Diocese of Fresno

Office of Catholic Education

In Partnership with

CREATIVE LEADERSHIP SOLUTIONS

EVIDENCE. PASSION. RESULTS.

Present

MATHEMATICS POWER STANDARDS 2021-2022

FOURTH GRADE

Introduction

In June 2021, a committee comprised of teachers and administrators led by Dr. Bill Sternberg from Creative Leadership Solutions worked over a period of three days to identify math Power Standards in Kindergarten through 8th Grade (and Algebra). This work, grounded in research from Doug Reeves, Larry Ainsworth, Dylan Wiliam and others offered the opportunity to collaboratively identify those standards that would be consistently focused upon throughout the year for maximum learning impact in math. The following three criteria were used in the identification of these standards:

Leverage: *Does this indicator apply to other subjects?*

Endurance: *Will this indicator be taught over multiple years of instruction?*

Essentiality: *Is this indicator an essential skill students need to know and be able to do as soon as they enter their next level of instruction?*

Over the course of three days, our committee met in grade level teams to first identify those indicators that possessed leverage. From this list, grade level teams then identified indicators that also possessed endurance, effectively reducing the number of indicators from the original list. Lastly, grade level teams were paired with their vertical counterparts (e.g., Kindergarten was paired with First Grade) to identify indicators that possessed essentiality. Thus, from a list of 30 (or more) grade level math indicators, teams were able to identify 8-12 (depending upon grade level) indicators that would become Power Standards for their specific grade level.

As explained during this process, the intent is to focus consistently on these Power Standards through multiple units of instruction. In reviewing grade level math indicators, there are some that do not require an equal amount of focus as others: In other words, there are supporting standards that may only need to be taught for a smaller time period (e.g., 4-6 weeks) in order for a student to demonstrate mastery of that specific indicator. However, Power Standards identified in this process are those that will require a much more concerted focus throughout the academic year to better prepare students in their learning journey.

Under each Power Standard identified, you'll note graphic organizers that identify the C*oncepts* (nouns or noun phrases) of each Power Standard along with S*kills* (what we want students to know and be able to do). As well, there is a section labeled "*Topics*" which allows other content area teachers to identify units of instruction where these specific Power Standards can be inserted as a means of building cross-curricular connections. The "*Topics"* section is one that should continually be added to over time as there will undoubtedly be multiple opportunities for insertion of these Power Standards in other content areas.

The last piece you'll note under each identified Power Standard is a table listing "*Big Ideas"* and "*Essential Questions"*. The *"Big Ideas*" are those critical understandings of the purpose and meaning behind learning the Power Standard that we want students to possess in *their own words*. In essence, students should know the *why* of what they are learning, not just the *what*. The *"Essential Questions"* are those questions teachers use during instruction encompassing these Power Standards as a means to build interest and understanding from their students. We would expect student replies to these *"Essential Questions"* to resemble the *"Big Ideas"* within this table.

Contents

Power Standard #1:

4.OA.1. Interpret a multiplication equation as a comparison, e.g., interpret 35 = 5 × 7 as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations.

Concepts	*Skills*
• multiplication equation as comparison • verbal statements • multiplicative comparison • multiplication equations	• Interpret a multiplication equation as a comparison, • Represent verbal statements of multiplicative comparisons • Represent verbal statements as multiplication equations.

Big Ideas	**Essential Questions**
• Multiplication equation as a comparison • Verbal statements of multiplicative comparison • Multiplication equations	• **What is a multiplication comparison?**

Bloom's Taxonomy Level: Understand
Depth of Knowledge Level: DOK Level 2

Assessment Item:

Three-Column Rubric

EXPECTATION	STUDENT SELF-ASSESSMENT	TEACHER ASSESSMENT

Point Value Three-Column Rubric

EXPECTATION	STUDENT SELF-ASSESSMENT			TEACHER ASSESSMENT
	3	2	1	
	3	2	1	
	3	2	1	

*If using point values, create explicit expectations for student performance under each point value for each specific standard expectation.

