



Mathematics Curriculum

Ogdensburg Borough School District

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RATIONALE

The mathematics program prepares students to possess numeracy literacy, understand and apply math skills through high school, and competently utilize math in personal, work, and civic life. The program, which mirrors the Common Core Content Standards and Standards for Mathematical Practice, expects students to be proficient at each grade level accompanied by strong support.

The curriculum buttresses a program that entices students to love math and enjoy the learning of math and mathematical discovery. The program strives to lead students to become collaborative learners who can both lead and follow each other to uncover math truths and postulates. Simultaneously, students develop methodologies that assist and develop perseverance in problem solving.

Technologically driven tools and texts assist students to develop twenty-first century aptitude and proficiency. Math literacy is necessary for students to function as adults and mathematical competence opens doors

EIGHT STANDARDS OF MATHEMATICAL PRACTICE

1. Make sense of problems and persevere in solving them.

Mathematically proficient students start by explaining to themselves the meaning of a problem and looking for entry points to its solution.

2. Reason abstractly and quantitatively.

Mathematically proficient students make sense of quantities and their relationships in problem situations.

3. Construct viable arguments and critique the reasoning of others.

Mathematically proficient students understand and utilize standard assumptions, definitions, and previously established results in constructing arguments.

4. Model with mathematics

Mathematically proficient students can apply mathematics they know to solve problems arising in everyday life, society, and the workplace.

5. Use appropriate tools strategically

Mathematically proficient students consider the available tools when solving a mathematical problem.

6. Attend to precision

Mathematically proficient students try to communicate precisely to others.

7. Look for and make uses of structure.

Mathematically proficient students look closely to discern a pattern or structure.

8. Look for and express regularity in repeated reasoning.

Mathematically proficient students notice if calculations are repeated and look both for general methods and for shortcuts.

INSTRUCTIONAL OBJECTIVES

- IT** Present activities that build self efficacy and perseverance in mathematics.
- IT** Provide situations that develop critical thinking, reasoning, analysis, and quantitative acumen.
- IT** Utilize activities that develop aural, verbal, and kinesthetic learning.
- IT** Promote mathematical independence and bolster critical thinking skills.
- IT** Integrate technology to build 21st century competence.
- IT** Utilize collaborative situations to enhance and strengthen mathematical investigations.
- IT** Provide activities as underpinning for procedural skills.
- IT** Actively engage students in communicating mathematical procedures.
- IT** Offer mathematical problems where students can synthesize material and apply to real world contexts

Mathematics Curriculum

Kindergarten

KINDERGARTEN CURRICULUM

Structure

Big Ideas

- Counting and re-ordering numbers
- Counting and pairing numbers with objects as you count.
- Compare sizes, amounts, and number values.
- Fluent in addition and subtraction
- Use groups of ten in base ten
- Classify objects

- Objects can be classified by shape
- Shapes' attributes: composition, similarities and differences, corners, and edges

Enduring Understanding

Students will understand that...

- Counting finds the answer to “how many?”
- Successive numbers pair with the next object.
- Each object can only be paired with a single number.
- Cardinal words represent another form of counting.
- Determine which group has a greater number (or smaller) of objects. Identify which number name is larger (or smaller, or equal to).
- Represent addition and subtraction in kinesthetic, aural, and visual ways.
- Analyze math problems utilizing pictures or objects.
- Demonstrate composing and decomposing numbers from 11 to 19 into a ten plus additional ones.
- Sort objects by specific attributes.
- Describe shapes in everyday environment. State relative positions (listed in KG1).
- Identify shapes as flat or three dimensional.
- Many objects in the world are made of basic geometric shapes and can be compared.

KINDERGARTEN CURRICULUM

Structure

Essential Questions

- How do you count objects?
- What is the next number?
- What object is first (second, third, etc.)?
- How many objects are in the arrangement?
- Which group is larger? Which number is smaller?
- What is addition? What is subtraction? How do you add? How do you subtract?
- How can pictures help solve math problems?

- How many ones are in a group of ten? How do you separate 17 into a ten plus additional ones?
- What are different attributes you can use to sort objects?
- What are the names of shapes? What do the shapes look like? Which shapes are flat shapes? Which shapes are solid?
- How can two shapes be different? What shapes can make another shape?

<p>MATERIALS and RESOURCES: YouTube https://www.quia.com/ Teacher Pay Teachers materials</p> <ul style="list-style-type: none"> ● Presentation Tools: SeeSaw ● Online Speaking/Recording Tools: SeeSaw ● Video Tools: QR Codes: QR Code Generator Game-based ● Response Tools: Kahoot!, Socrative, ● Word clouds: Tagxedo, Wordle ● Interpersonal Communicative Tools: Skype, Google Hangouts, Twitter, ● Learning Management Systems such as Edmodo, Schoology, Canvas, Blackboard, etc. E-Portfolios: Google Drive, Pinterest, LiveBinder ● Authentic listening and reading sources that provides data and support for speaking and writing prompts. ● Real world applications 	<p>INSTRUCTIONAL STRATEGIES</p> <ul style="list-style-type: none"> ● Reinforcing effort ● Provide recognition ● Cooperative learning ● Cues, Questions, Organizers ● Summarizing (or note taking) ● Generating & testing hypotheses ● Student practice ● Individualized instruction ● Effective feedback ● Presenting learning goals/ objectives ● Self-directed learning ● Blended learning ● Authentic learning ● Adapting to learning styles ● Conferencing ● Activate prior knowledge ● Investigations ● Flexible classrooms ● Flipped classroom ● Graphic organizers ● Guest speakers ● Identifying similarities and differences ● Learning centers ● Modeling ● Music/ songs ● Peer teaching ● project -based learning ● Reading aloud ● Debate ● Word walls ● Student choice ● Think- Pair- Share 	<p>DIFFERENTIATION GIFTED AND TALENTED</p> <ul style="list-style-type: none"> ● Thematic topics for discussion and research: families & communities, science and technology, beauty and aesthetics, contemporary life, global challenges, personal and public identities. ● Use of technological device to gain access to online resources in order to research and explore current events and cultural practices. Use advanced supplementary / reading materials ● Use of authentic resources to promote a deeper understanding of culture. ● Provide opportunities for open-ended, self-directed activities ● Communication outside the language classroom for travel, study, work, and/or interviews with community members. ● Encourage the use of creativity / ● Provide opportunities to develop depth and breadth of knowledge in the subject area (examples: create drawings/illustrations, use of music, create poems/songs, write opinion letters, create videos/stories/comic strips, etc.) Conduct research and provide presentation of cultural topics. ● Design surveys to generate and analyze data to be used in discussion. <p>STUDENTS AT RISK OF FAILURE</p> <ul style="list-style-type: none"> ● Ask students to restate information, directions, and assignments. ● Repetition and practice ● Model skills / techniques to be mastered. ● Extended time to complete class work ● Provide copy of class notes ● Preferential seating to be mutually determined by the student and teacher ● Student may request to use a computer to complete
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	<ul style="list-style-type: none"> • Rubrics • Varied texts • Literature circles • Reading buddies • 	<ul style="list-style-type: none"> • assignments. • Establish expectations for correct spelling on assignments. • Extra textbooks for home. • Student may request books on tape / CD / digital media, as available and appropriate. • Assign a peer helper in the class setting • Provide oral reminders and check student work during independent work time • Assist student with long and short term planning of assignments • Encourage student to proofread assignments and tests • Provide regular parent/ school communication • Teachers will check/sign student agenda daily
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KINDERGARTEN CURRICULUM

Content Area: Mathematics	Grade Level: K	Domain: Counting and Cardinality
21st Century Theme: Student’s mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.		
Standard: Know number names and the count sequence		
Clusters		
K.CC.A.1 Count to one hundred by ones and by tens.	K.CC.A.2 Count forward beginning from a given number within the known sequence (instead of having to begin at one).	K.CC.A.3 Write numbers from zero to twenty. Represent a number of objects with a written numeral from 0 to 20 (with zero representing a count of no objects).
Cluster Assessment		

Count to one hundred by ones.	Count by ones to 40 starting with the number 22.	Write the numbers zero to twenty.
Count to one hundred by tens	Count by tens to 100 starting with the number 30.	
Standards for Mathematical Practice: MP2 - Reason quantitatively; MP6 - Attend to precision; MP7 - Look for and make use of structure.		
Assessment - Students will be assessed on a regular basis using summative and formative assessments to help guide instruction.		

KINDERGARTEN CURRICULUM

Content Area: Mathematics	Grade Level: K	Domain: Counting and Cardinality
21st Century Theme: Student's mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.		
Standard: Count to tell the number of objects.		
Clusters		

<p>K.CC.B.4a Understand the relationship between numbers and quantities; connect counting to cardinality. a. When counting objects, say the number names in order and pair each object with one number name and each number name with one and only one object.</p>	<p>K.CC.B.4b Understand the relationship between numbers and quantities; connect counting to cardinality. b. Understand that the last number name said tells the number of objects counted. The number of objects is the same regardless of their arrangement or the order in which they were counted.</p>	<p>K.CC.B.4c Understand the relationship between numbers and quantities; connect counting to cardinality. c. Understand that each successive number name refers to a quantity that is one larger.</p>	<p>K.CC.B.5 Count to answer “how many” for as many as 20 things arranged in a line, a rectangular array, a circle, or as many as 10 objects in a scattered configuration. Given a number from 1 – 20, count out that many objects.</p>
Teacher Generated Questions			
<p>Count the people in line starting with the word “first”. Count each object in the picture.</p>	<p>How many objects have you already counted?</p>	<p>You have 5 objects on your desk. If you add one, how many will you have?</p>	<p>Look at the objects in the picture. Count the objects. How many are in the picture?</p>
<p>Standards for Mathematical Practice: MP2 - Reason quantitatively; MP6 - Attend to precision; MP7 - Look for and make use of structure.</p>			
<p>Assessment - Students will be assessed on a regular basis using summative and formative assessments to help guide instruction.</p>			

KINDERGARTEN CURRICULUM

Content Area: Mathematics	Grade Level: K	Domain: Counting and Cardinality
<p>21st Century Theme: Student’s mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.</p>		
<p>Standard: Compare numbers</p>		

Clusters	
K.CC.C.6 Identify whether the number of objects in one group is greater than, less than, or equal to the number of objects in another groups, e.g., by using matching and counting strategies.	K.CC.C.7 Compare two numbers between 1 and 10 presented as written numerals.
Teacher Generated Questions	
Count the objects in both piles. Which group has more (or less)?	Given three and seven, which number is greater than (or less than)?
Standards for Mathematical Practice: MP2 - Reason quantitatively; MP6 - Attend to precision; MP7 - Look for and make use of structure.	
Assessment - Students will be assessed on a regular basis using summative and formative assessments to help guide instruction.	

KINDERGARTEN CURRICULUM

Content Area: Mathematics	Grade Level: K	Domain: Operations and Algebraic Thinking
21st Century Theme: Student's mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.		
Standard: Understand addition as putting together and adding to, and understand subtraction as taking apart and taking from.		

Clusters				
K.OA.A.1 Represent addition and subtraction with objects, fingers, mental images, drawings, sounds (e.g. claps), and acting out situations, verbal explanations, expressions, or equations.	K.OA.A.2 Solve addition and subtraction word problems, and add and subtract within 10 (by counting objects or drawing) to represent the problem.	K.OA.A.3 Decompose numbers less than or equal to 10 into pairs in more than one way (by using objects or drawings) and record each decomposition by a drawing or equation ($5 = 2 + 3$ and $5 = 4 + 1$).	K.OA.A.4 For any number from 1 to 9, find the number that makes 10 when added to the given number, (by using objects or drawings), and record the answer with a drawing or equation.	K.OA.A.5 Proficiently add and subtract within 5.
Teacher Generated Questions				
Show me $3 + 2$. (utilize K.OA.1 processes)	If you have nine apples and I take one apple, how many apples will you have?	Show me three ways to make the number 8.	How many do I add to 6 to make ten?	Subtract 3 from 4. (Students are expected to answer within three seconds.)
Standards for Mathematical Practice: MP2 - Reason abstractly and quantitatively. MP5 - Use appropriate tools strategically. MP8 - Look for and express regularity in repeated reasoning.				
Assessment - Students will be assessed on a regular basis using summative and formative assessments to help guide instruction.				

KINDERGARTEN CURRICULUM

Content Area: Mathematics	Grade Level: K	Domain: Number and Operations in Base Ten
21st Century Theme: Student's mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.		

Standard: Work with numbers 11-19 to gain foundations for place value.
Clusters
<p>K.NBT.A.1 Compose and decompose numbers from 11 to 19 into ten ones plus some further ones. Show each composition and decomposition with objects, drawings, or equations.</p>
Teacher Generated Questions
<p>Show me a group of ten ones plus more ones to make 14. (Use objects, drawings, or equations.)</p> <p>Show your partner a group of tens and additional ones to make 16. Your partner should agree or critique.</p>
<p>Standards for Mathematical Practice: MP1 - Make sense of problems and persevere in solving them. MP2 - Reason abstractly and quantitatively. MP3 - Construct viable arguments and critique the reasoning of others. MP4 - Model with mathematics. MP7 - Look for and make use of structure. MP8 - Look for and express regularity in repeated reasoning.</p>
<p>Assessment - Students will be assessed on a regular basis using summative and formative assessments to help guide instruction.</p>

KINDERGARTEN CURRICULUM

Content Area: Mathematics	Grade Level: K	Domain: Measurement and Data
21st Century Theme: Student’s mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.		
Standard: Describe and compare measureable attributes.		
Clusters		
K.MD.A.1 Describe measureable attributes of objects, such as length or weight. Describe several measureable attributes of a single object.	K.MD.A.2 Directly compare two objects with a measureable attribute in common to see which object has “more of” / “less of” the attribute and describe the difference.	
Teacher Generated Questions		
Find an object in the room. Describe the object using words such as long or heavy.	Compare the heights of two students. Explain which child is shorter (or taller). Find two objects in the room that you can pick up. Which object is heavier (or lighter)?	
Standards for Mathematical Practice: MP1 - Make sense of problems and persevere in solving them. MP4 - Model with mathematics. MP5 Use appropriate tools strategically. MP6 - Attend to precision.		
Assessment - Students will be assessed on a regular basis using summative and formative assessments to help guide instruction.		

KINDERGARTEN CURRICULUM

Content Area: Mathematics	Grade Level: K	Domain: Measurement and Data
21st Century Theme: Student’s mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent		

engagement in future personal, work and civic life.
Standard: Classify objects and count the number of objects in each category.
Clusters
K.MD.B.3 Classify objects into different categories; count the numbers of objects in each category and sort the categories by count.
Teacher Generated Questions
Group the beans according to color and write the number in each group.
Standards for Mathematical Practice: MP4 - Model with mathematics. MP6 - Attend to precision. MP7 - Look for and make use of structure.
Assessment - Students will be assessed on a regular basis using summative and formative assessments to help guide instruction.

KINDERGARTEN CURRICULUM

Content Area: Mathematics	Grade Level: K	Domain: Geometry
21st Century Theme: Student’s mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.		
Standard: Identify and describe shapes (squares, circles, triangles, rectangles, hexagons, cubes, cones, cylinders, and spheres.)		
Clusters		
K.G.A.1 Describe objects in the environment using names of shapes and describe the relative positions of these objects (above, below, beside, in front of, behind, and next to).	K.G.A.2 Correctly name shapes regardless of their orientations or overall size.	K.G.A.3 Identify shapes as two-dimensional (lying in a plane “flat” or three-dimensional “solid”).
Teacher Generated Questions		
Stand “in front of” your chair. Find another rectangle in the room (use all shape names).	Draw a triangle. Now, draw the triangle upside down.	Find a flat shape in the room. Find a solid shape in the room.
Standards for Mathematical Practice: MP1 - Make sense of problems and persevere in solving them. MP4 - Model with mathematics. MP7 - Look for and make use of structure.		
Assessment - Students will be assessed on a regular basis using summative and formative assessments to help guide instruction.		

KINDERGARTEN CURRICULUM

Content Area: Mathematics	Grade Level: K	Domain: Geometry
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21st Century Theme: Student’s mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.

Standard: Analyze, compare, create, and compose shapes.

Clusters

K.G.B.4 Analyze and compare two- and three-dimensional shapes using informal language to describe the similarities and differences, parts (number of sides, vertices/corners) and other attributes (sides of equal length)	K.G.B.5 Model shapes in the world by building shapes from components (e.g. sticks and clay balls) and drawing shapes.	K.G.B.6 Compose simple shapes to form larger shapes. (e.g. Can you join these two triangles with full sides touching to make a rectangle?)
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Teacher Generated Questions

Find two shapes in the room. How are the shapes similar? How are the shapes different?	Create a hexagon with popsicle sticks. Create a cube with toothpicks and marshmallows (other materials can be substituted).	Use two books to make a rectangle.
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Standards for Mathematical Practice: MP1 - Make sense of problems and persevere in solving them. MP4 - Model with mathematics. MP7 - Look for and make use of structure.

Assessment - Students will be assessed on a regular basis using summative and formative assessments to help guide instruction.

Mathematics Curriculum

Grade One

GRADE ONE CURRICULUM

Structure

Big Ideas

- Model and solve problems involving addition and subtraction

- Understand the relationship between addition and subtraction
- Add and subtract fluently using numerals 0 to 10
- Add and subtract using numerals 0 to 20
- Use strategies to add to 100
- Subtract multiples of 10 from numbers 10 to 100
- Compare whole numbers to at least 100
- Explain addition and subtraction equations
- Extend the counting sequence to 120
- Understand place value for ones, tens, and hundreds
- Measure lengths indirectly
- Tell and write time
- Represent and interpret data
- Reason with shapes and their attributes
- Use mental math to add or subtract using numerals 0 to 10

Enduring Understanding

Students will understand that...

- Real life problems can be solved with addition and subtraction.
- Objects can model addition and subtraction.
- Fact families assist in computation.
- Fluency in addition and subtraction is vital.
- A symbol or variable can take the place of an unknown number.
- Hundreds, tens, and ones hold place value in a two and three digit number.
- Numbers can be compared ($<$ $>$ $=$).
- Lengths can be measured and compared.
- Clocks tell hours and half hours in analog and digital formats.
- Organizing data into a chart enables comparison of the information.
- Figures can be closed or open.
- Figures can be partitioned to make other shapes.
- Figures can be composed from other figures.

Essential Questions

- How do you add in base ten?
- What strategies do you use to add three whole numbers?
- What are the first three place values?
- What is the relationship between addition and subtraction (fact family)?
- Why are addition and subtraction related?
- Why can a symbol or letter represent an unknown number?
- What number occurs after 99?
- Do you add 10 to the ones or tens place?
- How can you measure objects?
- How do you decide which object is shorter (or longer)?
- What is the difference between the two types of clocks?
- Where is the minute hand for an hour? For a half hour?
- How does a chart show information?
- How do you read a graph?
- Can you name a closed shape?
- What does a half, quarter, and fourth of an object describe?

<p>MATERIALS and RESOURCES: YouTube https://www.quia.com/ Teacher Pay Teachers materials</p> <ul style="list-style-type: none"> ● Presentation/Digital Storytelling Tools: Google Slides, Prezi, Go Animate, Storybird, ToonDoo, ZooBurst, ● Online Speaking/Recording Tools: Voicethread, clear.msu, Audacity, Vocaroo, Aviary, Voki, Chatterpix Backchanneling: TodaysMeet, Polleverywhere, Padlet ● Video Tools: YouTube, TubeChop, educanon, blubbr.tv, edpuzzle, QR Codes: QR Code Generator Game-based ● Response Tools: Kahoot!, Socrative, Word clouds: Tagxedo, Wordle Interpersonal ● Communicative Tools: Skype, Google Hangouts, Twitter, Learning Management 	<p>INSTRUCTIONAL STRATEGIES</p> <ul style="list-style-type: none"> ● Reinforcing effort ● Provide recognition ● Cooperative learning ● Cues, Questions, Organizers ● Summarizing (or note taking) ● Generating & testing hypotheses ● Student practice ● Individualized instruction ● Effective feedback ● Presenting learning goals/ objectives ● Self-directed learning ● Blended learning ● Authentic learning ● Adapting to learning styles ● Conferencing ● Activate prior knowledge ● Investigations ● Flexible classrooms 	<p>DIFFERENTIATION GIFTED AND TALENTED</p> <ul style="list-style-type: none"> ● Thematic topics for discussion and research: families & communities, science and technology, beauty and aesthetics, contemporary life, global challenges, personal and public identities. ● Use of technological device to gain access to online resources in order to research and explore current events and cultural practices. Use advanced supplementary / reading materials ● Use of authentic resources to promote a deeper understanding of culture. ● Provide opportunities for open-ended, self-directed activities ● Communication outside the language classroom for travel, study, work, and/or interviews with community members.
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<p>Systems such as Edmodo, Schoology, Canvas, Blackboard, etc. E-Portfolios: Google Drive, Pinterest, LiveBinder</p> <ul style="list-style-type: none"> • Authentic listening and reading sources that provides data and support for speaking and writing prompts. • Exploration of art and/or artists to understand society and history. 	<ul style="list-style-type: none"> • Flipped classroom • Graphic organizers • Guest speakers • Identifying similarities and differences • Learning centers • Modeling • Music/ songs • Peer teaching • project -based learning • Reading aloud • Debate • Word walls • Student choice • Think- Pair- Share • Rubrics • Varied texts • Literature circles • Reading buddies • 	<ul style="list-style-type: none"> • Encourage the use of creativity / • Provide opportunities to develop depth and breadth of knowledge in the subject area (examples: create drawings/illustrations, use of music, create poems/songs, write opinion letters, create videos/stories/comic strips, etc.) Conduct research and provide presentation of cultural topics. • Design surveys to generate and analyze data to be used in discussion. <p>STUDENTS AT RISK OF FAILURE</p> <ul style="list-style-type: none"> • Ask students to restate information, directions, and assignments. • Repetition and practice • Model skills / techniques to be mastered. • Extended time to complete class work • Provide copy of class notes • Preferential seating to be mutually determined by the student and teacher • Student may request to use a computer to complete assignments. • Establish expectations for correct spelling on assignments. • Extra textbooks for home. • Student may request books on tape / CD / digital media, as available and appropriate. • Assign a peer helper in the class setting • Provide oral reminders and check student work during independent work time • Assist student with long and short term planning of assignments • Encourage student to proofread assignments and tests • Provide regular parent/ school communication • Teachers will check/sign student agenda daily
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GRADE ONE CURRICULUM

Content Area: Mathematics	Grade Level: 1	Domain: Operations and Algebraic Thinking
21st Century Theme: Student’s mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.		
Standard: Represent and solve problems involving addition and subtraction		
Clusters		
1.OA.A.1 Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart, and comparing with unknowns in all positions (using objects, drawings, equations with symbol for the unknown).	1.OA.A.2 Solve word problems that call for addition of three whole numbers whose sum is less than or equal to 20 (using objects, drawings, equations with symbol for the unknown).	
Teacher Generated Questions		
Jane had 19 apples. She gave some to Sally. Jane has 8 left. How many did she give Sally? (Show with cubes. Show with a drawing. Write an equation, e.g. $19 - a = 8$.)	Jim has 8 pens. Jay has 6 pens. Jake has 9 pens. How many pens do the boys have in all? Show with cubes. Show with a drawing. Write an equation, e.g. $8+6+9 = p$	

Standards for Mathematical Practice: MP1 - Make sense of problems and persevere in solving them. MP2 - Reason abstractly and quantitatively. MP5 - Use appropriate tools strategically. MP8 - Look for and express regularity in repeated reasoning.

Assessment - Students will be assessed on a regular basis using summative and formative assessments to help guide instruction.

GRADE ONE CURRICULUM

Content Area: Mathematics	Grade Level: 1	Domain: Operations and Algebraic Thinking
21st Century Theme: Student’s mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.		
Standard: Understand and apply properties of operations and the relationship between addition and subtraction.		
Clusters		
1.OA.B.3 Apply properties of operations as strategies to add and subtract.	1.OA.B.4 Understand subtraction as an unknown-addend problem.	
Teacher Generated Questions		
If $8 + 5$ is 13. What is $5 + 8$? To add $6 + 7 + 4$ what do I add first? ($6+4$ to make ten - Commutative Property)	If I can subtract 8 from 11, what do I add to 8 to equal 11?	

Standards for Mathematical Practice: MP1 - Make sense of problems and persevere in solving them. MP2 - Reason abstractly and quantitatively. MP5 - Use appropriate tools strategically. MP8 - Look for and express regularity in repeated reasoning.

Assessment - Students will be assessed on a regular basis using summative and formative assessments to help guide instruction.

GRADE ONE CURRICULUM

Content Area: Mathematics	Grade Level: 1	Domain: Operations and Algebraic Thinking
21st Century Theme: Student's mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.		
Standard: Add and subtract within 20		
Clusters		
1.OA.C.5 Relate counting to addition and subtraction.	1.OA.C.6 Add and subtract within 20, demonstrating fluency for addition and subtraction within 10. Use strategies such as counting on, making ten, decomposing a number, using the relationship between addition and subtraction.	
Teacher Generated Questions		

Count on from 2 to add three to 2 ($2 + 3$).	Write a fact family for $12 + 3 = 15$. $8 + 6 = 8 + 2 + 4 = 10 + 4$ (decomposing).
Standards for Mathematical Practice: MP1 - Make sense of problems and persevere in solving them. MP2 - Reason abstractly and quantitatively. MP3 - Construct viable arguments and critique the reasoning of others. MP4 - Model with Mathematics. MP6 - Attend to precision. MP8 - Look for and express regularity in repeated reasoning.	
Assessment - Students will be assessed on a regular basis using summative and formative assessments to help guide instruction.	

GRADE ONE CURRICULUM

Content Area: Mathematics	Grade Level: 1	Domain: Operations and Algebraic Thinking
21st Century Theme: Student's mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.		
Standard: Work with addition and subtraction equations.		
Clusters		
1.OA.D.7 Understand the meaning of the equal sign, and determine if equations involving addition and subtraction are true or false.	1.OA.D.8 Determine the unknown whole number in an addition or subtraction equation relating three whole numbers.	
Teacher Generated Questions		

True or false? 13 = 13 7 = 8-1 10-6 = 4	What number makes the equation true? 8 + ? = 11 12 - 2 = ?
Standards for Mathematical Practice: MP1 - Make sense of problems and persevere in solving them. MP2 - Reason abstractly and quantitatively. MP4 - Model with Mathematics. MP6 - Attend to precision. MP7 - Look for and make use of structure. MP8 - Look for and express regularity in repeated reasoning.	
Assessment - Students will be assessed on a regular basis using summative and formative assessments to help guide instruction.	

GRADE ONE CURRICULUM

Content Area: Mathematics	Grade Level:	Domain: Number and Operations in Base Ten		
21st Century Theme: Student’s mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.				
Standard: Extend the counting sequence.				
Clusters				
1.NBT.A.1 Count to 120, starting at any number less than 120, in this range, read and write numerals and represent a number of objects with written numerals.	1.NBT.B.2a Understand that the two digits of a two-digit number represent amounts of tens and ones a. where 10 can be thought of as a bundle of ten ones (called a “ten”).	1.NBT.B.2b Understand that the two digits of a two-digit number represent amounts of tens and ones b. where the numbers 11 to 19 are composed of a ten bundle and one to nine additional ones.	1.NBT.B.2c Understand that the two digits of a two-digit number represent amounts of tens and ones c. where the tens numbers 10 to 90 refer to 1 to 9 tens (with zero ones).	1.NBT.B.3 Compare two two-digit numbers based on meanings of the tens and ones digits, recording the results of comparisons with the symbols < > =.

Teacher Generated Questions

Count to 120 beginning with 98.	Write the number 23. Draw a line through the number to separate the tens and ones.	Show the numbers 17 with your cubes (group of ten plus 7 ones).	Draw the number 80 (student draws 8 piles of ten).	Which number is greater 45 or 74? Draw a compare sign between the two numbers.
Standards for Mathematical Practice: MP2 - Reason abstractly and quantitatively. MP3 - Construct viable arguments and critique the reasoning of others. MP4 - Model with Mathematics. MP5 - Use appropriate tools strategically. MP6 - Attend to precision.				
Assessment - Students will be assessed on a regular basis using summative and formative assessments to help guide instruction.				

