

In Partnership with



Present

MATHEMATICS POWER STANDARDS 2021-2022

FIFTH 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 *Concepts* (nouns or noun phrases) of each Power Standard along with *Skills* (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.

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5.G.1. Use a pair of perpendicular number lines, called axes, to define a coordinate system, with the intersection of the lines (the origin) arranged to coincide with the 0 on each line and a given point in the plane located by using an ordered pair of numbers, called its coordinates. Understand that the first number indicates how far to travel from the origin in the direction of one axis, and the second number indicates how far to travel in the direction of the second axis, with the convention that the names of the two axes and the coordinates correspond (e.g., x-axis and x-coordinate, y-axis and y-coordinate) 24

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5.G.2. Represent real-world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation. 28

Power Standard #1:

5.OA.2.1 Express a whole number in the range 2–50 as a product of its prime factors. For example, find the prime factors of 24 and express 24 as $2 \times 2 \times 2 \times 3$. CA

<p><u>Concepts</u></p> <ul style="list-style-type: none"> ● Whole Number ● range ● product ● prime factors 	<p><u>Skills</u></p> <ul style="list-style-type: none"> ● Express prime factorization of whole numbers 2-50
<p><u>Topics</u> (Reducing Fractions)</p>	

- Cooking - Converting between the measuring spoons/cups you have available and what you are told you will need.
- Science - Measuring data to interpret on a graph.
- Social Studies - Exchanging money.

<u>Big Ideas</u>	<u>Essential Questions</u>
<ul style="list-style-type: none"> ● Understanding a whole number as the product of its parts makes doing long division easier. ● Understanding a whole number as the product of its parts makes reducing fractions easier. ● Understanding a whole number as the product of its parts makes writing equivalent fractions easier. ● Knowing the difference between a prime number and a composite number so that you know when you need to try and simplify a fraction. ● Understanding how to divide up the number into smaller parts will help when they need to do square roots next year. 	<ul style="list-style-type: none"> ● Why is it important for me to understand a whole number as a product of its parts? ● Why do I need to know the difference between a prime number and a composite number? ● Why do I need to understand how to divide a number into smaller parts/pieces?

Bloom's Taxonomy Level: Apply

Depth of Knowledge Level: DOK 1

Assessment Item:

Using white boards, give me the prime factorization of 6; 12; 15; 24

Three-Column Rubric

EXPECTATION	STUDENT SELF-ASSESSMENT	TEACHER ASSESSMENT
Students can correctly give prime factorization. Answers written on wipe boards.	I express prime factors for a given number.	Verbal cues

Point Value Three-Column Rubric

EXPECTATION	STUDENT SELF-ASSESSMENT			TEACHER ASSESSMENT
Students can correctly give prime factorization. Answers written on wipe boards.	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:

5.NBT.7. Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used

<p style="text-align: center;"><u>Concepts</u></p> <ul style="list-style-type: none"> ● decimals ● hundredths ● concrete models ● drawings ● strategies ● place value ● operations ● relationship ● addition ● subtraction ● written method ● reasoning 	<p style="text-align: center;"><u>Skills</u> <i>(ALL operations with decimals)</i></p> <ul style="list-style-type: none"> ● Adding decimals ● Subtracting decimals ● Multiplying decimals ● Dividing decimals ● Using concrete models ● Using drawings ● Using strategies ● Using place value ● Using properties of operations ● Using the relationship between addition and subtraction ● Relate the strategy to a written method ● Explain reasoning used ● Rounding decimals to the nearest hundredth
<p><u>Topics</u></p> <ul style="list-style-type: none"> ● Social Studies - Money, economy, taxes ● Science - Collecting, analyzing, and interpreting data. ● LA - Reasoning and explaining the reasoning used. 	

<p style="text-align: center;"><u>Big Ideas</u></p> <ul style="list-style-type: none"> ● Adding and subtracting with decimals will help me keep track of my earnings and spendings in my piggy bank. ● Multiplying with decimals will help me figure out how much more than one of an item costs. ● Multiplying with decimals will help me find how much tax there is on an item. ● Adding decimals will help me find out how much the item costs with tax. ● Dividing with decimals will help me figure out how much each person gets if we run a business (e.g. bake sale, lemonade stand) together. 	<p style="text-align: center;"><u>Essential Questions</u></p> <ul style="list-style-type: none"> ● Why do I need to know how to add and subtract decimals? ● Why do I need to know how to multiply decimals? ● Why do I need to know how to divide decimals? ● Why do I need to understand place value? ● Why is it important for me to understand properties of operations? ● Why do I need to be able to put my thinking process into words?
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<ul style="list-style-type: none"> • Understanding place value for decimals will help me to use the operations correctly. • Understanding properties of operations as they relate to decimals will make it easier for me to solve multi-step problems later. • Being able to put my thinking process into words will help me explain my science projects later. 	
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Bloom's Taxonomy Level: Apply
Depth of Knowledge Level: DOK 2

