lengths using the transitive property.	1.MD.1	3	OS	
1.4.D	Use non-standard units to compare objects according to their capacities or weights.		0		In the CCSS only length is measured in kindergarten through second grade.
1.4.E	Describe the connection between the size of the measurement unit and the number of units needed to measure something.	1.MD.2	3	OS	
1.4.F	Name the days of the week and the months of the year, and use a calendar to determine a day or month.		0		



<b>1.5. Additional Key Content</b>					
Number	Performance Expectation (PE)	Common Core State Standard (CCSS)	Rating	Grade-Level Timing	Comments
1.5.A	Represent data using tallies, tables, picture graphs, and bar-type graphs.	1.MD.4 2.MD.10	3	PL	These CCSS do not mention tallies or tables but ask students to organize, represent, and interpret data in first grade.
1.5.B	Ask and answer comparison questions about data.	1.MD.4	3	OS	
<b>Grade 2</b>					
<b>2.1. Core Content: Place value and the base ten system</b>					
Number	WA Performance Expectation (PE)	Common Core State Standard (CCSS)	Rating	Grade-Level Timing	Comments
2.1.A	Count by tens or hundreds forward and backward from 1 to 1,000, starting at any number.	2.NBT.2	3	OS	This CCSS does not ask students to count backwards.
2.1.B	Connect place value models with their numerical equivalents to 1,000.	2.NBT.1	3	OS	This CCSS only addresses two-digit numbers.
2.1.C	Identify the ones, tens, and hundreds place in a number and the digits occupying them.	2.NBT.1	3	OS	
2.1.D	Write three-digit numbers in expanded form.	2.NBT.3	3	OS	

Number	WA Performance Expectation (PE)	Common Core State Standard (CCSS)	Rating	Grade-Level Timing	Comments
2.1.E	Group three-digit numbers into hundreds, tens, and ones in more than one way.	2.NBT.7 2.NBT.1a	2	OS	The CCSS develop this through addition and subtraction.
2.1.F	Compare and order numbers from 0 to 1,000.	2.NBT.4	2	OS	The CCSS only compares numbers to 100 at this grade.
<b>2.2. Core Content: Addition and subtraction</b>					
Number	WA Performance Expectation (PE)	Common Core State Standard (CCSS)	Rating	Grade-Level Timing	Comments
2.2.A	Quickly recall basic addition facts and related subtraction facts for sums through 20.	2.OA.2	3	OS	
2.2.B	Solve addition and subtraction word problems that involve joining, separating, and comparing and verify the solution.	2.OA.1	3	OS	
2.2.C	Add and subtract two-digit numbers efficiently and accurately using a procedure that works with all two-digit numbers and explain why the procedure works.	1.NBT.4 2.NBT.5 2.NBT.6 2.NBT.7	3	OS	

Number	WA Performance Expectation (PE)	Common Core State Standard (CCSS)	Rating	Grade-Level Timing	Comments
2.2.D	<b>Add and subtract two-digit numbers mentally and explain the strategies used.</b>	2.NBT.8 2.NBT.9	3	OS	These CCSS have students adding 10 or 100 to any three-digit number where the WA PE have students adding a two-digit to a two-digit number.
2.2.E	<b>Estimate sums and differences</b>	MP5	2	OS	A proficient math student is expected to detect possible errors by strategically using estimation and other mathematical knowledge.
2.2.F	<b>Create and state a rule for patterns that can be generated by addition and extend the pattern.</b>	3.OA.9	2	L	
2.2.G	<b>Solve equations in which the unknown number appears in a variety of positions.</b>	1.OA.8	3	E	
2.2.H	<b>Name each standard U.S. coin, write its value using the \$ sign and the ¢ sign, and name combinations of other coins with the same total value.</b>	2.MD.8	3	OS	This WA PE is a prerequisite skill for the CCSS.
2.2.I	<b>Determine the value of a collection of coins totaling less than \$1.00.</b>	2.MD.8	3	OS	This WA PE is a prerequisite skill for the CCSS.

<b>2.3. Core Content: Measurement</b>					
Number	WA Performance Expectation (PE)	Common Core State Standard (CCSS)	Rating	Grade-Level Timing	Comments
2.3.A	Identify objects that represent or approximate standard units and use them to measure length.	1.MD.2	3	E	
2.3.B	Estimate length using metric and U.S. customary units.	2.MD.3	3	OS	
2.3.C	Measure length to the nearest whole unit in both metric and U.S. customary units.	2.MD.1 2.MD.2 2.MD.3 2.MD.4	3	OS	These CCSS are more rigorous than the WA PE in the application of the concept.
2.3.D	Describe the relative size among minutes, hours, days, weeks, months, and years.	1.MD.3	1	E	The CCSS does not address days, weeks, months, years; it does address hours (in 4MD.1).
2.3.E	Use both analog and digital clocks to tell time to the minute.	2.MD.7 3.MD.1	3	PL	These CCSS require reading time to five minutes in second grade and to the minute in third grade.
<b>2.4. Additional Key Content</b>					
Number	WA Performance Expectation (PE)	Common Core State Standard (CCSS)	Rating	Grade-Level Timing	Comments
2.4.A	Solve problems involving properties of two-and three dimensional figures.	2.G.1	3	OS	

Number	WA Performance Expectation (PE)	Common Core State Standard (CCSS)	Rating	Grade-Level Timing	Comments
2.4.B	Collect, organize, represent, and interpret data in bar graphs and picture graphs.	2.MD.9 2.MD.10	3	OS	
2.4.C	Model and describe multiplication situations in which sets of equal size are joined.	2.OA.4 2.G.2	3	OS	
2.4.D	Model and describe division situations in which sets are separated into equal parts.	3.OA.3	3	L	
2.4.E	Interpret a fraction as a number of equal parts of a whole or a set.	2.G.3 3.NF.1	3	PL	
<b>Grade 3</b>					
<b>3.1. Core Content: Addition, subtraction, and place value</b>					
Number	WA Performance Expectation (PE)	Common Core State Standard (CCSS)	Rating	Grade-Level Timing	Comments
3.1.A	Read, write, compare, order and represent numbers to 10,000 using numbers, words, and symbols.	2.NBT.1 2.NBT.3 2.NBT.4 4.NBT.2	3	PE PL	These CCSS only require students to read and write numbers to 1,000 in the third grade.

Number	WA Performance Expectation (PE)	Common Core State Standard (CCSS)	Rating	Grade-Level Timing	Comments
3.1.B	Round whole numbers through 10,000 to the nearest ten, hundred, and thousand.	3.NBT.1 4.NBT.3	3	PL	The third grade CCSS requires rounding to the hundreds. The fourth grade CCSS does not specify the size of the numbers to be rounded.
3.1.C	Fluently and accurately add and subtract whole numbers using the standard regrouping algorithms.	3.NBT.2 4.NBT.4	3	PL	The CCSS address the standard algorithm in fourth grade.
3.1.D	Estimate sums and differences to approximate solutions to problems and determine reasonableness of answers.	3.OA.8	3	OS	Estimation is addressed as part of problem solving in the CCSS.
3.1.E	Solve single-and multi-step word problems involving addition and subtraction of whole numbers and verify the solutions.	3.OA.8	3	OS	

<b>3.2. Core Content: Concepts of multiplication and division</b>					
Number	WA Performance Expectation (PE)	Common Core State Standard (CCSS)	Rating	Grade-Level Timing	Comments
<b>3.2.A</b>	<b>Represent multiplication as repeated addition, arrays, counting by multiples, and equal jumps on the number line, and connect each representation to the related equation.</b>	3.OA.1 3.OA.3	2	OS	The CCSS do not mention representing multiplication using repeated addition, jumps on a number line, or counting by multiples. Using area models is mentioned in the overview paragraph for third grade.
<b>3.2.B</b>	<b>Represent division as equal sharing, repeated subtraction, equal jumps on the number line, and formation of equal groups of objects, and connect each representation to the related equation.</b>	3.OA.2 3.OA.3	3	OS	These CCSS do not mention representing division using repeated subtraction or jumps on a number line.
<b>3.2.C</b>	<b>Determine products, quotients, and missing factors using the inverse relationship between multiplication and division.</b>	3.OA.4 3.OA.6	3	OS	