GRADE ONE CURRICULUM

Content Area: Mathematics	Grade Level: 1	Domain: Numbers and Operations in Base Ten
21st Century Theme: Student’s mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.		
Standard: Use place value understanding and properties of operations to add and subtract.		
Clusters		
1.NBT.C.4 Add within 100, including adding a two-digit number and a one-digit number, and adding a two-digit number and a multiple of 10, using concrete models, drawings, base ten strategies, properties of operations, and/or the relationship between addition and subtraction.	1.NBT.C.5 Given a two-digit number find 10 more or 10 less than the number mentally, without having to count; explain the reasoning used.	1.NBT.C.6 Subtract multiples of 10 in the range 10 – 90 using concrete models, drawings, base ten strategies, properties of operations, and relationship between addition and subtraction. Apply the strategy, write the equation, explain the reasoning used.
Teacher Generated Questions		

Add 82 + 6. Add 70 + 10.	What is 80 plus 10? Explain how you added.	Show 80 minus 20 (use the above methods). Then, write the equation.
Standards for Mathematical Practice: MP2 - Reason abstractly and quantitatively. MP3 - Construct viable arguments and critique the reasoning of others. MP4 - Model with Mathematics. MP6 - Attend to precision. MP7 - Look for and make use of structure. MP8 - Look for and express regularity in repeated reasoning.		
Assessment - Students will be assessed on a regular basis using summative and formative assessments to help guide instruction.		

GRADE ONE CURRICULUM

Content Area: Mathematics	Grade Level: 1	Domain: Measurement and Data
21st Century Theme: Student's mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.		
Standard: Measure lengths indirectly and by iterating length units.		
Clusters		

1.MD.A.1 Order three objects by length; compare the lengths of two objects indirectly by using a third object.	1.MD.A.2 Express the length of an object as a whole number of length units, by laying multiple copies of a shorter object end to end. Understand that the length measurement of an object is the number of same-size length units that span it with no gaps or overlaps.
Teacher Generated Questions	
Order three pencils by size, shortest to longest. Measure your knee to your ankle with string; compare the length to another student's leg length.	Measure the leg of your desk with blocks. Discuss with a partner why your blocks must be the same size.
Standards for Mathematical Practice: MP1 - Make sense of problems and persevere in solving them. MP2 - Reason abstractly and quantitatively. MP3 - Construct viable arguments and critique the reasoning of others. MP5 - Use appropriate tools strategically. MP6 - Attend to precision.	
Assessment - Students will be assessed on a regular basis using summative and formative assessments to help guide instruction.	

GRADE ONE CURRICULUM

Content Area: Mathematics	Grade Level:	Domain: Measurement and Data
21st Century Theme: Student's mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts support competent engagement in future personal, work and civic life.		
Standard: Tell and write time.		
Clusters		

1.MD.B.3

Tell and write time in hours and half-hours using analog and digital clocks.

Teacher Generated Questions

What time does the clock show?
Write the time 3:45.

Standards for Mathematical Practice: MP1 - Make sense of problems and persevere in solving them. MP2 - Reason abstractly and quantitatively. MP5 - Use appropriate tools strategically. MP6 - Attend to precision.

Assessment - Students will be assessed on a regular basis using summative and formative assessments to help guide instruction.

GRADE ONE CURRICULUM

Content Area: Mathematics	Grade Level:	Domain: Measurement and Data
21st Century Theme: Student's mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.		

Standard: Represent and interpret data
Clusters
<p>1.MD.C.4 Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another.</p>
Teacher Generated Questions
Make a chart by coloring the blocks. Look at the chart. How many students have cats? Tell me what type of pet more students have.
Standards for Mathematical Practice: MP2 - Reason abstractly and quantitatively. MP4 - Model with Mathematics. MP5 - Use appropriate tools strategically
Assessment - Students will be assessed on a regular basis using summative and formative assessments to help guide instruction.

GRADE ONE CURRICULUM

Content Area: Mathematics	Grade Level:	Domain: Geometry
21st Century Theme: Student’s mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.		

Standard: Reason with shapes and their attributes		
Clusters		
1.G.A.1 Distinguish between defining attributes versus non-defining attributes; build and draw shapes that possess defining attributes. (closed/open, overall size, corners, sides)	1.G.A.2 Compose two and three-dimensional shapes to create a composite shape, and compose new shapes from the composite shape. (rectangles, squares, trapezoids, triangles, half circles, quarter circles, cubes, right rectangular prism, right circular cones, right circular cylinders)	1.G.A.3 Partition circles and rectangles into two and four equal shares, describe the shares using the words <i>halves, fourths, and quarters</i> . Use the phrases <i>half of, fourth of, and quarter of</i> . Describe the whole as two of or four of the shares. Understand that decomposing into more equal shares creates smaller shares.
Teacher Generated Questions		
Tell your partner how many corners are on the pattern block.	Pick two pattern blocks out of the bag. Work with a partner to create another shape that you can identify.	Cut your circle into four equal parts. Pick up 2 pieces. How much of the circle is left?
Standards for Mathematical Practice: MP1 - Make sense of problems and persevere in solving them. MP2 - Reason abstractly and quantitatively. MP3 - Construct viable arguments and critique the reasoning of others. MP7 - Look for and make use of structure. MP8 - Look for and express regularity in repeated reasoning.		
Assessment - Students will be assessed on a regular basis using summative and formative assessments to help guide instruction.		

MATERIALS and RESOURCES: YouTube https://www.quia.com/ Teacher Pay Teachers materials <ul style="list-style-type: none"> • Presentation/Digital Storytelling Tools: Google Slides, Prezi, Go Animate, Storybird, ToonDoo, ZooBurst, • Online Speaking/Recording Tools: Voicethread, clear.msu, Audacity, Vocaroo, Aviary, Voki, Chatterpix Backchanneling: 	INSTRUCTIONAL STRATEGIES <ul style="list-style-type: none"> • Reinforcing effort • Provide recognition • Cooperative learning • Cues, Questions, Organizers • Summarizing (or note taking) • Generating & testing hypotheses • Student practice • Individualized instruction • Effective feedback • Presenting learning goals/ objectives 	DIFFERENTIATION GIFTED AND TALENTED <ul style="list-style-type: none"> • Thematic topics for discussion and research: families & communities, science and technology, beauty and aesthetics, contemporary life, global challenges, personal and public identities. • Use of technological device to gain access to online resources in order to research and explore current events and cultural practices. Use advanced supplementary /
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<p>Today'sMeet, Polleverywhere, Padlet</p> <ul style="list-style-type: none"> • Video Tools: YouTube, TubeChop, educanon, blubbr.tv, edpuzzle, QR Codes: QR Code Generator Game-based • Response Tools: Kahoot!, Socrative, Word clouds: Tagxedo, Wordle Interpersonal • Communicative Tools: Skype, Google Hangouts, Twitter, Learning Management Systems such as Edmodo, Schoology, Canvas, Blackboard, etc. E-Portfolios: Google Drive, Pinterest, LiveBinder • Authentic listening and reading sources that provides data and support for speaking and writing prompts. • Exploration of art and/or artists to understand society and history. 	<ul style="list-style-type: none"> • Self-directed learning • Blended learning • Authentic learning • Adapting to learning styles • Conferencing • Activate prior knowledge • Investigations • Flexible classrooms • Flipped classroom • Graphic organizers • Guest speakers • Identifying similarities and differences • Learning centers • Modeling • Music/ songs • Peer teaching • project -based learning • Reading aloud • Debate • Word walls • Student choice • Think- Pair- Share • Rubrics • Varied texts • Literature circles • Reading buddies • 	<p>reading materials</p> <ul style="list-style-type: none"> • Use of authentic resources to promote a deeper understanding of culture. • Provide opportunities for open-ended, self-directed activities • Communication outside the language classroom for travel, study, work, and/or interviews with community members. • Encourage the use of creativity / • Provide opportunities to develop depth and breadth of knowledge in the subject area (examples: create drawings/illustrations, use of music, create poems/songs, write opinion letters, create videos/stories/comic strips, etc.) Conduct research and provide presentation of cultural topics. • Design surveys to generate and analyze data to be used in discussion. <p>STUDENTS AT RISK OF FAILURE</p> <ul style="list-style-type: none"> • Ask students to restate information, directions, and assignments. • Repetition and practice • Model skills / techniques to be mastered. • Extended time to complete class work • Provide copy of class notes • Preferential seating to be mutually determined by the student and teacher • Student may request to use a computer to complete assignments. • Establish expectations for correct spelling on assignments. • Extra textbooks for home. • Student may request books on tape / CD / digital media, as available and appropriate. • Assign a peer helper in the class setting • Provide oral reminders and check student work during independent work time
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		<ul style="list-style-type: none">• Assist student with long and short term planning of assignments• Encourage student to proofread assignments and tests• Provide regular parent/ school communication• Teachers will check/sign student agenda daily
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Mathematics Curriculum

Grade Two

GRADE TWO CURRICULUM

Structure

Big Ideas

- Add and subtract fluently using numerals 0 to 100
- Solve one and two step word problems
- Identify odd and even numbers (up to 20)
- Understand that numbers in base ten have ones, tens, hundreds, and thousands
- Add and subtract using numerals 0 to 1000 using strategies
- Count within 1000 by 5s, 10s, and 100s
- Compare numbers of two and three digits
- Fluently add and subtract within 100 using strategies
- Mentally add and subtract using 10 and 100
- Measure and estimate lengths with standard units (standard and metric)
- Use a number line to understand length
- Read and write time
- Read and write money
- Draw and read bar graphs
- Recognize shapes and their attributes
- Create rectangular arrays to show multiplication

Enduring Understanding

Students will understand that...

- Fluency in mathematics is necessary.
- Creating equal groups models multiplication.
- Three digit numbers represent ones, tens and hundreds.
- 1000 occurs after 999.
- Comparing three digit numbers starts with the hundreds place.
- Fact families within 100 assist in subtracting.
- Mental addition and subtraction is useful.
- Objects can be measured with standard measurement units.
- A number line can demonstrate length.
- Hour and minute hands assist in telling time.
- Money symbols must be used appropriately.
- A bar graph shows data.
- Shapes can be open or closed.
- Shapes can make other shapes.
- Shapes can be divided into halves, fourths (or quarters).

Essential Questions

- How do you solve a two step problem?
- How do two single digits create a double digit?
- How do you write rows and columns as an equation?
- What does skip counting mean?
- How do you add two two-digit numbers?
- Where do you add 100 in a three digit number?
- How does measuring with different size units affect the answer?
- How can you estimate length without a ruler?
- What do the two hands on a clock tell?
- What are two symbols used with money?
- How do you add information on a graph?

- What are the parts of closed shapes?
- Can shapes be divided equally into halves or quarters?

GRADE TWO CURRICULUM

Content Area: Mathematics	Grade Level: 2	Domain: Operations and Algebraic Thinking
21st Century Theme: Student’s mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.		
Standard: Represent and solve problems involving addition and subtraction.		
Clusters		
2.OA.A.1 Use addition and subtraction within 100 to solve one and two-step word problems involving situations of adding to, taking from, putting together, taking apart, and comparing with unknowns in all positions. +	2.OA.A.1 Use drawings and equations with a symbol to represent the problem.	
Teacher Generated Questions		

Write an equation using a symbol (preferably a letter) for the unknown.	Draw pictures to show the problem $23 + 41$.
Standards for Mathematical Practice: MP1 - Make sense of problems and persevere in solving them. MP2 - Reason abstractly and quantitatively. MP4 - Model with Mathematics. MP5 - Use appropriate tools strategically. MP6 - Attend to precision.	
Assessment - Students will be assessed on a regular basis using summative and formative assessments to help guide instruction.	

GRADE TWO CURRICULUM

Content Area: Mathematics	Grade Level: 2	Domain: Operations and Algebraic Thinking
21st Century Theme: Student's mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.		
Standard: Add and subtract within 20		
Clusters		

2.OA.B.2

Fluently add and subtract using numerals 0 to 20 using mental strategies.

Teacher Generated Questions

Add 34 and 41.

Subtract 13 from 90. Answer within 5 seconds.

Standards for Mathematical Practice: MP2 - Reason abstractly and quantitatively. MP3 - Construct viable arguments and critique the reasoning of others. MP6 - Attend to precision. MP7 - Look for and make use of structure. MP8 - Look for and express regularity in repeated reasoning.

Assessment - Students will be assessed on a regular basis using summative and formative assessments to help guide instruction.

GRADE TWO CURRICULUM

Content Area: Mathematics	Grade Level: 2	Domain: Operations and Algebraic Thinking
21st Century Theme: Student's mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.		
Standard: Work with equal groups of objects to gain foundations for multiplication.		
Clusters		

<p>2.OA.C.3 Determine whether a group of objects (up to 20) has an odd or even number of members (by pairing objects or counting by 2s); write an equation to express an even number as a sum of two equal addends.</p>	<p>2.OA.C.4 Use addition to find the total number of objects arranged in rectangular arrays with up to 5 rows and up to 5 columns; write an equation to express the total as a sum of equal addends.</p>
<p>Teacher Generated Questions</p>	
<p>Place 13 blocks on your desk. Is there an odd or even number of blocks? Pair them off to decide.</p>	<p>Line up 4 rows with 3 blocks in each. How many columns are there? Write an equation to show the addition of the blocks.</p>
<p>Standards for Mathematical Practice: MP1 - Make sense of problems and persevere in solving them. MP2 - Reason abstractly and quantitatively. MP4 - Model with Mathematics. MP6 - Attend to precision. MP7 - Look for and make use of structure. MP8 - Look for and express regularity in repeated reasoning.</p>	
<p>Assessment - Students will be assessed on a regular basis using summative and formative assessments to help guide instruction.</p>	

GRADE TWO CURRICULUM

Content Area: Mathematics	Grade Level: 2	Domain: Number and Operations in Base Ten
<p>21st Century Theme: Student’s mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.</p>		
<p>Standard: Understand place value.</p>		
<p>Clusters</p>		

2.NBT.A.1a Understand that the three digits of a three-digit number represent amounts of hundreds, tens, and ones a. where 100 can be thought of as ten tens – called a hundred.	2.NBT.A.1b Understand that the three digits of a three-digit number represent amounts of hundreds, tens, and ones b. where hundred numbers (100, 200,...900) refer to 1 to 9 hundreds with zero tens and ones.	2.NBT.A.2 Count within 1000; skip count by 5s, 10s, and 100s.	2.NBT.A.3 Read and write numbers to 1000 using base-ten numerals, number names, and expanded forms.	2.NBT.A.4 Compare two three-digit numbers based on meanings of the hundreds, tens, and ones digits using $<$ $>$ $=$ to record results of the comparison.
Teacher Generated Questions				
Separate the number 258 by adding hundreds, tens, and ones ($200 + 50 + 8$).	Show a pile of 200 with zero tens and zero ones.	Starting at 821, count to 1000. Count to 1000 by tens starting at 750..	Write the number 823 in numerals. Write the number 145 in words. Write an equation adding hundreds, tens, and ones for the number 319 ($300 + 10 + 9$).	Place the comparison symbol between the numbers 312 and 327.
Standards for Mathematical Practice: MP1 - Make sense of problems and persevere in solving them. MP2 - Reason abstractly and quantitatively. MP3 - Construct viable arguments and critique the reasoning of others. MP4 - Model with Mathematics. MP5 - Use appropriate tools strategically. MP6 - Attend to precision. MP7 - Look for and make use of structure. MP8 - Look for and express regularity in repeated reasoning.				
Assessment - Students will be assessed on a regular basis using summative and formative assessments to help guide instruction.				

GRADE TWO CURRICULUM

Content Area: Mathematics	Grade Level: 2	Domain: Number and Operations in Base Ten
21st Century Theme: Student's mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.		

Standard: Use place value understanding and properties of operations to add and subtract.				
Clusters				
<p>2.NBT.B.5 Fluently add and subtract using numbers up to 100 applying strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.</p>	<p>2.NBT.B.6 Add up to four two-digit numbers using strategies based on place value and properties of operations.</p>	<p>2.NBT.B.7 Add and subtract using numbers up to 1000, using concrete models, drawing, strategies based on place value, properties of operations, and the relationship between addition and subtraction. Understand that in adding or subtracting three-digit numbers, one subtracts within the appropriate place values or by decomposing a number.</p>	<p>2.NBT.B.8 Mentally add 10 or 100 to a given number from 100-900 and mentally subtract 10 from a given number between 100-900.</p>	<p>2.NBT.B.9 Explain why addition and subtraction strategies work, using place value and the properties of operations.</p>
Teacher Generated Questions				
<p>The picture shows islands connected by bridges. To cross a bridge, you must pay a toll in coins. If you start on the island marked in blue with 100 coins, how can you make it to the island marked in red?</p>	<p>Add $12 + 24 + 30 + 17$. Show addition of ones and tens.</p>	<p>Subtract 138 from 999. Show your work by drawing pictures.</p>	<p>$824 - 100 = ?$</p>	<p>Explain why adding $100 + 20 + 3 + 200 + 60 + 2 = 123 + 262$.</p>
<p>Standards for Mathematical Practice: MP1 - Make sense of problems and persevere in solving them. MP2 - Reason abstractly and quantitatively. MP3 - Construct viable arguments and critique the reasoning of others. MP4 - Model with Mathematics. MP6 - Attend to precision. MP7 - Look for and make use of structure. MP8 - Look for and express regularity in repeated reasoning.</p>				
<p>Assessment - Students will be assessed on a regular basis using summative and formative assessments to help guide instruction.</p>				

GRADE TWO CURRICULUM

Content Area: Mathematics		Grade Level: 2	Domain: Measurement and Data	
21st Century Theme: Student’s mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.				
Standard: Measure and estimate lengths in standard units.				
Clusters				
2.MD.A.1 Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes.	2.MD.A.2 Measure the length of an object twice, using units of different lengths for the two measurements; describe how the two measurements relate to the size of the unit chosen.	2.MD.A.3 Estimate lengths using units of inches, feet, centimeters, and meters.	2.MD.A.4 Measure to determine how much longer one object is than another. Express the length difference in terms of a standard length unit.	
Teacher Generated Questions				
What is the length of your desk top in inches?	What is the length of your desk top in inches and in centimeters? Explain why the number of centimeters is greater.	How many inches do you estimate your shoe to be? How many centimeters?	Choose an object in the room and measure it. Compare your object to your partner’s. Which object has a longer measurement?	
Standards for Mathematical Practice: MP1 - Make sense of problems and persevere in solving them. MP2 - Reason abstractly and quantitatively. MP3 - Construct viable arguments and critique the reasoning of others. MP5 - Use appropriate tools strategically. MP6 - Attend to precision.				
Assessment - Students will be assessed on a regular basis using summative and formative assessments to help guide instruction.				

GRADE TWO CURRICULUM

Content Area: Mathematics	Grade Level: 2	Domain: Measurement and Data
21st Century Theme: Student’s mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.		
Standard: Relate addition and subtraction to length.		
Clusters		
2.MD.B.5 Use addition and subtraction using numbers up to 100 to solve word problems involving lengths that are given in the same units. Use drawings (draw a ruler) and equations with a symbol for the unknown.	2.MD.B.6 Represent whole numbers as lengths from 0 on a number line diagram with equally spaced points corresponding to numbers. Represent sums and differences on the number line.	
Teacher Generated Questions		
If a rectangular yard is 13 feet long and the width is 2 less than the length, what is the measurement of the width? Write an equation for the problem.	What is $35 - 12$? Show your answer using a number line.	
Standards for Mathematical Practice: MP1 - Make sense of problems and persevere in solving them. MP2 - Reason abstractly and quantitatively. MP4 - Model with Mathematics. MP5 - Use appropriate tools strategically. MP6 - Attend to precision.		
Assessment - Students will be assessed on a regular basis using summative and formative assessments to help guide instruction.		

GRADE TWO CURRICULUM

Content Area: Mathematics	Grade Level: 2	Domain: Measurement and Data
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21st Century Theme: Student’s mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.	
Standard: Work with time and money	
Clusters	
2.MD.C.7 Tell and write time from analog and digital clocks to the nearest five minutes, using a.m. and p.m.	2.MD.C.8 Solve word problems involving dollar bills, quarters, dimes, nickels, and pennies. Use \$ and ¢ symbols appropriately.
Teacher Generated Questions	
What time does the clock tell? Write the time on your board.	If you have two dimes and four pennies, how much money do you have?
Standards for Mathematical Practice: MP1 - Make sense of problems and persevere in solving them. MP2 - Reason abstractly and quantitatively. MP4 - Model with Mathematics. MP5 - Use appropriate tools strategically. MP6 - Attend to precision.	
Assessment - Students will be assessed on a regular basis using summative and formative assessments to help guide instruction.	

GRADE TWO CURRICULUM

Content Area: Mathematics	Grade Level: 2	Domain: Measurement and Data
21st Century Theme: Student’s mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.		
Standard: Represent and interpret data.		
Clusters		
2.MD.D.9 Generate measurement data by measuring lengths of several objects to the nearest whole unit, or by making repeated measurements of the same object. Show the measurements by making a line plot, where the horizontal scale is marked off in whole number units.	2.MD.D.10 Draw a picture graph and a bar graph to represent a data set with up to four categories. Solve simple put-together, take –apart, and compare problems using information presented in the graph.	
Teacher Generated Questions		
Measure your crayon. What is the length? Record the length of your crayon and 5 other students’ crayons on a line plot.	Draw a bar graph and a picture graph to represent how many people live in 5 students’ houses. Who has the most people? Who has the least?	
Standards for Mathematical Practice: MP1 - Make sense of problems and persevere in solving them. MP2 - Reason abstractly and quantitatively. MP4 - Model with Mathematics. MP5 - Use appropriate tools strategically. MP6 - Attend to precision. MP7 - Look for and make use of structure.		
Assessment - Students will be assessed on a regular basis using summative and formative assessments to help guide instruction.		

GRADE TWO CURRICULUM

Content Area: Mathematics	Grade Level: 2	Domain: Geometry
21st Century Theme: Student’s mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.		
Standard: Reason with shapes and their attributes.		
Clusters		
2.G.A.1 Recognize and draw shapes having specified attributes, such as a given number of angles, sides, or faces. Identify triangles, quadrilaterals, pentagons, hexagons, and cubes.	2.G.A.2 Partition a rectangle into rows and columns of same size squares and count to find the total number of partitions.	2.G.A.3 Partition circles and rectangles into two, three, or four equal shares. Describe the shares using halves, thirds, fourths, etc. Describe the whole as two halves etc. Recognize the equal shares of identical wholes need not have the same shape.
Teacher Generated Questions		
What shape has 5 angles? Draw the shape.	Use your ruler to mark squares on your rectangle. What is the total area of the rectangle?	Cut a rectangle in half. Now cut the rectangle into fourths. One half equals how many fourths?
Standards for Mathematical Practice: MP1 - Make sense of problems and persevere in solving them. MP4 - Model with Mathematics. MP5 - Use appropriate tools strategically.		
Assessment - Students will be assessed on a regular basis using summative and formative assessments to help guide instruction.		

<p>MATERIALS and RESOURCES: YouTube https://www.quia.com/ Teacher Pay Teachers materials</p> <ul style="list-style-type: none"> ● Presentation/Digital Storytelling Tools: Google Slides, Prezi, Go Animate, Storybird, ToonDoo, ZooBurst, ● Online Speaking/Recording Tools: 	<p>INSTRUCTIONAL STRATEGIES</p> <ul style="list-style-type: none"> ● Reinforcing effort ● Provide recognition ● Cooperative learning ● Cues, Questions, Organizers ● Summarizing (or note taking) ● Generating & testing hypotheses ● Student practice ● Individualized instruction 	<p>DIFFERENTIATION GIFTED AND TALENTED</p> <ul style="list-style-type: none"> ● Thematic topics for discussion and research: families & communities, science and technology, beauty and aesthetics, contemporary life, global challenges, personal and public identities. ● Use of technological device to gain access to online resources in order to research and
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<p>Voicethread, clear.msu, Audacity, Vocaroo, Aviary, Voki, Chatterpix Backchanneling: TodaysMeet, Polleverywhere, Padlet</p> <ul style="list-style-type: none"> • Video Tools: YouTube, TubeChop, educanon, blubbr.tv, edpuzzle, QR Codes: QR Code Generator Game-based • Response Tools: Kahoot!, Socrative, Word clouds: Tagxedo, Wordle Interpersonal • Communicative Tools: Skype, Google Hangouts, Twitter, Learning Management Systems such as Edmodo, Schoology, Canvas, Blackboard, etc. E-Portfolios: Google Drive, Pinterest, LiveBinder • Authentic listening and reading sources that provides data and support for speaking and writing prompts. • Exploration of art and/or artists to understand society and history. 	<ul style="list-style-type: none"> • Effective feedback • Presenting learning goals/ objectives • Self-directed learning • Blended learning • Authentic learning • Adapting to learning styles • Conferencing • Activate prior knowledge • Investigations • Flexible classrooms • Flipped classroom • Graphic organizers • Guest speakers • Identifying similarities and differences • Learning centers • Modeling • Music/ songs • Peer teaching • project -based learning • Reading aloud • Debate • Word walls • Student choice • Think- Pair- Share • Rubrics • Varied texts • Literature circles • Reading buddies • 	<p>explore current events and cultural practices. Use advanced supplementary / reading materials</p> <ul style="list-style-type: none"> • Use of authentic resources to promote a deeper understanding of culture. • Provide opportunities for open-ended, self-directed activities • Communication outside the language classroom for travel, study, work, and/or interviews with community members. • Encourage the use of creativity / • Provide opportunities to develop depth and breadth of knowledge in the subject area (examples: create drawings/illustrations, use of music, create poems/songs, write opinion letters, create videos/stories/comic strips, etc.) Conduct research and provide presentation of cultural topics. • Design surveys to generate and analyze data to be used in discussion. <p>STUDENTS AT RISK OF FAILURE</p> <ul style="list-style-type: none"> • Ask students to restate information, directions, and assignments. • Repetition and practice • Model skills / techniques to be mastered. • Extended time to complete class work • Provide copy of class notes • Preferential seating to be mutually determined by the student and teacher • Student may request to use a computer to complete assignments. • Establish expectations for correct spelling on assignments. • Extra textbooks for home. • Student may request books on tape / CD / digital media, as available and appropriate. • Assign a peer helper in the class setting
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		<ul style="list-style-type: none">• Provide oral reminders and check student work during independent work time• Assist student with long and short term planning of assignments• Encourage student to proofread assignments and tests• Provide regular parent/ school communication• Teachers will check/sign student agenda daily
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Mathematics Curriculum

Grade Three

GRADE THREE CURRICULUM

Structure

Big Ideas

- Understanding multiplication and division
- Properties of multiplication
- Fluently multiply and divide all one digit numbers
- Solve two step problems and use patterns
- Understanding place value
- Fractions as numbers
- Measurement and estimation
- Graphs and data
- Geometric measurement: area and perimeter
- Geometric shapes and their attributes

Enduring Understanding

Students will understand that...

- Word problems can use multiplication and division.

- Pictures can be drawn to solve multiplication and division problems.
- Properties of multiplication are strategies that can be helpful when solving larger multiplication problems.
- Use strategies to assist in gaining fluency in multiplication and division facts.
- Word problems often have more than one operation involved when solving.
- Properties of operations can assist in finding patterns.
- Patterns can be identified and described.
- Place value can assist when rounding, using strategies or algorithms to multiply and divide.
- Fractions are numbers that can be shown on a number line.
- Equal fractions will be at the same point on a number line.
- Whole numbers can be written as fractions.
- Estimation can be used to help analyze measurements.
- Graphs are helpful in representing and interpreting data.
- Area is related to multiplication and addition.
- Perimeter and area are different.
- Shapes have different attributes.
- Shapes can be broken into equal pieces and represented as a fraction.

