Kindergarten Unit 1: Counting and Cardinality

Stage 1 Desired Results

ESTABLISHED GOALS:

Competencies:

- ***Students will demonstrate the ability to apply and extend mathematical properties in order to solve problems.***
- ***Students will demonstrate the ability to communicate and justify reasoning in order to support mathematical arguments.***

Content Standards:

- K.CC.1. Count to 100 by ones and by tens.
- K.CC.2. Count forward beginning from a given number within the known sequence (instead of having to begin at 1).
- K.CC.3. Write numbers from 0 to 20. Represent a number of objects with a written numeral 0-20 (with 0 representing a count of no objects).
- K.CC.4. Understand the relationship between numbers and quantities; connect counting to cardinality.
  - K.CC.4a. When counting objects, say the number names in the standard order, pairing each object with one and only one number name and each number name with one and only one object.
  - K.CC.4b. 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.
  - K.CC.4c. Understand that each successive number name refers to a quantity that is one larger.

Transfer

Students will be able to independently use their learning to ***recognize the relationship between objects and numbers.***

Meaning

ENDURING UNDERSTANDINGS

Students will understand that…

- numbers can be read and written.
- there are different ways to make numbers.
- numbers can be counted in different arrangements.

ESSENTIAL QUESTIONS

- Why is counting important?
- What is the easiest way to compare and order numbers?

Acquisition

Students will know…

- that the number of objects is the same regardless of their arrangement or the order in which they were counted.
- the numbers to 100.
- the formation of numbers 0 - 20.
- that one more of any number gives you the next number.
- that one less of any number gives you the previous number.

vocabulary: number, ones place, tens place, hundreds place, number line

Students will be skilled at…

- counting to 100 by ones.
- counting to 100 by tens.
- counting forward beginning from a given number within the known sequence (instead of having to begin at 1).
- writing numbers from 0 to 20.
- representing a number of objects with a written numeral 0-20 (with 0 representing a count of no objects).
- saying the number names in the standard order, pairing each object with one and only one number name and each number name with one and only one object.
- recognizing that the last number name said tells the number of objects counted.
- recognizing that each successive number name refers to a quantity that is one larger.
- counting to answer "how many?" questions about as many as 20 things arranged in a line, a rectangular array, or a circle, or as many as 10 things in a scattered configuration; given a number from 1–20, count out that many objects.

● K.CC.5. Count to answer "how many?" questions about as many as 20 things arranged in a line, a rectangular array, or a circle, or as many as 10 things in a scattered configuration; given a number from 1–20, count out that many objects. ● K.CC.6. Identify whether the number of objects in one group is greater than, less than, or equal to the number of objects in another group, e.g., by using matching and counting strategies.1 ● K.CC.7. Compare two numbers between 1 and 10 presented as written numerals.		● identifying whether the number of objects in one group is greater than, less than, or equal to the number of objects in another group, ● comparing two numbers between 1 and 10 presented as written numerals.
Content Area Literacy Standards		***21st Century Skills***
● Not Applicable		● ***Reason effectively*** ● ***Use systems thinking*** ● ***Communicate clearly*** ● ***Solve problems***

Kindergarten Unit 2: Operations and Algebraic Thinking

Stage 1 Desired Results

ESTABLISHED GOALS:

Competencies:

- ***Students will demonstrate the ability to apply and extend mathematical properties in order to solve problems.***
- ***Students will demonstrate the ability to communicate and justify reasoning in order to support mathematical arguments.***

Content Standards:

- K.OA.1. Represent addition and subtraction with objects, fingers, mental images, drawings, sounds (e.g., claps), acting out situations, verbal explanations, expressions, or equations.
- K.OA.2. Solve addition and subtraction word problems, and add and subtract within 10, e.g., by using objects or drawings to represent the problem.
- K.OA.3. Decompose numbers less than or equal to 10 into pairs in more than one way, e.g., by using objects or drawings, and record each decomposition by a drawing or equation (e.g., 5 = 2 + 3 and 5 = 4 + 1).
- K.OA.4. For any number from 1 to 9, find the number that makes 10 when added to the given number, e.g., by using objects or drawings, and record the answer with a drawing or equation.
- K.OA.5. Fluently add and subtract within 5.

Transfer

Students will be able to independently use their learning to ***recognize the relationship between objects and numbers.***

Meaning

ENDURING UNDERSTANDINGS

Students will understand that…

- written numbers tell how many in all.
- stories can be formulated from an equation.
- answers can be found, communicated and written to tell how many.

ESSENTIAL QUESTIONS

- What types of situations might involve both addition and subtraction at the same time?
- How does math solve problems?

Acquisition

Students will know…

- that addition is more
- that subtraction is less
- that any number 1-9 has a partner number 1-9 that when added to it makes 10.
- that the number 10 can be broken down into pairs.

vocabulary: plus sign +, minus sign -, equal sign =, take apart

Students will be skilled at…

- representing addition and subtraction with objects, fingers, mental images, drawings, sounds (e.g., claps), acting out situations, verbal explanations, expressions, or equations.
- solving addition and subtraction word problems, and add and subtract within 10.
- decomposing numbers less than or equal to 10 into pairs in more than one way and record each decomposition by a drawing or equation (e.g., 5 = 2 + 3 and 5 = 4 + 1).
- finding the number that makes 10 when added to the given number 1-9.
- adding and subtracting within 5.

Content Area Literacy Standards

- NOT APPLICABLE

21st Century Skills

- ***Make judgements and decisions***
- ***solve problems***
- ***work creatively with others***

	• ***think creatively***

Kindergarten Unit 3: Number and Operations in Base 10

Stage 1 Desired Results

ESTABLISHED GOALS:

Competencies:

- ***Students will demonstrate the ability to apply and extend mathematical properties in order to solve problems.***
- ***Students will demonstrate the ability to communicate and justify reasoning in order to support mathematical arguments.***

Content Standards:

- K.NBT.1. Compose and decompose numbers from 11 to 19 into ten ones and some further ones, e.g., by using objects or drawings, and record each composition or decomposition by a drawing or equation (e.g., 18 = 10 + 8); understand that these numbers are composed of ten ones and one, two, three, four, five, six, seven, eight, or nine ones.

Transfer

Students will be able to independently use their learning to ***evaluate the relationship between different numbers***

Meaning

ENDURING UNDERSTANDINGS

Students will understand that…

- finding the answer and writing the numbers tells how many.
- numbers can be joined together to make a single number with the same value using 10 as one of the addends.
- decomposing a number to make two numbers with the same total value can be done using 10 as one of the addends.

ESSENTIAL QUESTIONS

- How can decomposing numbers help you with addition?
- Why is there more than one way to compose and decompose numbers?

Acquisition

Students will know…

- that any number 11-19 can be broken down into one ten and 1 - 9 ones.
- that this composition or decomposition can be written as an equation.

vocabulary: take apart, ones, tens, greater than, less than

Students will be skilled at…

- composing and decomposing numbers from 11 to 19 into ten ones and some further ones,
- recording each composition or decomposition by a drawing or equation (e.g., 18 = 10 + 8);
- recognizing that these numbers are composed of ten ones and one, two, three, four, five, six, seven, eight, or nine ones.

Content Area Literacy Standards

- Not applicable

21st Century Skills

- ***Use systems thinking***
- ***Reason effectively***
- ***Think creatively***
- ***Communicate clearly***

Kindergarten Unit 4: Measurement and Data

Stage 1 Desired Results

ESTABLISHED GOALS:

Competencies:

- ***Students will demonstrate the ability to apply and extend mathematical properties in order to solve problems.***
- ***Students will demonstrate the ability to communicate and justify reasoning in order to support mathematical arguments.***

Content Standards:

- K.MD.1. Describe measurable attributes of objects, such as length or weight. Describe several measurable attributes of a single object.
- K.MD.2. Directly compare two objects with a measurable attribute in common, to see which object has "more of"/"less of" the attribute, and describe the difference. For example, directly compare the heights of two children and describe one child as taller/shorter.
- K.MD.3. Classify objects into given categories; count the numbers of objects in each category and sort the categories by count.

Transfer

Students will be able to independently use their learning to ***identify characteristics and classify objects.***

Meaning

ENDURING UNDERSTANDINGS (3-5 total)

Students will understand that…

- an object can have more than one measurable attribute.
- a comparison depends on the attribute being measured.
- good math thinkers are careful about what they write and say, so their ideas about math are clear.

ESSENTIAL QUESTIONS

- Why do we need to measure?
- What is the best way to compare an object?

Acquisition

Students will know…

- that the length of an object is how long it is.
- that the weight of an object is how heavy it is.
- that classifying objects will put them in different groups.

vocabulary: length, width, heavy, group, category, more, less, height, weight, shorter, longer

Students will be skilled at…

- describing measurable attributes of objects, such as length or weight.
- describing several measurable attributes of a single object.
- comparing two objects with a measurable attribute in common, to see which object has "more of"/"less of" the attribute.
- describing the difference as outlined above.
- classifying objects into given categories.
- counting the numbers of objects in each category.
- sorting the categories by count.

Content Area Literacy Standards

- NOT APPLICABLE

21st Century Skills

- ***Solve problems***
- ***Collaborate with others***
- ***Communicate clearly***

	• ***Make judgements and decisions***

Kindergarten Unit 5: Geometry

Stage 1 Desired Results

ESTABLISHED GOALS:

Competencies:

- ***Students will demonstrate the ability to apply and extend mathematical properties in order to solve problems.***
- ***Students will demonstrate the ability to communicate and justify reasoning in order to support mathematical arguments.***

Content Standards:

- K.G.1. Describe objects in the environment using names of shapes, and describe the relative positions of these objects using terms such as above, below, beside, in front of, behind, and next to.
- K.G.2. Correctly name shapes regardless of their orientations or overall size.
- K.G.3. Identify shapes as two-dimensional (lying in a plane, "flat") or three-dimensional ("solid").
- K.G.4. Analyze and compare two- and three-dimensional shapes, in different sizes and orientations, using informal language to describe their similarities, differences, parts (e.g., number of sides and vertices/"corners") and other attributes (e.g., having sides of equal length).
- K.G.5. Model shapes in the world by building shapes from components (e.g., sticks and clay balls) and drawing shapes.
- K.G.6. Compose simple shapes to form larger shapes. For example, "Can you join these two triangles with full sides touching to make a rectangle?"

Transfer

Students will be able to independently use their learning to ***recognize and identify shapes in their daily life.***

Meaning

ENDURING UNDERSTANDINGS (3-5 total)

Students will understand that…

- that many shapes are named based on the number of sides.
- that the world we live in is made up of many different 3D shapes.
- that shapes can be put together to make different shapes.

ESSENTIAL QUESTIONS

- How many different ways are there to classify shapes?
- When can one shape become another?

Acquisition

Students will know…

- that a triangle has 3 sides.
- that a square has 4 equal sides.
- that a rectangle has 4 sides.
- that the opposite sides of a rectangle are equal.
- that a hexagon has 6 sides.
- that a circle has no sides or corners.
- the difference between 2 and 3 dimensional shapes.
- that you can use simple shapes to make larger shapes.

vocabulary: circle, triangle, square, rectangle, hexagon, above, below, beside, in front of, behind, next to, 2-dimensional, 3-dimensional, cone, cylinder, cube, sphere

Students will be skilled at…

- describing objects in the environment using names of shapes.
- describing the relative positions of these objects using terms such as above, below, beside, in front of, behind, and next to.
- correctly naming shapes regardless of their orientations or overall size.
- identifying shapes as two-dimensional (lying in a plane, "flat") or three-dimensional ("solid").
- analyzing and comparing two- and three-dimensional shapes, in different sizes and orientations, using informal language to describe their similarities, differences, parts (e.g., number of sides and vertices/"corners") and other attributes (e.g., having sides of equal length).