Number	WA Performance Expectation (PE)	Common Core State Standard (CCSS)	Rating	Grade-Level Timing	Comments
3.2.D	Apply and explain strategies to compute multiplication facts to 10 X 10 and the related division facts.	3.OA.5 3.OA.7	3	OS	
3.2.E	Quickly recall those multiplication facts for which one factor is 1, 2, 5, or 10 and the related division facts.	3.OA.7	3	OS	The CCSS requires memorization of facts within 100.
3.2.F	Solve and create word problems that match multiplication or division equations.	3.OA.1 3.OA.2 3.OA.8	3	OS	
3.2.G	Multiply any number from 11 through 19 by a single-digit number using the distributive property and place value concepts.	3.OA.5 4.NBT.5	3	PL	The CCSS are unclear about the size of numbers to be multiplied in 3.OA.5.
3.2.H	Solve single- and multi-step word problems involving multiplication and division and verify the solutions.	3.OA.8	3	OS	



<b>3.3. Core Content: Fraction concepts</b>					
Number	WA Performance Expectation (PE)	Common Core State Standard (CCSS)	Rating	Grade-Level Timing	Comments
<b>3.3.A</b>	<b>Represent fractions that have denominators of 2, 3, 4, 5, 6, 8, 9, 10, and 12 as parts of a whole, parts of a set, and points on the number line.</b>	3.NF.1 3.NF.2 3.G.2	2	OS	The CCSS limit fraction denominators to 2, 3, 4, 6, and 8. Also, the CCSS doesn't expect students to represent fractions as parts of a set.
<b>3.3.B</b>	<b>Compare and order fractions that have denominations of 2, 3, 4, 5, 6, 8, 9, 10, and 12.</b>	3.NF.3.d 4.NF.2	3	PL	These CCSS limit fraction denominators to 2, 3, 4, 6, and 8 in third grade and comparisons are limited to fractions with the same numerator or denominator.
<b>3.3.C</b>	<b>Represent and identify equivalent fractions with denominators of 2, 3, 4, 5, 6, 8, 9, 10, and 12.</b>	3.NF.3	2	OS	This CCSS limits fraction denominators to 2, 3, 4, 6, and 8.
<b>3.3.D</b>	<b>Solve single- and multi-step word problems involving comparison of fractions and verify the solutions.</b>		0		
<b>3.4. Core Content: Geometry</b>					
Number	WA Performance Expectation (PE)	Common Core State Standard (CCSS)	Rating	Grade-Level Timing	Comments
<b>3.4.A</b>	<b>Identify and sketch parallel, intersecting, and perpendicular lines and line segments.</b>	4.G.1	3	L	This CCSS goes beyond the WA PE.
<b>3.4.B</b>	<b>Identify and sketch right angles.</b>	4.G.1	3	L	

Number	WA Performance Expectation (PE)	Common Core State Standard (CCSS)	Rating	Grade-Level Timing	Comments
3.4.C	Identify and describe special types of quadrilaterals.	3.G.1	3	OS	
3.4.D	Measure and calculate perimeters of quadrilaterals.	3.MD.8	3	OS	This CCSS includes polygons, not just quadrilaterals.
3.4.E	Solve single- and multi-step word problems involving perimeters of quadrilaterals and verify the solutions.	3.MD.8	3	OS	This CCSS includes polygons, not just quadrilaterals.
<b>3.5. Additional Key Content</b>					
Number	WA Performance Expectation (PE)	Common Core State Standard (CCSS)	Rating	Grade-Level Timing	Comments
3.5.A	Determine whether two expressions are equal and use "=" to denote equality.	3.NF.3.b	1	OS	The concept of equality is not explicitly addressed, although it is assumed in many of the CCSS.
3.5.B	Measure temperature in degrees Fahrenheit and degrees Celsius using a thermometer.		0		
3.5.C	Estimate, measure, and compare weight and mass using appropriate-sized U.S. customary and metric units.	3.MD.2 4.MD.1	3	PL	

Number	WA Performance Expectation (PE)	Common Core State Standard (CCSS)	Rating	Grade-Level Timing	Comments
3.5.D	Estimate, measure, and compare capacity using appropriate-sized U.S. customary and metric units.	3.MD.2 4.MD.1	3	PL	
3.5.E	Construct and analyze pictographs, frequency tables, line plots, and bar graphs.	2.MD.9 2.MD.10 3.MD.3	3	PE	
<b>Grade 4</b>					
<b>4.1. Core Content: Multi-digit multiplication</b>					
Number	WA Performance Expectation (PE)	Common Core State Standard (CCSS)	Rating	Grade-Level Timing	Comments
4.1.A	Quickly recall multiplication facts through 10 X 10 and the related division facts.	3.OA.7	3	E	
4.1.B	Identify factors and multiples of a number.	4.OA.4	3	OS	
4.1.C	Represent multiplication of a two-digit number by a two-digit number with place value models.	4.NBT.5	2	OS	
4.1.D	Multiply by 10, 100, and 1,000.	3.NBT.3 4.NBT.1 5.NBT.2	3	PE PL	Multiplying by 10 is addressed by the CCSS in third grade. Working with powers of 10 occurs in fifth grade.

Number	WA Performance Expectation (PE)	Common Core State Standard (CCSS)	Rating	Grade-Level Timing	Comments
4.1.E	Compare the values represented by digits in whole numbers using place value.	4.NBT.1 4.NBT.2	3	OS	
4.1.F	Fluently and accurately multiply up to a three-digit number by one- and two-digit numbers using the standard multiplication algorithm.	5.NBT.5	3	L	
4.1.G	Mentally multiply two-digit numbers by numbers through 10 and by multiples of 10.	3.NBT.3	2	E	
4.1.H	Estimate products to approximate solutions to problems and determine reasonableness of answers.	4.OA.3	3	OS	
4.1.I	Solve single-and multi-step word problems involving multi-digit multiplication and verify the solutions.	4.OA.2 4.OA.3	3	OS	

Number	WA Performance Expectation (PE)	Common Core State Standard (CCSS)	Rating	Grade-Level Timing	Comments
4.1.J	Solve single- and multi-step word problems involving division and verify the solutions.	4.OA.2 4.OA.3	3	OS	
<b>4.2. Core Content: Fractions, decimals, and mixed numbers</b>					
Number	WA Performance Expectation (PE)	Common Core State Standard (CCSS)	Rating	Grade-Level Timing	Comments
4.2.A	Represent decimals through hundredths with place value models, fraction equivalents, and the number line.	4.NF.5 4.NF.6 4.NF.7	3	OS	
4.2.B	Read, write, compare, and order decimals through hundredths.	4.NF.7 5.NBT.3	3	PL	
4.2.C	Convert a mixed number to a fraction and vice versa, and visually represent the number.	4.NF.3.b	2	OS	This CCSS has students convert mixed numbers to fractions but doesn't explicitly refer to converting fractions to mixed numbers.
4.2.D	Convert a decimal to a fraction and vice versa, and visually represent the number.	4.NF.6 4.NF.7	3	OS	

Number	WA Performance Expectation (PE)	Common Core State Standard (CCSS)	Rating	Grade-Level Timing	Comments
4.2.E	<b>Compare and order decimals and fractions (including mixed numbers) on the number line, lists, and the symbols <math>&lt;</math>, <math>&gt;</math>, or <math>=</math>.</b>	4.NF.2 4.NF.7	1	OS	These CCSS do not expect students to compare fractions to decimals and vice versa.
4.2.F	<b>Write a fraction equivalent to a given fraction.</b>	4.NF.1	3	OS	
4.2.G	<b>Simplify fractions using common factors.</b>	3.NF.3.a 4.NF.3.b	1	PE	This WA PE is embedded in several fourth grade fraction expectations in the CCSS.
4.2.H	<b>Round fractions and decimals to the nearest whole number.</b>	5.NBT.4	2	L	No mention of rounding fractions to the nearest whole number was found in the CCSS.
4.2.I	<b>Solve single- and multi-step word problems involving comparison of decimals and fractions (including mixed numbers), and verify the solutions.</b>	4.NF.4.c 4.MD.2	1	OS	The CCSS do not specifically call for comparing fractions, but could occur within these CCSS.