Essential Questions

- What situation could represent a multiplication/ division problem?
- How is a missing number determined in an equation?
- What are the properties of multiplication?
- How can multiplication help find the answer to a division problem?
- What are ways to memorize multiplication?
- What are ways to memorize division?
- How can a word problem include more than one operation?
- What are ways to find patterns in addition and multiplication?
- What properties of operations help identify patterns?
- How do you round using place value?
- How is a fraction a number?
- How can fractions be represented?
- How does estimation help with measurement?
- What do graphs provide?
- How are area and perimeter related?
- What are different attributes of shapes?

GRADE THREE CURRICULUM

Content Area: Mathematics		Grade Level: 3	Domain: Operations and Algebraic Thinking	
21st Century Theme: Student’s mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.				
Standard: Represent and solve problems involving multiplication and division.				
Clusters				
3.OA.A.1 Interpret products of whole numbers, e.g., interpret 5×7 as the total number of objects in 5 groups of 7 objects each.	3.OA.A.2 Interpret whole-number quotients of whole numbers, e.g., interpret $56 \div 8$ as the number of objects in each share when 56 objects are partitioned equally into 8 shares, or as a number of shares when 56 objects are partitioned into equal	3.OA.A.3 Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown	3.OA.A.4 Determine the unknown whole number in a multiplication or division equation relating three whole numbers.	

	shares of 8 objects each.	number to represent the problem.	
Teacher Generated Questions			
Describe a situation where a total number of objects can be expressed as 5×8 .	Describe a situation where a number of groups can be expressed as $64 \div 8$.	Create a word problem using multiplication (or division) and have another student answer the problem by drawing a picture and writing the equation. (Switch roles)	Determine the unknown number that makes the equation true in each of the equations $8 \times ? = 48$ $5 = ? \div 3$ $6 \times 6 = ?$.
Standards for Mathematical Practice: MP1- Make sense of problems and persevere in solving them; MP2- Reason abstractly and quantitatively; MP3- Construct viable arguments and critique the reasoning of others.			
Assessment - Students will be assessed on a regular basis using summative and formative assessments to help guide instruction.			

GRADE THREE CURRICULUM

Content Area: Mathematics	Grade Level: 3	Domain: Operations and Algebraic Thinking
21st Century Theme: Student's mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.		
Standard: Understand properties of multiplication and the relationship between multiplication and division.		
Clusters		

<p>3.OA.B.5</p> <p>Apply properties of operations as strategies to multiply and divide.2 Examples: If $6 \times 4 = 24$ is known, then $4 \times 6 = 24$ is also known.(Commutative property of multiplication.) $3 \times 5 \times 2$ can be found by $3 \times 5 = 15$, then $15 \times 2 = 30$, or by $5 \times 2 = 10$, then $3 \times 10 = 30$. (Associative property of multiplication.) Knowing that $8 \times 5 = 40$ and $8 \times 2 = 16$, one can find 8×7 as $8 \times (5 + 2) = (8 \times 5) + (8 \times 2) = 40 + 16 = 56$. (Distributive property.)</p>	<p>3.OA.B.6</p> <p>Understand division as an unknown-factor problem.</p>
<p>Teacher Generated Questions</p>	
<p>Give an example of the commutative property of multiplication, associative property of multiplication, and the distributive property.</p>	<p>Find $32 \div 8$ by finding the number that makes 32 when multiplied by 8.</p>
<p>Standards for Mathematical Practice: MP2- Reason abstractly and quantitatively; MP7- Look for and make use of structure.</p>	
<p>Assessment - Students will be assessed on a regular basis using summative and formative assessments to help guide instruction.</p>	

GRADE THREE CURRICULUM

Content Area: Mathematics	Grade Level: 3	Domain: Operations and Algebraic Thinking
<p>21st Century Theme: Student’s mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.</p>		
<p>Standard: Multiply and divide within 100.</p>		
<p>Clusters</p>		

3.OA.C.7

Fluently multiply and divide using numbers up to 100, applying strategies such as the relationship between multiplication and division (e.g., knowing that $8 \times 5 = 40$, one knows $40 \div 5 = 8$) or properties of operations. By the end of Grade 3, know from memory all products of two one-digit numbers.

Teacher Generated Questions

Give speed multiplication and division tests. (Students should be able to answer multiplication facts in 2 seconds.)

Standards for Mathematical Practice: MP7- Look for and make use of structure.; MP8- Look for and express regularity in repeated reasoning.

Assessment - Students will be assessed on a regular basis using summative and formative assessments to help guide instruction.

GRADE THREE CURRICULUM

Content Area: Mathematics	Grade Level: 3	Domain: Operations and Algebraic Thinking
21st Century Theme: Student's mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.		

Standard: Solve problems involving the four operations, and identify and explain patterns in arithmetic.	
Clusters	
3.OA.D.8 Solve two-step word problems using the four operations. 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.	3.OA.D.9 Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations. (For example, observe that 4 times a number is always even, and explain why 4 times a number can be decomposed into two equal addends.)
Teacher Generated Questions	
Write a two step word problem. Use an equation with a variable representing an unknown amount. Have a partner solve the problem. (Switch roles)	Look at an addition table and multiplication table. Come up with two different patterns that you can find.
Standards for Mathematical Practice: MP1- Make sense of problems and persevere in solving them.; MP3- Construct viable arguments and critique the reasoning of others.; MP7- Look for and make use of structure.; MP8- Look for and express regularity in repeated reasoning.	
Assessment - Students will be assessed on a regular basis using summative and formative assessments to help guide instruction.	

GRADE THREE CURRICULUM

Content Area: Mathematics	Grade Level: 3	Domain: Number and Operations in Base Ten
21st Century Theme: Student's mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.		
Standard: Use place value understanding and properties of operations to perform multi-digit arithmetic.		

Clusters		
3.NBT.A.1 Use place value understanding to round whole numbers to the nearest 10 or 100.	3.NBT.A.2 Fluently add and subtract using numbers up to 1000 applying strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.	3.NBT.A.3 Multiply one-digit whole numbers by multiples of 10 in the range 10–90 (e.g., 9×80 , 5×60) using strategies based on place value and properties of operations.
Teacher Generated Questions		
Round the number 467 to the nearest ones, tens, and hundreds place.	What strategy could you use to subtract $1012 - 1003$? Add $1965 + 1257$ in five seconds.	What strategy would you use to solve 5×40 ? How does place value help you?
Standards for Mathematical Practice: MP1- Make sense of problems and persevere in solving them.; MP7- Look for and make use of structure.; MP8- Look for and express regularity in repeated reasoning.		
Assessment - Students will be assessed on a regular basis using summative and formative assessments to help guide instruction.		

GRADE THREE CURRICULUM

Content Area: Mathematics	Grade Level: 3	Domain: Number and Operations- Fractions
21st Century Theme: Student's mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent		

engagement in future personal, work and civic life.		
Standard: Develop understanding of fractions as numbers.		
Clusters		
3.NF.A.1 Understand a fraction $1/b$ as the quantity formed by 1 part when a whole is partitioned into b equal parts; understand a fraction a/b as the quantity formed by a parts of size $1/b$.	3.NF.A.2a Understand a fraction as a number on the number line; represent fractions on a number line diagram. a. Understand a fraction as a number on the number line; represent fractions on a number line diagram.	3.NF.A.2b Understand a fraction as a number on the number line; represent fractions on a number line diagram. b. Represent a fraction a/b on a number line diagram by marking off a lengths $1/b$ from 0. Recognize that the resulting interval has size a/b and that its endpoint locates the number a/b on the number line.
Teacher Generated Questions		
Explain what the numerator and denominator represent of each fraction: $1/2$, $3/4$, and $5/8$.	Draw a number line and show where $1/4$ would be. Split the line into equal parts and mark $3/4$ on the same line.	Show $4/5$ on a number line by first marking the 5 lengths and then finding the endpoint where $4/5$ would be.
Standards for Mathematical Practice: MP1- Make sense of problems and persevere in solving them.; MP2- Reason abstractly and quantitatively.; MP4- Model with mathematics.; MP6- Attend to precision.; MP7- Look for and make use of structure.		
Assessment - Students will be assessed on a regular basis using summative and formative assessments to help guide instruction.		

GRADE THREE CURRICULUM

Content Area: Mathematics	Grade Level: 3	Domain: Number and Operations- Fractions
21st Century Theme: Student's mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.		
Standard: Develop understanding of fractions as numbers.		

Clusters			
<p>3.NF.A.3a</p> <p>Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size.</p> <p>a. Understand two fractions as equivalent (equal) if they are the same size, or the same point on a number line.</p>	<p>3.NF.A.3b</p> <p>Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size.</p> <p>b. Recognize and generate simple equivalent fractions, e.g., $1/2 = 2/4$, $4/6 = 2/3$.</p>	<p>3.NF.A.3c</p> <p>Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size.</p> <p>c. Express whole numbers as fractions, and recognize fractions that are equivalent to whole numbers. Recognize that $6/1 = 6$; locate $4/4$ and 1 at the same point of a number line diagram.</p>	<p>3.NF.A.3d</p> <p>Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size.</p> <p>d. Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with the symbols $>$, $<$, or $=$ and justify the conclusions, e.g., by using a visual fraction model.</p>
Teacher Generated Questions			
Describe two fractions that would fall on the same point on the number line.	Explain why the fractions $3/4$ and $6/8$ are equivalent, e.g., by using a visual fraction model.	Express 3 as a fraction. Explain what $5/5$ would be equivalent to.	Which fraction is greater, $1/4$ or $3/4$? How do you know? Which fraction is greater, $1/8$ or $1/5$? How do you know?
Standards for Mathematical Practice: MP1- Make sense of problems and persevere in solving them; MP2- Reason abstractly and quantitatively.; MP4- Model with mathematics.; MP6- Attend to precision.; MP7- Look for and make use of structure.			
Assessment - Students will be assessed on a regular basis using summative and formative assessments to help guide instruction.			

GRADE THREE CURRICULUM

Content Area: Mathematics	Grade Level: 3	Domain: Measurement and Data
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21st Century Theme: Student’s mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.	
Standard: Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects.	
Clusters	
3.MD.A.1 Tell and write time to the nearest minute and measure time intervals in minutes. Solve word problems involving addition and subtraction of time intervals in minutes, e.g., by representing the problem on a number line diagram.	3.MD.A.2 Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l). ⁶ Add, subtract, multiply, or divide to solve one-step word problems involving masses or volumes that are given in the same units, e.g., by using drawings (such as a beaker with a measurement scale) to represent the problem.
Teacher Generated Questions	
Use a number line to help solve the problem. Sarah started her chores at 4:30pm. It took her 7 minutes to fold laundry and 10 minutes to clean her room. What time was she finished?	If you fill a beaker with 11 liters of water and add 5 liters of water, how much water do you have? Estimate then solve.
Standards for Mathematical Practice: MP1- Make sense of problems and persevere in solving them; MP5- Use appropriate tools strategically.	
Assessment - Students will be assessed on a regular basis using summative and formative assessments to help guide instruction.	

GRADE THREE CURRICULUM

Content Area: Mathematics	Grade Level: 3	Domain: Measurement and Data
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21st Century Theme: Student’s mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.	
Standard: Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects.	
Clusters	
3.MD.B.3 Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step “how many more” and “how many less” problems using information presented in scaled bar graphs. <i>For example, draw a bar graph in which each square in the bar graph might represent 5 pets.</i>	3.MD.B.4 Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate units— whole numbers, halves, or quarters.
Teacher Generated Questions	
Create a scaled graph for the number of boys and girls in the class. How many more (or fewer) girls are there than boys.	Measure each students hand. Create a line plot and mark the horizontal scale in appropriate units of whole numbers, halves, or quarters.
Standards for Mathematical Practice: MP1- Make sense of problems and persevere in solving them; MP5- Use appropriate tools strategically.	
Assessment - Students will be assessed on a regular basis using summative and formative assessments to help guide instruction.	

GRADE THREE CURRICULUM

Content Area: Mathematics	Grade Level: 3	Domain: Measurement and Data
21st Century Theme: Student’s mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.		
Standard: Geometric measurement: understand concepts of area and relate area to multiplication and to addition.		
Clusters		
3.MD.C.5a Recognize area as an attribute of plane figures and understand concepts of area measurement. a. A square with side length 1 unit, called “a unit square,” is said to have “one square unit” of area, and can be used to measure area.	3.MD.C.5b Recognize area as an attribute of plane figures and understand concepts of area measurement. b. A plane figure which can be covered without gaps or overlaps by n unit squares is said to have an area of n square units.	3.MD.C.6 Measure areas by counting unit squares (square cm, square m, square in, square ft, and improvised units).
Teacher Generated Questions		
Explain what a square unit is.	Square units help you find _____.	How do you find the area of a flat shape?
Standards for Mathematical Practice: MP1- Make sense of problems and persevere in solving them.; MP3- Construct viable arguments and critique the reasoning of others.; MP4- Model with mathematics.; MP6- Attend to precision.; MP7- Look for and make use of structure.		
Assessment - Students will be assessed on a regular basis using summative and formative assessments to help guide instruction.		

GRADE THREE CURRICULUM

Content Area: Mathematics		Grade Level: 3		Domain: Measurement and Data	
21st Century Theme: Student’s mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.					
Standard: Geometric measurement: understand concepts of area and relate area to multiplication and to addition.					
Clusters					
3.MD.C.7a Relate area to the operations of multiplication and addition. a. Find the area of a rectangle with whole-number side lengths by tiling it, and show that the area is the same as would be found by multiplying the side lengths.		3.MD.C.7b Relate area to the operations of multiplication and addition. b. Multiply side lengths to find areas of rectangles with whole number side lengths in the context of solving real world and mathematical problems, and represent whole-number products as rectangular areas in mathematical reasoning.		3.MD.C.7c Relate area to the operations of multiplication and addition. c. Use tiling to show in a concrete case that the area of a rectangle with whole-number side lengths a and $b + c$ is the sum of $a \times b$ and $a \times c$. Use area models to represent the distributive property in mathematical reasoning.	
3.MD.C.7d Relate area to the operations of multiplication and addition. d. Recognize area as additive. Find areas of rectilinear figures by decomposing them into non-overlapping rectangles and adding the areas of the non-overlapping parts, applying this technique to solve real world problems.					
Teacher Generated Questions					
Draw a rectangle that is 3in by 4 in. Fill in the tiles and come up with a strategy to find the area of a rectangle.		Create a problem for another student where they need to find the area of an object. Use real life experiences. Switch problems and solve. Critique each other and explain your thought process.		Use area models to show the distributive property.	
Create a real world problem where you would have to add areas and explain the strategy you would use to solve the problem.					
Standards for Mathematical Practice: MP1- Make sense of problems and persevere in solving them.; MP3- Construct viable arguments and critique the reasoning of others.; MP4- Model with mathematics.; MP6- Attend to precision.; MP7- Look for and make use of structure.					
Assessment - Students will be assessed on a regular basis using summative and formative assessments to help guide instruction.					

GRADE THREE CURRICULUM

Content Area: Mathematics	Grade Level: 3	Domain: Measurement and Data
<p>21st Century Theme: Student’s mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.</p>		
<p>Standard: Geometric measurement: recognize perimeter as an attribute of plane figures and distinguish between linear and area measures.</p>		
<p>Clusters</p>		
<p>3.MD.D.8</p> <p>Solve real world and mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths, finding an unknown side length, and exhibiting rectangles with the same perimeter and different areas or with the same area and different perimeters.</p>		
<p>Teacher Generated Questions</p>		
<p>The area of a rectangle is 30 square feet. If the length is 5 feet, what is the width? Create a rectangle with an area of 30 square feet, but a different perimeter. What are the lengths of each side? Explain.</p>		
<p>Standards for Mathematical Practice: MP4- Model with mathematics; MP7- Look for and make use of structure.</p>		
<p>Assessment - Students will be assessed on a regular basis using summative and formative assessments to help guide instruction.</p>		

GRADE THREE CURRICULUM

Content Area: Mathematics	Grade Level: 3	Domain: Geometry
21st Century Theme: Student’s mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.		
Standard: Reason with shapes and their attributes.		
Clusters		
3.G.A.1 Understand that shapes in different categories (e.g., rhombuses, rectangles, and others) may share attributes (e.g., having four sides), and that the shared attributes can define a larger category (e.g., quadrilaterals). Recognize rhombuses, rectangles, and squares as examples of quadrilaterals, and draw examples of quadrilaterals that do not belong to any of these subcategories.	3.G.A.2 Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole. For example, partition a shape into 4 parts with equal area, and describe the area of each part as $\frac{1}{4}$ of the area of the shape.	
Teacher Generated Questions		
Give 3 similarities and 3 differences that the following shapes have: square, rectangle, and rhombus. Share your thoughts with a partner.	Cut out a rectangle on grid paper. Draw lines to cut the shape so each part has an equal area. What fraction does one part of the shape represent?	
Standards for Mathematical Practice: MP3- Construct viable arguments and critique the reasoning of others.; MP5- Use appropriate tool strategically.; MP6- Attend to precision.		
Assessment - Students will be assessed on a regular basis using summative and formative assessments to help guide instruction.		

<p>MATERIALS and RESOURCES: YouTube https://www.quia.com/ Teacher Pay Teachers materials</p> <ul style="list-style-type: none"> ● Presentation/Digital Storytelling Tools: Google Slides, Prezi, Go Animate, Storybird, ToonDoo, ZooBurst, ● Online Speaking/Recording Tools: Voicethread, clear.msu, Audacity, Vocaroo, Aviary, Voki, Chatterpix Backchanneling: TodaysMeet, Polleverywhere, Padlet ● Video Tools: YouTube, TubeChop, educanon, blubbr.tv, edpuzzle, QR Codes: QR Code Generator Game-based ● Response Tools: Kahoot!, Socrative, Word clouds: Tagxedo, Wordle Interpersonal ● Communicative Tools: Skype, Google Hangouts, Twitter, Learning Management Systems such as Edmodo, Schoology, Canvas, Blackboard, etc. E-Portfolios: Google Drive, Pinterest, LiveBinder ● Authentic listening and reading sources that provides data and support for speaking and writing prompts. ● Exploration of art and/or artists to understand society and history. 	<p>INSTRUCTIONAL STRATEGIES</p> <ul style="list-style-type: none"> ● Reinforcing effort ● Provide recognition ● Cooperative learning ● Cues, Questions, Organizers ● Summarizing (or note taking) ● Generating & testing hypotheses ● Student practice ● Individualized instruction ● Effective feedback ● Presenting learning goals/ objectives ● Self-directed learning ● Blended learning ● Authentic learning ● Adapting to learning styles ● Conferencing ● Activate prior knowledge ● Investigations ● Flexible classrooms ● Flipped classroom ● Graphic organizers ● Guest speakers ● Identifying similarities and differences ● Learning centers ● Modeling ● Music/ songs ● Peer teaching ● project -based learning ● Reading aloud ● Debate ● Word walls ● Student choice ● Think- Pair- Share ● Rubrics ● Varied texts ● Literature circles ● Reading buddies 	<p>DIFFERENTIATION GIFTED AND TALENTED</p> <ul style="list-style-type: none"> ● Thematic topics for discussion and research: families & communities, science and technology, beauty and aesthetics, contemporary life, global challenges, personal and public identities. ● Use of technological device to gain access to online resources in order to research and explore current events and cultural practices. Use advanced supplementary / reading materials ● Use of authentic resources to promote a deeper understanding of culture. ● Provide opportunities for open-ended, self-directed activities ● Communication outside the language classroom for travel, study, work, and/or interviews with community members. ● Encourage the use of creativity / ● Provide opportunities to develop depth and breadth of knowledge in the subject area (examples: create drawings/illustrations, use of music, create poems/songs, write opinion letters, create videos/stories/comic strips, etc.) Conduct research and provide presentation of cultural topics. ● Design surveys to generate and analyze data to be used in discussion. <p>STUDENTS AT RISK OF FAILURE</p> <ul style="list-style-type: none"> ● Ask students to restate information, directions, and assignments. ● Repetition and practice ● Model skills / techniques to be mastered. ● Extended time to complete class work ● Provide copy of class notes
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	•	<ul style="list-style-type: none">• Preferential seating to be mutually determined by the student and teacher• Student may request to use a computer to complete assignments.• Establish expectations for correct spelling on assignments.• Extra textbooks for home.• Student may request books on tape / CD / digital media, as available and appropriate.• Assign a peer helper in the class setting• Provide oral reminders and check student work during independent work time• Assist student with long and short term planning of assignments• Encourage student to proofread assignments and tests• Provide regular parent/ school communication• Teachers will check/sign student agenda daily
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Mathematics Curriculum

Grade Four

GRADE FOUR CURRICULUM

Structure

Big Ideas

- Solve problems using the four operations
- Fluently multiply and divide from 0 to 12
- Factors and multiples
- Analyze patterns
- Place value for multi-digit whole numbers
- Use place value to help solve multi-digit arithmetic
- Fraction equivalence and ordering
- Build fractions
- Relate and compare decimal to fractions
- Convert forms of measurement

- Data analysis
- Angle measurement and descriptions
- Lines, angles, and shapes

Enduring Understanding

Students will understand that...

- Problems can consist of more than one operation.
- Factors and multiples will assist in more complex math concepts.
- Patterns are used continuously in math.
- Place value can make working with multi-digit numbers more clear.
- Fractions have many equivalents.
- Fractions can be represented as decimals and both can be compared.
- Measurements can be converted from larger units to smaller units and vice versa.
- Data can be interpreted and represented in a variety of ways.
- Angles have different names and can be measured.
- Lines and angles assist in classifying shapes.

Essential Questions

- What are ways word problems can be solved?
- What is the difference between factors and multiples?
- How is a rule for a pattern determined?
- How does place value assist in rounding multi-digit numbers?
- How do you compare two multi-digit numbers using place value?
- What strategies can help add, subtract, multiply, or divide multi-digit whole numbers?
- What are equivalent fractions?
- What are ways a fraction can be represented?
- What are the steps in adding or subtracting fractions?
- What are the steps in multiplying a fraction by a whole number?
- How is a fraction represented as a decimal?
- How are fractions and decimals compared?

- How can measurements be converted?
- How can area and perimeter be calculated?
- How can a line plot help analyze fractions?
- How is an angle measured?
- What are the steps to draw the different types of lines and angles?
- How can shapes be classified by their lines and angles?
- What is a line of symmetry?

GRADE FOUR CURRICULUM

Content Area: Mathematics	Grade Level: 4	Domain: Operations and Algebraic Thinking
21st Century Theme: Student's mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.		
Standard: Use the four operations with whole numbers to solve problems.		
Clusters		

<p>4.OA.A.1 Interpret a multiplication equation as a comparison, e.g., interpret $35 = 5 \times 7$ 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.</p>	<p>4.OA.A.2 Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison.</p>	<p>4.OA.A.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.</p>
<p>Teacher Generated Questions</p>		
<p>Write an equation to represent the following: 6 times as many as 4 is 24.</p>	<p>Helen raised \$12 for the food bank last year and she raised 6 times as much money this year. How much money did she raise this year?</p> <p>Sandra raised \$15 for the PTA and Nita raised \$45. How many times as much money did Nita raise as compared to Sandra?</p>	<p>Karl's rectangular vegetable garden is 20 feet by 45 feet, and Makenna's is 25 feet by 40 feet. Whose garden is larger in area?</p> <p>Allow students to create their own problem, share, and critique one another.</p>
<p>Standards for Mathematical Practice: MP1- Make senses of problems and persevere in solving them.; MP3- Construct viable arguments and critique the reasoning of others.; MP4- Model with mathematics.; MP6- Attend to precision.; MP7- Look for and make use of structure.</p>		
<p>Assessment - Students will be assessed on a regular basis using summative and formative assessments to help guide instruction.</p>		

GRADE FOUR CURRICULUM

<p>Content Area: Mathematics</p>	<p>Grade Level: 4</p>	<p>Domain: Operations and Algebraic Thinking</p>
<p>21st Century Theme: Student's mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.</p>		

Standard: Gain familiarity with factors and multiples.
Clusters
<p>4.OA.B.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.</p>
Teacher Generated Questions
<p>What are the factors for the number 16? Is 16 prime or composite? Is 36 a multiple of 6? Is 36 prime or composite?</p>
Standards for Mathematical Practice: MP2- Reason abstractly and quantitatively; MP7- Look for and make use of structure.; MP8- Look for and express regularity in repeated reasoning.
Assessment - Students will be assessed on a regular basis using summative and formative assessments to help guide instruction.

GRADE FOUR CURRICULUM

Content Area: Mathematics	Grade Level: 4	Domain: Operations and Algebraic Thinking
21st Century Theme: Student’s mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.		
Standard: Generate and analyze patterns.		

Clusters

4.OA.C.5

Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself.
For example, given the rule "Add 3" and the starting number 1, generate terms in the resulting sequence and observe that the terms appear to alternate between odd and even numbers. Explain informally why the numbers will continue to alternate in this way.

Teacher Generated Questions

Generate a number pattern that follows the rule "add 5." What do you notice about the pattern? Discuss with a partner.

Standards for Mathematical Practice: MP1- Make sense of problems and persevere in solving them.; MP2- Reason abstractly and quantitatively.; MP3- Construct viable arguments and critique the reasoning of others.; MP6- Attend to precision.; MP7- Look for and make use of structure.; MP8- Look for and express regularity in repeated reasoning.

Assessment - Students will be assessed on a regular basis using summative and formative assessments to help guide instruction.

GRADE FOUR CURRICULUM

Content Area: Mathematics

Grade Level: 4

Domain: Number and Operations in Base Ten

21st Century Theme: Student's mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports

competent engagement in future personal, work and civic life.		
Standard: Generalize place value understanding for multi-digit whole numbers.		
Clusters		
4.NBT.A.1 Recognize that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right. <i>For example, recognize that $700 \div 70 = 10$ by applying concepts of place value and division.</i>	4.NBT.A.2 Read and write multi-digit whole numbers using base-ten numerals, number names, and expanded form. Compare two multi-digit numbers based on meanings of the digits in each place, using $>$, $=$, and $<$ symbols to record the results of comparisons.	4.NBT.A.3 Use place value understanding to round multi-digit whole numbers to any place.
Teacher Generated Questions		
Using place value, what is: $600 \div 6 = \underline{\quad}$ $500 \div 50 = \underline{\quad}$ Explain how you solved these problems using your understanding of place value.	Arrange these numbers in order, beginning with the greatest. 1470, 847, 710, 1047, 147 Describe which is greater and how you know: 546 and 5460	Round 3,466 to the tens place. Round 3,466 to the hundreds place.
Standards for Mathematical Practice: MP2- Reason abstractly and quantitatively; MP6- Attend to precision.; MP7- Look for and make use of structure.; MP8- Look for and express regularity in repeated reasoning.		
Assessment - Students will be assessed on a regular basis using summative and formative assessments to help guide instruction.		

GRADE FOUR CURRICULUM

Content Area: Mathematics	Grade Level: 4	Domain: Number and Operations in Base Ten
21st Century Theme: Student's mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports		

competent engagement in future personal, work and civic life.		
Standard: Use place value understanding and properties of operations to perform multi-digit arithmetic.		
Clusters		
4.NBT.B.4 Fluently add and subtract multi-digit whole numbers using the standard algorithm.	4.NBT.B.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.	4.NBT.B.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.
Teacher Generated Questions		
Provide timed tests of addition and subtraction of multi-digit whole numbers.	Complete the following in 5 seconds: 324 x 4 1243 x 2 23 x 13 35 x 11	Complete the following: 214 ÷ 2 3124 ÷ 4 4315 ÷ 5
Standards for Mathematical Practice: MP1- Make sense of problems and persevere in solving them.; MP2- Reason abstractly and quantitatively.; MP6- Attend to precision.; MP7- Look for and make use of structure.; MP8- Look for and express regularity in repeated reasoning.		
Assessment - Students will be assessed on a regular basis using summative and formative assessments to help guide instruction.		

GRADE FOUR CURRICULUM

Content Area: Mathematics	Grade Level: 4	Domain: Number and Operations- Fractions
21st Century Theme: Student's mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports		

competent engagement in future personal, work and civic life.

Standard: Extend understanding of fraction equivalence and ordering.

Clusters

4.NF.A.1

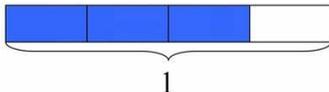
Explain why a fraction a/b is equivalent to a fraction $(n \times a)/(n \times b)$ by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions.