		● modeling shapes in the world by building shapes from components (e.g., sticks and clay balls) and drawing shapes. ● composing simple shapes to form larger shapes.
Content Area Literacy Standards		***21st Century Skills***
● Not applicable		● ***Communicate clearly*** ● ***Think creatively*** ● ***Solve problems*** ● ***Collaborate with others***

Grade 1 Unit 1: Numbers and Operations - Fact fluency

Stage 1 Desired Results

ESTABLISHED GOALS:

Competencies:

- ***Students will demonstrate the ability to apply and extend mathematical properties in order to solve problems.***
- ***Students will demonstrate the ability to communicate and justify reasoning in order to support mathematical arguments.***

Content Standards:

- 1.NBT.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 a written numeral.
- 1.NBT.2. Understand that the two digits of a two-digit number represent amounts of tens and ones. Understand the following as special cases:
  - 1.NBT.2a. 10 can be thought of as a bundle of ten ones — called a "ten."
  - 1.NBT.2b. The numbers from 11 to 19 are composed of a ten and one, two, three, four, five, six, seven, eight, or nine ones.
  - 1.NBT.2c. The numbers 10, 20, 30, 40, 50, 60, 70, 80, 90 refer to one, two, three, four, five, six, seven, eight, or nine tens (and 0 ones).
- 1.NBT.3. Compare two two-digit numbers based on meanings of the tens and ones digits, recording the results of comparisons with the symbols >, =, and <.
- 1.NBT.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 or

Transfer

Students will be able to independently use their learning to ***recognize the relationships between numbers.***

Meaning

ENDURING UNDERSTANDINGS

Students will understand that…

- there are multiple ways to write a number.
- numbers are made up of parts with different values.
- that math can be represented in ways other than numbers.

ESSENTIAL QUESTIONS

- Why do we need numbers?

Acquisition

Students will know…

- the numbers to 120.
- that a two digit number consists of tens and ones.
- that the symbols >, =, and < are used when comparing two two-digit numbers.
- that addition results in having more and subtraction results in having less.
- that a concrete model or drawing can represent a number.
- that mental math can be used when finding a solution to an equation.
- that math can be explained through words and pictures.
- that numbers can be written in expanded form or standard form.
- that numbers consist of part-part-whole.
- the multiples of ten.

vocabulary: tens, ones, numeral, digit, more, less

Students will be skilled at…

- counting to 120, starting at any number less than 120.
- reading and writing numerals up to 120 and representing a number of objects with a written numeral.
- recognizing that the two digits of a two-digit number represent amounts of tens and ones.
- recognizing that 10 can be thought of as a bundle of ten ones — called a "ten."
- recognizing that the numbers from 11 to 19 are composed of a ten and one, two, three, four, five, six, seven, eight, or nine ones.
- recognizing that the numbers 10, 20, 30, 40, 50, 60, 70, 80, 90 refer to one, two, three, four, five, six, seven, eight, or nine tens (and 0 ones).
- comparing two two-digit numbers based on meanings of the tens and ones digits, recording the results of comparisons with the symbols >, =, and <.
- adding within 100, including adding a two-digit number and a one-digit number, and

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. Understand that in adding two-digit numbers, one adds tens and tens, ones and ones; and sometimes it is necessary to compose a ten. ● 1.NBT.5. Given a two-digit number, mentally find 10 more or 10 less than the number, without having to count; explain the reasoning used. ● 1.NBT.6. Subtract multiples of 10 in the range 10-90 from multiples of 10 in the range 10-90 (positive or zero differences), 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.		adding a two-digit number and a multiple of 10. ● using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction. ● relating the strategy to a written method and explaining the reasoning used. ● recognizing that in adding two-digit numbers, one adds tens and tens, ones and ones; and sometimes it is necessary to compose a ten. ● mentally finding 10 more or 10 less than the number, without having to count. ● explaining the reasoning used. ● subtracting multiples of 10 in the range 10-90 from multiples of 10 in the range 10-90 (positive or zero differences), using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction ● relating the strategy to a written method and explain the reasoning used.
Content Area Literacy Standards		***21st Century Skills***
NOT APPLICABLE		● ***Use systems thinking*** ● ***Solve problems*** ● ***Communicate clearly***

Grade 1 Unit 2: Operations and Algebraic Thinking- Word Problems

Stage 1 Desired Results

ESTABLISHED GOALS:

Competencies:

- ***Students will demonstrate the ability to apply and extend mathematical properties in order to solve problems.***
- ***Students will demonstrate the ability to communicate and justify reasoning in order to support mathematical arguments.***

Content Standards:

- 1.OA.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, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem.
- 1.OA.2. Solve word problems that call for addition of three whole numbers whose sum is less than or equal to 20, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem.
- 1.OA.3. Apply properties of operations as strategies to add and subtract.
- 1.OA.4. Understand subtraction as an unknown-addend problem.
- 1.OA.5. Relate counting to addition and subtraction (e.g., by counting on 2 to add 2).
- 1.OA.6. Add and subtract within 20, demonstrating fluency for addition and subtraction within 10. Use

Transfer

Students will be able to independently use their learning to ***recognize the role of addition and subtraction in their everyday life.***

Meaning

ENDURING UNDERSTANDINGS

Students will understand that…

- addition and subtraction can help you to solve word problems.
- that sentences can be written as mathematical equations.

ESSENTIAL QUESTIONS

- How do you decide what to do?
- Is it always better to have more?

Acquisition

Students will know…

- that addition can be adding more to a group or putting groups together to make a larger group.
- the relationships between the parts (part - part- whole).
- that subtraction can be used to compare numbers.
- that subtraction can be used to take a part out of the whole.

vocabulary: add, sum, plus, equation, equals, part, whole, difference, subtract, minus, more, fewer, addend

Students will be skilled at…

- using 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.
- solve word problems that call for addition of three whole numbers whose sum is less than or equal to 20.
- applying properties of operations as strategies to add and subtract.
- recognizing subtraction as an unknown-addend problem.
- relating counting to addition and subtraction .
- adding and subtracting within 20, demonstrating fluency for addition and subtraction within 10.
- using strategies such as counting on; making ten.
- decomposing a number leading to a ten

strategies such as counting on; making ten (e.g., 8 + 6 = 8 + 2 + 4 = 10 + 4 = 14); decomposing a number leading to a ten (e.g., 13 – 4 = 13 – 3 – 1 = 10 – 1 = 9); using the relationship between addition and subtraction (e.g., knowing that 8 + 4 = 12, one knows 12 – 8 = 4); and creating equivalent but easier or known sums (e.g., adding 6 + 7 by creating the known equivalent 6 + 6 + 1 = 12 + 1 = 13). ● 1.OA.7. Understand the meaning of the equal sign, and determine if equations involving addition and subtraction are true or false. ● 1.OA.8. Determine the unknown whole number in an addition or subtraction equation relating three whole numbers.		● using the relationship between addition and subtraction. ● creating equivalent but easier or known sums). ● recognizing the meaning of the equal sign, and determining if equations involving addition and subtraction are true or false. ● determining the unknown whole number in an addition or subtraction equation relating three whole numbers.
Content Area Literacy Standards		***21st Century Skills***
NOT APPLICABLE		● ***Reason effectively*** ● ***Solve problems*** ● ***Think creatively*** ● ***Use and manage information***

Grade 1 Unit 3: Graphing, Measuring, Time to the half hour

Stage 1 Desired Results

ESTABLISHED GOALS:

Competencies:

- ***Students will demonstrate the ability to apply and extend mathematical properties in order to solve problems.***
- ***Students will demonstrate the ability to communicate and justify reasoning in order to support mathematical arguments.***

Content Standards:

- 1.MD.1. Order three objects by length; compare the lengths of two objects indirectly by using a third object.
- 1.MD.2. Express the length of an object as a whole number of length units, by laying multiple copies of a shorter object (the length unit) 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. Limit to contexts where the object being measured is spanned by a whole number of length units with no gaps or overlaps.
- 1.MD.3. Tell and write time in hours and half-hours using analog and digital clocks.
- 1.MD.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.

Transfer

*Students will be able to independently use their learning to **solve real-world problems and explain the solution.***

Meaning

ENDURING UNDERSTANDINGS

Students will understand that…

- we can compare objects using their physical properties.
- different objects are measured with different units.

ESSENTIAL QUESTIONS

- Why is time important?
- What is better, a lot of little things or one big thing?

Acquisition

Students will know…

- the difference between an analog and digital clock.
- that we measure time in hours and minutes.
- that the length of any object can be used as a nonstandard measurement unit of length
- that the length of an object is the number of same-size measurement units with no gaps or overlaps.

vocabulary: hour, hour hand, minute, minute hand, o'clock, half hour, longest, shortest, longer, shorter, length, measure, length unit

Students will be skilled at…

- ordering three objects by length.
- comparing the lengths of two objects indirectly by using a third object.
- comparing the lengths of a variety of real world objects?
- measuring the length of an object end to end (no gaps or overlaps) using multiple copies of a shorter object
- measuring length with non standard units.
- telling and writing time in hours and half-hours using analog and digital clocks in a variety of real world contexts.
- organizing, representing, and interpreting data with at least three categories.
- collecting, organizing and analyzing data on a graph.

Content Area Literacy Standards

NOT APPLICABLE

21st Century Skills

- ***Reason effectively***
- ***Use systems thinking***
- ***Make judgements and decisions***
- ***solve problems***

	• ***think creatively***

Grade 1 Unit 4: Geometry 2D and 3D, Fractions ¼, ½

Stage 1 Desired Results

ESTABLISHED GOALS:

Competencies:

- ***Students will demonstrate the ability to apply and extend mathematical properties in order to solve problems.***
- ***Students will demonstrate the ability to communicate and justify reasoning in order to support mathematical arguments.***

Content Standards:

- 1.G.1. Distinguish between defining attributes (e.g., triangles are closed and three-sided) versus non-defining attributes (e.g., color, orientation, overall size); build and draw shapes to possess defining attributes.
- 1.G.2. Compose two-dimensional shapes (rectangles, squares, trapezoids, triangles, half-circles, and quarter-circles) or three-dimensional shapes (cubes, right rectangular prisms, right circular cones, and right circular cylinders) to create a composite shape, and compose new shapes from the composite shape.
- 1.G.3. Partition circles and rectangles into two and four equal shares, describe the shares using the words halves, fourths, and quarters, and use the phrases half of, fourth of, and quarter of. Describe the whole as two of, or four of the shares. Understand for these examples that decomposing into more equal shares creates smaller shares.

Transfer

Students will be able to independently use their learning to ***identify shapes both part and whole in their daily lives.***

Meaning

ENDURING UNDERSTANDINGS

Students will understand that…

- shapes, both 2D and 3D, are seen everywhere.
- all shapes can be broken into equal parts.

ESSENTIAL QUESTIONS

- When is ¼ better than ½?
- When is seeing things in 2D more important than in 3D?