<b>4.3. Core Content: Concept of area</b>					
Number	WA Performance Expectation (PE)	Common Core State Standard (CCSS)	Rating	Grade-Level Timing	Comments
4.3.A	Determine congruence of two-dimensional figures.		0		
4.3.B	Determine the approximate area of a figure using square units.	3.MD.5 3.MD.6	3	E	
4.3.C	Determine the perimeter and area of a rectangle using formulas, and explain why the formulas work.	3.MD.7.a 4.MD.3	3	PE	These CCSS do not specifically address why the perimeter formula works.
4.3.D	Determine the areas of figures that can be broken down into rectangles.	3.MD.7.d	3	E	
4.3.E	Demonstrate that rectangles with same area can have different perimeters, and that rectangles with the same perimeter can have different areas.	3.MD.8	3	E	
4.3.F	Solve single- and multi-step word problems involving perimeters and areas of rectangles and verify the solutions.	4.MD.3	3	OS	

<b>4.4. Additional Key Content</b>					
Number	WA Performance Expectation (PE)	Common Core State Standard (CCSS)	Rating	Grade-Level Timing	Comments
<b>4.4.A</b>	<b>Represent an unknown quantity in simple expressions, equations, and inequalities using letters, boxes, and other symbols.</b>	4.OA.3 6.EE.2.a	2	PL	This CCSS explicitly calls for the use of a variable and does not include boxes or other symbols.
<b>4.4.B</b>	<b>Solve single- and multi-step problems involving familiar unit conversions, including time, within either the U.S. customary or metric system.</b>	4.MD.1 4.MD.2 5.MD.1	3	PL	These CCSS do not include single-step problems.
<b>4.4.C</b>	<b>Estimate and determine elapsed time using a calendar, a digital clock, and an analog clock.</b>	3.MD.1 4.MD.2	2	PE	These CCSS do not mention estimation.
<b>4.4.D</b>	<b>Graph and identify points in the first quadrant of the coordinate plane using ordered pairs.</b>	5.G.1 5.G.2	3	L	This skill is embedded in more rigorous CCSS.
<b>4.4.E</b>	<b>Determine the median, mode, and range of a set of data and describe what each measure indicates about the data.</b>	6.SP.3 6.SP.5.c 6.SP.5.d	3	L	



Number	WA Performance Expectation (PE)	Common Core State Standard (CCSS)	Rating	Grade-Level Timing	Comments
4.4.F	<b>Describe and compare the likelihood of events.</b>	7.SP.5	2	L	The CCSS take a deeper look at probability at a later age.
4.4.G	<b>Determine a simple probability from a context that includes a picture.</b>		0		
4.4.H	<b>Display the results of probability experiments and interpret the results.</b>	7.SP.6 7.SP.7	3	L	The CCSS exceed this WA PE by delaying this topic until seventh grade.

<b>Grade 5</b>					
<b>5..1. Core Content: Multi-digit division (Operations, Algebra)</b>					
<b>Number</b>	<b>WA Performance Expectation (PE)</b>	<b>Common Core State Standard (CCSS)</b>	<b>Rating</b>	<b>Grade-Level Timing</b>	<b>Comments</b>
<b>5.1.A</b>	<b>Represent multi-digit division using place value models and connect the representation to the related equation.</b>	4.NBT.6	3	E	
<b>5.1.B</b>	<b>Determine quotients for multiples of 10 and 100 by applying knowledge of place value and properties of operations.</b>	5.NBT.1 5.NBT.6	2	OS	The CCSS are not specifically asking to find quotients involving multiples of ten.
<b>5.1.C</b>	<b>Fluently and accurately divide up to a four-digit number by one- or two-digit divisors using the standard long-division algorithm.</b>	5.NBT.6 6.NS.2	3	PL	The use of the standard division algorithm is not expected until sixth grade in the CCSS.
<b>5.1.D</b>	<b>Estimate quotients to approximate solutions and determine reasonableness of answers in problems involving up to two-digit divisors.</b>	4.OA.3	3	E	This WA PE is also addressed in the CCSS introductory paragraphs in grades four and five.

Number	WA Performance Expectation (PE)	Common Core State Standard (CCSS)	Rating	Grade-Level Timing	Comments
5.1.E	<b>Mentally divide two-digit numbers by one-digit divisors and explain the strategies used.</b>	4.OA.3 5.NBT.6	2	PE	The CCSS do not explicitly call for the use of mental math or require students to explain the mental math strategies used.
5.1.F	<b>Solve single- and multi-step word problems involving multi-digit division and verify the solutions.</b>	4.OA.3	3	E	This WA PE is also addressed in the Mathematical Practices.
<b>5.2. Core Content: Addition and subtraction of fractions and decimals</b>					
5.2 .A	<b>Represent addition and subtraction of fractions and mixed numbers using visual and numerical models, and connect the representation to the related equation.</b>	5.NF.1 5.NF.2	3	OS	This WA PE is also addressed in the Mathematical Practices. The CCSS do not expect students to make a connection between the representation and the related equation.
5.2 .B	<b>Represent addition and subtraction of decimals using place value models and connect the representation to the related equation.</b>	5.NBT.7	3	OS	

Number	WA Performance Expectation (PE)	Common Core State Standard (CCSS)	Rating	Grade-Level Timing	Comments
5.2 .C	Given two fractions with unlike denominators, rewrite the fractions with a common denominator.	4.NF.2 5.NF.1	3	PE	
5.2 .D	Determine the greatest common factor and the least common multiple of two or more whole numbers.	6.NS.4	3	L	
5.2 .E	Fluently and accurately add and subtract fractions, including mixed numbers.	4.NF.3.c 5.NF.1	3	PE	
5.2 .F	Fluently and accurately add and subtract decimals.	5.NBT.7 6.NS.3	3	PL	The CCSS explicitly calls for the use in sixth grade of the standard algorithms for decimals.
5.2.G	Estimate sums and differences of fractions, mixed numbers, and decimals to approximate solutions to problems and determine reasonableness of answers.	5.NF.1 5.NF.2 5.NBT.7	3	OS	This CCSS is also addressed in the Mathematical Practices and the introductory paragraphs for fifth grade.
5.2.H	Solve single-and multi-step word problems involving addition and subtraction of whole numbers, fractions (including mixed numbers), and decimals, and verify the solutions.	4.OA.3 4.NF.3.d 4.MD.2 5.NF.2	3	PE	These CCSS do not specify problem solving involving decimals as separate from fractions.

### 5.3. Core Content: Triangles and quadrilaterals

Number	WA Performance Expectation (PE)	Common Core State Standard (CCSS)	Rating	Grade-Level Timing	Comments
5.3.A	Classify quadrilaterals.	5.G.4	3	OS	This skill builds in first, second, third, and fourth grade. The CCSS is not specific to classifying quadrilaterals, but rather based on properties of two-dimensional figures.
5.3.B	Identify, sketch, and measure acute, right, and obtuse angles.	4.MD.5 4.MD.6 4.G.1	3	E	
5.3.C	Identify, describe, and classify triangles by angle measure and number of congruent sides.	4.G.2	1	PE	Congruency is addressed in detail in eighth grade.
5.3.D	Determine the formula for the area of a parallelogram by relating it to the area of a rectangle.	6.G.1	1	L	This CCSS does not have students determine the formula for the area of parallelograms.
5.3.E	Determine the formula for the area of a triangle by relating it to the area of a parallelogram.	6.G.1	1	L	This CCSS does not have students determine the formula for area of triangles.
5.3.F	Determine the perimeters and areas of triangles and parallelograms.	3.MD.8 6.G.1	3	PE PL	Perimeter is addressed in third grade in the CCSS, area of triangles in sixth grade.

Number	WA Performance Expectation (PE)	Common Core State Standard (CCSS)	Rating	Grade-Level Timing	Comments
5.3.G	Draw quadrilaterals and triangles from given information about sides and angles.	5.G.3 5.G.4 7.G.2	3	PL	These CCSS do not specifically address drawing quadrilaterals, but requires students to draw geometric shapes with given conditions.
5.3.H	Determine the number and location of lines of symmetry in triangles and quadrilaterals.	4.G.3	3	E	
5.3.I	Solve single- and multi-step problems about the perimeters and areas of quadrilaterals and triangles and verify the solutions.	4.MD.3 6.G.1	3	PE PL	The Mathematical Practices address verifying solutions to problems.
<b>5.4. Core Content: Representations of algebraic relationships</b>					
5.4.A	Describe and create a rule for numerical and geometric patterns and extend the patterns.	4.OA.5	2	E	This CCSS requires students to do the opposite of the PE. Instead of creating a rule given a geometric or numerical pattern, this CCSS gives the rule and students create the numerical and/or geometric pattern.
5.4.B	Write a rule to describe the relationship between two sets of data that are linearly related.	5.OA.3	2	OS	This CCSS does not require students to write the rule describing the linear relationship.