4.NF.A.2

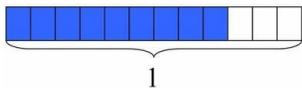
Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or numerators, or by comparing to a benchmark fraction such as $1/2$. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols $>$, $=$, or $<$, and justify the conclusions, e.g., by using a visual fraction model.

Teacher Generated Questions

The rectangle below has length 1. What fraction does the shaded part represent?



The rectangle below has the same length. What fraction does the shaded part represent?



Use the pictures to explain why the two fractions represented above are equivalent.

How can you compare $29/60$ and $45/88$? Compare them to a benchmark fraction.

Compare $1/5$ and $11/40$ using $>$, $=$, or $<$. Explain your reasoning.

Standards for Mathematical Practice: MP1- Make sense of problems and persevere in solving them; MP2- Reason abstractly and quantitatively.; MP4- Model with mathematics.; MP6- Attend to precision.

Assessment - Students will be assessed on a regular basis using summative and formative assessments to help guide instruction.

GRADE FOUR CURRICULUM

Content Area: Mathematics		Grade Level: 4	Domain: Number and Operations- Fractions	
21st Century Theme: Student’s mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.				
Standard: Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.				
Clusters				
4.NF.B.3a Understand a fraction a/b with $a > 1$ as a sum of fractions $1/b$. a. Understand addition and subtraction of fractions as joining and separating parts referring to the same whole.	4.NF.B.3b Understand a fraction a/b with $a > 1$ as a sum of fractions $1/b$. b. Decompose a fraction into a sum of fractions with the same denominator in more than one way, recording each decomposition by an equation. Justify decompositions, e.g., by using a visual fraction model. <i>Examples:</i> $3/8 = 1/8 + 1/8 + 1/8$; $3/8 = 1/8 + 2/8$; $2\ 1/8 = 1 + 1 + 1/8 = 8/8 + 8/8 + 1/8$.	4.NF.B.3c Understand a fraction a/b with $a > 1$ as a sum of fractions $1/b$. c. Add and subtract mixed numbers with like denominators, e.g., by replacing each mixed number with an equivalent fraction, and/or by using properties of operations and the relationship between addition and subtraction.	4.NF.B.3d Understand a fraction a/b with $a > 1$ as a sum of fractions $1/b$. d. Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators, e.g., by using visual fraction models and equations to represent the problem.	
Teacher Generated Questions				
$\frac{1}{2} + \frac{1}{2} = ?$ Use a picture to explain how to find the answer.	Write $14/7$ as a sum of fractions in two different ways.	Complete the following: $4\ \frac{1}{2} + 3\ \frac{1}{2} = ?$ $5\ \frac{7}{8} - 2\ \frac{5}{8} = ?$ $2\ \frac{1}{3} + 2\ \frac{2}{3} = ?$	Susie bought $3\ \frac{2}{5}$ yards of rope and she used $1\ \frac{1}{5}$ yards. How much did she have left? Create a word problem involving adding or subtracting mixed numbers with like denominators.	
Standards for Mathematical Practice: MP1- Make sense of problems and persevere in solving them; MP2- Reason abstractly and quantitatively.; MP3- Construct viable arguments and critique the reasoning of others.; MP7- Look for and make use of structure.				
Assessment - Students will be assessed on a regular basis using summative and formative assessments to help guide instruction.				

GRADE FOUR CURRICULUM

Content Area: Mathematics		Grade Level: 4	Domain: Number and Operations- Fractions
21st Century Theme: Student’s mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.			
Standard: Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.			
Clusters			
<p>4.NF.B.4a</p> <p>Apply and extend previous understandings of multiplication to multiply a fraction by a whole number.</p> <p>a. Understand a fraction a/b as a multiple of $1/b$. <i>For example, use a visual fraction model to represent $5/4$ as the product $5 \times (1/4)$.</i></p>	<p>4.NF.B.4b</p> <p>Apply and extend previous understandings of multiplication to multiply a fraction by a whole number.</p> <p>b. Understand a multiple of a/b as a multiple of $1/b$, and use this understanding to multiply a fraction by a whole number. <i>For example, use a visual fraction model to express $3 \times (2/5)$ as $6 \times (1/5)$, recognizing this product as $6/5$. (In general, $n \times (a/b) = (n \times a)/b$.)</i></p>	<p>4.NF.B.4c</p> <p>Apply and extend previous understandings of multiplication to multiply a fraction by a whole number.</p> <p>c. Solve word problems involving multiplication of a fraction by a whole number, e.g., by using visual fraction models and equations to represent the problem.</p>	
Teacher Generated Questions			
<p>$7/3$ is $7 \times \underline{\quad}$ $4 \times \frac{1}{4} = \underline{\quad}$ Explain step by step how to solve these problems.</p>	<p>$4 \times \frac{3}{5} = ?$ $2 \times \frac{3}{4} = ?$ Explain step by step how to solve these problems.</p>	<p>If each person at a party will eat $\frac{3}{8}$ of a pound of roast beef, and there will be 5 people at the party, how many pounds of roast beef will be needed? Between what two whole numbers does your answer lie?</p>	
Standards for Mathematical Practice: MP1- Make sense of problems and persevere in solving them; MP2- Reason abstractly and quantitatively.; MP7- Look for and make use of structure.; MP8- Look for and express regularity in repeated reasoning.			
Assessment - Students will be assessed on a regular basis using summative and formative assessments to help guide instruction.			

GRADE FOUR CURRICULUM

Content Area: Mathematics	Grade Level: 4	Domain: Number and Operations- Fractions
21st Century Theme: Student’s mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.		
Standard: Understand decimal notation for fractions, and compare decimal fractions.		
Clusters		
4.NF.C.5 Express a fraction with denominator 10 as an equivalent fraction with denominator 100, and use this technique to add two fractions with respective denominators 10 and 100. <i>For example, express 3/10 as 30/100, and add 3/10 + 4/100 = 34/100.</i>	4.NF.C.6 Use decimal notation for fractions with denominators 10 or 100.	4.NF.C.7 Compare two decimals to hundredths by reasoning about their size. Recognize that comparisons are valid only when the two decimals refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual model.
Teacher Generated Questions		
Use equivalent fractions to help solve the following. $9/10 + 8/100 = ?$ $23/100 + 7/10 = ?$	Write the decimal form of $62/100$. What could the decimal represent? Draw a number line and locate the decimal. What would $3/10$ be as a decimal?	Compare the fractions and decimals using >, =, or <. $.42$ and $32/100$ $3/10$ and $.3$ $4/100$ and $.06$
Standards for Mathematical Practice: MP2- Reason abstractly and quantitatively; MP6- Attend to precision; MP7- Look for and make use of structure.		
Assessment - Students will be assessed on a regular basis using summative and formative assessments to help guide instruction.		

GRADE FOUR CURRICULUM

Content Area: Mathematics	Grade Level: 4	Domain: Measurement and Data	
21st Century Theme: Student’s mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.			
Standard: Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit.			
Clusters			
4.MD.A.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. <i>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), ...</i>	4.MD.A.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.	4.MD.A.3 Apply the area and perimeter formulas for rectangles in real world and mathematical problems. <i>For example, find the width of a rectangular room given the area of the flooring and the length, by viewing the area formula as a multiplication equation with an unknown factor</i>	
Teacher Generated Questions			
Meat weighs 2 lbs, how many ounces does the meat weigh? How many meters are in a kilometer?	John had 4.3 liters of soda for a party. His friends drink 1.4 liters before everyone gets to the party, how much soda is left for everyone? Sam fills a bird feeder with $3\frac{3}{4}$ cups of seed, but it is not enough. The bird feeder can hold 6 cups. How much more does Sam need to fill the feeder?	The area of a playroom is 75 feet and the length of the room is 25 feet, what is the width? Draw the room to help you.	
Standards for Mathematical Practice: MP1- Make sense of problems and persevere in solving them.; MP2- Reason abstractly and quantitatively.; MP4- Model with mathematics.; MP6- Attend to precision.; MP7- Look for and make use of structure.; MP8- Look for and express regularity in repeated reasoning.			
Assessment - Students will be assessed on a regular basis using summative and formative assessments to help guide instruction.			

GRADE FOUR CURRICULUM

Content Area: Mathematics	Grade Level: 4	Domain: Measurement and Data
<p>21st Century Theme: Student’s mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.</p>		
<p>Standard: Represent and interpret data.</p>		
<p>Clusters</p>		
<p>4.MD.B.4 Make a line plot to display a data set of measurements in fractions of a unit ($\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$). Solve problems involving addition and subtraction of fractions by using information presented in line plots. <i>For example, from a line plot find and interpret the difference in length between the longest and shortest specimens in an insect collection.</i></p>		
<p>Teacher Generated Questions</p>		
<p>Create a line plot showing the following fractions that represent the sizes of different insects. One insect measured $2\frac{1}{4}$ inches, another was $2\frac{1}{2}$ inches and the last was $2\frac{3}{4}$ inches. Which insect is the smallest? What is the difference between the largest and smallest insect?</p>		
<p>Standards for Mathematical Practice: MP1- Make sense of problems and persevere in solving them; MP2- Reason abstractly and quantitatively.; MP3MP4- Model with mathematics.; MP6- Attend to precision.</p>		
<p>Assessment - Students will be assessed on a regular basis using summative and formative assessments to help guide instruction.</p>		

GRADE FOUR CURRICULUM

Content Area: Mathematics		Grade Level: 4		Domain: Measurement and Data	
21st Century Theme: Student’s mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.					
Standard: Geometric measurement: understand concepts of angle and measure angles.					
Clusters					
4.MD.B.5a Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint, and understand concepts of angle measurement. a. An angle is measured with reference to a circle with its center at the common endpoint of the rays, by considering the fraction of the circular arc between the points where the two rays intersect the circle. An angle that turns through $1/360$ of a circle is called a “one-degree angle,” and can be used to measure angles.		4.MD.B.5b Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint, and understand concepts of angle measurement. b. An angle that turns through n one-degree angles is said to have an angle measure of n degrees.		4.MD.B.6 Measure angles in whole-number degrees using a protractor. Sketch angles of specified measure.	
4.MD.B.7 Recognize angle measure as additive. When an angle is decomposed into non-overlapping parts, the angle measure of the whole is the sum of the angle measures of the parts. Solve addition and subtraction problems to find unknown angles on a diagram in real world and mathematical problems, e.g., by using an equation with a symbol for the unknown angle measure.					
Teacher Generated Questions					
Where are angles formed in a circle? What is that angle called? (central angle)		If an angle turns 25 degrees, what would its angle measure be?		Sketch an angle of 45 degrees using a protractor. Sketch an angle that is 150 degrees using a protractor.	
If two angles measure 95 degrees together, and one angle is 20 degrees, write an equation and solve to find the measure of the missing angle.					
Standards for Mathematical Practice: MP1- Make sense of problems and persevere in solving them; MP2- Reason abstractly and quantitatively.; MP4- Model with mathematics.; MP5- Use appropriate tools strategically.; MP6- Attend to precision.					
Assessment - Students will be assessed on a regular basis using summative and formative assessments to help guide instruction.					

GRADE FOUR CURRICULUM

Content Area: Mathematics	Grade Level: 4	Domain: Geometry
21st Century Theme: Student’s mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.		
Standard: Draw and identify lines and angles, and classify shapes by properties of their lines and angles.		
Clusters		
4.G.A.1 Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.	4.G.A.2 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.	4.G.A.3 Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded along the line into matching parts. Identify line-symmetric figures and draw lines of symmetry.
Teacher Generated Questions		
Create a poster explaining the definition of point, lines, line segments, rays, acute angle, obtuse angle, right angle, perpendicular lines, and parallel lines. All figures must be labeled correctly with a definition.	Draw two shapes that both have one set of perpendicular lines. Draw two shapes with two sets of parallel lines and label the right angles if any are formed.	Draw a star and find the lines of symmetry. How many are there? Create your own shape and see how many lines of symmetry you can find.
Standards for Mathematical Practice: MP1- Make sense of problems and persevere in solving them.; MP4- Model with mathematics.; MP5- Use appropriate tools strategically.; MP6- Attend to precision.; MP7- Look for and make use of structure.		
Assessment - Students will be assessed on a regular basis using summative and formative assessments to help guide instruction.		

<p>MATERIALS and RESOURCES: YouTube https://www.quia.com/ Teacher Pay Teachers materials</p> <ul style="list-style-type: none"> ● Presentation/Digital Storytelling Tools: Google Slides, Prezi, Go Animate, Storybird, ToonDoo, ZooBurst, ● Online Speaking/Recording Tools: Voicethread, clear.msu, Audacity, Vocaroo, Aviary, Voki, Chatterpix Backchanneling: TodaysMeet, Polleverywhere, Padlet ● Video Tools: YouTube, TubeChop, educanon, blubbr.tv, edpuzzle, QR Codes: QR Code Generator Game-based ● Response Tools: Kahoot!, Socrative, Word clouds: Tagxedo, Wordle Interpersonal ● Communicative Tools: Skype, Google Hangouts, Twitter, Learning Management Systems such as Edmodo, Schoology, Canvas, Blackboard, etc. E-Portfolios: Google Drive, Pinterest, LiveBinder ● Authentic listening and reading sources that provides data and support for speaking and writing prompts. ● Exploration of art and/or artists to understand society and history. 	<p>INSTRUCTIONAL STRATEGIES</p> <ul style="list-style-type: none"> ● Reinforcing effort ● Provide recognition ● Cooperative learning ● Cues, Questions, Organizers ● Summarizing (or note taking) ● Generating & testing hypotheses ● Student practice ● Individualized instruction ● Effective feedback ● Presenting learning goals/ objectives ● Self-directed learning ● Blended learning ● Authentic learning ● Adapting to learning styles ● Conferencing ● Activate prior knowledge ● Investigations ● Flexible classrooms ● Flipped classroom ● Graphic organizers ● Guest speakers ● Identifying similarities and differences ● Learning centers ● Modeling ● Music/ songs ● Peer teaching ● project -based learning ● Reading aloud ● Debate ● Word walls ● Student choice ● Think- Pair- Share ● Rubrics ● Varied texts ● Literature circles ● Reading buddies ● 	<p>DIFFERENTIATION GIFTED AND TALENTED</p> <ul style="list-style-type: none"> ● Thematic topics for discussion and research: families & communities, science and technology, beauty and aesthetics, contemporary life, global challenges, personal and public identities. ● Use of technological device to gain access to online resources in order to research and explore current events and cultural practices. Use advanced supplementary / reading materials ● Use of authentic resources to promote a deeper understanding of culture. ● Provide opportunities for open-ended, self-directed activities ● Communication outside the language classroom for travel, study, work, and/or interviews with community members. ● Encourage the use of creativity / ● Provide opportunities to develop depth and breadth of knowledge in the subject area (examples: create drawings/illustrations, use of music, create poems/songs, write opinion letters, create videos/stories/comic strips, etc.) Conduct research and provide presentation of cultural topics. ● Design surveys to generate and analyze data to be used in discussion. <p>STUDENTS AT RISK OF FAILURE</p> <ul style="list-style-type: none"> ● Ask students to restate information, directions, and assignments. ● Repetition and practice ● Model skills / techniques to be mastered. ● Extended time to complete class work ● Provide copy of class notes ● Preferential seating to be mutually
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		<p>determined by the student and teacher</p> <ul style="list-style-type: none"> ● Student may request to use a computer to complete assignments. ● Establish expectations for correct spelling on assignments. ● Extra textbooks for home. ● Student may request books on tape / CD / digital media, as available and appropriate. ● Assign a peer helper in the class setting ● Provide oral reminders and check student work during independent work time ● Assist student with long and short term planning of assignments ● Encourage student to proofread assignments and tests ● Provide regular parent/ school communication ● Teachers will check/sign student agenda daily
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Mathematics Curriculum

Grade Five

GRADE FIVE CURRICULUM

Structure

Big Ideas

- Numerical expressions
- Analyze patterns using rules
- Place value system and patterns
- Compare decimals
- Multiply and divide multi-digit whole numbers and decimals
- Equivalent fractions

- Add and subtract fractions with like and unlike denominators
- Multiply and divide fractions
- Convert like measurements
- Interpret data
- Volume and solid figures
- Graph on a coordinate plane
- Classify two dimensional figures

Enduring Understanding

Students will understand that...

- Writing numerical expressions assists in recording calculations with numbers.
- Patterns can be analyzed by using rules to explain the relationship.
- Place value can make working with multi-digit numbers more clear.
- Decimals can be compared using place value.
- Utilizing algorithms can assist in multiplying and dividing multi-digit numbers.
- Strategies using place value can assist with adding, subtracting, multiplying, and dividing decimals.
- Finding equivalent fractions is a strategy to assist when adding and subtracting fractions.
- Adding, subtracting, multiplying, and dividing fractions are consistently used in real world problems.
- Measurements can be converted from larger to smaller units and vice versa.
- Line plots can represent a set of data.
- Volume is an attribute of a solid figure and can be measured with a formula.
- Graphing on a coordinate plane can assist in solving real world and mathematical problems.
- Two- dimensional figures can be grouped based on their common attributes.

Essential Questions

- What do parentheses represent in a numerical expression?
- How can patterns be analyzed?
- How does each place in the place value system relate to the place on the left and right?
- How can numbers be multiplied or divided by a power of ten?
- How can decimals be represented?
- How can decimals be compared?

- How are decimals rounded?
- What are the steps to multiplying multi-digit numbers?
- What are the steps to dividing with two digit divisors?
- How are operations performed with decimals?
- What are equivalent fractions?
- How are fractions added and subtracted?
- How are fractions multiplied?
- How are fractions divided?
- In a given measurement system, how can units be converted?
- How is data represented in line plots?
- What is volume?
- How is volume measured?
- How are points represented on a coordinate plane?
- How can two dimensional figures be classified?

GRADE FIVE CURRICULUM

Content Area: Mathematics	Grade Level: 5	Domain: Operations and Algebraic Thinking
21st Century Theme: Student’s mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.		
Standard: Write and interpret numerical expressions.		
Clusters		

<p>5.OA.A.1 Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols.</p>	<p>5.OA.A.2 Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them. <i>For example, express the calculation “add 8 and 7, then multiply by 2” as $2 \times (8 + 7)$. Recognize that $3 \times (18932 + 921)$ is three times as large as $18932 + 921$, without having to calculate the indicated sum or product.</i></p>
<p>Teacher Generated Questions</p>	
<p>Evaluate the following numerical expressions: $2(5+(3)(2)+4)$ $2((5+3)(2+4))$ $2(5+3(2+4))$</p> <p>If the parentheses are removed, will you get a different answer? Why?</p>	<p>Complete the expression to make the following true: Add 2 and 4 and multiply the sum by 3. Next, add 5 to that product and then double the result.</p>
<p>Standards for Mathematical Practice: MP1- Make sense of problems and persevere in solving them; MP2- Reason abstractly and quantitatively.; MP6- Attend to precision.; MP7- Look for and make use of structure.</p>	
<p>Assessment - Students will be assessed on a regular basis using summative and formative assessments to help guide instruction.</p>	

GRADE FIVE CURRICULUM

Content Area: Mathematics	Grade Level: 5	Domain: Operations and Algebraic Thinking
<p>21st Century Theme: Student’s mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.</p>		
<p>Standard: Analyze patterns and relationships.</p>		

Clusters

5.OA.B.3

Generate two numerical patterns using two given rules. Identify apparent relationships between corresponding terms. Form ordered pairs consisting of corresponding terms from the two patterns, and graph the ordered pairs on a coordinate plane.

Teacher Generated Questions

Given the rule “Add 3” and the starting number 0, and given the rule “Add 6” and the starting number 0, generate terms in the resulting sequences. What do you notice about the resulting sequences? Graph the pattern on a coordinate plane.

Standards for Mathematical Practice: MP1- Make sense of problems and persevere in solving them; MP2- Reason abstractly and quantitatively.; MP4- Model with mathematics.; MP6- Attend to precision.; MP7- Look for and make use of structure.

Assessment - Students will be assessed on a regular basis using summative and formative assessments to help guide instruction.

GRADE FIVE CURRICULUM

Content Area: Mathematics	Grade Level: 5	Domain: Number and Operations in Base Ten
21st Century Theme: Student’s mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.		

Standard: Understand the place value system.				
Clusters				
5.NBT.A.1 Recognize that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and 1/10 of what it represents in the place to its left.	5.NBT.A.2 Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10.	5.NBT.A.3a Read, write, and compare decimals to thousandths. a. Read and write decimals to thousandths using base-ten numerals, number names, and expanded form, e.g., $347.392 = 3 \times 100 + 4 \times 10 + 7 \times 1 + 3 \times (1/10) + 9 \times (1/100) + 2 \times (1/1000)$.	5.NBT.A.3b Read, write, and compare decimals to thousandths. b. Compare two decimals to thousandths based on meanings of the digits in each place, using $>$, $=$, and $<$ symbols to record the results of comparisons.	5.NBT.A.4 Use place value understanding to round decimals to any place.
Teacher Generated Questions				
A number in the hundreds place is how much larger than a number in the tens place? Explain the place value system and how the places relate to one another.	$23 \times 100 = ?$ $45.6 \div 10 = ?$ $10.7 \times 10^3 = ?$ $.036 \times 10^4 = ?$ $550.67 \div 10^2 = ?$	Correctly name the following and write them in expanded form: 1.21 .02 23.7 145.567 86.231	Compare the following decimals using $>$, $=$, and $<$: 0.45 ___ 0.35 1.412 ___ 1.402 3.06 ___ 3.064 23.032 ___ 23.320	Round 45.657 to the nearest ones, tenths, and thousandths place.
Standards for Mathematical Practice: MP1- Make sense of problems and persevere in solving them; MP2- Reason abstractly and quantitatively.; MP6- Attend to precision.; MP7- Look for and make use of structure.				
Assessment - Students will be assessed on a regular basis using summative and formative assessments to help guide instruction.				

GRADE FIVE CURRICULUM

Content Area: Mathematics	Grade Level: 5	Domain: Number and Operations in Base Ten
21st Century Theme: Student’s mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.		
Standard: Perform operations with multi-digit whole numbers and with decimals to hundredths.		
Clusters		
5.NBT.B.5 Fluently multiply multi-digit whole numbers using the standard algorithm.	5.NBT.B.6 Find whole-number quotients of whole numbers with up to four-digit dividends and two-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.	5.NBT.B.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.
Teacher Generated Questions		
Solve the following: 121 x 4 = ? 23 x 45 = ? 246 x 24 = ?	Solve the following: 2135 ÷ 45 = ? 1260 ÷ 20 = ? 456 ÷ 18 = ?	Use place value strategies, concrete models, or drawings to help solve the following problems. 1.23 + 0.45 = ? 45.23 – 5.622 = ? 2.546 x 0.3 = ? 98.25 ÷ 0.15 = ?
Standards for Mathematical Practice: MP1- Make sense of problems and persevere in solving them; MP2- Reason abstractly and quantitatively.; MP4- Model with mathematics.; MP6- Attend to precision.; MP7- Look for and make use of structure.		
Assessment - Students will be assessed on a regular basis using summative and formative assessments to help guide instruction.		

GRADE FIVE CURRICULUM

Content Area: Mathematics	Grade Level: 5	Domain: Number and Operations- Fractions
21st Century Theme: Student’s mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent		

engagement in future personal, work and civic life.	
Standard: Use equivalent fractions as a strategy to add and subtract fractions.	
Clusters	
<p>5.NF.A.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. <i>For example, $2/3 + 5/4 = 8/12 + 15/12 = 23/12$. (In general, $a/b + c/d = (ad + bc)/bd$.)</i></p>	<p>5.NF.A.2 Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators, e.g., by using visual fraction models or equations to represent the problem. Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers. <i>For example, recognize an incorrect result $2/5 + 1/2 = 3/7$, by observing that $3/7 < 1/2$.</i></p>
Teacher Generated Questions	
<p>Complete the following finding equivalent fractions: $2/5 + 2/7 = ?$ $1\ 2/3 + 2\ 1/2 = ?$ $5/8 - 1/3 = ?$ $5\ 4/9 - 2\ 3/18 = ?$</p>	<p>A farmer planted $2/5$ of his forty acres in corn and another $3/10$ of his land in wheat. Taken together, what fraction of the 40 acres had been planted in corn or wheat? What benchmark fraction could be used to estimate the fraction $2/5$? $7/8$? $12/18$?</p>
Standards for Mathematical Practice: MP1- Make sense of problems and persevere in solving them; MP2- Reason abstractly and quantitatively. MP4- Model with mathematics; MP6- Attend to precision.; MP8- Look for and express regularity in repeated reasoning.	
Assessment - Students will be assessed on a regular basis using summative and formative assessments to help guide instruction.	

GRADE FIVE CURRICULUM

Content Area: Mathematics	Grade Level: 5	Domain: Number and Operations- Fractions
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21st Century Theme: Student’s mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.

Standard: Apply and extend previous understandings of multiplication and division to multiply and divide fractions.

Clusters

<p>5.NF.B.3 Interpret a fraction as division of the numerator by the denominator ($a/b = a \div b$). Solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers, e.g., by using visual fraction models or equations to represent the problem. <i>For example, interpret $3/4$ as the result of dividing 3 by 4, noting that $3/4$ multiplied by 4 equals 3, and that when 3 wholes are shared equally among 4 people each person has a share of size $3/4$.</i></p>	<p>5.NF.B.4a Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction. a. Interpret the product $(a/b) \times q$ as a parts of a partition of q into b equal parts; equivalently, as the result of a sequence of operations $a \times q \div b$. <i>For example, use a visual fraction model to show $(2/3) \times 4 = 8/3$, and create a story context for this equation. (In general, $(a/b) \times (c/d) = ac/bd$.)</i></p>	<p>5.NF.B.4b Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction. b. Find the area of a rectangle with fractional side lengths by tiling it with unit squares of the appropriate unit fraction side lengths, and show that the area is the same as would be found by multiplying the side lengths. Multiply fractional side lengths to find areas of rectangles, and represent fraction products as rectangular areas.</p>	<p>5.NF.B.5a Interpret multiplication as scaling (resizing), by: a. Comparing the size of a product to the size of one factor on the basis of the size of the other factor, without performing the indicated multiplication.</p>	<p>5.NF.B.5b Interpret multiplication as scaling (resizing), by: b. Explaining why multiplying a given number by a fraction greater than 1 results in a product greater than the given number (recognizing multiplication by whole numbers greater than 1 as a familiar case); explaining why multiplying a given number by a fraction less than 1 results in a product smaller than the given number; and relating the principle of fraction equivalence $a/b = (n \times a)/(n \times b)$ to the effect of multiplying a/b by 1.</p>
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Teacher Generated Questions

<p>If 9 people want to share a 50-pound sack of rice equally by weight, how many pounds of rice should each person get? Between what two whole numbers does your answer lie?</p>	<p>Draw a diagram to represent $2/3$ of 3. Create another story using multiplication with a fraction and a whole number. Share with a partner, solve, and critique the problem.</p>	<p>A rectangle has a length equal to $3/4$ inch and the width is equal to $2/3$ inch. Find the area of the rectangle by tiling the rectangle and explain the pattern.</p>	<p>Decide which is greater without multiplying. 817 or 235×817 99 or $1/4 \times 99$ $51/100$ or $51/100 \times 301$ $13/90$ or $2/3 \times 13/90$</p>	<p>When multiplying a fraction by a number greater than one, will the product be greater or less than the original number? When multiplying a fraction by a number less than one, will the product be greater or less than the original number?</p>
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Standards for Mathematical Practice: MP1- Make sense of problems and persevere in solving them.; MP2- Reason abstractly and quantitatively.; MP3- Construct viable arguments and critique the reasoning of others.; MP4- Model with mathematics.; MP6- Attend to precision.; MP7- Look for and make use of structure.; MP8- Look for and express regularity in repeated reasoning.

Assessment - Students will be assessed on a regular basis using summative and formative assessments to help guide instruction.