Acquisition

Students will know…

- that color, orientation and overall size are examples of non-defining attributes
- that decomposing an object into equal parts makes smaller parts.
- that shapes are divided into equal and unequal shares.
- that shapes can be divided into equal parts called halves, quarters or fourths.
- that 2D and 3D shapes have names.
- the difference between edges, vertices and flat surfaces of 3D shapes.
- the difference between sides and vertices of 2D shapes.
- that composing shapes create a larger shape.

vocabulary: attributes, triangle, defining, non-defining, two-dimensional, three-dimensional, partition, halves, fourths, quarters, 2D shapes, sides, vertices, edges, faces, flat surfaces, rectangular prism, 3D shapes, equal shares

Students will be skilled at…

- distinguishing between defining attributes versus non-defining attributes(color, orientation and size don't define the shape).
- building and drawing shapes that have defining attributes.
- composing two-dimensional shapes or three-dimensional shapes to create a composite shape.
- composing new shapes from the composite shape.
- partitioning circles and rectangles into two and four equal shares.
- describing the shares using the words halves, fourths, and quarters, and use the phrases half of, fourth of, and quarter of.
- describing the whole as two of, or four of the shares.
- recognizing that decomposing into more equal shares creates smaller shares.
- naming 2D and 3D shapes

Content Area Literacy Standards

NOT APPLICABLE

21st Century Skills

- ***Use systems thinking***

	● ***Think creatively*** ● ***Collaborate with others***

Grade 2 Unit 1: Operations and Algebraic Thinking

Stage 1 Desired Results

ESTABLISHED GOALS:

Competencies:

- ***Students will demonstrate the ability to apply and extend mathematical properties in order to solve problems.***
- ***Students will demonstrate the ability to communicate and justify reasoning in order to support mathematical arguments.***

Content Standards:

- 2.OA.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, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.
- 2.OA.2. Fluently add and subtract within 20 using mental strategies. By end of Grade 2, know from memory all sums of two one-digit numbers.
- 2.OA.3. Determine whether a group of objects (up to 20) has an odd or even number of members, e.g., by pairing objects or counting them by 2s; write an equation to express an even number as a sum of two equal addends.
- 2.OA.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.

Transfer

Students will be able to independently use their learning to ***analyze the relationship between addition and subtraction.***

Meaning

ENDURING UNDERSTANDINGS

Students will understand that…

- the relationships among the operations and their properties promotes fluency.
- unknowns can be used in all positions when solving problems. (i.e. the addends, the sum, or the difference)
- repeated addition of the same addend involves joining equal groups.
- an equation shows the balance between what is on the left and right of the equal sign.

ESSENTIAL QUESTIONS

- Can your addition facts help you solve subtraction problems?
- What does an odd/even number look like?
- What is meant by equality?

Acquisition

Students will know…

- the difference between doubles and near doubles facts.
- the difference between even and odd numbers.
- that arrays show repeated addition.
- the addition and subtraction facts within 20.
- that addition and subtraction word problems can be solved in one or two steps.

vocabulary: ones place, tens place, hundreds, number line, sum, difference, fractions, doubles, compatible "friendly" numbers, regroup, add, subtract, addends, number sentence, greater than, less than, even, odd, array, equation

Students will be skilled at…

- using 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..
- fluently adding and subtracting within 20 using mental strategies.
- determining whether a group of objects (up to 20) is an odd or even.
- using addition to find the total number of objects arranged in rectangular arrays with up to 5 rows and up to 5 columns.
- writing an equation that shows repeated addition.

Content Area Literacy Standards

21st Century Skills

• NOT APPLICABLE	• ***Reason Effectively*** • ***Use Systems Thinking*** • ***Solve Problems***

Grade 2 Unit 2: Numbers and Operations

Stage 1 Desired Results

ESTABLISHED GOALS:

Competencies:

- ***Students will demonstrate the ability to apply and extend mathematical properties in order to solve problems.***
- ***Students will demonstrate the ability to communicate and justify reasoning in order to support mathematical arguments.***

Content Standards:

- 2.NBT.1. Understand that the three digits of a three-digit number represent amounts of hundreds, tens, and ones; e.g., 706 equals 7 hundreds, 0 tens, and 6 ones. Understand the following as special cases:
- 2.NBT.1a. 100 can be thought of as a bundle of ten tens — called a "hundred."
- 2.NBT.1b. The numbers 100, 200, 300, 400, 500, 600, 700, 800, 900 refer to one, two, three, four, five, six, seven, eight, or nine hundreds (and 0 tens and 0 ones).
- 2.NBT.2. Count within 1000; skip-count by 5s, 10s, and 100s.
- 2.NBT.3. Read and write numbers to 1000 using base-ten numerals, number names, and expanded form.
- 2.NBT.4. Compare two three-digit numbers based on meanings of the hundreds, tens, and ones digits, using >, =, and < symbols to record the results of comparisons.
- 2.NBT.5. Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.

Transfer

*Students will be able to independently use their learning to **analyze and describe patterns between quantities.***

Meaning

ENDURING UNDERSTANDINGS

Students will understand that…

- there are many ways to represent a number.
- our number system is based on groups of ten.
- place value can be used to order and compare numbers.
- there are a variety of ways to add or subtract multi-digit numbers.

ESSENTIAL QUESTIONS

- What is the best strategy for adding and subtracting double-digit numbers?
- How many ways can you count to 1,000?

Acquisition

Students will know…

- that three digit numbers are made up of hundreds, tens and ones.
- that ten tens is called a hundred.
- that the numbers 100, 200, 300, 400, 500, 600, 700, 800, 900 refer to one, two, three, four, five, six, seven, eight, or nine hundreds (and 0 tens and 0 ones).
- that you can regroup 1 ten for 10 ones.
- that two digit numbers are made up of tens and ones.
- that numbers can be written in expanded form, standard form or word form.
- the numbers to 1000.
- the symbols <, >, =.
- that models or drawings can convey their strategies.
- that when adding or subtracting numbers, you must align the hundreds, tens and ones when using paper and pencil strategy.
- that a variety of mental math strategies can be used when adding and subtracting.

Students will be skilled at…

- recognizing that the three digits of a three-digit number represent amounts of hundreds, tens, and ones.
- recognizing that a bundle of ten tens is called a "hundred."
- recognizing that the numbers 100, 200, 300, 400, 500, 600, 700, 800, 900 refer to one, two, three, four, five, six, seven, eight, or nine hundreds (and 0 tens and 0 ones).
- counting within 1000.
- skip-counting by 5s, 10s, and 100s.
- reading and writing numbers to 1000 using base-ten numerals, number names, and expanded form.
- comparing two three-digit numbers based on meanings of the hundreds, tens, and ones digits, using >, =, and < symbols to record the results of comparisons.
- fluently adding and subtracting within 100 using strategies based on place value, properties of operations, and/or the

● 2.NBT.6. Add up to four two-digit numbers using strategies based on place value and properties of operations. ● 2.NBT.7. Add and subtract within 1000, 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. Understand that in adding or subtracting three digit numbers, one adds or subtracts hundreds and hundreds, tens and tens, ones and ones; and sometimes it is necessary to compose or decompose tens or hundreds. ● 2.NBT.8. Mentally add 10 or 100 to a given number 100–900, and mentally subtract 10 or 100 from a given number 100–900. ● 2.NBT.9. Explain why addition and subtraction strategies work, using place value and the properties of operations.	***vocabulary:*** hundreds chart, open number line, break apart strategy, regroup, ones, tens, hundreds, expanded form, digit, greater than, less than, equal to	relationship between addition and subtraction. ● adding up to four two-digit numbers using strategies based on place value and properties of operations. ● adding and subtracting within 1000, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction. ● relating the strategy to a written method. ● recognizing that in adding or subtracting three digit numbers, one adds or subtracts hundreds and hundreds, tens and tens, ones and ones. ● recognizing that sometimes it is necessary to compose or decompose tens or hundreds. ● mentally adding 10 or 100 to a given number 100–900. ● mentally subtracting 10 or 100 from a given number 100–900. ● explaining why addition and subtraction strategies work, using place value and the properties of operations.
Content Area Literacy Standards		***21st Century Skills***
NOT APPLICABLE		● ***Reason Effectively*** ● ***Use Systems Thinking*** ● ***Solve problems***

Grade 2 Unit 3: Measurement and Data

Stage 1 Desired Results

ESTABLISHED GOALS:

Competencies:

- ***Students will demonstrate the ability to apply and extend mathematical properties in order to solve problems.***
- ***Students will demonstrate the ability to communicate and justify reasoning in order to support mathematical arguments.***

Content Standards:

- 2.MD.1. Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes.
- 2.MD.2. Measure the length of an object twice, using length units of different lengths for the two measurements; describe how the two measurements relate to the size of the unit chosen.
- 2.MD.3. Estimate lengths using units of inches, feet, centimeters, and meters.
- 2.MD.4. Measure to determine how much longer one object is than another, expressing the length difference in terms of a standard length unit.
- 2.MD.5. Use addition and subtraction within 100 to solve word problems involving lengths that are given in the same units, e.g., by using drawings (such as drawings of rulers) and equations with a symbol for the unknown number to represent the problem.
- 2.MD.6. Represent whole numbers as lengths from 0 on a number line diagram with equally spaced points corresponding to the numbers 0, 1, 2, ..., and represent whole-number sums and differences within 100 on a number line diagram.

Transfer

*Students will be able to independently use their learning to **solve real world problems and explain their solution.***

Meaning

ENDURING UNDERSTANDINGS

Students will understand that…

- standard units of measure enable people to interpret results of data.
- some attributes of objects are measurable and can be quantified using unit amounts.
- measurement in the same unit can be added or subtracted in the same way as whole numbers.
- time can be recorded to the nearest five minutes on analog or digital clocks.
- the same amount of money can be represented using different combinations of bills and coins.

ESSENTIAL QUESTIONS

- How is money important in our daily lives?
- Why do I need to use standard measurement?
- How do people use data to influence others?

Acquisition

Students will know…

- that different coins have different values.
- that different coins can be used to make the same total of money.
- the difference between am and pm.
- that time can be expressed using different units that are related.
- that the smaller the measurement unit, the greater number of units are needed to measure the length of an object.
- that whole numbers can be represented as lengths on a number line.
- that measurement word problems can compare lengths of objects.
- that line plots represent data, mostly measurement of object.

Students will be skilled at…

- measuring the length of an object by selecting and using appropriate tools.
- measuring the length of an object twice, using length units of different lengths.
- describing how the two measurements relate to the size of the unit chosen.
- estimating lengths using units of inches, feet, centimeters, and meters.
- measuring to determine how much longer one object is than another.
- expressing the length difference in terms of a standard length unit.
- using addition and subtraction within 100 to solve word problems involving lengths that are given in the same units.