Assessment Item:

<p>Students will individually solve the following equations: $\\$5 + \\1.32, $\\$7 - \\3.45, 0.67×0.4, $55.318 \div 3.4$</p>

Three-Column Rubric

EXPECTATION	STUDENT SELF-ASSESSMENT	TEACHER ASSESSMENT
Students can add and subtract decimals.	I can add and subtract decimals.	Student(s) volunteer to teach the class how to solve the equation.
Students can multiply decimals.	I can multiply decimals.	Student(s) volunteer to teach the class how to solve the equation.
Students can divide decimals.	I can divide decimals.	Student(s) volunteer to teach the class how to solve the equation.

Point Value Three-Column Rubric

EXPECTATION	STUDENT SELF-ASSESSMENT			TEACHER ASSESSMENT
	3	2	1	
	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:

5.NF.1. Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators. For example, $\frac{2}{3} + \frac{5}{4} = \frac{8}{12} + \frac{15}{12} = \frac{23}{12}$. (In general, $\frac{a}{b} + \frac{c}{d} = \frac{ad + bc}{bd}$.)

<u>Concepts</u>	<u>Skills</u>
<ul style="list-style-type: none">● fractions● unlike denominators● mixed numbers● equivalent fractions● equivalent sum● equivalent difference● like denominators	<ul style="list-style-type: none">● Adding fractions with unlike denominators● Subtracting fractions with unlike denominators● Common denominators● Replacing fractions with equivalent fractions● Produce an equivalent sum of fractions● Produce an equivalent difference of fractions
<p data-bbox="760 1318 841 1352" style="text-align: center;"><u>Topics</u></p> <ul style="list-style-type: none">● Cooking - Choosing which measuring spoons or cups to use. Doubling or decreasing a recipe.● Science - Measurements.● Geography - Map scales.	

<u>Big Ideas</u>	<u>Essential Questions</u>
<ul style="list-style-type: none">● Adding and subtracting fractions and mixed numbers with unlike denominators will help me convert measurements when cooking.	<ul style="list-style-type: none">● Why is it important to know how to add and subtract fractions and mixed numbers with unlike denominators?

<ul style="list-style-type: none"> • Adding and subtracting fractions and mixed numbers with unlike denominators will help me find the right measuring spoons or cups when following a recipe. • Being able to replace a fraction with an equivalent fraction will help me add and subtract fractions with unlike denominators. • Being able to replace a fraction with an equivalent fraction will help me to reduce fractions. • Being able to easily add and subtract fractions with unlike denominators will make it easier to solve problems with fractions next year. 	<ul style="list-style-type: none"> • Why do I need to be able to replace a fraction with an equivalent fraction? • Why does it matter if I can add and subtract fractions with unlike denominators easily?
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Bloom's Taxonomy Level: Analyze
Depth of Knowledge Level: DOK 2

Assessment Item:

<p>Solve: $\frac{1}{2} - \frac{1}{4}$, $\frac{3}{8} + \frac{1}{4}$, $\frac{5}{6} - \frac{1}{3}$, $\frac{1}{6} + \frac{2}{3}$</p> <p>Think/Pair/Share</p>
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Three-Column Rubric

EXPECTATION	STUDENT SELF-ASSESSMENT	TEACHER ASSESSMENT
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Students can create equivalent fractions with common denominators.	I can work with a partner to create equivalent fractions with common denominators.	Thumbs up/Thumbs down
Students can add fractions with unlike denominators.	I can add fractions with unlike denominators by creating equivalent fractions.	Thumbs up/Thumbs down
Students can subtract fractions with unlike denominators.	I can subtract fractions with unlike denominators by creating equivalent fractions.	Thumbs up/Thumbs down

Point Value Three-Column Rubric

EXPECTATION	STUDENT SELF-ASSESSMENT			TEACHER ASSESSMENT
	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:

5.NF.6. Solve real-world problems involving multiplication of fractions and mixed numbers, e.g., by using visual fraction models or equations to represent the problem.