GRADE FIVE CURRICULUM

Content Area: Mathematics		Grade Level: 5		Domain: Number and Operation- Fractions	
21st Century Theme: Student’s mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.					
Standard: Apply and extend previous understandings of multiplication and division to multiply and divide fractions.					
Clusters					
5.NF.B.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.	5.NF.B.7a Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions. a. Interpret division of a unit fraction by a non-zero whole number, and compute such quotients. <i>For example, create a story context for $(1/3) \div 4$, and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that $(1/3) \div 4 = 1/12$ because $(1/12) \times 4 = 1/3$.</i>		5.NF.B.7b Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions. b. Interpret division of a whole number by a unit fraction, and compute such quotients. <i>For example, create a story context for $4 \div (1/5)$, and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that $4 \div (1/5) = 20$ because $20 \times (1/5) = 4$.</i>		5.NF.B.7c Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions. c. Solve real world problems involving division of unit fractions by non-zero whole numbers and division of whole numbers by unit fractions, e.g., by using visual fraction models and equations to represent the problem. <i>For example, how much chocolate will each person get if 3 people share 1/2 lb of chocolate equally? How many 1/3-cup servings are in 2 cups of raisins?</i>
Teacher Generated Questions					
Kendra is making $\frac{1}{2}$ of a recipe. The full recipe calls for $3\frac{1}{4}$ cup of flour. How many cups of flour should Kendra use? Use a picture and then an equation to show how to solve the problem.	Write the equation you are trying to solve and use a picture to help you. There is $\frac{1}{4}$ of a cake left over and 3 boys want to share the cake. What fraction will each boy eat?		Write the equation you are trying to solve and use a picture to help you. Shauna buys a three-foot-long sandwich for a party. She then cuts the sandwich into pieces, with each piece being $\frac{1}{2}$ foot long. How many pieces does she get?		How much chocolate will each person get if 3 people share 1/2 lb of chocolate equally? How many 1/3-cup servings are in 2 cups of raisins?
Standards for Mathematical Practice: MP1- Make sense of problems and persevere in solving them.; MP2- Reason abstractly and quantitatively.; MP3- Construct viable arguments and critique the reasoning of others.; MP4- Model with mathematics.; MP6- Attend to precision.; MP7- Look for and make use of structure.					

Assessment - Students will be assessed on a regular basis using summative and formative assessments to help guide instruction.

GRADE FIVE CURRICULUM

Content Area: Mathematics	Grade Level: 5	Domain: Measurement and Data
21st Century Theme: Student’s mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.		
Standard: Convert like measurement units within a given measurement system.		
Clusters		
5.MD.A.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.		
Teacher Generated Questions		
Mrs. Smith had 75 feet of ribbon. If each of the 18 students in her class gets an equal length of ribbon, how long will each piece be? Write your answer		
<ul style="list-style-type: none">● Using only feet,● Using a whole number of feet and a whole number of inches, and● Using only inches.		
Standards for Mathematical Practice: MP1- Make sense of problems and persevere in solving them; MP2- Reason abstractly and quantitatively.; MP4- Model with mathematics.; MP6- Attend to precision.		
Assessment - Students will be assessed on a regular basis using summative and formative assessments to help guide instruction.		

GRADE FIVE CURRICULUM

Content Area: Mathematics	Grade Level: 5	Domain: Measurement and Data
21st Century Theme: Student’s mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.		
Standard: Represent and interpret data.		
Clusters		
5.MD.B.2		
Make a line plot to display a data set of measurements in fractions of a unit ($\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$). Use operations on fractions for this grade to solve problems involving information presented in line plots.		
Teacher Generated Questions		
Three identical beakers contain different amounts of liquid. One has $\frac{1}{3}$ of a beaker, the second has $\frac{3}{4}$ of a beaker, and the last has $\frac{1}{2}$ of a beaker. If all the beakers were combined and distributed evenly, how much would each beaker contain? You may use a line plot or pictures to assist you.		
Standards for Mathematical Practice: MP1- Make sense of problems and persevere in solving them.; MP2- Reason abstractly and quantitatively.; MP3- Construct viable arguments and critique the reasoning of others.; MP4- Model with mathematics.; MP6- Attend to precision.; MP7- Look for and make use of structure.		
Assessment - Students will be assessed on a regular basis using summative and formative assessments to help guide instruction.		

GRADE FIVE CURRICULUM

Content Area: Mathematics	Grade Level: 5	Domain: Measurement and Data
21st Century Theme: Student’s mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.		
Standard: Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition.		
Clusters		
5.MD.C.3a 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.	5.MD.C.3b Recognize volume as an attribute of solid figures and understand concepts of volume measurement. 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.	5.MD.C.4 Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and improvised units.
Teacher Generated Questions		
What do you use to measure volume?	If a container holds 24 unit cubes, what is the volume?	There are 3 cubic inches in length, 4 cubic inches in width, and 2 cubic inches in height. Use unit cubes to help find the volume of the three dimensional figure.
Standards for Mathematical Practice: MP1- Make sense of problems and persevere in solving them.; MP2- Reason abstractly and quantitatively.; MP4- Model with mathematics.; MP6- Attend to precision.; MP7- Look for and make use of structure.; MP8- Look for and express regularity in repeated reasoning.		
Assessment - Students will be assessed on a regular basis using summative and formative assessments to help guide instruction.		

GRADE FIVE CURRICULUM

Content Area: Mathematics	Grade Level: 5	Domain: Measurement and Data
21st Century Theme: Student's mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.		
Standard: Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition.		
Clusters		
<p>5.MD.C.5a</p> <p>Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume.</p> <p>a. Find the volume of a right rectangular prism with whole-number side lengths by packing it with unit cubes, and show that the volume is the same as would be found by multiplying the edge lengths, equivalently by multiplying the height by the area of the base. Represent threefold whole-number products as volumes, e.g., to represent the associative property of multiplication.</p>	<p>5.MD.C.5b</p> <p>Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume.</p> <p>b. Apply the formulas $V = l \times w \times h$ and $V = b \times h$ for rectangular prisms to find volumes of right rectangular prisms with whole number edge lengths in the context of solving real world and mathematical problems.</p>	<p>5.MD.C.5c</p> <p>Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume.</p> <p>c. Recognize volume as additive. Find volumes of solid figures composed of two non-overlapping right rectangular prisms by adding the volumes of the non-overlapping parts, applying this technique to solve real world problems.</p>
Teacher Generated Questions		
Jackie wants to fill a box with blocks that each represent one cubic inch. The area of the base of the box is 20 square inches, and the height is 4 cubic inches. How many blocks can she fit in the box?	Use the formula to find the volume of the rectangular prism. L = 13 cubic inches W= 8 cubic inches H= 4 cubic inches	James wants to fill a section of his garden with soil. One section of the garden is 12 feet by 13 feet by 2 feet and the other has a base area of 56 feet and a height of 2 feet. How many cubic feet of soil does James need to fill both sections of the garden?
Standards for Mathematical Practice: MP1- Make sense of problems and persevere in solving them.; MP2- Reason abstractly and quantitatively.; MP3- Construct viable arguments and critique the reasoning of others.; MP4- Model with mathematics.; MP6- Attend to precision.; MP7- Look for and make use of structure.; MP8- Look for and express regularity in repeated reasoning.		
Assessment - Students will be assessed on a regular basis using summative and formative assessments to help guide instruction.		

GRADE FIVE CURRICULUM

Content Area: Mathematics	Grade Level: 5	Domain: Geometry
21st Century Theme: Student’s mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.		
Standard: Graph points on the coordinate plane to solve real-world and mathematical problems.		
Clusters		
<p>5.G.A.1</p> <p>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).</p>	<p>5.G.A.2</p> <p>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>	
Teacher Generated Questions		
<p>Graph the (x, y) coordinates on the coordinate plane. Describe their relationship. $(2, 5)$ $(4, 10)$ $(6, 15)$</p>	<p>Find the point represented by $(8, 9)$ and label it A. If you travel to the left 3 places and down 1 and name that point B, what ordered pair will represent point B on the coordinate plane?</p>	
Standards for Mathematical Practice: MP1- Make sense of problems and persevere in solving them.; MP4- Model with mathematics.; MP5- Use appropriate tools strategically.; MP6- Attend to precision.; MP7- Look for and make use of structure.		
Assessment - Students will be assessed on a regular basis using summative and formative assessments to help guide instruction.		

GRADE FIVE CURRICULUM

Content Area: Mathematics	Grade Level: 5	Domain: Geometry
21st Century Theme: Student’s mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.		
Standard: Classify two-dimensional figures into categories based on their properties.		
Clusters		
5.G.B.3 Understand that attributes belonging to a category of two dimensional figures also belong to all subcategories of that category. <i>For example, all rectangles have four right angles and squares are rectangles, so all squares have four right angles.</i>	5.G.B.4 Classify two-dimensional figures in a hierarchy based on properties.	
Teacher Generated Questions		
What attributes do squares have in common with rectangles? What attributes do squares have in common with parallelograms? What attributes do rectangles have in common with parallelograms? What attributes do squares have in common with rhombuses?	Classify square, rectangle, parallelogram, trapezoid, and rhombus based on: 1. length of sides 2. angles 3. number of parallel lines	
Standards for Mathematical Practice: MP1- Make sense of problems and persevere in solving them; MP2- Reason abstractly and quantitatively.; MP4- Model with mathematics.; MP7- Look for and make use of structure.		
Assessment - Students will be assessed on a regular basis using summative and formative assessments to help guide instruction.		

MATERIALS and RESOURCES: YouTube https://www.quia.com/	INSTRUCTIONAL STRATEGIES <ul style="list-style-type: none"> ● Reinforcing effort ● Provide recognition 	DIFFERENTIATION GIFTED AND TALENTED <ul style="list-style-type: none"> ● Thematic topics for discussion and
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<p>Teacher Pay Teachers materials</p> <ul style="list-style-type: none"> ● Presentation/Digital Storytelling Tools: Google Slides, Prezi, Go Animate, Storybird, ToonDoo, ZooBurst, ● Online Speaking/Recording Tools: Voicethread, clear.msu, Audacity, Vocaroo, Aviary, Voki, Chatterpix Backchanneling: TodaysMeet, Polleverywhere, Padlet ● Video Tools: YouTube, TubeChop, educanon, blubbr.tv, edpuzzle, QR Codes: QR Code Generator Game-based ● Response Tools: Kahoot!, Socrative, Word clouds: Tagxedo, Wordle Interpersonal ● Communicative Tools: Skype, Google Hangouts, Twitter, Learning Management Systems such as Edmodo, Schoology, Canvas, Blackboard, etc. E-Portfolios: Google Drive, Pinterest, LiveBinder ● Authentic listening and reading sources that provides data and support for speaking and writing prompts. ● Exploration of art and/or artists to understand society and history. 	<ul style="list-style-type: none"> ● Cooperative learning ● Cues, Questions, Organizers ● Summarizing (or note taking) ● Generating & testing hypotheses ● Student practice ● Individualized instruction ● Effective feedback ● Presenting learning goals/ objectives ● Self-directed learning ● Blended learning ● Authentic learning ● Adapting to learning styles ● Conferencing ● Activate prior knowledge ● Investigations ● Flexible classrooms ● Flipped classroom ● Graphic organizers ● Guest speakers ● Identifying similarities and differences ● Learning centers ● Modeling ● Music/ songs ● Peer teaching ● project -based learning ● Reading aloud ● Debate ● Word walls ● Student choice ● Think- Pair- Share ● Rubrics ● Varied texts ● Literature circles ● Reading buddies ● 	<p>research: families & communities, science and technology, beauty and aesthetics, contemporary life, global challenges, personal and public identities.</p> <ul style="list-style-type: none"> ● Use of technological device to gain access to online resources in order to research and explore current events and cultural practices. Use advanced supplementary / reading materials ● Use of authentic resources to promote a deeper understanding of culture. ● Provide opportunities for open-ended, self-directed activities ● Communication outside the language classroom for travel, study, work, and/or interviews with community members. ● Encourage the use of creativity / ● Provide opportunities to develop depth and breadth of knowledge in the subject area (examples: create drawings/illustrations, use of music, create poems/songs, write opinion letters, create videos/stories/comic strips, etc.) Conduct research and provide presentation of cultural topics. ● Design surveys to generate and analyze data to be used in discussion. <p>STUDENTS AT RISK OF FAILURE</p> <ul style="list-style-type: none"> ● Ask students to restate information, directions, and assignments. ● Repetition and practice ● Model skills / techniques to be mastered. ● Extended time to complete class work ● Provide copy of class notes ● Preferential seating to be mutually determined by the student and teacher ● Student may request to use a computer to complete assignments.
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		<ul style="list-style-type: none">• Establish expectations for correct spelling on assignments.• Extra textbooks for home.• Student may request books on tape / CD / digital media, as available and appropriate.• Assign a peer helper in the class setting• Provide oral reminders and check student work during independent work time• Assist student with long and short term planning of assignments• Encourage student to proofread assignments and tests• Provide regular parent/ school communication• Teachers will check/sign student agenda daily
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Mathematics Curriculum

Grade Six

GRADE SIX CURRICULUM

Structure

Big Ideas

- Ratios and rates
- Dividing fractions
- Add, subtract, multiply, and divide multi-digit decimals
- Common factors and multiples
- System of rational numbers
- Comparing rational numbers
- Graphing on a coordinate plane
- Algebraic expressions
- Solving equations and inequalities

- Quantitative relationships between dependent and independent variables
- Area, surface area, and volume
- Statistical questions and measures of variation
- Distribution of data

Enduring Understanding

Students will understand that...

- Ratios and rates are used in mathematical problems and help solve real world problems.
- Fraction models and equations assist in understanding division of fractions with real world application.
- Numbers have a greatest common factors and a least common multiple, which can be found in different ways.
- Positive and negative numbers describe amounts with opposite values.
- Rational numbers are points on a number line.
- Rational numbers can be placed in order and compared.
- Graphing points on a coordinate plane can help find distances between points in the four quadrants.
- Expressions record operations with numbers and a variable.
- One variable equations and inequalities can be solved by getting the variable alone.
- Analyzing relationships between dependent and independent variables can be expressed through graphs and tables.
- Finding area of triangles, quadrilaterals, and other polygons can be found by decomposing shapes into smaller ones.
- Volume is expressed in cubic units and can be found by using the formulas.
- Nets assist in finding the surface area of three dimensional figures.
- Statistical questions can be tested and provide variability.
- Data can be collected to answer a statistical question and the distribution can be represented through line plots, dot plots, histograms, and box plots.

Essential Questions

- What does a ratio represent?
- What is a rate?
- How is a fraction divided by a fraction?
- How are common factors and multiples determined?
- What are the steps to adding, subtracting, multiplying, and dividing decimals?
- How are positive and negative numbers used?

- What is a rational number?
- How are rational numbers compared?
- How are points graphed on a coordinate plane?
- How are algebraic expressions represented?
- What are the steps to solving one variable equations and inequalities?
- How can dependent and independent variables be analyzed and represented?
- What are the formulas for area?
- How is surface area determined?
- What are formulas for volume?
- What is statistical variability and how can it be displayed?
- How can numerical data be represented?
- What are ways distribution of data can be analyzed?

GRADE SIX CURRICULUM

Content Area: Mathematics	Grade Level: 6	Domain: Ratios and Proportional Relationships
21st Century Theme: Student's mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.		
Standard: Understand ratio concepts and use ratio reasoning to solve problems.		
Clusters		

<p>6.RP.A.1 Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. <i>For example, "The ratio of wings to beaks in the bird house at the zoo was 2:1, because for every 2 wings there was 1 beak."</i></p>	<p>6.RP.A.2 Understand the concept of a unit rate a/b associated with a ratio $a:b$ with $b \neq 0$, and use rate language in the context of a ratio relationship. <i>For example, "This recipe has a ratio of 3 cups of flour to 4 cups of sugar, so there is $3/4$ cup of flour for each cup of sugar."</i></p>
<p>Teacher Generated Questions</p>	
<p>Write the ratio that describes each relationship. For every 1 vote for candidate A, candidate B received 3 votes. There are 4 pizzas for a group of 10 students.</p>	<p>Julie paid \$75 for 15 hamburgers, what is the rate per hamburger? The student types 80 words in 3 minutes, what is the unit rate?</p>
<p>Standards for Mathematical Practice: MP1- Make sense of problems and persevere in solving them; MP2- Reason abstractly and quantitatively.; MP7- Look for and make use of structure.; MP8- Look for and express regularity in repeated reasoning.</p>	
<p>Assessment - Students will be assessed on a regular basis using summative and formative assessments to help guide instruction.</p>	

GRADE SIX CURRICULUM

Content Area: Mathematics	Grade Level: 6	Domain: Ratios and Proportional Relationships
<p>21st Century Theme: Student's mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.</p>		
<p>Standard: Understand ratio concepts and use ratio reasoning to solve problems.</p>		
<p>Clusters</p>		

<p>6.RP.A.3a</p> <p>Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.</p> <p>a. Make tables of equivalent ratios relating quantities with whole number measurements, find missing values in the tables, and plot the pairs of values on the coordinate plane. Use tables to compare ratios.</p>	<p>6.RP.A.3b</p> <p>Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.</p> <p>b. Solve unit rate problems including those involving unit pricing and constant speed.</p>	<p>6.RP.A.3c</p> <p>Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.</p> <p>c. Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means 30/100 times the quantity); solve problems involving finding the whole, given a part and the percent.</p>	<p>6.RP.A.3d</p> <p>Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.</p> <p>d. Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities</p>
Teacher Generated Questions			
<p>Create a table of equal ratios using 1:3. Plot the points on a coordinate plane. What pattern do you notice?</p>	<p>If it took 7 hours to mow 4 lawns, then at that rate, how many lawns could be mowed in 35 hours? At what rate were lawns being mowed?</p>	<p>What is 20% of 80? 50 is 25% of what number? What is 50% of 280? 150 is 75% of what number?</p>	<p>Use ratios to find how many inches are in 5 yards.</p> <p>Use ratios to find how many meters are in 4 kilometers.</p>
<p>Standards for Mathematical Practice: MP1- Make sense of problems and persevere in solving them.; MP2- Reason abstractly and quantitatively.; MP4- Model with mathematics.; MP5- Use appropriate tools strategically.; MP6- Attend to precision.; MP7- Look for and make use of structure.; MP8- Look for and express regularity in repeated reasoning.</p>			
<p>Assessment - Students will be assessed on a regular basis using summative and formative assessments to help guide instruction.</p>			

GRADE SIX CURRICULUM

Content Area: Mathematics	Grade Level: 6	Domain: The Number System
<p>21st Century Theme: Student's mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent</p>		

engagement in future personal, work and civic life.
Standard: Apply and extend previous understandings of multiplication and division to divide fractions by fractions.
Clusters
6.NS.A.1 Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions, e.g., by using visual fraction models and equations to represent the problem. <i>For example, create a story context for $(2/3) \div (3/4)$ and use a visual fraction model to show the quotient; use the relationship between multiplication and division to explain that $(2/3) \div (3/4) = 8/9$ because $3/4$ of $8/9$ is $2/3$. (In general, $(a/b) \div (c/d) = ad/bc$.)</i>
Teacher Generated Questions
Solve the problems and use models to help solve if needed. How much chocolate will each person get if 3 people share $1/2$ lb of chocolate equally? How many $1/4$ -cup servings are in $2/3$ of a cup of yogurt? How wide is a rectangular strip of land with length $3/4$ mi and area $1/2$ square mi?
Standards for Mathematical Practice: MP1- Make sense of problems and persevere in solving them.; MP2- Reason abstractly and quantitatively.; MP4- Model with mathematics.; MP5- Use appropriate tools strategically.; MP6- Attend to precision.; MP7- Look for and make use of structure.; MP8- Look for and express regularity in repeated reasoning.
Assessment - Students will be assessed on a regular basis using summative and formative assessments to help guide instruction.

GRADE SIX CURRICULUM

Content Area: Mathematics	Grade Level: 6	Domain: The Number System
21st Century Theme: Student's mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.		
Standard: Compute fluently with multi-digit numbers and find common factors and multiples.		
Clusters		

6.NS.B.2 Fluently divide multi-digit numbers using the standard algorithm.	6.NS.B.3 Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.	6.NS.B.4 Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two whole numbers less than or equal to 12. Use the distributive property to express a sum of two whole numbers 1–100 with a common factor as a multiple of a sum of two whole numbers with no common factor. <i>For example, express $36 + 8$ as $4(9 + 2)$.</i>
Teacher Generated Questions		
Divide the following: 2345 ÷ 20 648 ÷ 22 32,746 ÷ 35 46,218 ÷ 18	Complete the following: 456.987 + 34.06 123.05 – 12.19 36.7 x 0.13 23.56 ÷ 0.21	Find the GCF for the following numbers: 32 and 18 26 and 13 50 and 100 Find the LCM for the following numbers: 3 and 8 5 and 12 9 and 12
Standards for Mathematical Practice: MP1- Make sense of problems and persevere in solving them.; MP2- Reason abstractly and quantitatively.; MP6- Attend to precision.; MP7- Look for and make use of structure.; MP8- Look for and express regularity in repeated reasoning.		
Assessment - Students will be assessed on a regular basis using summative and formative assessments to help guide instruction.		

GRADE SIX CURRICULUM

Content Area: Mathematics	Grade Level: 6	Domain: The Number System
21st Century Theme: Student’s mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.		
Standard: Apply and extend previous understandings of numbers to the system of rational numbers.		
Clusters		

<p>6.NS.C.5</p> <p>Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge); use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation.</p>	<p>6.NS.C.6a</p> <p>Understand a rational number as a point on the number line. Extend number line diagrams and coordinate axes familiar from previous grades to represent points on the line and in the plane with negative number coordinates.</p> <p>a. Recognize opposite signs of numbers as indicating locations on opposite sides of 0 on the number line; recognize that the opposite of the opposite of a number is the number itself, e.g., $-(-3) = 3$, and that 0 is its own opposite.</p>	<p>6.NS.C.6b</p> <p>Understand a rational number as a point on the number line. Extend number line diagrams and coordinate axes familiar from previous grades to represent points on the line and in the plane with negative number coordinates.</p> <p>b. Understand signs of numbers in ordered pairs as indicating locations in quadrants of the coordinate plane; recognize that when two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes.</p>	<p>6.NS.C.6c</p> <p>Understand a rational number as a point on the number line. Extend number line diagrams and coordinate axes familiar from previous grades to represent points on the line and in the plane with negative number coordinates.</p> <p>c. Find and position integers and other rational numbers on a horizontal or vertical number line diagram; find and position pairs of integers and other rational numbers on a coordinate plane.</p>
<p>Teacher Generated Questions</p>			
<p>Write the positive or negative integer that represents the situation: 50 feet below sea level, temperature rose 7 degrees, withdrawal 25 dollars, and deposit 50 dollars</p>	<p>What is the opposite of 4? What is the opposite of -8? What is the opposite of 0?</p>	<p>Label the following points on a coordinate plane and describe their relationship: (-1, 2) and (1, -2) (-2, 3) and (2, 3)</p>	<p>Create a number line. Find and label the following rational numbers: -1, 0, $-\frac{1}{2}$, 3, $\frac{3}{4}$, $\frac{7}{8}$, 1, and $-\frac{3}{4}$.</p>
<p>Standards for Mathematical Practice: MP1- Make sense of problems and persevere in solving them.; MP4- Model with mathematics.; MP6- Attend to precision.; MP7- Look for and make use of structure.</p>			
<p>Assessment - Students will be assessed on a regular basis using summative and formative assessments to help guide instruction.</p>			

GRADE SIX CURRICULUM

Content Area: Mathematics	Grade Level: 6	Domain: The Number System
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21st Century Theme: Student’s mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.

Standard: Apply and extend previous understandings of numbers to the system of rational numbers.

Clusters

<p>6.NS.C.7a</p> <p>Understand ordering and absolute value of rational numbers.</p> <p>a. Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram. <i>For example, interpret $-3 > -7$ as a statement that -3 is located to the right of -7 on a number line oriented from left to right.</i></p>	<p>6.NS.C.7b</p> <p>Understand ordering and absolute value of rational numbers.</p> <p>b. Write, interpret, and explain statements of order for rational numbers in real-world contexts. <i>For example, write $-3^{\circ}\text{C} > -7^{\circ}\text{C}$ to express the fact that -3°C is warmer than -7°C.</i></p>	<p>6.NS.C.7c</p> <p>Understand ordering and absolute value of rational numbers.</p> <p>c. Understand the absolute value of a rational number as its distance from 0 on the number line; interpret absolute value as magnitude for a positive or negative quantity in a real-world situation. <i>For example, for an account balance of -30 dollars, write $-30 = 30$ to describe the size of the debt in dollars.</i></p>	<p>6.NS.C.7d</p> <p>Understand ordering and absolute value of rational numbers.</p> <p>d. Distinguish comparisons of absolute value from statements about order. <i>For example, recognize that an account balance less than -30 dollars represents a debt greater than 30 dollars.</i></p>	<p>6.NS.C.8</p> <p>Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane. Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.</p>
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Teacher Generated Questions

<p>Which number is greater, -3 or -8? Which one is further to the right on a number line?</p>	<p>Which is warmer, -4 degrees or -9 degrees? Who has more points if one person has -1 points and another has -7 points?</p>	<p>What does absolute value describe? What is the absolute value of -45? What is the absolute value of 10?</p>	<p>The temperature in Alaska dropped and was less than -25 degrees Fahrenheit. Was the drop in temperature greater than or less than 25 degrees?</p>	<p>What is the distance between $(-5, 2)$ and $(-9, 2)$? What is the distance between $(3, -5 \frac{1}{2})$ and $(3, 2 \frac{1}{4})$?</p>
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Standards for Mathematical Practice: MP1- Make sense of problems and persevere in solving them; MP2- Reason abstractly and quantitatively.; MP4- Model with mathematics.; MP6- Attend to precision.; MP7- Look for and make use of structure.

Assessment - Students will be assessed on a regular basis using summative and formative assessments to help guide instruction.

GRADE SIX CURRICULUM

Content Area: Mathematics		Grade Level: 6		Domain: Expressions and Equations	
21st Century Theme: Student’s mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.					
Standard: Apply and extend previous understandings of arithmetic to algebraic expressions.					
Clusters					
6.EE.A.1 Write and evaluate numerical expressions involving whole-number exponents.	6.EE.A.2a Write, read, and evaluate expressions in which letters stand for numbers. a. Write expressions that record operations with numbers and with letters standing for numbers. <i>For example, express the calculation “Subtract y from 5” as $5 - y$.</i>		6.EE.A.2b Write, read, and evaluate expressions in which letters stand for numbers. b. Identify parts of an expression using mathematical terms (sum, term, product, factor, quotient, coefficient); view one or more parts of an expression as a single entity. <i>For example, describe the expression $2(8 + 7)$ as a product of two factors; view $(8 + 7)$ as both a single entity and a sum of two terms.</i>		6.EE.A.2c Write, read, and evaluate expressions in which letters stand for numbers. c. Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including those involving whole number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations).
Teacher Generated Questions					
The 6th grade class has three square garden boxes to create an outdoor community garden. The lengths of the sides of the three garden boxes are 12 feet, 15 feet, and 8 feet. Use exponents. What is the total area needed to create the	Some of the students at Kahlo Middle School like to ride their bikes to and from school. They always ride unless it rains. Let d be the distance in miles from a student’s home to the school. Write two different expressions that represent how far a student travels by bike in a four week		Describe the following expression using mathematical terms. $3(9-2) + 6x$ <u>25</u> $5 + 2(5 + 3)$		Use the formulas $V = s^3$ and $A = 6s^2$ to find the volume and surface area of a cube with sides of length $s = 1/2$. Discuss your solutions with a partner.

outdoor community garden?	period if there is one rainy day each week.		
Standards for Mathematical Practice: MP1- Make sense of problems and persevere in solving them.; MP2- Reason abstractly and quantitatively.; MP3- Construct viable arguments and critique the reasoning of others.; MP6- Attend to precision.; MP7- Look for and make use of structure.			
Assessment - Students will be assessed on a regular basis using summative and formative assessments to help guide instruction.			