EXPECTATION	3	2	1

Power Standard #2:

4.OA.3. 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.

Concepts	*Skills*
• multi-step word problems • whole numbers • four operations • remainders • equations • letter standing for the unknown quantity • reasonableness • mental computation • estimating strategies • rounding	• solve multistep word problems posed with whole numbers and whole number answers • use four operations • interpret remainders • represent problems using equations with a letter standing for the unknown quantity • assess for reasonableness of answer using mental computations • assess for reasonableness of answer using estimations strategies • assess for reasonableness of answer using rounding

Big Ideas	**Essential Questions**
• Multistep word problems with whole numbers • Letter standing for the unknown quantity • Interpreting remainders • Mental computation • Rounding	• **What steps should I take to complete the word problem?** • **What is operations is the word problem asking me to use?** • **How can I represent this word problem as an equation?** • **Is my answer reasonable?**

Bloom's Taxonomy Level: Analyze
Depth of Knowledge Level: DOK 3

Assessment Item:

Three-Column Rubric

EXPECTATION	STUDENT SELF-ASSESSMENT	TEACHER ASSESSMENT

Point Value Three-Column Rubric

EXPECTATION	STUDENT SELF-ASSESSMENT			TEACHER ASSESSMENT
	3	2	1	
	3	2	1	
	3	2	1	

*If using point values, create explicit expectations for student performance under each point value for each specific standard expectation.

EXPECTATION	3	2	1

Power Standard #3:

4.OA.4. Find all factor pairs for a whole number in the range 1–100. Recognize that a whole number is a multiple of each of its factors. Determine whether a given whole number in the range 1–100 is a multiple of a given one-digit number. Determine whether a given whole number in the range 1–100 is prime or composite.

Concepts	*Skills*
• factor pairs • whole number • multiple • factors • prime • composite	• find factor pairs for whole numbers to 100 • recognize a multiple • recognize a factor • determine if a number is prime or composite
Topics •	

Big Ideas	**Essential Questions**
• Factors of whole numbers in range 1-100 • Whole numbers as factors • Whole numbers as a multiple of its factors • Prime and composite	• **What is a factor?** • **What is a multiple?**

Bloom's Taxonomy Level: Understand
Depth of Knowledge Level: DOK 2

Assessment Item:

Three-Column Rubric

EXPECTATION	STUDENT SELF-ASSESSMENT	TEACHER ASSESSMENT

Point Value Three-Column Rubric

EXPECTATION	STUDENT SELF-ASSESSMENT			TEACHER ASSESSMENT
	3	2	1	
	3	2	1	
	3	2	1	

*If using point values, create explicit expectations for student performance under each point value for each specific standard expectation.

EXPECTATION	3	2	1

Power Standard #4:

4.NBT.5. Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.

Concepts	*Skills*
• whole number • place value • properties of operations • equations • rectangular arrays • area models • four digit number • one digit number • two digit number	• multiply whole number by a number up to 4 digits • multiply 2 two-digit numbers • use strategies for place value and properties of operations • illustrate and explain by using equations, rectangular arrays, area models
Topics •	

Big Ideas	**Essential Questions**
• Multi-digit multiplication • Place value • Rectangular arrays • Area models	• **How can I use place value to multiply muliti-digit numbers?**

Bloom's Taxonomy Level: Apply
Depth of Knowledge Level: DOK 1

Assessment Item:

Three-Column Rubric

EXPECTATION	STUDENT SELF-ASSESSMENT	TEACHER ASSESSMENT

Point Value Three-Column Rubric

EXPECTATION	STUDENT SELF-ASSESSMENT			TEACHER ASSESSMENT
	3	2	1	
	3	2	1	
	3	2	1	

*If using point values, create explicit expectations for student performance under each point value for each specific standard expectation.

EXPECTATION	3	2	1

Power Standard #5:

4.NBT.6. Find whole-number quotients and remainders with up to four-digit dividends and one-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.