● 2.MD.7. Tell and write time from analog and digital clocks to the nearest five minutes, using a.m. and p.m. ● 2.MD.8. Solve word problems involving dollar bills, quarters, dimes, nickels, and pennies, using $ and ¢ symbols appropriately. ● 2.MD.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.10. Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put together, take-apart, and compare problems using information presented in a bar graph.	● that bar graphs and picture graphs represent categorical data. ● that addition and subtraction word problems can be solved using data on graphs. ***vocabulary:*** rulers, yardsticks, meter sticks, measuring tapes, penny, nickel, dime, quarter, half-dollar, cents, dollar, tallymarks, am/pm, half past, quarter past, estimate, inch, foot, ruler, yard, length, height, meter, centimeter, data, line plot, bar graph, symbol, picture graph	● representing whole numbers as lengths on a number line with equally spaced points. ● representing whole-number sums and differences within 100 on a number line diagram. ● telling and writing time from analog and digital clocks to the nearest five minutes, using a.m. and p.m. ● solving word problems involving dollar bills, quarters, dimes, nickels, and pennies. ● using $ and ¢ symbols appropriately. ● generating measurement data by measuring lengths of several objects to the nearest whole unit, or by making repeated measurements of the same object. ● showing the measurements by making a line plot, where the horizontal scale is marked off in whole-number units. ● drawing a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. ● solving simple put together, take-apart, and compare problems using information presented in a bar graph. ● finding the value of a collection of coins and dollars. ● sorting coins from greatest to least value. ● stating a time multiple ways using phrases like “half past”. ● measuring to the nearest inch and centimeter.
Content Area Literacy Standards		***21st Century Skills***
Not Applicable		● ***Reason Effectively*** ● ***Make judgements and Decisions*** ● ***Solve Problems*** ● ***Communicate Clearly*** ● ***Access and Evaluate Information***

Grade 2 Unit 4: Geometry

Stage 1 Desired Results

ESTABLISHED GOALS:

Competencies:

- ***Students will demonstrate the ability to apply and extend mathematical properties in order to solve problems.***
- ***Students will demonstrate the ability to communicate and justify reasoning in order to support mathematical arguments.***

Content Standards:

- 2.G.1. Recognize and draw shapes having specified attributes, such as a given number of angles or a given number of equal faces.5 Identify triangles, quadrilaterals, pentagons, hexagons, and cubes.
- 2.G.2. Partition a rectangle into rows and columns of same-size squares and count to find the total number of them.
- 2.G.3. Partition circles and rectangles into two, three, or four equal shares, describe the shares using the words halves, thirds, half of, a third of, etc., and describe the whole as two halves, three thirds, four fourths. Recognize that equal shares of identical whole objects need not have the same shape.

Transfer

Students will be able to independently use their learning to ***recognize and identify shapes in their daily lives.***

Meaning

ENDURING UNDERSTANDINGS

Students will understand that…

- geometry and spatial sense offer ways to interpret and reflect on our physical environment.
- two and three dimensional objects can be described, classified, and analyzed by their attributes.
- fractions represent equal parts of a whole.

ESSENTIAL QUESTIONS

- How does repeated addition help you find the area of a rectangle?
- Do equal shares have to be the same size and shape?

Acquisition

Students will know…

- that equal shares of identical whole objects need not have the same shape.
- that 2 dimensional shapes can be sorted based on attributes.
- that polygons can be drawn or described by their number of sides and angles.
- that solid figures such as a cube can be described by their number of faces, edges and vertices.
- that a rectangle can be divided into rows and columns of squares that are the same size; and that this can be used to find the area.
- that you can show halves, thirds and fourths using fractions.

vocabulary: attributes, angles, faces, triangle, quadrilateral, pentagon, hexagon, cube, vertices,

Students will be skilled at…

- recognizing and drawing shapes having specified attributes, such as a given number of angles or a given number of equal faces.
- identifying triangles, quadrilaterals, pentagons, hexagons, and cubes.
- partitioning a rectangle into rows and columns of same-size squares and counting to find the area.
- partitioning circles and rectangles into two, three, or four equal shares.
- describing the fractions using the words halves, thirds, half of, a third of, etc.
- describing the whole as two halves, three thirds, four fourths.
- recognizing that equal shares of identical whole objects need not have the same shape.

	polygon, right angle, edge, equal shares, halves, thirds, fourths, fraction, numerator, denominator, area.	
Content Area Literacy Standards		***21st Century Skills***
NOT APPLICABLE		● ***Reason Effectively*** ● ***Use Systems Thinking*** ● ***Solve Problems*** ● ***Think Creatively***

Grade 3 Unit 1: Numbers and Operations

Stage 1 Desired Results

ESTABLISHED GOALS:

Competencies:

- ***Students will demonstrate the ability to apply and extend mathematical properties in order to solve problems.***
- ***Students will demonstrate the ability to communicate and justify reasoning in order to support mathematical arguments.***

Content Standards:

- 3.NBT.1. Use place value understanding to round whole numbers to the nearest 10 or 100.
- 3.NBT.2. Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.
- 3.NBT.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.

Transfer

Students will be able to independently use their learning to ***solve real-world problems and explain or defend the reasonableness of the solution.***

Meaning

ENDURING UNDERSTANDINGS

Students will understand that…

- that good math thinkers choose and apply math they know to show and solve problems from everyday life.
- place value lends to number sense and efficient computing with numbers.

ESSENTIAL QUESTIONS

- How does where you place something affect how much it is worth?

Acquisition

Students will know…

- that rounding is a process for finding multiples of 10 and 100 closest to a given number.
- that rounding can be used to estimate a sum or difference.
- that the standard algorithm for adding and subtracting 3 digit numbers is an extension of the 2 digit algorithm.
- that addition and subtraction are inverse operations and that this relationship can be used to solve problems.
- that good math thinkers choose and apply math they know to show and solve problems from everyday life.
- that an open number line or basic math facts and properties of multiplication can be used to find multiples of ten.

vocabulary: regroup, addend, sum, difference, place value, inverse operations, round, Identity (zero) property of addition, Commutative (order) property of addition, Associative (grouping) property of addition, equal groups, multiplication, factors, product,

Students will be skilled at…

- using place value to round whole numbers to the nearest 10 or 100.
- fluently adding and subtracting within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.
- multiplying 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.

	equation, unknown, number line, array, row, column, Commutative (order) property of multiplication, Identity (one) property of multiplication, the zero property of multiplication, multiple, the Associative (Grouping) property of Multiplication, the distributive property, fact family, division, dividend, divisor, quotient, even number, odd number	
Content Area Literacy Standards		***21st Century Skills***
NOT APPLICABLE		● ***Reason Effectively*** ● ***Solve Problems*** ● ***Communicate Clearly***

Grade 3 Unit 2: Operations and Algebraic Thinking

Stage 1 Desired Results

ESTABLISHED GOALS:

Competencies:

- ***Students will demonstrate the ability to apply and extend mathematical properties in order to solve problems.***
- ***Students will demonstrate the ability to communicate and justify reasoning in order to support mathematical arguments.***

Content Standards:

- 3.OA.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.2. Interpret whole-number quotients of whole numbers, e.g., interpret 56 ÷ 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 shares of 8 objects each.
- 3.OA.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 number to represent the problem.
- 3.OA.4. Determine the unknown whole number in a multiplication or division equation relating three whole numbers.
- 3.OA.5. Apply properties of operations as strategies to multiply and divide. Examples: If 6 × 4 = 24 is known, then 4 × 6 = 24 is also known. (Commutative property of multiplication.) 3 × 5 × 2 can be found by 3 × 5 = 15, then 15 × 2 = 30, or by 5 × 2 = 10, then 3 × 10 = 30. (Associative property of multiplication.) Knowing that 8 × 5 = 40 and 8 × 2 = 16, one can find 8 × 7 as 8 × (5 + 2) = (8 × 5) + (8 × 2) = 40 + 16 = 56. (Distributive property.)

Transfer

*Students will be able to independently use their learning to **analyze and describe patterns between quantities.***

ENDURING UNDERSTANDINGS

Students will understand that…

- mathematical operations are used in solving problems in which a new value is produced from one or more values.
- Algebraic thinking involves choosing, combining and applying effective strategies for answering quantitative questions.

ESSENTIAL QUESTIONS

- How are multiplication and division related?
- When does order matter?

Acquisition

Students will know…

- that repeated addition that involves joining equal groups is one way to think about multiplication.
- that counting/joining equal groups on the number line is one way to think about multiplication.
- that an array involves displaying objects in equal rows and columns and is one way to think about multiplication.
- that two numbers can be multiplied in any order and the product remains the same.
- that sharing involves separating equal groups and is one way to think about division.
- that basic multiplication facts can be found by identifying patterns within each multiplication table.
- that the distributive property can be used to break a large array into smaller arrays which can be added together to get the final product.
- that multiplication and division have an inverse relationship and this relationship can be used to find division facts.

Students will be skilled at…

- interpreting products of whole numbers.
- interpreting whole-number quotients of whole numbers.
- using multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities.
- determining the unknown whole number in a multiplication or division equation relating three whole numbers.
- applying properties of operations as strategies to multiply and divide.
- recognizing division as an unknown-factor problem.
- fluently multiplying and dividing within 100, using strategies such as the relationship between multiplication and division or properties of operations.
- recalling from memory all products of two one-digit numbers.

● 3.OA.6. Understand division as an unknown-factor problem. ● 3.OA.7. Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that 8 × 5 = 40, one knows 40 ÷ 5 = 8) or properties of operations. By the end of Grade 3, know from memory all products of two one-digit numbers. ● 3.OA.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 ● 3.OA.9. Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations.	● that factors and products can be identified by patterns, as well as other characteristics, such as even and odd. ***vocabulary:*** Commutative property of multiplication, Associative property of multiplication, Distributive property, inverse operations, number line, equal groups, multiplication, factors, product, array, row, column, fact family, equation, round, even number, odd number, order of operations.	● solving two-step word problems using the four operations. ● representing these problems using equations with a letter standing for the unknown quantity. ● assessing the reasonableness of answers using mental computation and estimation strategies including rounding. ● identifying arithmetic patterns (including patterns in the addition table or multiplication table), and explaining them using properties of operations.
Content Area Literacy Standards		***21st Century Skills***
NOT APPLICABLE		● ***Reason Effectively*** ● ***Solve Problems*** ● ***Communicate Clearly***

Grade 3 Unit 3: Numbers and Operations - Fractions

Stage 1 Desired Results

ESTABLISHED GOALS:

Competencies:

- ***Students will demonstrate the ability to apply and extend mathematical properties in order to solve problems.***
- ***Students will demonstrate the ability to communicate and justify reasoning in order to support mathematical arguments.***

Content Standards:

- 3.NF.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.2. Understand a fraction as a number on the number line; represent fractions on a number line diagram.
  - 3.NF.2a. Represent a fraction 1/b on a number line diagram by defining the interval from 0 to 1 as the whole and partitioning it into b equal parts. Recognize that each part has size 1/b and that the endpoint of the part based at 0 locates the number 1/b on the number line.
  - 3.NF.2b. 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.
- 3.NF.3. Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size.

Transfer

*Students will be able to independently use their learning to **explore relationships between numbers.***

Meaning

ENDURING UNDERSTANDINGS

Students will understand that…

- fractions allow for quantities to be expressed with greater precision than with just whole numbers.
- attending to precise detail increases reliability of mathematica results and minimizes miscommunication of mathematical explanations.

ESSENTIAL QUESTIONS

- Can something be both a part and a whole?
- What visual models are most useful when working with fractions.

Acquisition

Students will know…

- that a unit fraction represents one part of a whole that has been divided into equal parts.
- that a fraction can represent multiple copies of a unit fraction.
- that the whole can be found given a fractional part.
- that points on a number line can represent fractions
- that the denominator represents the number of equal parts between 0 and 1 and the numerator represents the number of parts between 0 and the point.
- that a number line can be used to represent fractions greater than one.
- that the same fractional amount can be represented by an infinite set of different but equivalent fractions.
- that if two fractions have the same denominator, the fraction with the greater numerator is the greater fraction.

Students will be skilled at…

- recognizing a fraction 1/b is the quantity formed by 1 part when a whole is partitioned into b equal parts.
- recognizing a fraction a/b is the quantity formed by a parts of size 1/b.
- recognizing a fraction as a number on the number line.
- representing fractions on a number line diagram.
- representing a fraction 1/b on a number line diagram by defining the interval from 0 to 1 as the whole and partitioning it into b equal parts.
- recognizing that each part has size 1/b and that the endpoint of the part based at 0 locates the number 1/b on the number line.
- representing a fraction a/b on a number line diagram by marking off a lengths 1/b from 0.
- recognizing that the resulting interval has size a/b and that its endpoint locates the number a/b on the number line.