GRADE SIX CURRICULUM

Content Area: Mathematics	Grade Level: 6	Domain: Expressions and Equations	
21st Century Theme: Student’s mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.			
Standard: Apply and extend previous understandings of arithmetic to algebraic expressions.			
Clusters			
6.EE.A.3 Apply the properties of operations to generate equivalent expressions. <i>For example, apply the distributive property to the expression $3(2 + x)$ to produce the equivalent expression $6 + 3x$; apply the distributive property to the expression $24x + 18y$ to produce the equivalent expression $6(4x + 3y)$; apply properties of operations to $y + y + y$ to produce the equivalent expression $3y$.</i>		6.EE.A.4 Identify when two expressions are equivalent (i.e., when the two expressions name the same number regardless of which value is substituted into them). <i>For example, the expressions $y + y + y$ and $3y$ are equivalent because they name the same number regardless of which number y stands for.</i>	
Teacher Generated Questions			
Use the distributive property to find an equivalent expression: $6(3x + 4)$ $y + y + y + x + x$ $32x + 24y$		Are the following expressions equivalent? $x + x$ and $2x + 2x$ $y + y + y + x$ and $3y + x$ $14x + 7y$ and $7(2x + y)$ $12x + 4y$ and $4(4x + y)$	

Standards for Mathematical Practice: MP1- Make sense of problems and persevere in solving them.; MP2- Reason abstractly and quantitatively.; MP6- Attend to precision.; MP7- Look for and make use of structure.; MP8- Look for and express regularity in repeated reasoning.

Assessment - Students will be assessed on a regular basis using summative and formative assessments to help guide instruction.

GRADE SIX CURRICULUM

Content Area: Mathematics		Grade Level: 6		Domain: Expressions and Equations	
21st Century Theme: Student’s mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.					
Standard: Reason about and solve one-variable equations and inequalities.					
Clusters					
6.EE.B.5 Understand solving an equation or inequality as a process of answering a question: which values from a specified set, if any, make the equation or inequality true? Use substitution to determine whether a given number in a specified set makes an equation or inequality true.		6.EE.B.6 Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set.		6.EE.B.7 Solve real-world and mathematical problems by writing and solving equations of the form $x + p = q$ and $px = q$ for cases in which p, q and x are all nonnegative rational numbers.	
6.EE.B.8 Write an inequality of the form $x > c$ or $x < c$ to represent a constraint or condition in a real-world or mathematical problem. Recognize that inequalities of the form $x > c$ or $x < c$ have infinitely many solutions; represent solutions of such inequalities on number line diagrams.					
Teacher Generated Questions					

<p>Shipping is free for all orders \$24.99 and over at clothesfortrolls.com. What amounts can receive free shipping? Let "a" represent free shipping orders and write the inequality. Give 3 possible solutions.</p> <p>The librarian is filling a bookshelf. It can hold 125 books and she has placed 47 books on the shelf already. How many books can she add to the shelf to fill it? Write the equation and find the solution.</p>	<p>A town's total allocation for firefighter's wages and benefits in a new budget is \$600,000. If wages are calculated at \$40,000 per firefighter and benefits at \$20,000 per firefighter, write an equation whose solution is the number of firefighters the town can employ if they spend their whole budget. Solve the equation.</p>	<p>Ogdensburg Elementary 6th graders made \$215 dollars on their school play. They made \$55.00 on popcorn sales. How much did they earn from ticket sales?</p> <p>Ogdensburg Elementary 6th graders sold three times as many tickets to the school play this week as they did last week. They sold 60 tickets this week. How many tickets did they sell the week before?</p>	<p>Fishing Adventures rents small fishing boats to tourists for day-long fishing trips. Each boat can hold at most eight people. Additionally, each boat can only carry 900 pounds of weight for safety reasons.</p> <p>-Let p represent the total number of people. Write an inequality to describe the number of people that a boat can hold. Draw a number line diagram that shows all possible solutions.</p> <p>-Let w represent the total weight of a group of people wishing to rent a boat. Write an inequality that describes all total weights allowed in a boat. Draw a number line diagram that shows all possible solutions.</p>
<p>Standards for Mathematical Practice: MP1- Make sense of problems and persevere in solving them.; MP2- Reason abstractly and quantitatively.; MP6- Attend to precision.; MP7- Look for and make use of structure.</p>			
<p>Assessment - Students will be assessed on a regular basis using summative and formative assessments to help guide instruction.</p>			

GRADE SIX CURRICULUM

Content Area: Mathematics	Grade Level: 6	Domain: Expressions and Equations
<p>21st Century Theme: Student's mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.</p>		
<p>Standard: Represent and analyze quantitative relationships between dependent and independent variables.</p>		
<p>Clusters</p>		

6.EE.C.9

Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation. *For example, in a problem involving motion at constant speed, list and graph ordered pairs of distances and times, and write the equation $d = 65t$ to represent the relationship between distance and time.*

Teacher Generated Questions

Stephanie is helping her band collect money to fund a field trip. The band decided to sell boxes of chocolate bars. Each bar sells for \$1.50 and each box contains 20 bars. Create a table of money collected for different numbers of boxes sold.

- Write an equation for the amount of money, m , that will be collected if b boxes of chocolate bars are sold. Which is the independent variable and which is the dependent variable?
- Graph the equation using the ordered pairs from the table.
- Calculate how much money will be collected if 100 boxes of chocolate bars are sold.
- The band collected \$1530.00 from chocolate bar sales. How many boxes did they sell?

Standards for Mathematical Practice: MP1- Make sense of problems and persevere in solving them.; MP2- Reason abstractly and quantitatively.; MP4- Model with mathematics.; MP6- Attend to precision.; MP7- Look for and make use of structure.; MP8- Look for and express regularity in repeated reasoning.

Assessment - Students will be assessed on a regular basis using summative and formative assessments to help guide instruction.

GRADE SIX CURRICULUM

Content Area: Mathematics		Grade Level: 6	Domain: Geometry	
21st Century Theme: Student’s mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.				
Standard: Solve real-world and mathematical problems involving area, surface area, and volume.				
Clusters				
6.G.A.1 Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems.	6.G.A.2 Find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes of the appropriate unit fraction edge lengths, and show that the volume is the same as would be found by multiplying the edge lengths of the prism. Apply the formulas $V = lwh$ and $V = bh$ to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems.	6.G.A.3 Draw polygons in the coordinate plane given coordinates for the vertices; use coordinates to find the length of a side joining points with the same first coordinate or the same second coordinate. Apply these techniques in the context of solving real-world and mathematical problems.	6.G.A.4 Represent three-dimensional figures using nets made up of rectangles and triangles, and use the nets to find the surface area of these figures. Apply these techniques in the context of solving real-world and mathematical problems.	
Teacher Generated Questions				
What is the formula for finding area of the following: Triangle Square Rectangle How can the area of a parallelogram, hexagon, or octagon be found by breaking the shape into smaller shapes?	Leo's recipe for banana bread won't fit in his favorite pan. The batter fills the 8.5 inch by 11 inch 1.75 inch pan to the very top, but when it bakes it spills over the side. He has another pan that is 9 inches by 9 inches by 3 inches, and from past experience he thinks he needs about an inch between the top of the batter and the rim of the pan. Should he use this pan? Discuss your answer with a partner.	On a map, the library is located at (-2, 2), the city hall building is located at (0,2), and the high school is located at (0,0). Represent the locations as points on a coordinate grid with a unit of 1 mile. - What is the distance from the library to the city hall building? The distance from the city hall building to the high school? How do you know? - What shape does connecting the three locations form?	Draw a net of a rectangular prism with a length of 6 inches, a width of 3 inches and height of 2 inches. Explain how to find the surface area using the dimensions and the net.	

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

Assessment - Students will be assessed on a regular basis using summative and formative assessments to help guide instruction.

GRADE SIX CURRICULUM

Content Area: Mathematics	Grade Level: 6	Domain: Statistics and Probability	
21st Century Theme: Student’s mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.			
Standard: Develop understanding of statistical variability.			
Clusters			
6.SP.A.1 Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers. <i>For example, “How old am I?” is not a statistical question, but “How old are the students in my school?” is a statistical question because one anticipates variability in students’ ages.</i>	6.SP.A.2 Understand that a set of data collected to answer a statistical question has a distribution which can be described by its center, spread, and overall shape.	6.SP.A.3 Recognize that a measure of center for a numerical data set summarizes all of its values with a single number, while a measure of variation describes how its values vary with a single number.	
Teacher Generated Questions			
Determine if the following questions are statistical questions: What is my favorite color? How old am I? How many students are in each grade? Are apples red? What is the average amount of time students	The scores for organization in an extended response question were 0, 1, 2, 2, 3, 3, 3, 3, 3, 3, 4, 4, 4, 4, 5, 5, 5, 6, and 6. The scores for accuracy in an extended response question were 2, 2, 3, 3, 3, 3, 4, 4, 4, 4, 4, 5, 5, 5, 5, 5, 5, 6, 6, 6, and 6.	The scores for organization in an extended response question were 0, 1, 2, 2, 3, 3, 3, 3, 3, 3, 4, 4, 4, 4, 5, 5, 5, 6, and 6. - How many students are represented in the data set? - What are the mean, median, and mode of the data set? What do these values mean? How do they compare?	

spend exercising each week? How old are the students in the school?	- Graph the data from the two charts on a line plot. What observations do you notice about the center, spread, and overall shape of the data? When a large number is added to a distribution, does the mean or median change the most - and why?	- What is the range of the data? What does this value mean?
Standards for Mathematical Practice: MP1- Make sense of problems and persevere in solving them; MP2- Reason abstractly and quantitatively.; MP4- Model with mathematics.; MP6- Attend to precision.; MP7- Look for and make use of structure.		
Assessment - Students will be assessed on a regular basis using summative and formative assessments to help guide instruction.		

GRADE SIX CURRICULUM

Content Area: Mathematics	Grade Level: 6	Domain: Statistics and Probability		
21st Century Theme: Student's mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.				
Standard: Summarize and describe distributions.				
Clusters				
6.SP.B.4 Display numerical data in plots on a number line, including dot plots, histograms, and box plots.	6.SP.B.5a Summarize numerical data sets in relation to their context, such as by: a. Reporting the number of observations.	6.SP.B.5b Summarize numerical data sets in relation to their context, such as by: b. Describing the nature of the attribute under investigation, including how it was measured and	6.SP.B.5c Summarize numerical data sets in relation to their context, such as by: c. Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context	6.SP.B.5d Summarize numerical data sets in relation to their context, such as by: d. Relating the choice of measures of center and variability to the shape of the data distribution and the context in which the

		its units of measurement.	in which the data were gathered.	data were gathered.
Teacher Generated Questions				
Display the scores of the most recent math test in a dot plot, histogram, and a box plot. 68, 73, 75, 80, 84, 84, 84, 88, 90, 90, 91	Collect the number of pets each of the students in your class owns and summarize the data.	Explain how the unit of measure could change the way the data is collected and interpreted. When collecting data on people's height and foot length, why would the units used be important?	Explain the similarities and differences of the interquartile range and mean absolute deviation. How would two distributions compare to one another if they had the same mean but the variation for one was much smaller than the other? Discuss your ideas with a partner.	In a community of homes, most are very modest and similar. There are a few homes, however, that are very extravagant. What measure of center would be appropriate to describe the typical home value?
Standards for Mathematical Practice: MP1- Make sense of problems and persevere in solving them.; MP3- Construct viable arguments and critique the reasoning of others.; MP4- Model with mathematics.; MP5- Use appropriate tools strategically.; MP6- Attend to precision.; MP7- Look for and make use of structure.; MP8- Look for and express regularity in repeated reasoning.				
Assessment - Students will be assessed on a regular basis using summative and formative assessments to help guide instruction.				

<p>MATERIALS and RESOURCES: YouTube https://www.quia.com/ Teacher Pay Teachers materials</p> <ul style="list-style-type: none"> ● Presentation/Digital Storytelling Tools: Google Slides, Prezi, Go Animate, Storybird, ToonDoo, ZooBurst, ● Online Speaking/Recording Tools: Voicethread, clear.msu, Audacity, Vocaroo, Aviary, Voki, Chatterpix <p>Backchanneling:</p>	<p>INSTRUCTIONAL STRATEGIES</p> <ul style="list-style-type: none"> ● Reinforcing effort ● Provide recognition ● Cooperative learning ● Cues, Questions, Organizers ● Summarizing (or note taking) ● Generating & testing hypotheses ● Student practice ● Individualized instruction ● Effective feedback ● Presenting learning goals/ objectives 	<p>DIFFERENTIATION GIFTED AND TALENTED</p> <ul style="list-style-type: none"> ● Thematic topics for discussion and research: families & communities, science and technology, beauty and aesthetics, contemporary life, global challenges, personal and public identities. ● Use of technological device to gain access to online resources in order to research and explore current events and cultural practices. Use advanced supplementary /
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<p>TodaysMeet, Polleverywhere, Padlet</p> <ul style="list-style-type: none"> • Video Tools: YouTube, TubeChop, educanon, blubbr.tv, edpuzzle, QR Codes: QR Code Generator Game-based • Response Tools: Kahoot!, Socrative, Word clouds: Tagxedo, Wordle Interpersonal • Communicative Tools: Skype, Google Hangouts, Twitter, Learning Management Systems such as Edmodo, Schoology, Canvas, Blackboard, etc. E-Portfolios: Google Drive, Pinterest, LiveBinder • Authentic listening and reading sources that provides data and support for speaking and writing prompts. • Exploration of art and/or artists to understand society and history. 	<ul style="list-style-type: none"> • Self-directed learning • Blended learning • Authentic learning • Adapting to learning styles • Conferencing • Activate prior knowledge • Investigations • Flexible classrooms • Flipped classroom • Graphic organizers • Guest speakers • Identifying similarities and differences • Learning centers • Modeling • Music/ songs • Peer teaching • project -based learning • Reading aloud • Debate • Word walls • Student choice • Think- Pair- Share • Rubrics • Varied texts • Literature circles • Reading buddies • 	<p>reading materials</p> <ul style="list-style-type: none"> • Use of authentic resources to promote a deeper understanding of culture. • Provide opportunities for open-ended, self-directed activities • Communication outside the language classroom for travel, study, work, and/or interviews with community members. • Encourage the use of creativity / • Provide opportunities to develop depth and breadth of knowledge in the subject area (examples: create drawings/illustrations, use of music, create poems/songs, write opinion letters, create videos/stories/comic strips, etc.) Conduct research and provide presentation of cultural topics. • Design surveys to generate and analyze data to be used in discussion. <p>STUDENTS AT RISK OF FAILURE</p> <ul style="list-style-type: none"> • Ask students to restate information, directions, and assignments. • Repetition and practice • Model skills / techniques to be mastered. • Extended time to complete class work • Provide copy of class notes • Preferential seating to be mutually determined by the student and teacher • Student may request to use a computer to complete assignments. • Establish expectations for correct spelling on assignments. • Extra textbooks for home. • Student may request books on tape / CD / digital media, as available and appropriate. • Assign a peer helper in the class setting • Provide oral reminders and check student work during independent work time
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		<ul style="list-style-type: none">• Assist student with long and short term planning of assignments• Encourage student to proofread assignments and tests• Provide regular parent/ school communication• Teachers will check/sign student agenda daily
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Mathematics Curriculum

Grade Seven

GRADE SEVEN CURRICULUM

Structure

Big Ideas

- Develop an understanding of proportionality to solve multi-step problems
- Expand knowledge of percent problems to include percent of increase and percent of decrease
- Graph proportional relationships on the coordinate plane
- Perform four operations with the set of real numbers
- Create and solve expressions and equations to represent mathematical situations
- Use equations to solve perimeter, area, and volume
- Identify relationships of angles with parallel lines and transversals
- Use representative samples to draw inferences
- Represent real-life mathematical problems using expressions and equations
- Represent data in a variety of graphs
- Develop an understanding of probability

Enduring Understanding

Students will understand that...

- Unit rates can assist in solving problems.
- Quantities can be represented with proportionality.
- Proportional relationships can be represented on a coordinate plane.
- Opposite quantities combine to make zero.
- Absolute value measures a distance.
- Properties of operations are strategies that assist with calculations.
- Variables represent unknown quantities in expressions and equations.
- Tools assist in construction of geometrical figures.
- Formulas for area, perimeter, and volume support the solution of real-world problems.
- Supplementary, complementary, vertical, and adjacent angles apply to geometric figures.
- Random sampling draws conclusions about populations.
- Probability expresses the likelihood of an event.
- Probabilities of compound events uses organized lists, tables, tree diagrams, and simulation.

Essential Questions

- How do you calculate a unit rate?
- What is a proportion?
- How do you compare two ratios?
- What is an additive inverse?
- How is subtraction of integers related to addition?
- What is the process for performing the four operations on different formats of rational numbers?
- How does a fraction convert to a decimal?
- What are the steps for solving equations using variables?
- How are inequalities different than equalities?
- How do proportions assist in creating a scale drawing?
- What tools are used to draw geometric shapes?
- What is a plane section of a three-dimensional shape?
- What types of angles assist in analyzing angles with parallel lines and a transversal?
- How do statistics describe a population?
- How does a random sampling represent a population?
- What information is used to compare two populations?
- What does probability tell about an event?
- Between what two numbers does probability lie?
- What is a compound event when calculating probability?
- How do you calculate a compound event?

GRADE SEVEN CURRICULUM

Content Area: Mathematics		Grade Level: 7		Domain: Ratios and Proportional Relationships		
21st Century Theme: Student’s mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.						
Standard: Analyze proportional relationships and use them to solve real-world and mathematical problems.						
Clusters						
7.RP.A.1 Compute unit rates associated with ratios of fractions, including ratios of lengths, areas, and other quantities measured in like or different units.	7.RP.A.2 Recognize and represent proportional relationships between quantities: a. decide whether two quantities are in a proportional relationship.	7.RP.A.2 Recognize and represent proportional relationships between quantities: b. identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.	7.RP.A.2 Recognize and represent proportional relationships between quantities: c. represent proportional relationships by equations.	7.RP.A.2 Recognize and represent proportional relationships between quantities: d. explain what a point (x, y) on a graph of a proportional relationship means in terms of the situation, with special attention to $(0, 0)$ and $(1, r)$ where r is the unit rate.		
Teacher Generated Questions						
If a person walks $\frac{1}{2}$ mile in each $\frac{1}{4}$ hour, compute the unit rate as the complex fraction $\frac{1}{2} / \frac{1}{4}$ mph (2 mph).	Given a table of values, are there equivalent ratios in the table? Are the quantities in the table on the same line of the coordinate plane?	Study the graph. What is the unit rate of change?	If the total cost t is proportional to the number n of items purchased at a constant price p , what is the relationship between total cost and the number of items? $(t = pn)$	Look at the graph of two men’s salaries. Who makes more money after 5 hours?		
Standards for Mathematical Practice: MP1 - Make sense of problems and persevere in solving them. MP2- Reason abstractly and quantitatively. MP6 - Attend to precision. MP7 - Look for and make use of structure. MP8 - Look for and express regularity in repeated reasoning.						

Assessment - Students will be assessed on a regular basis using summative and formative assessments to help guide instruction.

GRADE SEVEN CURRICULUM

Content Area: Mathematics	Grade Level:	Domain: Ratios and Proportional Relationships
21st Century Theme: Student’s mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.		
Standard: Analyze proportional relationships and use them to solve real-world and mathematical problems.		
Clusters		
7.RP.A.3 Use proportional relationships to solve multistep ratio and percent problems.		
Teacher Generated Questions		
Given a principal of \$5000, with a simple interest rate of 2.5% per month, how much interest do you make the first year? How much is in the account at the end of the third month? How much would be in the account after the third month of compounded interest?		
Standards for Mathematical Practice: MP1 - Make sense of problems and persevere in solving them. MP2 - Reason abstractly and quantitatively. MP6 - Attend to precision. MP7 - Look for and make use of structure. MP8 - Look for and express regularity in repeated reasoning.		
Assessment - Students will be assessed on a regular basis using summative and formative assessments to help guide instruction.		

GRADE SEVEN CURRICULUM

Content Area: Mathematics		Grade Level: 7		Domain: The Number System	
21st Century Theme: Student’s mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.					
Standard: Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.					
Clusters					
7.NS.A.1 Apply and extend previous understandings of addition and subtraction with rational numbers; represent + and – on a horizontal or vertical number line. a. Describe situations in which opposite quantities combine to make zero.	7.NS.A.1 Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers: represent + and – on a horizontal or vertical number line. b. Understand $p + q$ as the number located a distance from p ($ q $) in the positive or negative direction.	7.NS.A.1 Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers: represent + and – on a horizontal or vertical number line. c. Represent proportional relationships by equations.	7.NS.A.1 Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers: represent + and – on a horizontal or vertical number line. d. Apply properties of operations as strategies to add and subtract rational numbers.	7.NS.A.2 Apply and extend previous understandings of multiplication and division and fractions to multiply and divide rational numbers: a. understand that properties of fractions extend to rational numbers (rules for signed numbers).	
Teacher Generated Questions					
A retailer sells 37 gumballs and replaces them with his next order of 45. Show the relationship on a number line.	Show the addition of $8 + -4$ on a number line. Which number needs to consider absolute value?	Given that you purchase n items at a price p . What is the equation for the total cost t ?	Add $3.5 + 3\frac{1}{2} + -8.15$ using associative property.	If a store sells a ream for \$2.50 and averages selling $\frac{1}{2}$ a ream of paper every $\frac{1}{4}$ hour, how much money will they lose if they sell the paper for $\frac{1}{10}$ its cost for a week?	
Standards for Mathematical Practice: MP1 - Make sense of problems and persevere in solving them. MP2 - Reason abstractly and quantitatively. MP3 - Construct viable arguments and critique the reasoning of others. MP6 - Attend to precision. MP7 - Look for and make use of structure. MP8 - Look for and express regularity in repeated reasoning.					

Assessment - Students will be assessed on a regular basis using summative and formative assessments to help guide instruction.

GRADE SEVEN CURRICULUM

Content Area: Mathematics		Grade Level: 7		Domain: The Number System	
21st Century Theme: Student’s mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.					
Standard: Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.					
Clusters					
7.NS.A.2 Apply and extend previous understandings of multiplication and division and fractions to multiply and divide rational numbers: b. understand that integers can be divided (not by 0) and the quotient will be rational.		7.NS.A.2 Apply and extend previous understandings of multiplication and division and fractions to multiply and divide rational numbers: c. apply properties of operations as strategies to multiply and divide rational numbers.		7.NS.A.2 Apply and extend previous understandings of multiplication and division and fractions to multiply and divide rational numbers; Convert rational numbers to decimals using long division: d. understand the decimal (0 or repeating) of a rational number.	
7.NS.A.3 Solve real-world and mathematical problems involving the four operations with rational numbers.					
Teacher Generated Questions					
Explain what - 0.5 means on a stock market quote. How do you write 15 degrees below zero as an integer?		What are the rules for operations with integers? Explain the difference between: $-(p/q)$ $-p/q$ $p/-q$		Why is Pi an irrational number? A student purchases $4 \frac{1}{3}$ meters of chain at \$.34 per meter. How much did they pay?	
Standards for Mathematical Practice: MP1 - Make sense of problems and persevere in solving them. MP2 - Reason abstractly and quantitatively. MP6 - Attend to precision. MP7 - Look for and make use of structure. MP8 - Look for and express regularity in repeated reasoning.					

Assessment - Students will be assessed on a regular basis using summative and formative assessments to help guide instruction.

GRADE SEVEN CURRICULUM

Content Area: Mathematics	Grade Level: 7	Domain: Expressions and Equations
21st Century Theme: Student's mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.		
Standard: Use properties of operations to generate equivalent expressions.		
Clusters		
7.EE.A.1 Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.	7.EE.A.2 Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related.	
Teacher Generated Questions		
Solve $2.3x + -7 = 39$	Explain why $a + 0.05a = 1.05a$. Recognize that the .05 is a 5% increase.	
Standards for Mathematical Practice: MP1 - Make sense of problems and persevere in solving them. MP2 - Reason abstractly and quantitatively. MP3 - Construct viable arguments and critique the reasoning of others. MP8 - Look for and express regularity in repeated reasoning.		
Assessment - Students will be assessed on a regular basis using summative and formative assessments to help guide instruction.		

GRADE SEVEN CURRICULUM

Content Area: Mathematics	Grade Level: 7	Domain: Expressions and Equations
21st Century Theme: Student’s mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.		
Standard: Solve real-life and mathematical problems using numerical and algebraic expressions and equations.		
Clusters		
7.EE.B.3 Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers while utilizing tools, properties of operations, and assess reasonableness of answer.	7.EE.B.4 Use variable to represent quantities; a . Construct equations and inequalities to solve problems in the form $ax + c = y$ or $a(x + c) = y$. Solve fluently.	7.EE.B.4 Use variable to represent quantities; b . Construct equations and inequalities to solve problems in the form $ax + c < (or >) y$. Graph the solution set.
Teacher Generated Questions		
If a woman making \$25 an hour gets a 10% raise, she will make an additional 1/10 of her salary an hour. What is her new salary? (\$2.50 + \$25). If you want to place a towel bar 9 ¾ in. long in the center of a door 2.5 ft. long, how far from each side will it be?	The perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width?	As a salesperson, you are paid \$50 per week plus \$3 per sale. You want your pay to be <i>at least</i> \$100. Write an inequality for the number of sales that you need and describe the solution. Explain your answer.
Standards for Mathematical Practice: MP1 Make sense of problems and persevere in solving them. MP2 - Reason abstractly and quantitatively. MP3 - Construct viable arguments and critique the reasoning of others. MP6 - Attend to precision. MP7 - Look for and make use of structure. MP8 - Look for and express regularity in repeated reasoning.		
Assessment - Students will be assessed on a regular basis using summative and formative assessments to help guide instruction.		

GRADE SEVEN CURRICULUM

Content Area: Mathematics		Grade Level: 7	Domain: Geometry
21st Century Theme: Student’s mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.			
Standard: Draw, construct, and describe geometrical figures and describe the relationship between them.			
Clusters			
7.G.A.1 Solve problems involving scale drawings of geometric figures including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale.	7.G.A.2 Draw geometric shapes with given conditions. Focus on constructing triangles from 3 measures of angles or sides. Notice when the conditions make a unique triangle, more than one triangle, or no triangle.	7.G.A.3 Describe the two-dimensional figures that result from slicing three-dimensional figures (as in plane sections of right rectangular prism or right rectangular pyramids).	
Teacher Generated Questions			
Your model car is at 1:16 scale. The model car is 12 inches long. How long would it be if the scale was 1:20?	Explain the steps to use a ruler and protractor to circumscribe a circle around a triangle.	What shape would result when you cut a right rectangular pyramid from the point to the base?	
Standards for Mathematical Practice: MP1 - Make sense of problems and persevere in solving them. MP4 - Model with Mathematics. MP5 Use appropriate tools strategically. MP6 - Attend to precision. MP7 - Look for and make use of structure.			
Assessment - Students will be assessed on a regular basis using summative and formative assessments to help guide instruction.			

GRADE SEVEN CURRICULUM

Content Area: Mathematics	Grade Level: 7	Domain: Geometry
21st Century Theme: Student's mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.		
Standard: Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.		
Clusters		
7.G.B.4 Know the formulas for a circle (area & circumference) and use them to solve problems; give an informal derivation of the relationship of circumference and area of circles.	7.G.B.5 Use facts about supplementary, complimentary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure.	7.G.B.6 Solve real-world and mathematical problems with area, volume, and surface area of 2 and 3 dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.
Teacher Generated Questions		
Explain from where the number Pi comes.	Given a diagram and one angle measurement, find the remaining angles.	A yard has an equilateral pentagonal pool. Each side measures 5 ft. The water will be 6 ft. deep. What is the volume of water in the pool?
Standards for Mathematical Practice: MP1 - Make sense of problems and persevere in solving them. MP2 - Reason abstractly and quantitatively. MP4 - Model with Mathematics. MP6 - Attend to precision. MP7 - Look for and make use of structure. MP8 - Look for and express regularity in repeated reasoning.		
Assessment - Students will be assessed on a regular basis using summative and formative assessments to help guide instruction.		