Number	WA Performance Expectation (PE)	Common Core State Standard (CCSS)	Rating	Grade-Level Timing	Comments
5.4.C	Write algebraic expressions that represent simple situations and evaluate the expressions, using substitution when variables are involved.	6.EE.1 6.EE.2 5.OA.1	3	PL	
5.4.D	Graph ordered pairs in the coordinate plane for two sets of data related by a linear rule and draw the line they determine.	5.OA.3	2	OS	This CCSS does not require students to draw the line determined by the data.
<b>5.5. Core Content: Additional Key Content</b>					
5.5.A	Classify numbers as prime or composite.	4.OA.4	3	E	
5.5.B	Determine and interpret the mean of a small data set of whole numbers.	6.SP.2 6.SP.5.c 6.SP.5.d	3	L	
5.5.C	Construct and interpret line graphs.		0		

<b>Grade 6</b>					
<b>6.1. Core Content: Multiplication and division of fractions and decimals</b>					
Number	WA Performance Expectation (PE)	Common Core State Standard (CCSS)	Rating	Grade-Level Timing	Comments
<b>6.1.A</b>	<b>Compare and order non-negative fractions, decimals, and integers using the number line, lists, and the symbols &lt;, &gt;, or =.</b>	6.NS.6.c 6.NS.7	3	OS	These CCSS cover the concept and go beyond to include negative numbers and absolute value.
<b>6.1.B</b>	<b>Represent multiplication and division of non-negative fractions and decimals using area models and the number line, and connect each representation to the related equation.</b>	5.NF.4 5.NF.7 5.NBT.7	2	PE	The specifics of using area models and number lines are missing in the CCSS.
<b>6.1.C</b>	<b>Estimate the products and quotients of fractions and decimals.</b>		0		The CCSS only directly address estimation of fractions with addition and subtraction.
<b>6.1.D</b>	<b>Fluently and accurately multiply and divide non-negative fractions and explain the inverse relationship between multiplication and division with fractions.</b>	5.NF.4 5.NF.7	2	E	These CCSS do not include an explanation of inverse relationship between multiplication and division.



Number	WA Performance Expectation (PE)	Common Core State Standard (CCSS)	Rating	Grade-Level Timing	Comments
6.1.E	Multiply and divide whole numbers and decimals by 1000, 100, 10, 1, 0.1, 0.01, and 0.001.	5.NBT.2	3	E	
6.1.F	Fluently and accurately multiply and divide non-negative decimals.	6.NS.3	3	OS	This CCSS includes negative numbers.
6.1.G	Describe the effect of multiplying or dividing a number by one, by zero, by a number between zero and one, and by a number greater than one.	5.NF.5.a 5.NF.5.b	2	E	Division is not included in these CCSS but could be as the inverse of multiplication.
6.1.H	Solve single- and multi-step word problems involving operations with fractions and decimals and verify the solutions.	5.NF.2 5.NF.6 7.NS.3	3	PE PL	These CCSS address positive fractions in fifth grade, and all rational numbers in seventh grade. Decimal operations are in sixth grade but word problems with decimals are not explicitly addressed.
<b>6.2. Core Content: Mathematical expressions and equations</b>					
6.2.A	Write a mathematical expression or equation with variables to represent information in a table or given situation.	6.EE.2.a	3	OS	
6.2.B	Draw a first-quadrant graph in the coordinate plane to represent information in a table or given situation.	5.G.2	3	E	

Number	WA Performance Expectation (PE)	Common Core State Standard (CCSS)	Rating	Grade-Level Timing	Comments
6.2.C	Evaluate mathematical expressions when the value for each variable is given.	6.EE.2.c	3	OS	
6.2.D	Apply the commutative, associative, and distributive properties, and use the order of operations to evaluate mathematical expressions.	6.EE.2 6.EE.3	2	OS	
6.2.E	Solve one-step equations and verify solutions.	6.EE.5 6.EE.7	3	OS	
6.2.F	Solve word problems using mathematical expressions and equations and verify solutions.	6.EE.6 6.EE.7	3	OS	
<b>6.3. Core Content: Ratios, rates, and percents</b>					
6.3.A	Identify and write ratios as comparisons of part-to-part and part-to-whole relationships.	6.RP.1 6.RP.2	3	OS	These CCSS do not specifically address part-to-part and part-to-whole.
6.3.B	Write ratios to represent a variety of rates.	6.RP.3	3	OS	This CCSS goes beyond the WA PE.
6.3.C	Represent percents visually and numerically, and convert between the fractional, decimal, and percent representations of a number.	6.RP.3.c	2	OS	

Number	WA Performance Expectation (PE)	Common Core State Standard (CCSS)	Rating	Grade-Level Timing	Comments
6.3.D	Solve single- and multi-step word problems involving ratios, rates, and percents, and verify the solutions.	6.RP.3	3	OS	
6.3.E	Identify the ratio of the circumference to the diameter of a circle as the constant $\pi$ and recognize $22/7$ and 3.14 as common approximations of $\pi$ .	7.G.4	1	L	This CCSS has students work with area and circumference, but doesn't speak directly to recognizing $22/7$ and 3.14 as common approximations of $\pi$ .
6.3.F	Determine the experimental probability of a simple event using data collected in an experiment.	7.SP.6	3	L	
6.3.G	Determine the theoretical probability of an event and its complement and represent the probability as a fraction or decimal from 0 to 1 or as a percent from 0 to 100.	7.SP.5 7.SP.7	3	L	These CCSS do not ask students to write probability as a percent.

<b>6.4. Core Content: Two- and three-dimensional figures</b>					
Number	WA Performance Expectation (PE)	Common Core State Standard (CCSS)	Rating	Grade-Level Timing	Comments
6.4.A	Determine the circumference and area of circles.	7.G.4	3	L	
6.4.B	Determine the perimeter and area of a composite figure that can be divided into triangles, rectangles, and parts of circles.	7.G.4 7.G.6	3	L	Perimeter is not addressed in these CCSS.
6.4.C	Solve single-and multi-step word problems involving the relationships among radius, diameter, circumference, and area of circles, and verify the solutions.	7.G.4	3	L	
6.4.D	Recognize and draw two-dimensional representations of three-dimensional figures.	6.G.4	3	OS	
6.4.E	Determine the surface area and volume of rectangular prisms using appropriate formulas and explain why the formulas work.	5.MD.3 5.MD.4 5.MD.5 6.G.2 6.G.4	3	PE	The CCSS cover volume in fifth grade and surface area in sixth grade.
6.4.F	Determine the surface area of a pyramid.	6.G.4	3	OS	

Number	WA Performance Expectation (PE)	Common Core State Standard (CCSS)	Rating	Grade-Level Timing	Comments
6.4.G	Describe and sort polyhedra by their attributes: parallel faces, types of faces, number of faces, edges, and vertices.		0		
<b>6.5. Additional Key Content</b>					
6.5.A	Use strategies for mental computations with non-negative whole numbers, fractions, and decimals.	5.NF.2 7.EE.3	3	PE PL	The seventh grade CCSS includes all rational numbers.
6.5.B	Locate positive and negative integers on the number line and use integers to represent quantities in various contexts.	6.NS. 5 6.NS.6.c	3	OS	
6.5.C	Compare and order positive and negative integers using the number line, lists, and the symbols $<$ , $>$ , or $=$ .	6.NS.6.c 6.NS.7.a	3	OS	

<b>Grade 7</b>					
<b>7.1. Core Content: Rational numbers and linear equations</b>					
Number	WA Performance Expectation (PE)	Common Core State Standard (CCSS)	Rating	Grade-Level Timing	Comments
7.1.A	Compare and order rational numbers using the number line, lists, and the symbols $<$ , $>$ , or $=$ .	6.NS.6 6.NS.7	3	E	
7.1.B	Represent addition, subtraction, multiplication, and division of positive and negative integers visually and numerically.	7.NS.1 7.NS.2	2	OS	Representations are limited to using a number line in the CCSS.
7.1.C	Fluently and accurately add, subtract, multiply, and divide rational numbers.	7.NS.1 7.NS.2	3	OS	The CCSS language specifically notes using an additive inverse method for subtraction.
7.1.D	Define and determine the absolute value of a number.	6.NS.7	3	E	
7.1.E	Solve two-step linear equations.	7.EE.3 7.EE.4	3	OS	
7.1.F	Write an equation that corresponds to a given problem situation, and describe a problem situation that corresponds to a given equation.	7.EE.4	2	OS	This CCSS does not ask students to write a problem corresponding to a given equation.