○ 3.NF.3a. Understand two fractions as equivalent (equal) if they are the same size, or the same point on a number line. ○ 3.NF.3b. Recognize and generate simple equivalent fractions, e.g., 1/2 = 2/4, 4/6 = 2/3. Explain why the fractions are equivalent, e.g., by using a visual fraction model. ○ 3.NF.3c. Express whole numbers as fractions, and recognize fractions that are equivalent to whole numbers. ○ 3.NF.3d. 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.	● that if two fractions have the same numerator, the fraction with the greater denominator is less than the other fraction. ● that you can use a number line to compare fractions. ● that benchmark numbers such as 0, ½ and 1 can be used to compare fractions ● that whole numbers can be represented by any different fraction names. ***vocabulary:*** Fraction, unit fraction, numerator, denominator, line plot, nearest half inch, nearest fourth inch, equivalent fraction	● explaining equivalence of fractions in special cases. ● compare fractions by reasoning about their size. ● recognizing two fractions as equivalent (equal) if they are the same size, or the same point on a number line. ● recognizing and generating simple equivalent fractions. ● explaining why the fractions are equivalent. ● express whole numbers as fractions, and recognizing fractions that are equivalent to whole numbers. ● comparing two fractions with the same numerator or the same denominator by reasoning about their size. ● recognizing that comparisons are valid only when the two fractions refer to the same whole. ● recording the results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model.
Content Area Literacy Standards		***21st Century Skills***
NOT APPLICABLE		● ***Reason Effectively*** ● ***USe Systems Thinking*** ● ***Make Judgements and Decisions*** ● ***Solve Problems*** ● ***Communicate Clearly***

Grade 3 Unit 4: Geometry

Stage 1 Desired Results

ESTABLISHED GOALS:

Competencies:

- ***Students will demonstrate the ability to apply and extend mathematical properties in order to solve problems.***
- ***Students will demonstrate the ability to communicate and justify reasoning in order to support mathematical arguments.***

Content Standards:

- 3.G.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.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 1/4 of the area of the shape.

Transfer

Students will be able to independently use their learning to ***solve real-world problems and explain or defend the reasonableness of the solution.***

Meaning

ENDURING UNDERSTANDINGS

Students will understand that…

- geometric attributes provide descriptive information about an object's properties and position in space.
- geometric attributes support visualization and problem solving.

ESSENTIAL QUESTIONS

- Can anything ever be the same, but different?

Acquisition

Students will know…

- that quadrilaterals can be described and classified by their sides and angles.
- that shapes can be classified according to their attributes.
- that a unit fraction represents one part of a whole that has been divided into equal parts and the area of each part can be expressed as a unit fraction of the whole.

vocabulary: quadrilateral, rhombus, rectangle, square, partition, attributes, polygon, side, angle, vertex, trapezoid, parallel sides, parallelogram, right angle, equilateral triangle

Students will be skilled at…

- recognizing that shapes in different categories may share attributes, and that the shared attributes can define a larger category (e.g., quadrilaterals).
- recognizing rhombuses, rectangles, and squares as examples of quadrilaterals.
- drawing examples of quadrilaterals that do not belong to any of these subcategories.
- partitioning shapes into parts with equal areas.
- expressing the area of each part as a unit fraction of the whole.

Content Area Literacy Standards

NOT APPLICABLE

21st Century Skills

- ***Reason Effectively***
- ***Use Systems Thinking***
- ***Make Judgements and Decisions***
- ***Think Creatively***
- ***Communicate Clearly***

Grade 3 Unit 5: Measurement and Data

Stage 1 Desired Results

ESTABLISHED GOALS:

Competencies:

- ***Students will demonstrate the ability to apply and extend mathematical properties in order to solve problems.***
- ***Students will demonstrate the ability to communicate and justify reasoning in order to support mathematical arguments.***

Content Standards:

- 3.MD.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.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.
- 3.MD.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.
- 3.MD.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.
- 3.MD.5. Recognize area as an attribute of plane figures and understand concepts of area measurement.

Transfer

*Students will be able to independently use their learning to **analyze and describe relationships between numbers.***

Meaning

ENDURING UNDERSTANDINGS

Students will understand that…

- measurement processes are used in everyday life to describe and quantify the world.
- data displays describe and represent data in alternative ways.

ESSENTIAL QUESTIONS

- Is there ever a wrong way to measure something?
- How can data be represented, interpreted and analyzed?
- What is the best way to share information?

Acquisition

Students will know…

- that clocks can be used to tell time to the nearest minute.
- that elapsed time can be found by finding the total amount of time that passess between a starting time and an ending time.
- that time intervals can be added or subtracted to solve problems.
- that benchmarks can be used to estimate capacity.
- that capacity is a measure of the amount of liquid a container can hold
- that mass is a measure of the quantity of matter in an object.
- that certain types of graphs are appropriate for certain kinds of data.
- that the key for a picture graph determines the number of pictures needed to represent the data.
- that in a scaled bar graph, the scale determines how long each bar needs to be to represent every number in the data set.

Students will be skilled at…

- telling and writing time to the nearest minute.
- measuring time intervals in minutes.
- solve word problems involving addition and subtraction of time intervals in minutes.
- measuring and estimating liquid volumes and masses of objects using standard units.
- adding, subtracting, multiplying, or dividing to solve one-step word problems involving masses or volumes that are given in the same units.
- drawing a scaled picture graph to represent a data set with several categories.
- drawing a scaled bar graph to represent a data set with several categories.
- solving one- and two-step "how many more" and "how many less" problems using information presented in scaled bar graphs.
- generating measurement data by measuring lengths using rulers marked with halves and fourths of an inch.

○ 3.MD.5a. 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.5b. 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.6. Measure areas by counting unit squares (square cm, square m, square in, square ft, and improvised units). ● 3.MD.7. Relate area to the operations of multiplication and addition. ○ 3.MD.7a. 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.7b. 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.7c. 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 × b and a × c. Use area models to represent the distributive property in mathematical reasoning. ○ 3.MD.7d. 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. ● 3.MD.8. 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.	● that some problems can be solved by making, reading and analyzing a graph. ● that a line plot is a way to organize data on a number line. ● that the amount of space inside a shape is its area and area can be found or estimated using unit squares. ● that area can be measured using non-standard units including unit squares of different sizes. ● that standard measurement units are used for consistency finding and communicating area measurements. ● that area can be found by multiplying the length times width of squares and rectangles. ● that the areas of rectangles can be used to model the distributive property of multiplication. ● that the area of some irregular shapes can be found by dividing the original shape into rectangles, finding the area of each rectangle and adding all of the areas ● that the distance around a figure is its perimeter. ● that the perimeter of a polygon can be found by adding the lengths of its sides. ● that polygons with the same perimeter may have different areas ● that polygons with the same area may have different perimeters. ***vocabulary:*** grams (g), kilograms (kg), liters (l), square cm, square m, square in, square ft, improvised units, line plot, perimeter, area, standard and non-standard measurement, A.M, P.M., elapsed time, time interval, capacity, milliliter (ml), mass, scaled picture graph, key, scaled bar graph, scale, frequency table data, survey, estimate, unit square, square unit	● showing the data by making a line plot, where the horizontal scale is marked off in appropriate units— whole numbers, halves, or quarters. ● recognizing area as an attribute of plane figures. ● recognizing that 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. ● recognizing that 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. ● measuring areas by counting unit squares. ● relating area to the operations of multiplication and addition. ● finding 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. ● multiplying 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. ● using 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 × b and a × c. Use area models to represent the distributive property in mathematical reasoning. ● recognizing area as additive. ● finding 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. ● solving 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.
Content Area Literacy Standards		***21st Century Skills***
NOT APPLICABLE		● ***Reason Effectively*** ● ***Use Systems Thinking*** ● ***Make Judgements and Decisions*** ● ***Think Creatively*** ● ***Communicate Clearly***

Grade 4 Unit 1: Place Value

Stage 1 Desired Results

ESTABLISHED GOALS:

Competencies:

- ***Students will demonstrate the ability to apply and extend mathematical properties in order to solve problems.***
- ***Students will demonstrate the ability to communicate and justify reasoning in order to support mathematical arguments.***

Content Standards:

- 4.NBT.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.
- 4.NBT.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.3. Use place value understanding to round multi-digit whole numbers to any place.

Transfer

Students will be able to independently use their learning to ***solve real-world problems and explain or defend the reasonableness of the solution.***

Meaning

ENDURING UNDERSTANDINGS

Students will understand that…

- the base-ten numeration system is a scheme for recording numbers using the digits 0-9, groups of tens and place value.
- numbers can be read and written using base-ten numerals (i.e. 321), word form (i.e. three hundred twenty one) and in expanded form (3 x 100 + 2 x 10 + 1 x 1).
- rounding whole numbers is a process for finding the multiple of 10, 100 and so on closest to a given number.

ESSENTIAL QUESTIONS

- What is the best way to write this number? Provide an example.

Acquisition

Students will know…

- that a number to the left is ten times greater than a number to the right when the digits are the same.
- that a multi-digit number can be written in many ways, such as standard form, word form, and expanded form.
- that multi-digit numbers can be compared by their places.
- that multi-digit numbers can be rounded by looking at place value.

vocabulary: place value, period, expanded form, standard form, word form, rounding, millions, greater than/less than

Students will be skilled at…

- recognizing that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right.
- reading and writing multi-digit whole numbers using base-ten numerals, number names, and expanded form.
- comparing two multi-digit numbers based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons.
- using place value understanding to round multi-digit whole numbers to any place.

Content Area Literacy Standards

21st Century Skills

• Not applicable	• ***Make judgements and decisions*** • ***Solve problems*** • ***Communicate Clearly*** • ***Collaborate with others*** • ***Access and evaluate information***

Grade 4 Unit 2: Adding and Subtracting Multi-Digit Numbers

Stage 1 Desired Results

ESTABLISHED GOALS:

Competencies:

- ***Students will demonstrate the ability to apply and extend mathematical properties in order to solve problems.***
- ***Students will demonstrate the ability to communicate and justify reasoning in order to support mathematical arguments.***

Content Standards:

- 4.NBT.4 Fluently add and subtract multi-digit whole numbers using the standard algorithm.
- 4.OA.3. Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.

Transfer

Students will be able to independently use their learning to ***solve real-world problems and explain or defend the reasonableness of the solution.***

Meaning

ENDURING UNDERSTANDINGS

Students will understand that…

- there are multiple ways to add and subtract numbers.
- that addition and subtraction can help you to find the unknown.

ESSENTIAL QUESTIONS

- What is the best procedure for adding and subtracting whole numbers?

Acquisition

Students will know…

- that multi-digit numbers can be added and subtracted using a standard algorithm.
- that multi-step word problems can be solved in many ways using the four operations.
- the strategies to solve equations using mental math, such as breaking apart, counting on, compensation, as well as, the properties of addition.
- that the reasonableness of an answer can be determined by using mental math strategies and estimation strategies, such as rounding.
- that problems can have numbers represented with a letter, for example,x, standing for the unknown quantity.

vocabulary: standard algorithm for addition, standard algorithm for subtraction, remainder, unknown, estimation, rounding, commutative property of addition, associative property of addition, identity property of addition, counting on, compensation,variable, inverse relations, regroup

Students will be skilled at…

- fluently adding and subtracting multi-digit whole numbers using the standard algorithm.
- solving multi step word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted.
- representing these problems using equations with a letter standing for the unknown quantity.
- assessing the reasonableness of answers using mental computation and estimation strategies including rounding.