Concepts	*Skills*
• whole number quotients • remainders • four-digit dividends • one -digit divisor • place value • properties of operations • multiplication & division (fact family) • equations • rectangular arrays • area models	• find whole number quotients with up to four digit dividends and one digit divisors • find remainders with up to four digit dividends and one digit divisors • use strategies for place value • use strategies for properties of operations • use the relationship between multiplication and division • illustrate and explain using equations • illustrate and explain using rectangular arrays • illustrate and explain using area models
Topics •	

Big Ideas	**Essential Questions**
• Whole-number quotients and remainders • Multiplication/division relationship • Rectangular arrays • Area models	• **How can I use factors to divide by one-digit divisors?**

Bloom’s Taxonomy Level: Apply
Depth of Knowledge Level: DOK 2

Assessment Item:

Three-Column Rubric

EXPECTATION	STUDENT SELF-ASSESSMENT	TEACHER ASSESSMENT

Point Value Three-Column Rubric

EXPECTATION	STUDENT SELF-ASSESSMENT			TEACHER ASSESSMENT
	3	**2**	**1**	
	3	**2**	**1**	

	3	2	1	

*If using point values, create explicit expectations for student performance under each point value for each specific standard expectation.

EXPECTATION	3	2	1

Power Standard #6:

4.NBT.2. Read and write multi-digit whole numbers using base-ten numerals, number names, and expanded form. Compare two multidigit numbers based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons.

Concepts	*Skills*
• multi-digit whole numbers • base-ten numerals • number names • expanded form • two multi digit numbers • symbols <,>, = • comparisons	• read multi-digit whole numbers using base-ten numerals, number names, expanded form • write multi-digit whole numbers using base-ten numerals, number names, expanded form • compare two multi-digit numbers • use symbols <,>,= • record results of comparisons

Topics
•

Big Ideas	**Essential Questions**
• Base-ten numerals • Expanded form • Comparisons	• **How can I compare multi-digit numbers using base-ten numbers?** • **How can I compare multi-digit numbers using expanded form?** • **How do I compare using <,>, and = symbols?**

Bloom's Taxonomy Level: Analyze

Depth of Knowledge Level: DOK 2

Assessment Item:

Three-Column Rubric

EXPECTATION	STUDENT SELF-ASSESSMENT	TEACHER ASSESSMENT

Point Value Three-Column Rubric

EXPECTATION	STUDENT SELF-ASSESSMENT			TEACHER ASSESSMENT
	3	2	1	
	3	2	1	
	3	2	1	

*If using point values, create explicit expectations for student performance under each point value for each specific standard expectation.

EXPECTATION	3	2	1

Power Standard #7:

4.NF.1. Explain why a fraction a/b is equivalent to a fraction (n × a)/(n × b) by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions.

Concepts	*Skills*
• fraction • equivalent • equivalent fractions • visual fraction models	• Explain why a fraction a/b is equivalent to a fraction (n × a)/(n × b) by using visual fraction models with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. • using principles to recognize and generate equivalent fractions
Topics •	

Big Ideas	**Essential Questions**
• Fraction models • Separating and joining parts referring to the same whole • Equivalent fractions	• **How can I use fraction models to create an equivalent fraction?** • **What is an equivalent fraction?**

Bloom's Taxonomy Level: Understand
Depth of Knowledge Level: DOK 3

Assessment Item:

Three-Column Rubric

EXPECTATION	STUDENT SELF-ASSESSMENT	TEACHER ASSESSMENT

Point Value Three-Column Rubric

EXPECTATION	STUDENT SELF-ASSESSMENT			TEACHER ASSESSMENT
	3	2	1	
	3	2	1	
	3	2	1	

*If using point values, create explicit expectations for student performance under each point value for each specific standard expectation.

EXPECTATION	3	2	1

Power Standard #8:

4.NF.3a. Understand addition and subtraction of fractions as joining and separating parts referring to the same whole.