Number	WA Performance Expectation (PE)	Common Core State Standard (CCSS)	Rating	Grade-Level Timing	Comments
7.1.G	Solve single- and multi-step word problems involving rational numbers and verify the solutions.	7.EE.3 7.NS.3	3	OS	Verifying solutions is addressed in the CCSS Mathematical Practices.
<b>7.2. Core Content: Proportionality and similarity</b>					
7.2.A	Mentally add, subtract, multiply, and divide simple fractions, decimals and percents.	7.EE.3	3	OS	This CCSS language states to mentally assess reasonableness of answers using mental computation and estimation strategies.
7.2.B	Solve single- and multi-step problems involving proportional relationships and verify the solutions.	7.RP.1 7.RP.2 7.RP.3	3	OS	Verifying solutions is addressed in CCSS Mathematical Practices.
7.2.C	Describe proportional relationships in similar figures and solve problems involving similar figures.	7.G.1	3	OS	
7.2.D	Make scale drawings and solve problems related to scale.	7.G.1	3	OS	
7.2.E	Represent proportional relationships using graphs, tables, and equations, and make connections among the representations.	7.RP.2	3	OS	The CCSS continue this standard through 8.EE.5.

Number	WA Performance Expectation (PE)	Common Core State Standard (CCSS)	Rating	Grade-Level Timing	Comments
7.2.F	Determine the slope of a line corresponding to the graph of a proportional relationship and relate slope to similar triangles.	8.EE.5 8.EE.6	3	L	The CCSS language in 7.RP.2a asks student to observe whether the graph is a straight line through the origin but does not ask student to determine slope.
7.2.G	Determine the unit rate in a proportional relationship and relate it to the slope of the associated line.	7.RP.1 7.RP.2.d 8.EE.5	3	PL	The CCSS language in 7.RP.2d refers to coordinate points and the proportional relationship but the CCSS do not use the term "slope" until 8.EE.5.
7.2.H	Determine whether or not a relationship is proportional and explain your reasoning.	7.RP.2.a	3	OS	The CCSS Mathematical Practices address explaining reasoning.
7.2.I	Solve single-and multi-step problems involving conversions within or between measurement systems and verify the solutions.	5.MD.1 6.RP.3.d	2	E	



<b>7.3. Core Content: Surface area and volume</b>					
Number	WA Performance Expectation (PE)	Common Core State Standard (CCSS)	Rating	Grade-Level Timing	Comments
7.3.A	Determine the surface area and volume of cylinders using the appropriate formulas and explain why the formulas work.	8.G.9	1	L	This CCSS involves volume of cylinders but there is no reference to determining surface area. Explaining why a formula works is in the CCSS Mathematical Practices.
7.3.B	Determine the volume of pyramids and cones using formulas.	8.G.9	2	L	Pyramids are not mentioned specifically in the CCSS.
7.3.C	Describe the effect that a change in scale factor on one attribute of a two-or three-dimensional figure, such as the side or edge length, perimeter, area, surface area, or volume of a geometric figure.	7.G.1	1	OS	This CCSS does not include finding the effect of changing one attribute on a three-dimensional figure, instead it is about scale factor effects on a two-dimensional figure.
7.3.D	Solve single- and multi-step word problems involving surface area or volume and verify the solutions.	7.G.6	3	OS	The CCSS geometric figures mentioned do not include cylinders.

<b>7.4. Core Content: Probability and data</b>					
Number	WA Performance Expectation (PE)	Common Core State Standard (CCSS)	Rating	Grade-Level Timing	Comments
7.4.A	Represent the sample space of probability experiments in multiple ways, including tree diagrams and organized lists.	7.SP.8.b	3	OS	
7.4.B	Determine the theoretical probability of a particular event and use theoretical probability to predict experimental outcomes.	7.SP.6 7.SP.7 7.SP.8	3	OS	
7.4.C	Describe a data set using measures of center (median, mean, and mode) and variability (maximum, minimum, and range) and evaluate the suitability and limitations of using each measure for different situations.	6.SP.5.d 7.SP.3 7.SP.4	2	PE	These CCSS do not state suitability and limitations of each measure, but include comparisons between centers and choices made by each measure of center and variability.
7.4.D	Construct and interpret histograms, stem-and-leaf plots, and circle graphs.	6.SP.4	1	E	This CCSS includes histograms, line plots and box plots but not stem-and-leaf or circle graphs.

Number	WA Performance Expectation (PE)	Common Core State Standard (CCSS)	Rating	Grade-Level Timing	Comments
7.4.E	Evaluate different displays of the same data for effectiveness and bias, and explain reasoning.	7.SP.3 7.SP.4	1	OS	These CCSS have students draw informal comparative inferences about two populations.
<b>7.5. Additional Key Content</b>					
7.5.A	Graph ordered pairs of rational numbers and determine the coordinates of a given point in the coordinate plane.	6.NS.6 6.NS.8	3	E	
7.5.B	Write the prime factorization of whole numbers greater than 1, using exponents when appropriate.		0		

<b>Grade 8</b>					
<b>8.1. Core Content: Linear functions and equations</b>					
Number	WA Performance Expectation (PE)	Common Core	Rating	Grade-Level Timing	Comments
8.1.A	Solve one-variable linear equations.	8.EE.7	3	OS	
8.1.B	Solve one-and two-step linear inequalities and graph the solutions on the number line.	6.EE.8 7.EE.4	3	E	
8.1.C	Represent a linear function with a verbal description, table, graph, or symbolic expression, and make connections among these representations.	8.F.2 8.F.4	3	OS	
8.1.D	Determine the slope and y-intercept of a linear function described by a symbolic expression, table, or graph.	8.F.3 8.F.4	3	OS	
8.1.E	Interpret the slope and y-intercept of the graph of a linear function representing a contextual situation.	8.F.4 8.SP.3	3	OS	
8.1.F	Solve single- and multi-step word problems involving linear functions and verify the solutions.	8.SP.3	2	OS	

Number	WA Performance Expectation (PE)	Common Core State Standard (CCSS)	Rating	Grade-Level Timing	Comments
8.1.G	Determine and justify whether a given verbal description, table, graph, or symbolic expression represents a linear relationship.	8.F.3	2	OS	This WA PE is more specific than this CCSS.
<b>8.2. Core Content: Properties of geometric figures</b>					
8.2.A	Identify pairs of angles, complementary, supplementary, adjacent, or vertical, and use these relationships to determine missing angle measures.	7.G.5	3	E	The CCSS does not ask students to identify these specific pairs but to use facts about angles to solve problems.
8.2.B	Determine missing angle measures using the relationships among the angles formed by parallel lines and transversals.	7.G.5	3	E	
8.2.C	Demonstrate that the sum of the angle measures in a triangle is 180 degrees, and apply this fact to determine the sum of the angle measures of polygons and to determine unknown angle measures.	8.G.5	2	OS	

Number	WA Performance Expectation (PE)	Common Core State Standard (CCSS)	Rating	Grade-Level Timing	Comments
8.2.D	Represent and explain the effect of one of more translations, rotations, reflections, or dilations (centered at the origin) of a geometric figure on the coordinate plane.	8.G.1 8.G.2 8.G.3 8.G.4	3	OS	
8.2.E	Quickly recall the square roots of the perfect squares from 1 through 225 and estimate the square roots of other positive numbers.	8.EE.2	3	OS	This CCSS asks students to evaluate squares of small perfect squares and cube roots of small perfect cubes.
8.2.F	Demonstrate the Pythagorean Theorem and its converse and apply them to solve problems.	8.G.6 8.G.7	3	OS	
8.2.G	Apply the Pythagorean Theorem to determine the distance between two points on the coordinate plane.	8.G.8	3	OS	

<b>8.3. Summary and analysis of data sets</b>					
Number	WA Performance Expectation (PE)	Common Core State Standard (CCSS)	Rating	Grade-Level Timing	Comments
8.3.A	Summarize and compare data sets in terms of variability and measures of center.	7.SP.3 7.SP.4	3	E	
8.3.B	Select, construct, and analyze data displays, including box-and-whisker plots, to compare two sets of data.	8.SP.4 S-ID.1	2	PL	Box-and-whisker plots are called "Box Plots" in the CCSS. Students are not asked to compare two sets of data in the CCSS.
8.3.C	Create a scatter plot for a two-variable data set, and, when appropriate, sketch and use a trend line to make predictions.	8.SP.1 8.SP.2	3	OS	
8.3.D	Describe different methods of selecting statistical samples and analyze the strengths and weaknesses of each method.	S-IC.3	2	L	This CCSS does not mention strengths and weaknesses.
8.3.E	Determine whether conclusions of statistical studies reported in the media are reasonable.	S-IC.6	1	L	Reference to this WA PE is found in the the CCSS statistics overview, but not in a specific CCSS standard.
8.3.F	Determine probabilities for mutually exclusive, dependent, and independent events for small sample spaces.	7.SP.7 7.SP.8	2	PE	