GRADE SEVEN CURRICULUM

Content Area: Mathematics	Grade Level: 7	Domain: Statistics and Probability
21st Century Theme: Student’s mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.		
Standard: Use random sampling to draw inferences about a population.		
Clusters		
7.SP.A.1 Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population. Understand that random sampling tends to produce representative samples and support valid inferences.	7.SP.A.2 Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generalize multiple samples of the same size to gauge the variation in estimates or predictions.	
Teacher Generated Questions		
Create a survey and, after collating the information draw conclusions about the population.	Estimate the mean word length in a book by randomly sampling words from the book. Predict the winner of a school election based on random sampling.	
Standards for Mathematical Practice: MP1 - Make sense of problems and persevere in solving them. MP2 - Reason abstractly and quantitatively. MP3 - Construct viable arguments and critique the reasoning of others. MP5 - Use appropriate tools strategically. MP6 - Attend to precision		
Assessment - Students will be assessed on a regular basis using summative and formative assessments to help guide instruction.		

GRADE SEVEN CURRICULUM

Content Area: Mathematics	Grade Level: 7	Domain: Statistics and Probability
21st Century Theme: Student’s mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.		
Standard: Draw informal comparative inferences about two populations.		
Clusters		
7.SP.B.3 Informally assess the degree of visual overlap of two numerical data distributions with similar variability; measure the difference between the centers and express it visually.	7.SP.B.4 Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations.	
Teacher Generated Questions		
The mean height of players on the basketball team is 10 cm greater than the mean height of players on the soccer team, about twice the variability (mean absolute deviation) on either team. Show on a dot plot the separation between the two distributions of heights is noticeable.	Decide whether the words in chapter 6 of your science book are generally longer than the words in ch. 6 of your fifth grade science book. Explain your findings.	
Standards for Mathematical Practice: MP1 - Make sense of problems and persevere in solving them. MP2 - Reason abstractly and quantitatively. MP3 - Construct viable arguments and critique the reasoning of others.		
Assessment - Students will be assessed on a regular basis using summative and formative assessments to help guide instruction.		

GRADE SEVEN CURRICULUM

Content Area: Mathematics	Grade Level: 7	Domain: Statistics and Probability	
21st Century Theme: Student’s mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.			
Standard: Investigate chance processes and develop, use, and evaluate probability models.			
Clusters			
7.SP.C.5 Understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring. Larger numbers indicate greater likelihood. Probability near 0 indicates an unlikely event. Probability near $\frac{1}{2}$ is neither likely nor unlikely.	7.SP.C.6 Approximate the probability of a chance event by collecting data on the processes that produce it. Observe its long run frequency. Predict the approximate relative frequency given the probability.	7.SP.C.7a Develop a probability model and use it to find probabilities of events. a. Compare probabilities to all outcomes, and use the model to determine probabilities of events.	7.SP.C.7b Develop a probability model and use it to find probabilities of events. b. Develop a probability model by observing frequencies in data generated from a chance process.
Teacher Generated Questions			
Using dice find the probability of rolling a 3; find the probability of rolling an even. Which event is more likely?	Roll a dice 600 times. Predict that a 3 or 6 will occur about 200 times. Explain why this is a good estimate.	If a student is selected at random from a class, find the probability that Jane will be selected and the probability that a girl will be selected. Explain your results.	Find the approximate probability that a spinning penny will land heads up or that a tossed paper cup will land open end down. Do the outcomes for the spinning penny appear to be equally likely based on the observed frequencies?
Standards for Mathematical Practice: MP2 - Reason abstractly and quantitatively. MP3 - Construct viable arguments and critique the reasoning of others. . MP6 - Attend to precision. MP8 - Look for and express regularity in repeated reasoning.			
Assessment - Students will be assessed on a regular basis using summative and formative assessments to help guide instruction.			

Content Area: Mathematics	Grade Level: 7	Domain: Statistics and Probability
21st Century Theme: Student’s mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.		
Standard: Investigate chance processes and develop, use, and evaluate probability models.		
Clusters		
7.SP.C.8a Find the probabilities of compound events using lists, tables, tree diagrams, and simulations. Understand that, just as with simple events, the probability of a compound event is the fraction of outcomes in the sample space for which the compound event occurs.	7.SP.C.8b Find the probabilities of compound events using lists, tables, tree diagrams, and simulations. b. Represent sample spaces for compound events. For an event described in everyday language (rolling double sixes) identify the outcomes in the sample space which compose the event.	7.SP.C.8c Find the probabilities of compound events using lists, tables, tree diagrams, and simulations. c. Design and use a simulation to generate frequencies for compound events.
Teacher Generated Questions		
Explain the sample space for a compound event. Explain why multiplication of probabilities is used in finding compound events	Find all outcomes of rolling two die. What is the probability of rolling double sixes?	Use random digits as a simulation tool to approximate the answer to the question: If 40% of donors have type A blood, what is the probability that it will take at least 4 donors to find one with type A blood?
Standards for Mathematical Practice: MP1 - Make sense of problems and persevere in solving them. MP2 - Reason abstractly and quantitatively. MP3 - Construct viable arguments and critique the reasoning of others. MP7 - Look for and make use of structure. MP8 Look for and express regularity in repeated reasoning.		
Assessment - Students will be assessed on a regular basis using summative and formative assessments to help guide instruction.		

MATERIALS and RESOURCES:	INSTRUCTIONAL STRATEGIES	DIFFERENTIATION
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<p>YouTube https://www.guia.com/ Teacher Pay Teachers materials</p> <ul style="list-style-type: none"> ● Presentation/Digital Storytelling Tools: Google Slides, Prezi, Go Animate, Storybird, ToonDoo, ZooBurst, ● Online Speaking/Recording Tools: Voicethread, clear.msu, Audacity, Vocaroo, Aviary, Voki, Chatterpix Backchanneling: TodaysMeet, Polleverywhere, Padlet ● Video Tools: YouTube, TubeChop, educanon, blubbr.tv, edpuzzle, QR Codes: QR Code Generator Game-based ● Response Tools: Kahoot!, Socrative, Word clouds: Tagxedo, Wordle Interpersonal ● Communicative Tools: Skype, Google Hangouts, Twitter, Learning Management Systems such as Edmodo, Schoology, Canvas, Blackboard, etc. E-Portfolios: Google Drive, Pinterest, LiveBinder ● Authentic listening and reading sources that provides data and support for speaking and writing prompts. ● Exploration of art and/or artists to understand society and history. 	<ul style="list-style-type: none"> ● Reinforcing effort ● Provide recognition ● Cooperative learning ● Cues, Questions, Organizers ● Summarizing (or note taking) ● Generating & testing hypotheses ● Student practice ● Individualized instruction ● Effective feedback ● Presenting learning goals/ objectives ● Self-directed learning ● Blended learning ● Authentic learning ● Adapting to learning styles ● Conferencing ● Activate prior knowledge ● Investigations ● Flexible classrooms ● Flipped classroom ● Graphic organizers ● Guest speakers ● Identifying similarities and differences ● Learning centers ● Modeling ● Music/ songs ● Peer teaching ● project -based learning ● Reading aloud ● Debate ● Word walls ● Student choice ● Think- Pair- Share ● Rubrics ● Varied texts ● Literature circles ● Reading buddies ● 	<p>GIFTED AND TALENTED</p> <ul style="list-style-type: none"> ● Thematic topics for discussion and research: families & communities, science and technology, beauty and aesthetics, contemporary life, global challenges, personal and public identities. ● Use of technological device to gain access to online resources in order to research and explore current events and cultural practices. Use advanced supplementary / reading materials ● Use of authentic resources to promote a deeper understanding of culture. ● Provide opportunities for open-ended, self-directed activities ● Communication outside the language classroom for travel, study, work, and/or interviews with community members. ● Encourage the use of creativity / ● Provide opportunities to develop depth and breadth of knowledge in the subject area (examples: create drawings/illustrations, use of music, create poems/songs, write opinion letters, create videos/stories/comic strips, etc.) Conduct research and provide presentation of cultural topics. ● Design surveys to generate and analyze data to be used in discussion. <p>STUDENTS AT RISK OF FAILURE</p> <ul style="list-style-type: none"> ● Ask students to restate information, directions, and assignments. ● Repetition and practice ● Model skills / techniques to be mastered. ● Extended time to complete class work ● Provide copy of class notes ● Preferential seating to be mutually determined by the student and teacher
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		<ul style="list-style-type: none">• Student may request to use a computer to complete assignments.• Establish expectations for correct spelling on assignments.• Extra textbooks for home.• Student may request books on tape / CD / digital media, as available and appropriate.• Assign a peer helper in the class setting• Provide oral reminders and check student work during independent work time• Assist student with long and short term planning of assignments• Encourage student to proofread assignments and tests• Provide regular parent/ school communication• Teachers will check/sign student agenda daily
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Mathematics Curriculum

Grade Eight - Math

GRADE EIGHT MATH CURRICULUM – PART I OF A BIFURCATED CURRICULUM

Structure

Big Ideas

- Identify sets of real numbers
- Understand and apply four operations to radicals
- Work with integers and radicals as exponents
- Understand linear equations
- Connect proportion to linear equations
- Understand and work with functions
- Recognize congruence and similarity in geometric figures and models
- Understand and apply the Pythagorean Theorem
- Define formulas for perimeter, area, and volume

- Display and analyze bivariate data

Enduring Understanding

Students will understand that...

- The set of real numbers consists of five sets of numbers.
- All numbers can be compared ($<$ $>$ $=$).
- Specific rules apply to the calculating of positive and negative numbers.
- Exponents and radicals can occur as exponents.
- Operations can be calculated in scientific notation.
- Slope reflects a unit rate.
- Slope intercept form is $y = mx + b$.
- Ordered steps are necessary to solve linear equations.
- Solving a system of equations can result in an intersection.
- Linear equations can solve real-world mathematics problems.
- Functions model relationships between quantities.
- Geometric figures can be proven congruent.
- Dilations, translations, and rotations do not change the shape.
- Angles and lines can be used to prove congruence.
- Pythagorean Theorem assists in finding measurements.
- Pythagorean Theorem has real world applications.
- The Pythagorean Theorem can be proven.
- Geometric formulas solve real-world mathematics problems.
- Scatterplots describe data.
- Bivariate measurement can be analyzed.

Essential Questions

- What sets of numbers are *real numbers*?
- What is an irrational number?
- What does a negative exponent indicate?
- What are applications for scientific notation?

- What is a unit rate?
- How is a unit rate displayed on a coordinate plane?
- What is slope intercept form and how is it applied?
- What are the ordered steps to solve equations?
- How do you simplify an expression?
- What is a system of equations?
- What are the types of intersections found in a linear system?
- What is a function?
- Are functions always linear?
- How do you graph a linear system?
- What is a rotation? A translation? A reflection?
- How does a translation move on a coordinate plane?
- How do you prove similarity of triangles?
- What are the applications for the Pythagorean Theorem?
- What is the Pythagorean Theorem?
- How do geometric formulas assist with real world problems?
- What is bivariate data?
- How does a straight line model a relationship between two quantities?

Assessment

Students will be assessed on a regular basis using summative and formative assessments to help guide instruction.

Assessments will include tests and benchmark assessments from the Algebra Pearson text, formative assessments through online programs such as Socrative, weekly quizzes on foundational materials, and projects with rubrics.

GRADE EIGHT MATH CURRICULUM – PART I OF A BIFURCATED CURRICULUM

Content Area: Mathematics	Grade Level: 8	Domain: The Number System
21st Century Theme: Student’s mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports		

competent engagement in future personal, work and civic life.	
Standard: Know that there are numbers that are not rational, and approximate them by rational numbers.	
Clusters	
8.NS.1 Know and define the set of irrational numbers. Understand that irrational numbers have non-repeating, unending decimals. Understand that rational numbers have repeating decimals.	8.NS.2 Use rational approximations of irrational numbers to compare the size. Place on a number line.
Teacher Generated Questions	
Give an example of a rational number. Give an example of an irrational number.	By truncating the decimal expansion of $\sqrt{2}$, show that $\sqrt{2}$ is between 1 and 2, between 1.4 and 1.5. Explain how to get better approximation.
Standards for Mathematical Practice: MP2 - Reason abstractly and quantitatively. MP3 - Construct viable arguments and critique the reasoning of others. . MP6 - Attend to precision. MP8 - Look for and express regularity in repeated reasoning.	
Assessment - https://docs.google.com/document/d/14tqHJCgjjwvvrZpQC5etrIkC2_skU47P5BEHM-kaPk7A/edit?usp=sharing	

GRADE EIGHT MATH CURRICULUM – PART I OF A BIFURCATED CURRICULUM

Content Area: Mathematics		Grade Level: 8		Domain: Expressions and Equations	
21st Century Theme: Student’s mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.					
Standard: Work with radicals and integer exponents					
Clusters					
8.EE.A.1 Know and apply the properties of integer exponents to generate equivalent numerical expressions		8.EE.A.2 Use square root and cube root symbols to represent solutions to equations of the form $x^2 = p$ and $x^3 = p$. Evaluate square roots and cube roots.		8.EE.A.3 Use numbers expressed in the form of a single digit times an integer power of 10 to estimate a very large or very small quantity.	
8.EE.A.4 Perform operations with numbers expressed in scientific notation including both decimal and scientific notation combined. Use scientific notation and choose units of appropriate size for measurements.					
Teacher Generated Questions					
What is the answer to: $3^2 \times 3^{-5} = 3^{-3} = 1/3^3 = 1/27$		Is the $\sqrt{2}$ irrational? What is 4^3 ?		Estimate the U.S. population as 3×10^8 and World population as 7×10^9 . How much larger is the world population than the US ?	
Standards for Mathematical Practice: MP1 - Make sense of problems and persevere in solving them. MP2 - Reason abstractly and quantitatively. MP6 - Attend to precision. MP8 - Look for and express regularity in repeated reasoning.					
Assessment - https://docs.google.com/document/d/14tqHJCgiwvvrZpQC5etrIkC2_skU47P5BEHM-kaPk7A/edit?usp=sharing					

GRADE EIGHT MATH CURRICULUM – PART I OF A BIFURCATED CURRICULUM

Content Area: Mathematics	Grade Level: 8	Domain: Expressions and Equations
21st Century Theme: Student's mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.		
Standard: Understand the connections between proportional relationships, lines, and linear equations.		
Clusters		
8.EEB.5 Graph proportional relationships, interpreting unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways.	8.EE.B.6 Use similar triangles to explain why the slope m is the same between any two distinct points on a non-vertical line in the coordinate plane; derive the equation $y = mx + b$ for a line intercepting the vertical axis at b .	
Teacher Generated Questions		
Compare a distance-time graph to a distance-time equation. Which of the two moving objects has greater speed?	Given a line on the coordinate plane, derive the equation $y = mx + b$. What is the slope of the line?	
Standards for Mathematical Practice: MP1 Make sense of problems and persevere in solving them. MP2 Reason abstractly and quantitatively. MP4 Model with Mathematics. MP5 MP6 Attend to precision. MP7 Look for and make use of structure.		
Assessment - https://docs.google.com/document/d/1eE_BsAdTIF-zvmJ7mLr8la4opladCVlgJNaP-13vWE8/edit?usp=sharing		

GRADE EIGHT MATH CURRICULUM – PART I OF A BIFURCATED CURRICULUM

Content Area: Mathematics		Grade Level: 8		Domain: Expressions and Equations	
21st Century Theme: Student’s mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.					
Standard: Analyze and solve linear equations and pairs of simultaneous linear equations.					
Clusters					
8.EE.C.7 Solve linear equations in one variable a. which give one solution, many solutions, or no solutions. Transform the equation to $x=a$, $a=a$, or $a=b$	8.EE.C.7 Solve linear equations in one variable b. with rational number coefficients, including combining like terms and the distributive property.	8.EE.C.8a Analyze and solve pairs of simultaneous equations: a. understand that their graphs may or may not have points of intersection.	8.EE.C.8 Analyze and solve pairs of simultaneous equations: b. in two variables.	8.EE.C.8 Analyze and solve pairs of simultaneous equations: c. that reflect real world applications.	
Teacher Generated Questions					
Given an equation, show the solution on a coordinate plane?	What is the solution for: $2x + 3 + 5x + 22 - 4x = 30$?	Given a system and its graph, identify the common points.	Why can't $3x + 2y = 5$ and $3x + 2y = 6$ have a common solution?	You have dimes and nickels that equal \$3.15. What are the combinations of coins that you could have?	
Standards for Mathematical Practice: MP1 - Make sense of problems and persevere in solving them. MP2 - Reason abstractly and quantitatively. MP5 - Use appropriate tools strategically. MP6 - Attend to precision. MP7 - Look for and make use of structure. MP8 - Look for and express regularity in repeated reasoning.					
Assessment - https://docs.google.com/document/d/1eE_BsAdTlF-zvmI7mLr8la4opIadCVIglNaP-l3vWE8/edit?usp=sharing					

GRADE EIGHT MATH CURRICULUM – PART I OF A BIFURCATED CURRICULUM

Content Area: Mathematics	Grade Level: 8	Domain: Functions
21st Century Theme: Student's mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.		
Standard: Define, evaluate, and compare functions		
Clusters		
8.F.A.1 Understand that a function is a rule that assigns to each input exactly one output. The graph of a function is the set of ordered pairs consisting of an input and the corresponding output.	8.F.A.2 Compare properties of two functions each represented in a different way (algebraically, graphically, numerically, in tables, or by verbal descriptions).	8.F.A.3 Interpret the equation $y = mx + b$ as defining a linear function, whose graph is a straight line: give examples of functions that are not linear.
Teacher Generated Questions		
Is the set of inputs/outputs a function? $\left[\begin{array}{cc} 2 & 4 \\ 3 & 4 \\ 5 & 5 \end{array} \right]$	Given a linear function from a table of values and a linear function represented by an expression, which function has the greatest rate of change?	The function $A = s^2$ gives the area of the square as a function of its side length. Explain why it is not a linear function.
Standards for Mathematical Practice: MP1 - Make sense of problems and persevere in solving them. MP2 - Reason abstractly and quantitatively. MP3 - Construct viable arguments and critique the reasoning of others. MP8 - Look for and express regularity in repeated reasoning.		
Assessment - https://docs.google.com/document/d/1eE_BsAdTIF-zvmJ7mLr8la4opladCVIgjNaP-l3vWE8/edit?usp=sharing		

GRADE EIGHT MATH CURRICULUM – PART I OF A BIFURCATED CURRICULUM

Content Area: Mathematics	Grade Level: 8	Domain: Functions
21st Century Theme: Student’s mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.		
Standard: Use functions to model relationships between quantities		
Clusters		
8.F.B.4 Construct a function to model a linear relationship between two quantities. Determine the rate of change and the initial value of the function from a description of a relationship or from two (x, y) values. Read from a table or a graph of the function.	8.F.B.5 Describe qualitatively the functional relationship between two quantities by analyzing a graph (where it increases/ decreases, linear/nonlinear). Sketch a graph that exhibits the qualitative features of a function that has been described verbally.	
Teacher Generated Questions		
A car drives 40 mph and uses one gallon of gas every twenty miles. What is the function that represents the relationship?	If a ball is thrown in an arc, what is the relationship and what would the graph resemble?	
Standards for Mathematical Practice: MP1 - Make sense of problems and persevere in solving them. MP2 - Reason abstractly and quantitatively. MP4 - Model with Mathematics. MP5 - Use appropriate tools strategically. MP8 - Look for and express regularity in repeated reasoning.		
Assessment - https://docs.google.com/document/d/1eE_BsAdTlF-zvmI7mLr8la4opIadCVIglNaP-l3vWE8/edit?usp=sharing		

GRADE EIGHT MATH CURRICULUM – PART I OF A BIFURCATED CURRICULUM

Content Area: Mathematics		Grade Level: 8		Domain: Geometry	
21st Century Theme: Student’s mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.					
Standard: Understand congruence and similarity using physical models, transparencies, or geometry software.					
Clusters					
8.G.A.1 Verify experimentally the properties of rotations, reflections, and translations a. where lines are taken to lines, and line segments to line segments of the same length.	8.G.A.1 Verify experimentally the properties of rotations, reflections, and translations: b. where angles are taken to angles of the same measure.	8.G.A.1 Verify experimentally the properties of rotations, reflections, and translations: c. where parallel lines are taken to parallel lines.	8.G.A.2 Understand that a two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of rotations, reflections, and translations; _____		
Teacher Generated Questions					
⇔ ⇐ What is the relationship between the two shapes?	Hold a shape to a mirror. Look at the angles. What property does this demonstrate?	Use two identical books placed differently on a desk. What property do the books demonstrate?	Use a trapezoid pattern block. What property will assist you to <u>make the pattern upside down?</u> _____	Look at the two shapes. What properties were used to move it? Are they congruent shapes?	
Standards for Mathematical Practice: MP2 - Reason abstractly and quantitatively. MP3 - Construct viable arguments and critique the reasoning of others. MP4 - Model with Mathematics. MP5 - Use appropriate tools strategically. MP6 - Attend to precision.					
Assessment - https://drive.google.com/open?id=0B6cERivn5wyWemhnajRvUGo4T0E					

Content Area: Mathematics	Grade Level: 8	Domain: Geometry
21st Century Theme: Student’s mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.		
Standard: Understand congruence and similarity using physical models, transparencies, or geometry software.		
Clusters		
8.G.A.3 Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.	8.G.A.4 Understand that a two-dimensional figure is similar to another if the second can be obtained from the first by a sequence of rotations, reflections, translations, and dilations; given two similar two-dimensional figures, describe a sequence that exhibits this similarity between them.	8.G.A.5 Use informal arguments to establish facts about the angle sum and exterior angle of triangles, about the angles created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles.
Teacher Generated Questions		
Draw a triangle on the coordinate plane. What do you need to do to draw a translation of the triangle on the plane?	Given two similar figures on the coordinate plane, explain the sequence of properties.	Given parallel lines with a transversal, identify the measurement of all angles.
Standards for Mathematical Practice: MP1 - Make sense of problems and persevere in solving them. MP2 - Reason abstractly and quantitatively. MP3 - Construct viable arguments and critique the reasoning of others. MP4 - Model with Mathematics. MP5 Use appropriate tools strategically. MP6 - Attend to precision. MP7 - Look for and make use of structure. MP8 - Look for and express regularity in repeated reasoning.		
Assessment - https://drive.google.com/open?id=0B6cERivn5wyWemhnajRvUGo4T0E		

GRADE EIGHT MATH CURRICULUM – PART I OF A BIFURCATED CURRICULUM

Content Area: Mathematics	Grade Level: 8	Domain: Geometry
21st Century Theme: Student’s mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.		
Standard: Understand and apply the Pythagorean Theorem		
Clusters		
8.G.B.6 Explain a proof of the Pythagorean Theorem	8.G.B.7 Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions.	8.G.B.8 Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.
Teacher Generated Questions		
How do squares assist in proving the Pythagorean Theorem?	You have the diagonal and one side measurement of a backyard. Can you use the Pythagorean Theorem to find the perimeter of the yard?	Given three points in a coordinate plane, what is the measurement of the diagonal of the triangle?
Standards for Mathematical Practice: MP1 - Make sense of problems and persevere in solving them. MP2 - Reason abstractly and quantitatively. MP3 - Construct viable arguments and critique the reasoning of others. MP4 - Model with Mathematics. MP5 - Use appropriate tools strategically. MP6 - Attend to precision. MP7 - Look for and make use of structure. MP8 - Look for and express regularity in repeated reasoning.		

Assessment - https://docs.google.com/document/d/1yClqRhWWkC_XS1eF0xJ5HnHE0JGWhKk80_yLzXXRzPM/edit?usp=sharing

GRADE EIGHT MATH CURRICULUM – PART I OF A BIFURCATED CURRICULUM

Content Area: Mathematics	Grade Level: 8	Domain: Geometry
21st Century Theme: Student’s mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.		
Standard: Solve real-world and mathematical problems involving volume of cylinders, cones, and spheres.		
Clusters		
8.G.C.9 Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.		
Teacher Generated Questions		
A cylinder with $h=60$, $d=12$, needs to be $\frac{3}{4}$ full of water. How much water does it need?		
Standards for Mathematical Practice: MP1 - Make sense of problems and persevere in solving them. MP2 - Reason abstractly and quantitatively. MP4 - Model with Mathematics. MP6 - Attend to precision. . MP8 - Look for and express regularity in repeated reasoning.		
Assessment - https://docs.google.com/document/d/1KkIjv5hbdxj1NOwaKjIdFVIXwYEydYUaug42XjW6t9U/edit?usp=sharing		

GRADE EIGHT MATH CURRICULUM – PART I OF A BIFURCATED CURRICULUM

Content Area: Mathematics		Grade Level: 8		Domain: Statistics and Probability	
21st Century Theme: Student’s mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.					
Standard: Investigate patterns of association in bivariate data					
Clusters					
8.SP.A.1 Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association.	8.SP.A.2 Know that straight lines are widely used to model relationships between two quantitative variables. For scatter plots that suggest a linear association, informally fit a straight line, and informally assess the model fit by judging the closeness of the data points to the line.		8.SP.A.3 Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept.		8.SP.A.4 Understand that patterns of association can also be seen in bivariate categorical data by displaying frequencies and relative frequencies in a two-way table. Construct and interpret a two-way table summarizing data on two categorical variables collected from the same subjects. Use relative frequencies calculated for 2 rows or columns to describe possible association between the 2 variables.
Teacher Generated Questions					
After creating a scatterplot of age/heart rate for the class, is there a positive or negative relationship?	What is the line of best fit for the heart rate experiment?		An additional hour of sunlight each day gives plants an additional 1.5 cm of plant height. What is the linear model for this?		Collect data on students’ chores at home and their hour of curfew. Is there evidence that those with curfew are those with chores?
Standards for Mathematical Practice: MP1 - Make sense of problems and persevere in solving them. MP2 - Reason abstractly and quantitatively. MP3 - Construct viable arguments and critique the reasoning of others. MP4 - Model with Mathematics. MP8 - Look for and					

express regularity in repeated reasoning.

Assessment <https://docs.google.com/document/d/1k48n3v2yE-GO9gqNpLsUlyxHzMMf43-g65dEUnadcAU/edit?usp=sharing>

<p>MATERIALS and RESOURCES: Pearson Algebra CC Text 2012 YouTube https://www.quia.com/ Teacher Pay Teachers materials</p> <ul style="list-style-type: none">● Presentation Tools: Google Slides, Prezi,● Online Speaking/Recording Tools: Voicethread, Screencastify,● Video Tools: Educanon, Blendspace, Khan Academy;● Game-based : Classcraft, Prodigy● Response Tools:, Socrative, PearDeck, Classcraft (Boss Battles)● Communicative Tools:, Google Hangouts, Classcraft● E-Portfolios: Google Drive,● Authentic listening and reading sources that provides data and support for speaking and writing prompts.	<p>INSTRUCTIONAL STRATEGIES</p> <ul style="list-style-type: none">● Reinforcing effort● Provide recognition● Cooperative learning● Cues, Questions, Organizers● Summarizing (or note taking)● Generating & testing hypotheses● Student practice● Individualized instruction● Effective feedback● Presenting learning goals/ objectives● Self-directed learning● Blended learning● Authentic learning● Adapting to learning styles● Conferencing● Activate prior knowledge● Investigations● Flexible classrooms● Graphic organizers● Identifying similarities and differences● Modeling● Music/ songs● Peer teaching● Project -based learning● Reading aloud● Debate● Student choice● Think- Pair- Share● Rubrics● Sage and Scribe	<p>DIFFERENTIATION</p> <p>GIFTED AND TALENTED</p> <ul style="list-style-type: none">● Use of technological device to gain access to online resources in order to research and explore content● Use advanced supplementary / reading materials● Use of authentic resources to promote a deeper understanding of material● Provide opportunities for open-ended, self-directed activities● Encourage the use of creativity● Provide opportunities to develop depth and breadth of knowledge in the subject area● Design surveys to generate and analyze data to be used in discussion.● Use of Challenge questions in text <p>STUDENTS AT RISK OF FAILURE</p> <ul style="list-style-type: none">● Ask students to restate information, directions, and assignments.● Repetition and practice● Model skills / techniques to be mastered.● Extended time to complete class work● Provide copy of class notes● Preferential seating to be mutually determined by the student and teacher● Student may request to use a computer to complete assignments. .● Extra textbooks for home.● Student may request digital media, as available and appropriate.● Assign a peer helper in the class setting
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		<ul style="list-style-type: none">• Provide oral reminders and check student work during independent work time• Assist student with long and short term planning of assignments• Encourage student to proofread assignments and tests• Provide regular parent/ school communication
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Mathematics Curriculum

Grade Eight - Algebra

Structure

Big Ideas

- Expressions use variables to represent information
- Simplifying expressions follows a specific order
- An expression has an underlying structure
- Algebraic expressions and equations are governed by properties of operations
- An equation is two equal expressions
- An equation with one variable results in a set of numbers
- An equation with two variables results in an ordered pair
- An inequality defines a comparison ($<$ $>$)
- A system can consist of two equations or inequalities
- Some equations have no solution
- Formulas can be rearranged similarly to equations
- Functions contain an input and an output
- Polynomials follow properties of operations
- Graphs represent equations or inequalities
- Quadratic equations can be factored and zeros of the equation calculated

Enduring Understanding

Students will understand that...