Content Area Literacy Standards	*21st Century Skills*
• Not applicable	• ***Make judgements and decisions*** • ***Solve problems*** • ***Communicate Clearly*** • ***Collaborate with others*** • ***Access and evaluate information***

Grade 4 Unit 3: Multiplying 2 Digit numbers

Stage 1 Desired Results

ESTABLISHED GOALS:

Competencies:

- ***Students will demonstrate the ability to apply and extend mathematical properties in order to solve problems.***
- ***Students will demonstrate the ability to communicate and justify reasoning in order to support mathematical arguments.***

Content Standards:

- 4.OA.1. Interpret a multiplication equation as a comparison, e.g., interpret 35 = 5 × 7 as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations.
- 4.OA.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.
- 4.OA.3. Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.
- 4.NBT.5. Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the

Transfer

Students will be able to independently use their learning to ***solve real-world problems and explain or defend the reasonableness of the solution.***

Meaning

ENDURING UNDERSTANDINGS

Students will understand that…

- Properties are the rules that govern arithmetic.
- There is more than one algorithm for each of the operations with rational numbers.
- Basic facts and place value patterns can be used to find products when one factor is 10 or 100.

ESSENTIAL QUESTIONS

- What is the easiest way to multiply whole numbers?

Acquisition

Students will know…

- that a multiplication equation can be written as a comparison and vice versa.
- that word problems can be solved using multiplication or repeated addition.
- that drawings and bar diagrams can be used to represent equations with an unknown number.
- that multiplication problems can be represented with a letter standing for the unknown quantity.
- the strategies to solve multiplication equations using mental math, such as, the properties of multiplication, using multiples of 10, and breaking apart.
- that reasonableness of an answer can be determined by using mental math and estimation strategies, such as, rounding, compensation, and using compatible numbers, in multiplication.
- that whole numbers with up to 4 digits can be multiplied by a one digit number using the standard algorithm and other strategies, such as, using area models, areas, and partial products..
- that two digit numbers can be multiplied using the standard algorithm and other strategies (area models, arrays, and partial products)

Students will be skilled at…

- interpreting a multiplication equation as a comparison.
- representing verbal statements of multiplicative comparisons as multiplication equations.
- multiplying or dividing 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.
- solving multi step word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted.
- representing these problems using equations with a letter standing for the unknown quantity.
- assessing the reasonableness of answers using mental computation and estimation strategies including rounding.

calculation by using equations, rectangular arrays, and/or area models.	● that the standard addition and subtraction algorithms for multi-digit numbers break the calculation into simpler calculations using place value starting with the ones, then tens and so on. ● that for a given set of numbers, there are relationships that are always true called properties. ● that properties are the rules that govern arithmetic. (ie. The Commutative Property, the Associative Property and the Distributive Property of multiplication are three such properties.) ● that there is more than one algorithm for each of the operations with rational numbers. ● that making an array with place-value blocks or area model provide ways to visualize and find products. ● that basic facts and place value patterns can be used to find products when one factor is 10 or 100. ● that there is an expanded algorithm for multiplying where numbers are broken apart using place value and the parts are used to find partial products. The partial products are then added together to find the product. ***vocabulary:*** array, compatible numbers, distributive property of multiplication, commutative property of multiplication, associative property of multiplication, numerical expression, compensation, partial product, multiples, estimate, factors	● multiplying a whole number of up to four digits by a one-digit whole number. ● multiplying two two-digit numbers, using strategies based on place value and the properties of operations. ● illustrating and explaining the calculation by using equations, rectangular arrays, and/or area models.
Content Area Literacy Standards		***21st Century Skills***
● NOT APPLICABLE		● ***Make judgements and decisions*** ● ***Solve problems*** ● ***Communicate Clearly*** ● ***Collaborate with others*** ● ***Access and evaluate information***

Grade 4 Unit 4: Dividing by 1 digit divisor

Stage 1 Desired Results

ESTABLISHED GOALS:

Competencies:

- ***Students will demonstrate the ability to apply and extend mathematical properties in order to solve problems.***
- ***Students will demonstrate the ability to communicate and justify reasoning in order to support mathematical arguments.***

Content Standards:

- 4.NBT.6. Find whole-number quotients and remainders with up to four-digit dividends and one-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.
- 4.OA.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.
- 4.OA.3. Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.

Transfer

*Students will be able to independently use their learning to **solve real-world problems and explain or defend the reasonableness of the solution.***

Meaning

ENDURING UNDERSTANDINGS

Students will understand that…

- multiplication and division are closely related and knowing one can help with the other.
- real world problems can be solved using math.
- knowing the relationships between operations can help with checking your solutions.

ESSENTIAL QUESTIONS

- Why is mental math important?

Acquisition

Students will know…

- that quotients and remainders with up to four digit dividends and one digit divisors can be found by using place value strategies, properties of operations, the relationship between multiplication and division, and the standard algorithm.
- that using rectangular arrays, area models, equations, such as the standard algorithm, can illustrate and explain the calculation.
- that word problems involving multiplicative comparison can be solved by multiplying or dividing.
- that multi step word problems posed with whole numbers and having whole number answers, including problems in which remainders must be interpreted, can be solved using the four operations.
- that the unknown quantity can be represented with a letter.
- that reasonableness can be assessed by using mental computation and estimation strategies,

Students will be skilled at…

- finding 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.
- illustrating and explaining the calculation by using equations, rectangular arrays, and/or area models.
- multiplying or dividing to solve word problems involving multiplicative comparison
- distinguishing multiplicative comparison from additive comparison.
- solving multi step word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted.
- representing these problems using equations with a letter standing for the unknown quantity.
- assessing the reasonableness of answers using mental computation and estimation strategies including rounding.

	including rounding, using compatible numbers, and place value patterns. ***<u>vocabulary:</u>*** divisor, dividend, quotients, remainder, compatible numbers, and partial quotients. interpret	
Content Area Literacy Standards		***21st Century Skills***
• NOT APPLICABLE		• ***Make judgements and decisions*** • ***Solve problems*** • ***Communicate Clearly*** • ***Collaborate with others*** • ***Access and evaluate information***

Grade 4 Unit 5: Fractions

Stage 1 Desired Results

ESTABLISHED GOALS:

Competencies:

- ***Students will demonstrate the ability to apply and extend mathematical properties in order to solve problems.***
- ***Students will demonstrate the ability to communicate and justify reasoning in order to support mathematical arguments.***

Content Standards:

- 4.NF.1. Explain why a fraction a/b is equivalent to a fraction (n × a)/(n × b) by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions.
- 4.NF.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.
- 4.NF.3. Understand a fraction a/b with a > 1 as a sum of fractions 1/b.
    - 4.NF.3a. Understand addition and subtraction of fractions as joining and separating parts referring to the same whole.
    - 4.NF.3b. Decompose a fraction into a sum of fractions with the same denominator in more than one way,

Transfer

Students will be able to independently use their learning to ***solve real-world problems and explain or defend the reasonableness of the solution.***

Meaning

ENDURING UNDERSTANDINGS

Students will understand that…

- objects can be broken into equal parts.
- fractions are used to talk about those parts as they relate to the whole.

ESSENTIAL QUESTIONS

- What are some ways to name the same part of a whole?

Acquisition

Students will know…

- that fraction a/b is equivalent to fraction (n x a)/(n x b) by using visual fraction models, attending to how the number and size of the parts are different even though the two fractions are the same size.
- that equivalent fractions can be generated using this principal, multiplying the fraction by another fraction that is equivalent to 1 whole, such as 4/4, 5/5/, 6/6, etc.
- that fractions with different numerators and denominators can be compared.
- that comparisons are valid only when two fractions refer to the same whole.
- that the symbols >, =, < can be used to record comparisons.
- that comparisons can be justified by using a visual fraction model.
- that fraction a/b with a > 1 is a sum of fractions 1/b (unit fractions). Ex. ⅝= ⅛ + ⅛ +⅛+ ⅛+ ⅛
- that addition and subtraction is joining and separating of fractions referring to the same whole.
- that decomposition of fractions can be written as the addition equation of fractions with the same denominator.

Students will be skilled at…

- explaining why a fraction a/b is equivalent to a fraction (n × a)/(n × b) by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size.
- using this principle to recognize and generate equivalent fractions.
- comparing two fractions with different numerators and different denominators.
- recognizing that comparisons are valid only when the two fractions refer to the same whole.
- recording the results of comparisons with symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model.
- recognizing a fraction a/b with a > 1 as a sum of fractions 1/b.
- recognizing addition and subtraction of fractions as joining and separating parts referring to the same whole.
- decomposing a fraction into a sum of fractions with the same denominator in more than one way, recording each decomposition by an equation.

recording each decomposition by an equation. Justify decompositions, e.g., by using a visual fraction model. ○ 4.NF.3c. 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.3d. 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. ● 4.NF.4. Apply and extend previous understandings of multiplication to multiply a fraction by a whole number. ○ 4.NF.4a. Understand a fraction a/b as a multiple of 1/b. For example, use a visual fraction model to represent 5/4 as the product 5 × (1/4), recording the conclusion by the equation 5/4 = 5 × (1/4). ○ 4.NF.4b. Understand a multiple of a/b as a multiple of 1/b, and use this understanding to multiply a fraction by a whole number. ○ 4.NF.4c. 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.	● that the decomposition of fractions can be written in many different ways. ● that decompositions can be justified with fraction strips or models. ● that mixed numbers with like denominators can be added or subtracted by replacing each mixed number with an equivalent fraction, and/or by using properties of operations and the relationship between addition and subtraction. ● that visual fraction models and equations can be used to solve word problems involving addition and subtraction of fraction referring to the same whole and having like denominators. ● that previous understandings of multiplication can be applied and extended to multiply a fraction by a whole number. ● that fraction a/b is a multiple of 1/b. Ex. ⅝= ⅛ x 5 ● that this understanding can be used to multiply a fraction by a whole number. ● that word problems involving multiplication of a fraction by a whole number can be solved using visual fraction models and equations to represent the problem. ***vocabulary:*** fraction, numerator, denominator, equivalent fractions, factors, multiples, common factor, benchmark fraction, unit fraction, prime??, composite??	● justifying decompositions. ● adding and subtracting 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. ● solving 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. ● applying and extending previous understandings of multiplication to multiply a fraction by a whole number. ● recognizing a fraction a/b as a multiple of 1/b. ● recognizing a multiple of a/b as a multiple of 1/b, and use this understanding to multiply a fraction by a whole number. ● solving word problems involving multiplication of a fraction by a whole number, e.g., by using visual fraction models and equations to represent the problem.
Content Area Literacy Standards		***21st Century Skills***
● NOT APPLICABLE		● ***Make judgements and decisions*** ● ***Solve problems*** ● ***Communicate Clearly*** ● ***Collaborate with others*** ● ***Access and evaluate information***

Grade 4 Unit 6: Geometry

Stage 1 Desired Results

ESTABLISHED GOALS:

Competencies:

- ***Students will demonstrate the ability to apply and extend mathematical properties in order to solve problems.***
- ***Students will demonstrate the ability to communicate and justify reasoning in order to support mathematical arguments.***

Content Standards:

- 4.G.1. Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.
- 4.G.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.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.

Transfer

Students will be able to independently use their learning to ***solve real-world problems and explain or defend the reasonableness of the solution.***

Meaning

ENDURING UNDERSTANDINGS

Students will understand that…

- shapes can be classified by their properties.
- a two dimensional figure is flat.
- shapes can be used to describe things we see in our everyday lives.

ESSENTIAL QUESTIONS

- Where do you see shapes in your everyday life?