Concepts	*Skills*
• Addition • subtraction • fractions • parts referring to the same whole	• understand addition of fractions as joining parts • understand subtraction of fractions as separating parts
Topics •	

Big Ideas	**Essential Questions**
• Joining and separating parts referring to the same whole • Addition and subtraction of fractions	• **How do I create a whole using the parts of the whole?**

Bloom's Taxonomy Level: Understand
Depth of Knowledge Level: DOK 2

Assessment Item:

Three-Column Rubric

EXPECTATION	STUDENT SELF-ASSESSMENT	TEACHER ASSESSMENT

Point Value Three-Column Rubric

EXPECTATION	STUDENT SELF-ASSESSMENT			TEACHER ASSESSMENT
	3	2	1	
	3	2	1	
	3	2	1	

*If using point values, create explicit expectations for student performance under each point value for each specific standard expectation.

EXPECTATION	3	2	1

Power Standard #9:

4.MD.1. Know relative sizes of measurement units within one system of units including km, m, cm; kg, g; lb, oz.; l, ml; hr, min, sec. Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. Record measurement equivalents in a two-column table. For example, know that 1 ft is 12 times as long as 1 in. Express the length of a 4 ft snake as 48 in. Generate a conversion table for feet and inches listing the number pairs (1, 12), (2, 24), (3, 36),

Concepts	*Skills*
• relative size • measurement units • one system of units • larger unit in terms of a smaller unit • measurement equivalents • two-column table • length • conversion table	• Know relative sizes of measurement units within one system of units • Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. • Record measurement equivalents in a two-column table • express length in two units • generate a conversion table

Topics
•

Big Ideas	**Essential Questions**
• Units of measurement (metric and standard) • Express measurements in larger units of a smaller unit • Convert measurements	• **What units relate to each other?** • **What units are used for time, length, volume, liquids, weight, height?** • **What operation should I use to convert from one measurement to another?**

Bloom’s Taxonomy Level: Apply
Depth of Knowledge Level: DOK 2

Assessment Item:

Three-Column Rubric

EXPECTATION	STUDENT SELF-ASSESSMENT	TEACHER ASSESSMENT

Point Value Three-Column Rubric

EXPECTATION	STUDENT SELF-ASSESSMENT			TEACHER ASSESSMENT
	3	**2**	**1**	
	3	**2**	**1**	

	3	2	1	

*If using point values, create explicit expectations for student performance under each point value for each specific standard expectation.

EXPECTATION	3	2	1

Power Standard #10:

4.MD.2. Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale

Concepts	*Skills*
• four operations • distances • intervals of time • liquid volumes • masses of objects • money • simple fractions • simple decimals • measurements quantities • diagrams • number line diagrams • measurement scale	• use found operations to solve word problems involving distances including problems involving simple fractions • use found operations to solve word problems involving distances including problems involving simple decimals • use found operations to solve word problems involving intervals of time including problems involving simple decimals • use found operations to solve word problems involving intervals of time including problems involving simple factions • use found operations to solve word problems involving liquid volumes including problems involving simple decimals • use found operations to solve word problems involving liquid volumes including problems involving simple fractions • use found operations to solve word problems involving masses of objects including problems involving simple decimals • use found operations to solve word problems involving masses of objects

	including problems involving simple factions ● use found operations to solve word problems involving money including problems involving simple factions ● use found operations to solve word problems involving money including problems involving simple decimals ● Represent measurement quantities using diagrams that feature a measurement scale ● Represent measurement quantities using number line diagrams that feature a measurement scale

Topics
●

Big Ideas	**Essential Questions**
● Units of measurement ● Number line diagrams ● Measurement scales	● **What operation do I use to solve word problems using measurement?** ● **How do I represent my answer as a diagram, and number line?**

Bloom’s Taxonomy Level: Analyze
Depth of Knowledge Level: DOK 2

Assessment Item:

Three-Column Rubric

EXPECTATION	STUDENT SELF-ASSESSMENT	TEACHER ASSESSMENT

Point Value Three-Column Rubric

EXPECTATION	STUDENT SELF-ASSESSMENT			TEACHER ASSESSMENT
	3	2	1	
	3	2	1	
	3	2	1	

*If using point values, create explicit expectations for student performance under each point value for each specific standard expectation.

EXPECTATION	3	2	1