Number	WA Performance Expectation (PE)	Common Core State Standard (CCSS)	Rating	Grade-Level Timing	Comments
<b>8.3.G</b>	<b>Solve single- and multi-step problems using counting techniques and Venn diagrams and verify the solutions.</b>	7.SP.8	1	PE	Venn diagrams are not listed in the CCSS.
<b>8.4. Additional Key Content</b>					
<b>8.4.A</b>	<b>Represent numbers in scientific notation, and translate numbers written in scientific notation into standard form.</b>	8.EE.3	3	OS	
<b>8.4.B</b>	<b>Solve problems involving operations with numbers in scientific notation and verify solutions.</b>	8.EE.4	3	OS	
<b>8.4.C</b>	<b>Evaluate numerical expressions involving non-negative integer exponents using the laws of exponents and the order of operations.</b>	6.EE.1 8.EE.1	3	PE	This CCSS includes negative exponents.
<b>8.4.D</b>	<b>Identify rational and irrational numbers.</b>	8.NS.1	3	OS	



<b>Algebra 1</b>					
<b>A1.1. Core Content: Solving problems</b>					
Number	Performance Expectation (PE)	Common Core State Standard (CCSS)	Rating	Grade-Level Timing	Comments
<b>A1.1.A</b>	<b>Select and justify functions and equations to model and solve problems.</b>		3	OS	The CCSS thoroughly embed functions and modeling throughout the standards.
<b>A1.1.B</b>	<b>Solve problems that can be represented by linear functions, equations, and inequalities.</b>	A.CED.1 A.CED.2 A.CED.3 A.REI.11 I.F.6 F.LE	3	OS	
<b>A1.1.C</b>	<b>Solve problems that can be represented by a system of two linear equations or inequalities.</b>	8.EE.8 A.CED.3 A.REI.11	3	PE	
<b>A1.1.D</b>	<b>Solve problems that can be represented by quadratic functions and equations.</b>	A.CED.1 A.CED.2 A.CED.3 F.LE	3	PE	
<b>A1.1.E</b>	<b>Solve problems that can be represented by exponential functions and equations.</b>	A.REI.11 F.IF.7 F.LE	3	OS	

<b>A1.2. Core Content: Numbers, expressions, and operations</b>					
Number	WA Performance Expectation (PE)	Common Core State Standard (CCSS)	Rating	Grade-Level Timing	Comments
<b>A1.2.A</b>	<b>Know the relationship between real numbers and the number line, and compare and order real numbers with and without the number line.</b>	6.NS.6.c 8.NS.1 8.NS.2	3	E	Rational numbers are established in sixth grade and irrational numbers in eighth grade in the CCSS.
<b>A1.2.B</b>	<b>Recognize the multiple uses of variables, determine all possible values of variables that satisfy prescribed conditions, and evaluate algebraic expressions that involve variables.</b>	6.EE.2 6.EE.5 6.EE.6 6.EE.7 6.EE.8 A.SSE.1 A.CED.3 F.IF.1 F.IF.2 F.LE.5	2	PE	These CCSS do not ask students to determine all possible values of variables as indicated in the WA PE examples.
<b>A1.2.C</b>	<b>Interpret and use integer exponents and square and cube roots, and apply the laws and properties of exponents to simplify and evaluate exponential expressions.</b>	8.EE.1 8.EE.2 A.SSE.2	2	PE	This is a weak match for variable bases with exponents.

Number	WA Performance Expectation (PE)	Common Core State Standard (CCSS)	Rating	Grade-Level Timing	Comments
A1.2.D	Determine whether approximations or exact value of real numbers are appropriate, depending on the context, and justify the selection.	7.EE.3 8.EE.4 N.Q.3	3	PE	
A1.2.E	Use algebraic properties to factor and combine like terms in polynomials.	A.SSE.2 A.SSE.3	3	OS	
A1.2.F	Add, subtract, multiply, and divide polynomials.	A.APR.1 A.APR.2 A.APR.6 A.APR.7	3	OS	
<b>A1.3. Core Content: Characteristics and behaviors of functions</b>					
A1.3.A	Determine whether a relationship is a function and identify the domain, range, roots, and independent and dependent variables.	F.IF.1 F.IF.2 F.IF.4 F.IF.5 F.IF.7.b F.IF.7.c F.IF.8.a F.IF.8.b	3	OS	
A1.3.B	Represent a function with a symbolic expression, as a graph, in a table, and using words, and make connections among these representations.	8.F.2 F.IF.9	3	PE	

Number	WA Performance Expectation (PE)	Common Core State Standard (CCSS)	Rating	Grade-Level Timing	Comments
A1.3.C	Evaluate $f(x)$ at $a$ (i.e., $f(a)$ ) and solve for $x$ in the equation $f(x) = b$ .	F.IF.4 F.BF.4.a	3	OS	
<b>A1.4. Core Content: Linear functions, equations, and inequalities</b>					
A1.4.A	Write and solve linear equations and inequalities in one variable.	A.REI.3	3	OS	
A1.4.B	Write and graph an equation for a line given the slope and the y-intercept, the slope and a point on the line, or two points on the line, and translate between forms of linear equations.	A.CED.2 F.LE.2	3	OS	
A1.4.C	Identify and interpret the slope and intercepts of a linear function, including equations for parallel and perpendicular lines.	F.IF.4 F.IF.6 F.IF.7.a S.ID.7	2	OS	A-REI.6 leads to but does not directly address parallel and perpendicular lines.
A1.4.D	Write and solve systems of two linear equations and inequalities in two variables.	A.REI.5 A.REI.6 A.REI.12	3	OS	

Number	WA Performance Expectation (PE)	Common Core State Standard (CCSS)	Rating	Grade-Level Timing	Comments
A1.4.E	Describe how changes in the parameters of linear functions and functions containing an absolute value of a linear expression affect their graphs and the relationships they represent.	F.BF.3 F.LE.5	3	OS	
<b>A1.5. Core Content: Quadratic functions and equations</b>					
A1.5.A	Represent a quadratic function with a symbolic expressions, as a graph, in a table, and with a description, and make connections among the representations.	F.IF.4 F.IF.7.a F.IF.7.c F.IF.9	3	OS	
A1.5.B	Sketch the graph of a quadratic function, describe the effects that changes in the parameters have on the graph, and interpret the x-intercepts as solutions to a quadratic equation.	F.IF.7.a F.IF.7.c F.BF.3	3	OS	

Number	WA Performance Expectation (PE)	Common Core State Standard (CCSS)	Rating	Grade-Level Timing	Comments
A1.5.C	Solve quadratic equations that can be factored as $(ax + b)(cx + d)$ where $a$ , $b$ , $c$ , and $d$ are integers.	A.SSE.3.a A.APR.3 A.REI.4.a A.REI.4.b F.IF.7.c	3	OS	
A1.5.D	Solve quadratic equations that have real roots by completing the square and by using the quadratic formula.	A.REI.4	3	OS	
<b>A1.6. Core Content: Data and distributions</b>					
A1.6.A	Use and evaluate the accuracy of summary statistics to describe and compare data sets.	S.ID.1 S.ID.2 S.ID.3	3	OS	
A1.6.B	Make valid inferences and draw conclusions based on data.	S.ID.5 S.ID.6.a S.ID.8 S.ID.9	3	OS	
A1.6.C	Describe how linear transformations affect the center and spread of univariate data.		0		

Number	WA Performance Expectation (PE)	Common Core State Standard (CCSS)	Rating	Grade-Level Timing	Comments
A1.6.D	Find the equation of a linear function that best fits bivariate data that are linearly related, interpret the slope and y-intercept of the line, and use the equation to make predictions.	S.ID.5 S.ID.6 S.ID.7 S.ID.8	3	OS	
A1.6.E	Describe the correlation of data in scatter plots in terms of strong or weak and positive or negative.	S.ID.8	3	OS	
<b>A1.7. Core Content: Additional Key Content</b>					
A1.7.A	Sketch the graph for an exponential function of the form $y = ab^n$ where $n$ is an integer, describe the effects that changes in the parameters $a$ and $b$ have on the graph; answer questions that arise in situations modeled by exponential functions.	F.IF.7.e F.IF.8.b F.BF.3 F.LE.1.c F.LE.2 F.LE.5	3	OS	
A1.7.B	Find and approximate solutions to exponential equations.	F.IF.4 A.REI.11	2	OS	Finding approximate solutions are not mentioned in these CCSS.