- Expressions use variables to represent the unknown.
- Expressions can be rewritten and simplified.
- Quadratic equations can be solved by factoring or the quadratic formula.
- Properties of exponents assist in transforming expressions.
- Polynomials are closed under the operations of addition, subtraction, and multiplication.
- Using the zeros of a function can help in graphing the function.
- Rational expressions can be rewritten in different forms.
- Equations in two or more variables represent relationships.
- Solving equations is a process of reasoning.
- Linear equations can be solved and graphed on the coordinate plane.
- Solving equations requires a series of ordered steps.
- Completing the square transforms a quadratic equation.
- Quadratic equations can be solved by inspection ($x^2 = 49$), completing the square, quadratic formula, or factoring.
- Substitution assists in solving a system of equations.
- Graphing a system of equations results in an intersection or no solution.
- Real life situations can be solved with equations.

Essential Questions

- What is an expression?
- Can expressions be combined?
- Can an expression be rewritten?
- How do you factor a quadratic equation?
- What is the benefit of completing the square?
- Can exponents be utilized in expressions?
- What operations can be used with polynomials?
- What are the zeros of an equation?
- What properties of operations can be used with polynomials?
- Can an equation be used to solve real world problems?
- What is an extraneous solution?
- What is the process for solving an equation?
- What is the result when you solve a one variable equation?
- What is the result when you solve a two variable equation?
- What is a system of equations?
- What is the solution set for a linear equation?

- What is the solution set for an inequality?
- How are a linear equation, a linear system, and quadratic equations different?
- How are the graphs different for a linear system, and quadratic equations different?
- How does the quadratic formula solve a quadratic equation?

GRADE EIGHT ALGEBRA CURRICULUM – PART II OF A BIFURCATED CURRICULUM

Content Area: Mathematics	Grade Level: 8A	Domain: Seeing structure in Expressions	
21st Century Theme: Student’s mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.			
Standard: Interpret the structure of expressions			
Clusters			
A.SSE.A.1 Interpret expressions that represent a quantity in terms of its context: a. Interpret parts of an expression, such as terms, factors, and coefficients.	A.SSE.A.1 Interpret expressions that represent a quantity in terms of its context: b. Interpret complicated expressions by viewing one or more of their parts as a single entity.		A.SSE.A.2 Use the structure of an expression to identify ways to rewrite it.
Teacher Generated Questions			
What is the coefficient of the expression $3x^2y^3z^4$?	Does $1+r$ depend on the other factor P in the expression $P(1+r)^n$? <i>No</i>	Is $x^4 - y^4 = (x^2)^2 - (y^2)^2$ a true statement? yes	
Standards for Mathematical Practice: MP1 - Make sense of problems and persevere in solving them. MP2 - Reason abstractly and quantitatively. MP3 - Construct viable arguments and critique the reasoning of others. MP8 - Look for and express regularity in repeated			

reasoning.

Assessment - <https://docs.google.com/document/d/18QyV90-YlUcD1UkGKgjTpd0KY7mLwAQafxhuvpDR-k/edit?usp=sharing>

GRADE EIGHT ALGEBRA CURRICULUM – PART II OF A BIFURCATED CURRICULUM

Content Area: Mathematics	Grade Level: 8A	Domain: Seeing Structure in Expressions	
21st Century Theme: Student's mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.			
Standard: Write expressions in equivalent forms to solve problems			
Clusters			
A.SSE.B.3 Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression: a . Factor a quadratic expression to reveal the zeros of the function it defines.	A.SSE.B.3 Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression: b . Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines.	A.SSE.B.3-3c Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression: c . Use the properties of exponents to transform expressions for exponential functions.	F.LE.A.2 Derive the formula for the sum of a finite geometric series (when the common ratio is not 1) and use the formula to solve problems.
Teacher Generated Questions			
Factor the expression $x^2 + 8x + 15$	Complete the square for $x^2 + 4x - 13 = 0$	Simplify $(x + 2)^2 + x^2$?	What is the mortgage payment on a \$150,000 mortgage?
Standards for Mathematical Practice: MP1 - Make sense of problems and persevere in solving them. MP2 - Reason abstractly and quantitatively. MP3 - Construct viable arguments and critique the reasoning of others. . MP6 - Attend to precision. MP7 - Look for and make			

use of structure. MP8 - Look for and express regularity in repeated reasoning.
Assessment - https://docs.google.com/document/d/13mvUMS2To8hiLCLkwub2QO9kpJ0bBUqQ2Tqpfk2w594/edit?usp=sharing

GRADE EIGHT ALGEBRA CURRICULUM – PART II OF A BIFURCATED CURRICULUM

Content Area: Mathematics	Grade Level: 8A	Domain: Arithmetic with Polynomials and Rational Expressions
21st Century Theme: Student’s mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.		
Standard: Perform arithmetic operations on polynomials		Standard: Understand the relationship between zeros and factors of polynomials
Clusters		Clusters
A.APR.A.1 Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.		A.APR.B.3 Identify zeros of polynomials when suitable factorizations are available, and use the zeros to construct a rough graph of the function defined by the polynomial.
Teacher Generated Questions		
What are the steps to combine polynomial expressions?		What are the zeros of the equation $x^2 - 2x - 15$?
Standards for Mathematical Practice: MP1 - Make sense of problems and persevere in solving them. MP2 - Reason abstractly and quantitatively. MP3 - Construct viable arguments and critique the reasoning of others. MP5 - Use appropriate tools strategically. MP8 - Look for and express regularity in		

repeated reasoning.
Assessment - https://docs.google.com/document/d/1cHe1ZtPoyIB7DDjuno58siCPPPE2stvsU_9-7B3flvk/edit?usp=sharing

GRADE EIGHT ALGEBRA CURRICULUM – PART II OF A BIFURCATED CURRICULUM

Content Area: Mathematics	Grade Level: 8A	Domain: Arithmetic with Polynomial and Rational Expressions
21st Century Theme: Student’s mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.		
Standard: Use polynomial identities to solve problems		
Clusters		
A.APR.C.4 Prove polynomial identities and use them to describe numerical relationships.	A.APR.C.5 Know and apply the expansion of $(x + y)^n$.	
Teacher Generated Questions		
Does $(x^2 + y^2) = (x^2 - y^2) + (2xy)$	Factor $(x + 3y)^2$	
Standards for Mathematical Practice: MP1 - Make sense of problems and persevere in solving them. MP2 - Reason abstractly and quantitatively. MP3 - Construct viable arguments and critique the reasoning of others. MP7 - Look for and make use of structure. MP8 - Look for and express regularity in repeated reasoning.		

GRADE EIGHT ALGEBRA CURRICULUM – PART II OF A BIFURCATED CURRICULUM

Content Area: Mathematics	Grade Level: 8A	Domain: Arithmetic with Polynomials and Rational Expressions
21st Century Theme: Student’s mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.		
Standard: Rewrite rational expressions		
Clusters		
A.APR.D.6 Rewrite simple rational expressions in different forms.	A.APR.D.7 Add, subtract, multiply and divide rational expressions. Understand that rational expressions are analogous to rational numbers.	
Teacher Generated Questions		
Does $4x/7x = 2x/7x + 2x/7x$?	Are rational expressions closed under addition, subtraction, multiplication, and division (non-zero denominator)?	
Standards for Mathematical Practice: MP1 - Make sense of problems and persevere in solving them. MP2 - Reason abstractly and quantitatively. MP3 - Construct viable arguments and critique the reasoning of others. MP4 - Model with Mathematics. MP5 - Use appropriate tools strategically. MP6 - Attend to precision. MP7 - Look for and make use of structure. MP8 - Look for and express regularity in repeated reasoning.		

GRADE EIGHT ALGEBRA CURRICULUM – PART II OF A BIFURCATED CURRICULUM

Content Area: Mathematics		Grade Level: 8A		Domain: Create Equations	
21st Century Theme: Student’s mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.					
Standard: Create equations that describe numbers or relationships					
Clusters					
A.CED.A.1 Create equations and inequalities in one variable and use them to solve problems.		A.CED.A.2 Create equations in two or more variables to represent relationships between quantities; graph equation on coordinate axes with labels and scales.		A.CED.A.3 Represent constraints for equations and inequalities (and systems of). Identify the numbers that will not work in the situation.	
				A.CED.A.4 Rearrange formulas to solve for a different variable.	
Teacher Generated Questions					
What is the difference between a linear and quadratic equation?		How is a linear graph different from a quadratic graph?		Graph a system of quadratic equations. Which area does not fit the system?	
				Solve for r in the equation $d = rt$.	
Standards for Mathematical Practice: MP1 - Make sense of problems and persevere in solving them. MP2 - Reason abstractly and quantitatively. MP3 - Construct viable arguments and critique the reasoning of others. MP4 - Model with Mathematics. MP7 - Look for and					

make use of structure. MP8 - Look for and express regularity in repeated reasoning.

Assessment - https://docs.google.com/document/d/1eE_BsAdTlF-zvmJ7mLr8la4opladCVlgJNaP-l3vWE8/edit?usp=sharing

GRADE EIGHT ALGEBRA CURRICULUM – PART II OF A BIFURCATED CURRICULUM

Content Area: Mathematics	Grade Level: 8A	Domain: Reasoning with Equations and Inequalities
21st Century Theme: Student's mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.		
Standard: Understand solving equations as a process of reasoning and explain the reasoning		
Clusters		
A.REI.A.1 Explain each step in solving an equation.	A.REI.A.2 Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.	
Teacher Generated Questions		
What are the steps to solve for x in an equation?	What is the first step in solving an equation with radicals in it?	
Standards for Mathematical Practice: MP1 - Make sense of problems and persevere in solving them. MP2 - Reason abstractly and quantitatively. MP3 - Construct viable arguments and critique the reasoning of others. MP4 - Model with Mathematics. MP5 - Use		

appropriate tools strategically. MP8 - Look for and express regularity in repeated reasoning.
Assessment - https://docs.google.com/document/d/1eE_BsAdTlF-zvmJ7mLr8la4oplacVlgJNaP-l3vWE8/edit?usp=sharing https://docs.google.com/document/d/18QyV90-YIUcD1UkGKgjTpd0KY7mLwAQafxhuvpDR-k/edit?usp=sharing https://docs.google.com/document/d/1dmCMsdIq0yiYzHbkrZKQ1Lp6qbKN8ylW74ma-NxpLqs/edit?usp=sharing

GRADE EIGHT ALGEBRA CURRICULUM – PART II OF A BIFURCATED CURRICULUM

Content Area: Mathematics	Grade Level: 8A	Domain: Reasoning with Equations and Inequalities
21st Century Theme: Student’s mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.		
Standard: Solve equations and inequalities in one variable		
Clusters		

A.REI.B.3 Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.	A.REI.B.4a-4b a. Solve quadratic equations in one variable: b. Use the method of completing the square to transform a quadratic equation.	A.REI.B.4b Solve quadratic equations in one variable: using square roots, the quadratic formula, and factoring.
Teacher Generated Questions		
What is the first step to solve the inequality $Ax + 6 = 24$?	How do you complete the square for $X^2 + 4x + 5 = 7$?	What is the quadratic formula and when is it used?
Standards for Mathematical Practice: MP1 - Make sense of problems and persevere in solving them. MP2 - Reason abstractly and quantitatively. MP3 - Construct viable arguments and critique the reasoning of others. MP8 - Look for and express regularity in repeated reasoning.		
Assessment - https://docs.google.com/document/d/1eE_BsAdTlF-zvmJ7mLr8la4opladCVIgJNaP-l3vWE8/edit?usp=sharing https://docs.google.com/document/d/13mvUMS2To8hiLCLkwub2QO9kpI0bBUqQ2Tqpfk2w594/edit?usp=sharing		

GRADE EIGHT ALGEBRA CURRICULUM – PART II OF A BIFURCATED CURRICULUM

Content Area: Mathematics	Grade Level: 8A	Domain: Reasoning with Equations and Inequalities
21st Century Theme: Student's mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.		
Standard: Solve systems of equations		
Clusters		

A.REI.C.5 Solve a system of equation utilizing substitution.	A.REI.C.6 Solve systems of linear equations exactly and approximately (with graphs).	A.REI.C.7 Solve systems consisting of a linear equation and a quadratic equation.
Teacher Generated Questions		
What does substitution mean for solving a system?	How will a graph appear if each line has the same y intercept?	What are the points of intersection for $y = -3x$ and $x^2 + y^2 = 3$?
Standards for Mathematical Practice: MP1- Make sense of problems and persevere in solving them. MP2 - Reason abstractly and quantitatively. MP3 - Construct viable arguments and critique the reasoning of others. MP4 - Model with Mathematics. MP5 - Use appropriate tools strategically. MP6 - Attend to precision. MP7 - Look for and make use of structure		
Assessment - https://docs.google.com/document/d/1FTGZ2KA_4NMbAZTxxkC7201OD-SVuLF3I2T0ZTSgYl6o/edit?usp=sharing https://docs.google.com/document/d/13mvUMS2To8hiLCLkwub2Q09kpI0bBUqQ2Tqpfk2w594/edit?usp=sharing		

GRADE EIGHT ALGEBRA CURRICULUM – PART II OF A BIFURCATED CURRICULUM

Content Area: Mathematics	Grade Level: 8A	Domain: Reasoning with Equations and Inequalities
21st Century Theme: Student’s mathematical skills accompanied by creativity, perseverance in problem-solving, and collaborative efforts supports competent engagement in future personal, work and civic life.		

Standard: Represent and solve equations and inequalities graphically		
Clusters		
A.REI.D.10 Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane.	A.REI.D.11 Explain why the intersection of $y = f(x)$ and $y = g(x)$ is the solution to $f(x) = g(x)$.	A.REI.D.12 Graph linear inequalities and linear inequality systems in two variables. Find the intersection for the systems.
Teacher Generated Questions		
How do you graph a line in slope intercept form?	How do you find the solution to a system in two variables?	When looking at a graphed system, how do you identify the common solutions?
Standards for Mathematical Practice: MP1 - Make sense of problems and persevere in solving them. MP2 - Reason abstractly and quantitatively. MP3 - Construct viable arguments and critique the reasoning of others. MP4 - Model with Mathematics. MP5 - Use appropriate tools strategically. MP6 - Attend to precision. MP7 - Look for and make use of structure. MP8 - Look for and express regularity in repeated reasoning.		
Assessment - https://docs.google.com/document/d/1eE_BsAdTIF-zvmJ7mLr8la4opladCVigJNaP-l3vWE8/edit?usp=sharing		

MATERIALS AND RESOURCES Pearson, Algebra I, Common Core ©2012 McDougall, Littell, Algebra I- Integrated Approach © 1991 Manipulatives such as Algebra tiles Dice Centimetre cubes Number tiles	INSTRUCTIONAL STRATEGIES <ul style="list-style-type: none"> ● Reinforcing effort ● Provide recognition ● Cooperative learning ● Cues, Questions, Organizers ● Summarizing (or note taking) ● Generating & testing hypotheses ● Student practice ● Individualized instruction ● Effective feedback ● Presenting learning goals/ objectives ● Self-directed learning 	DIFFERENTIATION GIFTED AND TALENTED <ul style="list-style-type: none"> ● Use of technological device to gain access to online resources in order to research and explore content ● Use advanced supplementary / reading materials ● Use of authentic resources to promote a deeper understanding of material ● Provide opportunities for open-ended, self-directed activities ● Encourage the use of creativity
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<p>3D nets</p> <p>Graph paper</p> <p>Yard/Metric sticks</p> <p>Rulers</p> <p><i>Apps on iPads</i> such as Dirt Bike Pro, Diamond Factor, Quadratic Formula, iFactor, Algebra Tiles, Mr. Noone Fatoring, GraphCalc HD, Solve Quadratics, 5 Dice, Probability tools, Data Analysis, Prezi, iMovie, VideoShop, Superslo, Exponents, Radicals, Benzinga, Porjectile HD</p> <p>YouTube https://www.quia.com/</p> <p>Teacher Pay Teachers materials</p> <ul style="list-style-type: none"> ● Presentation/Digital Storytelling Tools: Google Slides, Prezi, ● Online Speaking/Recording Tools: Voicethread, ● Video Tools: YouTube,, educanon, blubbr.tv, edpuzzle, screencasity ● Response Tools: Socrative, ● Communicative Tools: Skype, Google Hangouts, ● E-Portfolios: Google Drive, ● Classcraft ● Papershow ● Desmos ● LiveScribe 	<ul style="list-style-type: none"> ● Blended learning ● Authentic learning ● Adapting to learning styles ● Conferencing ● Activate prior knowledge ● Investigations ● Flexible classrooms ● Graphic organizers ● Identifying similarities and differences ● Modeling ● Music/ songs ● Peer teaching ● Project -based learning ● Reading aloud ● Debate ● Student choice ● Think- Pair- Share ● Rubrics ● Sage and Scribe 	<ul style="list-style-type: none"> ● Provide opportunities to develop depth and breadth of knowledge in the subject area ● Design surveys to generate and analyze data to be used in discussion. ● Use of Challenge questions in text <p>STUDENTS AT RISK OF FAILURE</p> <ul style="list-style-type: none"> ● Ask students to restate information, directions, and assignments. ● Repetition and practice ● Model skills / techniques to be mastered. ● Provide copy of class notes ● Preferential seating to be mutually determined by the student and teacher ● Extra textbooks for home. ● Student may request books on digital media, as available and appropriate. ● Assign a peer helper in the class setting ● Provide oral reminders and check student work during independent work time ● Assist student with long and short term planning of assignments ● Encourage student to proofread assignments and tests ● Provide regular parent/ school communication
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GLOSSARY

Addition and subtraction within 5, 10, 20, 100, or 1000 Addition or subtraction of two whole numbers with whole number answers, and with sum or minuend in the range 0-5, 0-10, 0-20, or 0-100, respectively. Example: $8 + 2 = 10$ is an addition within 10, $14 - 5 = 9$ is a subtraction within 20, and $55 - 18 = 37$ is a subtraction within 100.

Additive inverses Two numbers whose sum is 0 are additive inverses of one another. Example: $3/4$ and $-3/4$ are additive inverses of one another because $3/4 + (-3/4) = (-3/4) + 3/4 = 0$.

Associative property of addition See Table 3 in this Glossary.

Associative property of multiplication See Table 3 in this Glossary.

Bivariate data Pairs of linked numerical observations. Example: a list of heights and weights for each player on a football team.

Box plot. A method of visually displaying a distribution of data values by using the median, quartiles, and extremes of the data set. A box shows the middle 50% of the data.

Commutative property See Table 3 in this Glossary.

Complex fraction A fraction A/B where A and/or B are fractions (B nonzero).

Computation algorithm A set of predefined steps applicable to a class of problems that gives the correct result in every case when the steps are carried out correctly. *See also:* computation strategy.

Computation strategy. Purposeful manipulations that may be chosen for specific problems, may not have a fixed order, and may be aimed at converting one problem into another. *See also:* computation algorithm.

Congruent Two plane or solid figures are congruent if one can be obtained from the other by rigid motion (a sequence of rotations, reflections, and translations).

Counting on A strategy for finding the number of objects in a group without having to count every member of the group. For example, if a stack of books is known to have 8 books and 3 more books are added to the top, it is not necessary to count the stack all over again. One can find the total by *counting on*—pointing to the top book and saying “eight,” following this with “nine, ten, eleven. There are eleven books now.”

Dot plot See: line plot.

Dilation A transformation that moves each point along the ray through the point emanating from a fixed center, and multiplies distances from the center by a common scale factor.

Expanded form A multi-digit number is expressed in expanded form when it is written as a sum of single-digit multiples of powers of ten. For example, $643 = 600 + 40 + 3$.

Expected value For a random variable, the weighted average of its possible values, with weights given by their respective probabilities.

First quartile For a data set with median M , the first quartile is the median of the data values less than M . Example: For the data set {1, 3, 6, 7, 10, 12, 14, 15, 22, 120}, the first quartile is 6.2 See also: median, third quartile. (Many different methods for computing quartiles are in use. The method defined here is sometimes called the Moore and McCabe method.)

Fraction A number expressible in the form a/b where a is a whole number and b is a positive whole number. (The word *fraction* in these standards always refers to a non-negative number.) See also: rational number.

Identity property of 0 See Table 3 in this Glossary.

Independently combined probability models Two probability models are said to be combined independently if the probability of each ordered pair in the combined model equals the product of the original probabilities of the two individual outcomes in the ordered pair.

Integer A number expressible in the form a or $-a$ for some whole number a .

Line plot A method of visually displaying a distribution of data values where each data value is shown as a dot or mark above a number line. Also known as a dot plot.³

Mean A measure of center in a set of numerical data, computed by adding the values in a list and then dividing by the number of values in the list.⁴ Example: For the data set {1, 3, 6, 7, 10, 12, 14, 15, 22, 120}, the mean is 21.

Mean absolute deviation A measure of variation in a set of numerical data, computed by adding the distances between each data value and the mean, then dividing by the number of data values. Example: For the data set {2, 3, 6, 7, 10, 12, 14, 15, 22, 120}, the mean absolute deviation is 20.

Median A measure of center in a set of numerical data. The median of a list of values is the value appearing at the center of a sorted version of the list—or the mean of the two central values, if the list contains an even number of values. Example: For the data set {2, 3, 6, 7, 10, 12, 14, 15, 22, 90}, the median is 11.

Midline In the graph of a trigonometric function, the horizontal line halfway between its maximum and minimum values.

Multiplication and division within 100 Multiplication or division of two whole numbers with whole number answers, and with product or dividend in the range 0-100. Example: $72 \div 8 = 9$.

Multiplicative inverses Two numbers whose product is 1 are multiplicative inverses of one another. Example: $\frac{3}{4}$ and $\frac{4}{3}$ are multiplicative inverses of one another because $\frac{3}{4} \times \frac{4}{3} = \frac{4}{3} \times \frac{3}{4} = 1$.

Number line diagram A diagram of the number line used to represent numbers and support reasoning about them. In a number line diagram for measurement quantities, the interval from 0 to 1 on the diagram represents the unit of measure for the quantity.

Percent rate of change A rate of change expressed as a percent. Example: if a population grows from 50 to 55 in a year, it grows by $\frac{5}{50} = 10\%$ per year.

Probability distribution The set of possible values of a random variable with a probability assigned to each.

Properties of operations See Table 3 in this Glossary.

Properties of equality See Table 4 in this Glossary.

Properties of inequality See Table 5 in this Glossary.

Properties of operation See Table 3 in this Glossary.

Probability A number between 0 and 1 used to quantify likelihood for processes that have uncertain outcomes (such as tossing a coin, selecting a person at random from a group of people, tossing a ball at a target, or testing for a medical condition).

Probability model A probability model is used to assign probabilities to outcomes of a chance process by examining the nature of the process. The set of all outcomes is called the sample space, and their probabilities sum to 1. *See also:* uniform probability model.

Random variable An assignment of a numerical value to each outcome in a sample space.

Rational expression A quotient of two polynomials with a non-zero denominator.

Rational number A number expressible in the form a/b or $-a/b$ for some fraction a/b . The rational numbers include the integers.

Rectilinear figure A polygon all angles of which are right angles.

Rigid motion A transformation of points in space consisting of a sequence of one or more translations, reflections, and/or rotations. Rigid motions are here assumed to preserve distances and angle measures.

Repeating decimal The decimal form of a rational number. *See also:* terminating decimal.

Sample space In a probability model for a random process, a list of the individual outcomes that are to be considered.

Scatter plot A graph in the coordinate plane representing a set of bivariate data. For example, the heights and weights of a group of people could be displayed on a scatter plot.⁵

Similarity transformation A rigid motion followed by a dilation.

Tape diagram A drawing that looks like a segment of tape, used to illustrate number relationships. Also known as a strip diagram, bar model, fraction strip, or length model.

Terminating decimal A decimal is called terminating if its repeating digit is 0.

Third quartile For a data set with median M , the third quartile is the median of the data values greater than M . Example: For the data set {2, 3, 6, 7, 10, 12, 14, 15, 22, 120}, the third quartile is 15. *See also:* median, first quartile. (Many different methods for computing quartiles are in use. The method defined here is sometimes called the Moore and McCabe method.)

Transitivity principle for indirect measurement If the length of object A is greater than the length of object B, and the length of object B is greater than the length of object C, then the length of object A is greater than the length of object C. This principle applies to measurement of other quantities as well.

Uniform probability model A probability model which assigns equal probability to all outcomes. *See also:* probability model.

Vector A quantity with magnitude and direction in the plane or in space, defined by an ordered pair or triple of real numbers.

Visual fraction model A tape diagram, number line diagram, or area model.

Whole numbers The numbers 0, 1, 2, 3, 5

Adapted from Wisconsin Department of Public Instruction, <http://dpi.wi.gov/standards/mathglos.html>, accessed March 2, 2010.

Table 3
Properties of Operations

Here a , b and c stand for arbitrary numbers in a given number system. The properties of operations apply to the rational number system, the real number system, and the complex number system.

<i>Associative property of addition</i>	$(a + b) + c = a + (b + c)$
<i>Commutative property of addition</i>	$a + b = b + a$
<i>Additive identity property of 0</i>	$a + 0 = 0 + a = a$
<i>Existence of additive inverses</i>	For every a there exists $-a$ so that $a + (-a) = (-a) + a = 0$.
<i>Associative property of multiplication</i>	$(a \cdot b) \cdot c = a \cdot (b \cdot c)$
<i>Commutative property of multiplication</i>	$a \cdot b = b \cdot a$
<i>Multiplicative identity property of 1</i>	$a \cdot 1 = 1 \cdot a = a$
<i>Existence of multiplicative inverses</i>	For every a there exists $1/a$ so that $a \cdot 1/a = 1/a \cdot a = 1$.
<i>Distributive property of multiplication over addition</i>	$a \cdot (b + c) = a \cdot b + a \cdot c$

Table 4
Properties of Equality

Here a , b and c stand for arbitrary numbers in the rational, real, or complex number systems.

<i>Reflexive property of equality</i>	$a = a$
<i>Symmetric property of equality</i>	If $a = b$, then $b = a$.
<i>Transitive property of equality</i>	If $a = b$ and $b = c$, then $a = c$.
<i>Addition property of equality</i>	If $a = b$, then $a + c = b + c$.
<i>Subtraction property of equality</i>	If $a = b$, then $a - c = b - c$.
<i>Multiplication property of equality</i>	If $a = b$, then $a \cdot c = b \cdot c$.
<i>Division property of equality</i>	If $a = b$ and $c \neq 0$, then $a \div c = b \div c$.
<i>Substitution property of equality</i>	If $a = b$, then b may be substituted for a in any expression containing a .

Table 5
Properties of Inequality

Here a , b and c stand for arbitrary numbers in the rational or real number systems.
Exactly one of the following is true: $a < b$, $a = b$, $a > b$.

If $a > b$ and $b > c$ then $a > c$.

If $a > b$, then $b < a$.

If $a > b$, then $-a < -b$.

If $a > b$, then $a \pm c > b \pm c$.

If $a > b$ and $c > 0$, then $a \cdot c > b \cdot c$.

If $a > b$ and $c < 0$, then $a \cdot c < b \cdot c$.

If $a > b$ and $c > 0$, then $a \left| \begin{array}{l} c > b \\ c \end{array} \right| c$.

If $a > b$ and $c < 0$, then $a \left| \begin{array}{l} c < b \\ c \end{array} \right| c$.