Acquisition

Students will know…

- that points, lines, line segments, rays, angles (right, acute, obtuse, straight), and perpendicular and parallel lines can be drawn.
- that these can be identified in two-dimensional figures, such as triangles, quadrilaterals, and other polygons
- that two-dimensional figures can be classified based on the presence or absence of parallel and perpendicular lines, or the presence or absence of angles of a specified size.
- that triangles can be classified and identified by sides and angles.
- that a two dimensional figure has a line of symmetry if the figure has a line across the figure such that the figure can be folded along the line into matching parts.
- that figures can be identified as line symmetric.
- that a line of symmetry can be drawn in a figure.

vocabulary: point,line, angle, obtuse angle, right angle, acute angle, straight angle, ray, protractor, line

Students will be skilled at…

- drawing points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines.
- identifying these in two-dimensional figures.
- classifying 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.
- recognizing right triangles as a category, and identify right triangles.
- recognizing 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.
- identifying line-symmetric figures and draw lines of symmetry.

	segment, polygon, parallelogram, square, rectangle, trapezoid, rhombus, line symmetric, line of symmetry, quadrilateral, right triangle, acute triangle, obtuse triangle, equilateral triangle, isosceles triangle, scalene triangle, parallel lines, perpendicular lines, intersecting lines, vertex, degree, unit angle, angle measure	
Content Area Literacy Standards		***21st Century Skills***
• NOT APPLICABLE		• ***Make judgements and decisions*** • ***Solve problems*** • ***Communicate Clearly*** • ***Collaborate with others*** • ***Access and evaluate information***

Grade 4 Unit 7: Decimals

Stage 1 Desired Results

ESTABLISHED GOALS:

Competencies:

- ***Students will demonstrate the ability to apply and extend mathematical properties in order to solve problems.***
- ***Students will demonstrate the ability to communicate and justify reasoning in order to support mathematical arguments.***

Content Standards:

- 4.NF.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 100.4 For example, express 3/10 as 30/100, and add 3/10 + 4/100 = 34/100.
- 4.NF.6. Use decimal notation for fractions with denominators 10 or 100.
- 4.NF.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.

Transfer

*Students will be able to independently use their learning to solve **real-world problems and explain or defend the reasonableness of the solution.***

Meaning

ENDURING UNDERSTANDINGS

Students will understand that…

- all fractions can be expressed as a decimal and vice versa.
- that the number of 10s in the denominator of a fraction is directly related to the place of the number to the right of the decimal point.

ESSENTIAL QUESTIONS

- How are fractions and decimals related?

Acquisition

Students will know…

- that a fraction with a denominator 10 can be expressed as an equivalent fraction with denominator 100.
- that fractions of denominators 10 and 100 can be added by using this technique.
- that fractions with denominators of 10 and 100 can be written using decimal notation.
- that two decimals can be compared to hundredths by reasoning about their size.
- that comparisons are valid only when two decimals refer to the same whole.
- that the results of comparisons can be recorded with the symbols <, =, or > and conclusions can be justified by using a visual model.

vocabulary: tenths, hundreths, decimal, decimal point, equivalent

Students will be skilled at…

- expressing a fraction with denominator 10 as an equivalent fraction with denominator 100.
- using this technique to add two fractions with respective denominators 10 and 100.
- using decimal notation for fractions with denominators 10 or 100.
- comparing two decimals to hundredths by reasoning about their size.
- recognizing that comparisons are valid only when the two decimals refer to the same whole.
- recording the results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual model.

Content Area Literacy Standards

- NOT APPLICABLE

21st Century Skills

- ***Make judgements and decisions***
- ***Solve problems***

	● ***Communicate Clearly*** ● ***Collaborate with others*** ● ***Access and evaluate information***

Grade 4 Unit 8: Measurement and Data

Stage 1 Desired Results

ESTABLISHED GOALS:

Competencies:

- ***Students will demonstrate the ability to apply and extend mathematical properties in order to solve problems.***
- ***Students will demonstrate the ability to communicate and justify reasoning in order to support mathematical arguments.***

Content Standards:

- 4.MD.1. Know relative sizes of measurement units within one system of units including km, m, cm; kg, g; lb, oz.; l, ml; hr, min, sec. Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. Record measurement equivalents in a two column table.
- 4.MD.2. Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale.
- 4.MD.3. Apply the area and perimeter formulas for rectangles in real world and mathematical problems.
- 4.MD.4. Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Solve problems involving addition and subtraction of fractions by using information presented in line plots.
- 4.MD.5. Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint, and understand concepts of angle measurement:

Transfer

*Students will be able to independently use their learning to solve **real-world problems and explain or defend the reasonableness of the solution.***

Meaning

ENDURING UNDERSTANDINGS

Students will understand that…

- everything we measure has a specific unit.
- that there are many ways to track and display data.

ESSENTIAL QUESTIONS

- Is it important to always have an exact answer?

Acquisition

Students will know…

- that 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.
- the relationship between different units that measure the same thing.
- that measurements can be converted from smaller to larger units and vice versa.
- that measurement equivalents can be recorded in a two column table.
- that the four operations can be used 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.
- that measurement quantities can be expressed using diagrams such as number lines that feature a measurement scale.
- the formulas for finding area and perimeter of rectangles and that they can applied to real world mathematical problems.

Students will be skilled at…

- knowing relative sizes of measurement units within one system of units.
- Within a single system of measurement, expressing measurements in a larger unit in terms of a smaller unit.
- recording measurement equivalents in a two column table.
- using 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. r
- representing measurement quantities using diagrams such as number line diagrams that feature a measurement scale.
- applying the area and perimeter formulas for rectangles in real world and mathematical problems.
- making a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8).

○ 4.MD.5a. 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.5b. An angle that turns through n one-degree angles is said to have an angle measure of n degrees. ● 4.MD.6. Measure angles in whole-number degrees using a protractor. Sketch angles of specified measure. ● 4.MD.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.	● that a data set of measurements in fractions of a unit or whole numbers can be displayed in a line plot. ● that information presented in line plots can be used to solve addition and subtraction problems. ● that angles are geometric shapes formed wherever two rays share a common endpoint. ● that an angle that turns through 1/360 of a circle is called a one degree angle and can be used to measure other angles. ● that angles can be measured with reference to a circle with its center at the common endpoint of the rays. ● that angles can be measured using a protractor in increments of one degree. ● that angles can be sketched of a specified measure using a protractor. ● that angle measures are additive. ● that real world mathematical problems in addition and subtraction can be solved to find unknown angles on a diagram. ***vocabulary:*** millimeter, centimeter, meter, kilometer, milligram, gram, kilogram, ounce, pound, ton, liter, milliliter, second, minute, hour, fluid ounce, cup,pint, quart,gallon, angle measure, protractor, angle, unit angle, degree, vertex, ray, convert, conversion, capacity, mass, weight, length, perimeter, area, formula, equivalence	● solving problems involving addition and subtraction of fractions by using information presented in line plots. ● recognizing angles as geometric shapes that are formed wherever two rays share a common endpoint. ● recognizing 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. ● recognizing that an angle that turns through n one-degree angles is said to have an angle measure of n degrees. ● measuring angles in whole-number degrees using a protractor. ● sketching angles of specified measure. ● recognizing angle measure as additive. ● solving addition and subtraction problems to find unknown angles on a diagram in real world and mathematical problems.
Content Area Literacy Standards		***21st Century Skills***
● NOT APPLICABLE		● ***Make judgements and decisions*** ● ***Solve problems*** ● ***Communicate Clearly*** ● ***Collaborate with others*** ● ***Access and evaluate information***

Grade 5 Unit 1: Numbers and Operations Base 10

Stage 1 Desired Results

ESTABLISHED GOALS:

Competencies:

- ***Students will demonstrate the ability to apply and extend mathematical properties in order to solve problems.***
- ***Students will demonstrate the ability to communicate and justify reasoning in order to support mathematical arguments.***

Content Standards:

- 5.NBT.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.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.3. Read, write, and compare decimals to thousandths.
  - 5.NBT.3a. 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.3b. Compare two decimals to thousandths based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons.

Transfer

Students will be able to independently use their learning to ***solve real-world problems and explain or defend the reasonableness of the solution.***

Meaning

ENDURING UNDERSTANDINGS

Students will understand that…

- numerical expressions can be written and interpreted in various ways.
- patterns can be found in numbers.
- there is a specific order to which operations with numbers can be performed.

ESSENTIAL QUESTIONS

- How do the properties of a number help determine its value?
- How are factors and multiples of a number different?

Acquisition

Students will know…

- that a multi-digit number contains specific place values; ones, tens, hundreds, etc.
- that there are patterns in the number of zeros when multiplying by powers of 10.
- that place value understanding is needed to round decimals.
- the steps to multiply whole numbers.
- the steps to divide whole numbers.
- the relationship between addition and subtraction, and multiplication and division.

vocabulary: Place Value, Rounding, Exponent, Power, Digit, Whole Number, Array

Students will be skilled at…

- recognizing 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.
- explaining patterns in the number of zeros of the product when multiplying a number by powers of 10.
- explaining patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10.
- using whole-number exponents to denote powers of 10.
- reading, writing, and comparing decimals to thousandths.
- reading and writing decimals to thousandths using base-ten numerals, number names, and expanded form.
- comparing two decimals to thousandths based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons.

● 5.NBT.4. Use place value understanding to round decimals to any place. ● 5.NBT.5. Fluently multiply multi-digit whole numbers using the standard algorithm. ● 5.NBT.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.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.		● using place value understanding to round decimals to any place. ● multiplying fluently multi-digit whole numbers using the standard algorithm. ● finding 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. ● illustrating and explaining the calculation by using equations, rectangular arrays, and/or area models. ● adding, subtracting, multiplying, and dividing 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. ● explaining the reasoning used when solving a problem.
Content Area Literacy Standards		***21st Century Skills***
RST.6-8.3 Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks. RST.6-8.4 Determine the meaning of symbols, key terms and other domain-specific words and phrases as they are used in a specific scientific or technical context. WHST.6-8.1 Write arguments focused on discipline-specific content. WHST.6-8.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.		● ***Reason Effectively*** ● ***Solve Problems*** ● ***Communicate Clearly*** ● ***Apply Technology Effectively*** ● ***Interact Effectively with Others***

Grade 5 Unit 2: Operations and Algebraic Thinking

Stage 1 Desired Results

ESTABLISHED GOALS:

Competencies:

- ***Students will demonstrate the ability to apply and extend mathematical properties in order to solve problems.***
- ***Students will demonstrate the ability to communicate and justify reasoning in order to support mathematical arguments.***

Content Standards:

- 5.OA.1. Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols.
- 5.OA.2. Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them.
- 5.OA.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.

Transfer

Students will be able to independently use their learning to ***solve real-world problems and explain or defend the reasonableness of the solution.***

Meaning

ENDURING UNDERSTANDINGS

Students will understand that…

- numerical expressions can be written and interpreted in various ways.
- patterns can be found in numbers.
- there is a specific order to which operations with numbers can be performed.

ESSENTIAL QUESTIONS

- Which operation is needed to solve an equation?

Acquisition

Students will know…

- the concept of Order of Operations.
- that a set of ordered pairs correlate to a location on a graph.
- that ordered pairs are written in the form of (x,y).
- that the x axis is the horizontal axis and the y axis is the vertical one.

vocabulary: Parenthesis, Brackets, Order of Operations, Ordered Pair, Coordinate Plane

Students will be skilled at…

- using parentheses, brackets, or braces in numerical expressions, and evaluating expressions with these symbols.
- writing simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them.
- generating two numerical patterns using two given rules.
- identifying apparent relationships between corresponding terms.
- forming ordered pairs consisting of corresponding terms from the two patterns.
- graphing the ordered pairs on a coordinate plane.