Number	WA Performance Expectation (PE)	Common Core State Standard (CCSS)	Rating	Grade-Level Timing	Comments
A1.7.C	Express arithmetic and geometric sequences in both explicit & recursive forms, translate between the two forms, explain how rates of change is represented in each form, & use the forms to find specific terms in the sequence.	F.BF.1a F.BF.1b F.BF.2	3	OS	
A1.7.D	Solve an equation involving several variables by expressing one variable in terms of the others.	A.CED.4	3	OS	
<b>Geometry</b>					
<b>G.2. Core Content: Lines and angles</b>					
G.2.A	Know, prove, and apply theorems about parallel and perpendicular lines.	G.CO.9	2	OS	
G.2.B	Know, prove, and apply theorems about angles, including angles that arise from parallel lines intersected by a transversal	G.CO.9	2	OS	The CCSS has specific examples. WA PEs could imply there are other theorems beyond those mentioned in the CCSS.



Number	WA Performance Expectation (PE)	Common Core State Standard (CCSS)	Rating	Grade-Level Timing	Comments
<b>G.2.C</b>	<b>Explain and perform basic compass and straightedge constructions related to parallel and perpendicular lines.</b>	G.CO.12	2	OS	This CCSS requires more constructions than the WA PE.
<b>G.2.D</b>	<b>Describe the intersections of lines and plans, and of planes in space.</b>		0		
<b>G.3. Core Content: Two- and three-dimensional figures</b>					
<b>G.3.A</b>	<b>Know, explain, and apply basic postulates and theorems about triangles and the special lines, line segments, and rays associated with a triangle.</b>	G.CO.10	2	OS	If the list in CCSS is exhaustive there are topics missing, such as: perpendicular bisectors of legs meet at circumcenter, angle bisectors for isosceles or equilateral triangles. The CCSS have nothing on rays. The pieces that are there are OS but the missing pieces were not found earlier.
<b>G.3.B</b>	<b>Determine and prove triangle congruence, triangle similarity, and other properties of triangles.</b>	G.CO.7 G.CO.8 G.SRT.2 G.SRT.3 G.SRT.4 G.SRT.5	3	OS	These CCSS are more extensive, using transformations as a thread. Current curricula do not use the terminology "rigid motion". Teachers may be more familiar with "transformation".

Number	WA Performance Expectation (PE)	Common Core State Standard (CCSS)	Rating	Grade-Level Timing	Comments
<b>G.3.C</b>	<b>Use the properties of special right triangles (30°-60° -90° and 45°-45°-90°) to solve problems.</b>	G.SRT.4 G.SRT.6 G.SRT.8	1	OS	Each of the CCSS could develop what this WA PE expects but in none of these is it explicit. The CCSS's intention is using similarity and trigonometry whereas this WA does not have that intention. WA's PE is of a very small grain size.
<b>G.3.D</b>	<b>Know, prove, and apply the Pythagorean Theorem and its converse.</b>	G.SRT.4 G.SRT.8	2	OS	WA Standards have students know, apply and explain a proof in eighth grade. In the CCSS for geometry only similarity is used to prove the theorem. The CCSS for functions has another proof using only trigonometry.
<b>G.3.E</b>	<b>Solve problems involving the basic trigonometric ratios of sine, cosine, and tangent.</b>	G.SRT.8	3	OS	
<b>G.3.F</b>	<b>Know, prove, and apply basic theorems about parallelograms.</b>	G.CO.3 G.CO.11	3	OS	Knowing and proving in the CCSS is strong. There is less application, however.
<b>G.3.G</b>	<b>Know, prove, and apply theorems about properties of quadrilaterals and other polygons.</b>	G.CO.3 G.C.3 G.SRT.5	1	PE	There are lots of 'know and apply' early on in CCSS. These geometry CCSS are very specific. The modeling is loose. The CCSS have no proofs at HS level for quadrilaterals and polygons.

Number	WA Performance Expectation (PE)	Common Core State Standard (CCSS)	Rating	Grade-Level Timing	Comments
<b>G.3.H</b>	<b>Know, prove, and apply basic theorems relating circles to tangents, chords, radii, secants, and inscribed angles.</b>	G.C.1 G.C.2 G.C.3 G.C.4	2	OS	Secant lines are not mentioned in the CCSS anywhere. There are lots of 'know and apply' in the CCSS but only one proof on this in geometry.
<b>G.3.I</b>	<b>Explain and perform constructions related to the circle.</b>	G.C.3 G.C.4 G.CO.13	3	OS	
<b>G.3.J</b>	<b>Describe prisms, pyramids, parallelepipeds, tetrahedra, and regular polyhedra in terms of their faces, edges, vertices, and properties.</b>	G.GMD.1 G.GMD.2 G.GMD.4 G.MG.1	1	OS	The CCSS seems to intend a usage of these polyhedra at a higher level. There is no use of these words in the CCSS: polyhedra, tetrahedra, parallelepiped. What is in common between the standards is on schedule but the missing information is never articulated in the CCSS.
<b>G.3.K</b>	<b>Analyze cross-sections of cubes, prisms, pyramids, and spheres and identify the resulting shapes.</b>	G.GMD.4	2	OS	This CCSS only has them identify shapes, but refers to more geometric figures.

<b>G.4. Core Content: Geometry in the coordinate plane</b>					
Number	WA Performance Expectation (PE)	Common Core State Standard (CCSS)	Rating	Grade-Level Timing	Comments
<b>G.4.A</b>	<b>Determine the equation of a line in the coordinate plane that is described geometrically, including a line through two given points, a line through a given point parallel to a given line, and a line through a given point perpendicular to a given line.</b>	G.GPE.5	3	OS	All of the WA PE is covered and the CCSS requires proof as well.
<b>G.4.B</b>	<b>Determine the coordinates of a point that is described geometrically.</b>	G.GPE.4 G.GPE.6	2	OS	These CCSS are very specific but they cover the WA PE generally.
<b>G.4.C</b>	<b>Verify and apply properties of triangles and quadrilaterals in the coordinate plane.</b>	G.GPE.4 G.GPE.5 G.GPE.7	2	OS	These CCSS are very specific.
<b>G.4.D</b>	<b>Determine the equation of a circle that is described geometrically in the coordinate plane and, given equations for a circle and a line, determine the coordinates of their intersections(s).</b>	G.GPE.1 G.GPE.4	1	OS	These CCSS touch on equations of circles and points on circles but in very specific instances and not as a general topic.

<b>G.5. Core Content: Geometric transformations</b>					
Number	WA Performance Expectation (PE)	Common Core State Standard (CCSS)	Rating	Grade-Level Timing	Comments
<b>G.5.A</b>	<b>Sketch results of transformations and compositions of transformations for a given two-dimensional figure on the coordinate plane, and describe the rule(s) for performing translations or for performing reflections about the coordinate axes or the line <math>y = x</math>.</b>	G.CO.5	3	OS	
<b>G.5.B</b>	<b>Determine and apply properties of transformations.</b>	G.CO.4 G.CO.6	2	OS	
<b>G.5.C</b>	<b>Given two congruent or similar figures in a coordinate plane, describe a composition of translations, reflections, rotations, and dilations that superimposes one figure on the other.</b>	G.CO.4 G.CO.5 G.CO.7	2	OS	
<b>G.5.D</b>	<b>Describe the symmetries of two-dimensional figures and describe transformations, including reflections across a line and rotations about a point.</b>	G.CO.1 G.CO.4	1	OS	

<b>G.6. Additional Key Content</b>					
Number	WA Performance Expectation (PE)	Common Core State Standard (CCSS)	Rating	Grade-Level Timing	Comments
<b>G.6.A</b>	<b>Derive and apply formulas for arc length and area of a sector of a circle.</b>	G.C.5	3	OS	
<b>G.6.B</b>	<b>Analyze distance and angle measures on a sphere and apply these measurements to the geometry of the earth.</b>	G.GMD.2	1	OS	
<b>G.6.C</b>	<b>Apply formulas for surface area and volume of three-dimensional figures to solve problems.</b>	7.G.6 G.GMD.3	3	PE	
<b>G.6.D</b>	<b>Predict and verify the effect that changing one, two, or three linear dimensions has on perimeter, area, volume, or surface area of two- and three-dimensional figures.</b>		0		

Number	WA Performance Expectation (PE)	Common Core State Standard (CCSS)	Rating	Grade-Level Timing	Comments
<b>G.6.E</b>	<b>Use different degrees of precision in measurement, explain the reason for using a certain degree of precision, and apply estimation strategies to obtain reasonable measurement with appropriate precision for a given purpose.</b>	N.Q.3	1	OS	
<b>G.6.F</b>	<b>Solve problems involving measurement conversions within and between systems, including those involving derived units; analyze solutions for reasonableness of solutions and appropriate units.</b>	MP6	1	OS	