<p style="text-align: center;"><u>Concepts</u></p> <ul style="list-style-type: none"> ● real-world problems ● multiplication ● fractions ● mixed numbers ● visual fraction models ● equations ● problems 	<p style="text-align: center;"><u>Skills</u></p> <ul style="list-style-type: none"> ● Solve real world problems ● Solve word problems ● Multiplication of fractions ● Multiplication of mixed numbers ● Using visual fraction models ● Using equations to represent the problems
<p><u>Topics</u></p> <ul style="list-style-type: none"> ● Cooking - Choosing the correct measuring spoons or cups. Increasing a recipe. ● Science - Ratios. ● Home Ec. - Amount of paint needed. Amount of flooring needed. Amount of material needed to make a project. 	

<u>Big Ideas</u>	<u>Essential Questions</u>
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<ul style="list-style-type: none"> • Being able to multiply fractions will make it easier to increase a recipe. • Being able to multiply fractions will allow me to determine how much material I will need for a project. • Being able to easily multiply by fractions will make it easier in the next grade. • Understanding how to take a real-world problem and make it into a solvable equation will help me in my daily life. 	<ul style="list-style-type: none"> • Why do I need to know how to multiply fractions? • Why do I need to know how to multiply mixed numbers? • Why is it important to solve real-world problems with equations?
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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	
	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:

5.MD.1. Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multi-step, real-world problems

<p style="text-align: center;"><u>Concepts</u></p> <ul style="list-style-type: none">● different-sized● standard measurement units● measurement system● conversions● multi-step● real-world problems	<p style="text-align: center;"><u>Skills</u></p> <ul style="list-style-type: none">● Convert standard measurement units using metric system● Convert standard measurement units using customary (US) system● Use conversions solving multi-step problems● Use conversions solving real-world problems
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<p style="text-align: center;"><u>Topics</u></p> <ul style="list-style-type: none">● Geography - Map scales.● Science - Measurements for data values. Measurements in experiments.● Cooking - Which units of measure to use for which ingredients. What to do when you don't have a unit of measure you want.

<p style="text-align: center;"><u>Big Ideas</u></p>	<p style="text-align: center;"><u>Essential Questions</u></p>
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<ul style="list-style-type: none"> • Being able to convert between units will help me find the amount I need to complete a project no matter what unit of measure I used in the first place or what unit of measure the store is using. • Being able to convert between units of measure will help me to compare like products to each other. • Being able to convert between units of measure will help me answer questions about the measurement (weight, height, length, size) of something. • Being familiar with both units of measurement means I can travel to other countries and understand their units of measurement. 	<ul style="list-style-type: none"> • Why is it important to convert units of measurement? • When would I need to convert units of measure in my life?
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Bloom's Taxonomy Level: Analyze
Depth of Knowledge Level: DOK 3

Assessment Item:

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Three-Column Rubric

EXPECTATION	STUDENT SELF-ASSESSMENT	TEACHER ASSESSMENT

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Point Value Three-Column Rubric

EXPECTATION	STUDENT SELF-ASSESSMENT			TEACHER ASSESSMENT
	3	2	1	
	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

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Power Standard #6:

5.MD.3. Recognize volume as an attribute of solid figures and understand concepts of volume measurement. a. A cube with side length 1 unit, called a “unit cube,” is said to have “one cubic unit” of volume, and can be used to measure volume. b. A solid figure which can be packed without gaps or overlaps using n unit cubes is said to have a volume of n cubic units.

<u>Concepts</u>	<u>Skills</u>
<ul style="list-style-type: none"> ● volume ● attribute ● solid figures ● concepts ● volume measurement ● unit cube ● cubic unit ● measure ● packed without gaps ● packed without overlaps 	<ul style="list-style-type: none"> ● Recognize volume (vs area) as an attribute of solid figures ● Understand volume measurement ● Understand a cube with a side length of one unit is called a unit cube ● Understand a unit cube is one cubic unit ● Understand that unit cubes can be used to measure volume ● Understand that a shape can be packed with n cubes without gaps or overlaps ● Understand that the number of cubes is equal to the volume (cubic units)

Topics

- Science - Measuring liquids. Matter and mass.
- Cooking - Measuring liquids.

<u>Big Ideas</u>	<u>Essential Questions</u>
<ul style="list-style-type: none">● Understanding that volume is an attribute of a solid figure helps me measure the inside of containers.● Understanding that volume is an attribute of a solid figure helps me find the amount of liquid I need for a project.● Knowing the volume of something means that I can then find the right sized box for my item that I'm shipping.● Knowing the volume of something means that I can find the right sized container to store my toys.	<ul style="list-style-type: none">● Why do I need to understand volume as an attribute of solid figures?● Why would I need to understand the concept of volume measurement?

Bloom's Taxonomy Level: Understand

Depth of Knowledge Level: DOK 3

Assessment Item:

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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	
	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:

5.G.1. Use a pair of perpendicular number lines, called axes, to define a coordinate system, with the intersection of the lines (the origin) arranged to coincide with the 0 on each line and a given point in the plane located by using an ordered pair of numbers, called its coordinates. Understand that the first number indicates how far to travel from the origin in the direction of one axis, and the second number indicates how far to travel in the direction of the second axis, with the convention that the names of the two axes and the coordinates correspond (e.g., x-axis and x-coordinate, y-axis and y-coordinate)

<u>Concepts</u>	<u>Skills</u>
<ul style="list-style-type: none"> ● perpendicular ● number lines ● perpendicular number lines ● axes ● coordinate system ● intersection ● origin ● line ● point ● plane ● ordered pair ● numbers ● coordinates ● first number ● first axis ● direction ● second number ● second axis ● convention 	<ul style="list-style-type: none"> ● Use a pair of perpendicular number lines as axes ● Define a coordinate system ● Locate the origin on a coordinate system (0,0) ● Recognize x-axis ● Recognize y-axis ● Recognize x-coordinate (x,y) ● Recognize y-coordinate (x,y) ● Use an ordered pair of numbers ● Understand first number indicates how far to travel (horizontally) from the origin on the first axis with the convention of the axis being called the x-axis ● Understand first number indicates how far to travel (horizontally) from the origin on the first axis with the

<ul style="list-style-type: none"> ● two axes ● x-axis ● y-axis ● x-coordinate ● y-coordinate ● horizontal (not required) ● vertical (not required) 	<p>convention of the first point begin called the x-coordinate</p> <ul style="list-style-type: none"> ● Understand second number indicates how far to travel (vertically) from the origin on the second axis with the convention of the axis being called the y-axis ● Understand second number indicates how far to travel (vertically) from the origin on the second axis with the convention of the second point being called the y-coordinate
<p style="text-align: center;"><u>Topics</u></p> <ul style="list-style-type: none"> ● Science - Reading, making, and interpreting graphs. 	

<p style="text-align: center;"><u>Big Ideas</u></p> <ul style="list-style-type: none"> ● Being able to put points on a graph means I can show data that I gathered through science experiments. ● Being able to put points on a graph will make it easier to find locations on a map. ● Being able to put points on a graph will let me plot a way from one place to another. ● Being able to put points on a graph means that I can use graphs in my science fair projects. ● Being able to read points on a graph will help me identify which location is closer. ● Being able to read points on a graph will allow me to predict what will happen next. 	<p style="text-align: center;"><u>Essential Questions</u></p> <ul style="list-style-type: none"> ● Why do I need to put points on a graph? ● Why do I need to know how to read points on a graph?
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Bloom's Taxonomy Level: Analyze
Depth of Knowledge Level: DOK 3

Assessment Item:

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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:

5.G.2. Represent real-world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation.

<p style="text-align: center;"><u>Concepts</u></p> <ul style="list-style-type: none">● real-world problems● mathematical problems● graphing● points● quadrant● first quadrant● coordinate● coordinate plane● coordinate values● context	<p style="text-align: center;"><u>Skills</u></p> <ul style="list-style-type: none">● Graphing points in the first quadrant of a coordinate plane● Represent real-world problems by graphing● Represent mathematical problems by graphing● Interpret coordinate values of points● Interpret coordinate values of points in the context of the situation
<p style="text-align: center;"><u>Topics</u></p> <ul style="list-style-type: none">● Science - Reading, making, and interpreting graphs.	

<u>Big Ideas</u>	<u>Essential Questions</u>
<ul style="list-style-type: none"> ● Being able to put points on a graph means I can show data that I gathered through science experiments. ● Being able to put points on a graph will make it easier to find locations on a map. ● Being able to put points on a graph will let me plot a way from one place to another. ● Being able to put points on a graph means that I can use graphs in my science fair projects. ● Being able to read points on a graph will help me identify which location is closer. ● Being able to read points on a graph will allow me to predict what will happen next. 	<ul style="list-style-type: none"> ● Why do I need to be able to graph points on a coordinate plane? ● What real-world problem would require me to use a graph?

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