<b>Algebra 2</b>					
<b>A2.1. Core Content: Solving problems</b>					
Number	WA Performance Expectation (PE)	Common Core State Standard (CCSS)	Rating	Grade-Level Timing	Comments
<b>A2.1.A</b>	<b>Select and justify functions and equations to model and solve problems.</b>		3	PE	The CCSS thoroughly embed functions and modeling throughout the standards.
<b>A2.1.B</b>	<b>Solve problems that can be represented by systems of equations and inequalities.</b>	A.CED.3 A.REI.5 A.REI.6 A.REI.11 A.REI.12 F.IF.9	3	OS	
<b>A2.1.C</b>	<b>Solve problems that can be represented by quadratic functions, equations, and inequalities.</b>	A.REI.4.a A.REI.4.b	3	OS	The CCSS appear to have intentionally limited inequalities to linear inequalities. The WA PEs include quadratic inequalities, though it is very vague and unclear about the expectations related to quadratic inequalities.
<b>A2.1.D</b>	<b>Solve problems that can be represented by exponential and logarithmic functions and equations.</b>	F.BF.5 F.LE.1. F.LE.2 F.LE.3 F.LE.4 F.LE.5	3	PE	



Number	WA Performance Expectation (PE)	Common Core State Standard (CCSS)	Rating	Grade-Level Timing	Comments
A2.1.E	Solve problems that can be presented by inverse variations of the forms $f(x) = a/x + b$ , $F(x) = a/x^2 + b$ , and $f(x) = a/(bx + c)$ .	A.REI.2 F.IF.7.d	3	OS	
A2.1.F	Solve problems involving combinations and permutations.	S.CP.9	3	L	
<b>A2.2. Core Content: Numbers, expressions, and operations</b>					
A2.2.A	Explain how whole, integer, rational, real, & complex numbers are related, & identify the number systems(s) within which a given algebraic equation can be solved.		0		The spirit of this WA PE is about how the different number systems relate/encompass one another. The CCSS do not explicitly address this.
A2.2.B	Use the laws of exponents to simplify and evaluate numeric and algebraic expressions that contain rational exponents.	N.RN.1 N.RN.2 A.SSE.3.c	3	E	The CCSS address this WA PE in their Algebra 1 course.
A2.2.C	Add, subtract, multiply, divide, and simplify rational and more general algebraic expressions.	A.APR.6 A.APR.7	3	OS	

<b>A2.3. Core Content: Quadratic functions and equations</b>					
Number	WA Performance Expectation (PE)	Common Core State Standard (CCSS)	Rating	Grade-Level Timing	Comments
<b>A2.3.A</b>	<b>Translate between the standard form of a quadratic function, the vertex form, and the factored form; graph and interpret the meaning of each form.</b>	A.SSE.3.a A.SSE.3.b F.IF.8.a	3	E	The CCSS place this WA PE in Algebra 1.
<b>A2.3.B</b>	<b>Determine the number and nature of the roots of a quadratic function.</b>	N.CN.7	3	OS	
<b>A2.3.C</b>	<b>Solve quadratic equations and inequalities, including equations with complex roots.</b>	N.CN.7 N.CN.8 A.REI.4.a A.REI.4.b	2	PE	Solving quadratic equations with real solutions begins in Algebra 1 in the CCSS pathway and then the complex solutions come in Algebra II. The CCSS and the WA PE are very similar except the CCSS appear to have intentionally limited inequalities to linear inequalities. The WA PEs include quadratic inequalities.

<b>A2.4. Core Content: Exponential and logarithmic functions and equations</b>					
Number	WA Performance Expectation (PE)	Common Core State Standard (CCSS)	Rating	Grade-Level Timing	Comments
<b>A2.4.A</b>	<b>Know and use basic properties of exponential and logarithmic functions and the inverse relationship between them.</b>	F.BF.5	1	L	The properties of logarithms are missing from CCSS. The CCSS is meant for a fourth year class.
<b>A2.4.B</b>	<b>Graph an exponential function of the form <math>f(x) = ab^n</math> and the inverse logarithmic function.</b>	F.IF.7.e F.LE.2	3	OS	This WA PE and these CCSS appear similar in expecting complete graphs of exponentials but not of logarithms.
<b>A2.4.C</b>	<b>Solve exponential and logarithmic equations.</b>	F.BF.5 F.LE.4	3	PL	The CCSS puts the concept of inverse in the "4th course," where WA puts inverses in Algebra II.

<b>A2.5. Core Content: Additional functions and equations</b>					
Number	WA Performance Expectation (PE)	Common Core State Standard (CCSS)	Rating	Grade-Level Timing	Comments
<b>A2.5.A</b>	<b>Construct new functions using the transformations <math>f(x - h)</math>, <math>f(x) + k</math>, <math>cf(x)</math>, and by adding and subtracting functions, and describe the effect on the original graphs(s).</b>	F.BF.3	3	OS	The WA PE doesn't include $f(kx)$ .
<b>A2.5.B</b>	<b>Plot points, sketch, and describe the graphs of functions of the form <math>f(x) = a\sqrt{x-c} + d</math>, and solve related equations.</b>	A.REI.2 F.IF.7.b F.BF.4.a	1	OS	These CCSS do not address the general square root function transformation specifically. The cited CCSS are loosely aligned.
<b>A2.5.C</b>	<b>Plot points, sketch, and describe the graphs of functions of the form <math>f(x) = a/x + b</math>, <math>f(x) = ax^2 + b</math>, and <math>f(x) = a/(bx + c)</math>, and solve related equations.</b>	A.REI.2 F.IF.7.d	3	OS	
<b>A2.5.D</b>	<b>Plot points, sketch, and describe the graphs of cubic polynomial functions of the form <math>f(x) = ax^3 + d</math> as an example of higher order polynomials and solve related equations.</b>	A.APR.3 F.IF.7.c	3	OS	

<b>A2.6. Core Content: Probability, data, and distributions</b>					
Number	WA Performance Expectation (PE)	Common Core State Standard (CCSS)	Rating	Grade-Level Timing	Comments
<b>A2.6.A</b>	<b>Apply the fundamental counting principle and the ideas of order and replacement to calculate probabilities in situations arising from two-stage experiments (compound events).</b>	S.CP.6 S.CP.7 S.CP.8	2	OS	This CCSS speaks more to general probabilities of compound events. In contrast, this WA PE refers specifically to the Fundamental Counting Principle.
<b>A2.6.B</b>	<b>Given a finite sample space consisting of equally likely outcomes and containing events A and B, determine whether A and B are independent or dependent, and find the conditional probability of A given B.</b>	S.CP.2 S.CP.3 S.CP.4 S.CP.5	3	E	This concept appears in the geometry standards of the CCSS.
<b>A2.6.C</b>	<b>Compute permutations and combinations, and use the results to calculate probabilities.</b>	S.CP.9	3	E	This concept appears in the geometry standards of the CCSS.
<b>A2.6.D</b>	<b>Apply the binomial theorem to solve problems involving probability.</b>	A.APR.5	1	OS	This CCSS makes a tangential remark that the binomial theorem can be used to expand a polynomial $(x+a)^3$ . There is no connection made to probability.

Number	WA Performance Expectation (PE)	Common Core State Standard (CCSS)	Rating	Grade-Level Timing	Comments
<b>A2.6.E</b>	<b>Determine if a bivariate data set can be better modeled with an exponential or a quadratic function and use the model to make predictions.</b>	S.ID.6.a S.ID.6.b	3	E	These CCSS include linear models in this section, which are in WA Algebra 1 PEs.
<b>A2.6.F</b>	<b>Calculate and interpret measures of variability and standard deviation and use these measures and the characteristics of the normal distribution to describe and compare data sets.</b>	S.ID.2 S.ID.3 S.ID.4	2	PE	There is no mention of a normal distribution in the CCSS.
<b>A2.6.G</b>	<b>Calculate and interpret margin of error and confidence intervals for population proportions.</b>	S.IC.4	2	OS	

<b>A2.7. Additional Key Content</b>					
Number	WA Performance Expectation (PE)	Common Core State Standard (CCSS)	Rating	Grade-Level Timing	Comments
<b>A2.7.A</b>	<b>Solve systems of three equations with three variables.</b>	A.REI.5 A.REI.6	2	E	These CCSS only contains standards for systems of two equations in two variables.
<b>A2.7.B</b>	<b>Find the terms and partial sums of arithmetic and geometric series and the infinite sum for geometric series.</b>	A.SSE.4 F.BF.2 F.LE.2	2	PE	These CCSS do not address the infinite sum for geometric sums, though the extent to which the infinite sum is expected to be taught is not explicitly stated. In general, both the CCSS and WA PEs address the basics of arithmetic and geometric sequences.

Appendix  
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