Content Area Literacy Standards

RST.6-8.3 Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.
RST.6-8.4 Determine the meaning of symbols, key terms and other domain-specific words and phrases as they are used in a specific scientific or technical context.
WHST.6-8.1 Write arguments focused on discipline-specific content.
WHST.6-8.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

21st Century Skills

- ***Reason Effectively***
- ***Make Judgements and Decisions***
- ***Solve Problems***

	• ***Communicate Clearly*** • ***Apply Technology Effectively*** • ***Interact Effectively with Others***

Grade 5 Unit 3: Numbers and Operations - Fractions

Stage 1 Desired Results

ESTABLISHED GOALS:

Competencies:

- ***Students will demonstrate the ability to apply and extend mathematical properties in order to solve problems.***
- ***Students will demonstrate the ability to communicate and justify reasoning in order to support mathematical arguments.***

Content Standards:

- 5.NF.1. Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators.
- 5.NF.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.
- 5.NF.3. Interpret a fraction as division of the numerator by the denominator (a/b = a ÷ 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.
- 5.NF.4. Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction.
  - 5.NF.4a. Interpret the product (a/b) × q as a parts of a partition of q into b equal

Transfer

*Students will be able to independently use their learning to **solve real-world problems and explain or defend the reasonableness of the solution.***

Meaning

ENDURING UNDERSTANDINGS

Students will understand that…

- many fractions can be equivalent to one another.
- fractions can be added and subtracted.

ESSENTIAL QUESTIONS

- How are fractions and whole numbers used together in real-life?

Acquisition

Students will know…

- that fractions can have to have a common denominator to add or subtract together.
- that fractions can be used to solve word problems.
- that a fraction is another way to write a division problem.
- that multiplication is a form of scaling.
- the skill to add, subtract, multiply and divide fractions.

vocabulary: Sum, Difference, Numerator, Denominator, Fraction,Equivalent, Proper fraction, Improper fraction, Mixed number

Students will be skilled at…

- adding and subtracting 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.
- solving 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.
- using benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers.
- interpreting a fraction as division of the numerator by the denominator (a/b = a ÷ b).
- solving 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.
- applying and extending previous understandings of multiplication to multiply a fraction or whole number by a fraction.

parts; equivalently, as the result of a sequence of operations a × q ÷ b. ○ 5.NF.4b. 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. ● 5.NF.5. Interpret multiplication as scaling (resizing), by: ● 5.NF.5a. 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. ● 5.NF.5b. 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×a)/(n×b) to the effect of multiplying a/b by 1. ● 5.NF.6. Solve real world problems involving multiplication of fractions and mixed numbers, e.g., by using visual fraction models or equations to represent the problem. ● 5.NF.7. Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions.1 ● 5.NF.7a. Interpret division of a unit fraction by a non-zero whole number, and compute such quotients. ● 5.NF.7b. Interpret division of a whole number by a unit fraction, and compute such quotients. ● 5.NF.7c. 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.		● interpreting the product (a/b) × q as a parts of a partition of q into b equal parts; equivalently, as the result of a sequence of operations a × q ÷ b. ● finding the area of a rectangle with fractional side lengths by tiling it with unit squares of the appropriate unit fraction side lengths, and showing that the area is the same as would be found by multiplying the side lengths. ● multiplying fractional side lengths to find areas of rectangles, and representing fraction products as rectangular areas. ● 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. ● 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. ● relating the principle of fraction equivalence a/b = (n×a)/(n×b) to the effect of multiplying a/b by 1. ● solving real world problems involving multiplication of fractions and mixed numbers. ● applying and extending previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions.1 ● interpreting division of a unit fraction by a non-zero whole number, and computing such quotients. ● interpreting division of a whole number by a unit fraction, and compute such quotients. ● solving real world problems involving division of unit fractions by non-zero whole numbers and division of whole numbers by unit fractions.

Content Area Literacy Standards	***21st Century Skills***
RST.6-8.3 Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks. RST.6-8.4 Determine the meaning of symbols, key terms and other domain-specific words and phrases as they are used in a specific scientific or technical context. WHST.6-8.1 Write arguments focused on discipline-specific content. WHST.6-8.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.	• ***Reason Effectively*** • ***Solve Problems*** • ***Communicate Clearly*** • ***Apply Technology Effectively*** • ***Interact Effectively with Others***

Grade 5 Unit 4: Geometry

Stage 1 Desired Results

ESTABLISHED GOALS:

Competencies:

- ***Students will demonstrate the ability to apply and extend mathematical properties in order to solve problems.***
- ***Students will demonstrate the ability to communicate and justify reasoning in order to support mathematical arguments.***

Content Standards:

- 5.G.1. Use a pair of perpendicular number lines, called axes, to define a coordinate system, with the intersection of the lines (the origin) arranged to coincide with the 0 on each line and a given point in the plane located by using an ordered pair of numbers, called its coordinates. Understand that the first number indicates how far to travel from the origin in the direction of one axis, and the second number indicates how far to travel in the direction of the second axis, with the convention that the names of the two axes and the coordinates correspond (e.g., x-axis and x-coordinate, y-axis and y-coordinate).
- 5.G.2. Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation.
- 5.G.3. Understand that attributes belonging to a category of two dimensional figures also belong to all subcategories of that category.
- 5.G.4. Classify two-dimensional figures in a hierarchy based on properties.

Transfer

*Students will be able to independently use their learning to **solve real-world problems and explain or defend the reasonableness of the solution.***

Meaning

ENDURING UNDERSTANDINGS

Students will understand that…

- graphing can be used to solve real world problems.
- shapes and figures can be classified and categorized by their properties.

ESSENTIAL QUESTIONS

- Which 3 dimensional figure is the most important?
- Which is a better classification, a circle or a sphere?
- Are all shapes, or graphs, created equal?

Acquisition

Students will know…

- that an ordered pair can be represented on a coordinate grid.
- that a pair of perpendicular line, called axes, define a coordinate system.
- that graphs can be used to represent real world problems.
- the classification of two-dimensional figures.

vocabulary: axis (axes), origin, coordinates, quadrant, coordinate plane, ordered pair

Students will be skilled at…

- using 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.
- recognizing 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).
- representing 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.
- recognizing that attributes belonging to a category of two dimensional figures also belong to all subcategories of that category.

		● classifying two-dimensional figures in a hierarchy based on properties.
Content Area Literacy Standards		***21st Century Skills***
RST.6-8.3 Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks. RST.6-8.4 Determine the meaning of symbols, key terms and other domain-specific words and phrases as they are used in a specific scientific or technical context. WHST.6-8.1 Write arguments focused on discipline-specific content. WHST.6-8.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.		● ***Reason Effectively*** ● ***Make Judgements and Decisions*** ● ***Solve Problems*** ● ***Communicate Clearly*** ● ***Apply Technology Effectively*** ● ***Interact Effectively with Others***

Grade 5 Unit 5: Measurement and Data

Stage 1 Desired Results

ESTABLISHED GOALS:

Competencies:

- ***Students will demonstrate the ability to apply and extend mathematical properties in order to solve problems.***
- ***Students will demonstrate the ability to communicate and justify reasoning in order to support mathematical arguments.***

Content Standards:

- 5.MD.1. Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multi-step, real world problems.
- 5.MD.2. Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Use operations on fractions for this grade to solve problems involving information presented in line plots.
- 5.MD.3. Recognize volume as an attribute of solid figures and understand concepts of volume measurement.
    - 5.MD.3a. 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.3b. 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.4. Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and improvised units.

Transfer

*Students will be able to independently use their learning to **solve real-world problems and explain or defend the reasonableness of the solution.***

Meaning

ENDURING UNDERSTANDINGS

Students will understand that…

- measurements can be converted.
- shapes can have three-dimensions.

ESSENTIAL QUESTIONS

- What is the best way to convert measurements?
- How do we represent the inside of a three-dimensional figure?

Acquisition

Students will know…

- that measurements can be converted between different units.
- that a line plot can be used to represent data.
- the concept of volume as an attribute of solid figures.
- that the formula for the volume of a rectangular prism is length x width x height.

vocabulary: Volume, Line plot, Unit cube, cubic cm, cubic in, cubic ft, improvised units

Students will be skilled at…

- converting among different-sized standard measurement units within a given measurement system and using these conversions in solving multi-step, real world problems.
- making a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8).
- using operations on fractions for this grade to solve problems involving information presented in line plots.
- recognizing volume as an attribute of solid figures and understand concepts of volume measurement.
- measuring volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and improvised units.
- relating volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume.
- finding the volume of a right rectangular prism with whole-number side lengths by packing it with unit cubes, and show that the

● 5.MD.5. Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume. ● 5.MD.5a. 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. ● 5.MD.5b. Apply the formulas V = l × w × h and V = b × 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. ● 5.MD.5c. 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.		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. ● applying the formulas V = l × w × h and V = b × 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. ● recognizing volume as additive. ● finding 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.
Content Area Literacy Standards		***21st Century Skills***
RST.6-8.3 Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks. RST.6-8.4 Determine the meaning of symbols, key terms and other domain-specific words and phrases as they are used in a specific scientific or technical context. WHST.6-8.1 Write arguments focused on discipline-specific content. WHST.6-8.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.		● ***Reason Effectively*** ● ***Make Judgements and Decisions*** ● ***Solve Problems*** ● ***Communicate Clearly*** ● ***Apply Technology Effectively*** ● ***Interact Effectively with Others***

Grade 6: Algebraic Expressions and Equations

Stage 1 Desired Results

ESTABLISHED GOALS:

Competencies:

- ***Students will demonstrate the ability to apply and extend mathematical properties in order to solve problems.***
- ***Students will demonstrate the ability to communicate and justify reasoning in order to support mathematical arguments.***

Content Standards:

- 6.EE.1. Write and evaluate numerical expressions involving whole-number exponents.
- 6.EE.2. Write, read, and evaluate expressions in which letters stand for numbers.
  - 6.EE.2a. Write expressions that record operations with numbers and with letters standing for numbers.
  - 6.EE.2b. 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.
  - 6.EE.2c. 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).

Transfer

Students will be able to independently use their learning to ***solve real world problems and explain or defend the reasonableness of the solution.***

Meaning

ENDURING UNDERSTANDINGS

Students will understand that…

- sometimes the value of one quantity can be found if the value of another is known.
- the relationships between the quantities can be represented in different ways, including tables, equations, and graphs.
- Algebra uses symbols to represent quantities that are unknown or that vary.

ESSENTIAL QUESTIONS

- What does it mean to find the solution to an equation?
- Is there a best way to get to a solution?
- Can a problem have no solution?

Acquisition

Students will know…

- that mathematical phrases and real-world relationships can be represented using symbols and operations.
- that an algebraic expression can be simplified by combining the parts of the expression that are alike.
- that the distributive property can be used to simplify the product of a number and a sum or difference.
- that when simplifying an expression, operations must be performed in the right order.
- that a mathematical sentence uses an "=" symbol.
- that a solution makes the equation complete.
- that inverse operations are used to solve equations.
- that an inequality is a mathematical sentence that compares expressions.

Students will be skilled at…

- writing and evaluating algebraic expressions (including whole number exponents and unknown variables).
- finding the GCF in algebraic expressions
- applying the Commutative, Associative, and Distributive Properties to show expressions are equivalent
- determining if a value is a solution
- representing constraints with inequalities and recognizing they can have infinitely many solutions
- solving one-step equations.
- solving real world mathematical problems that include variable.

● 6.EE.3. Apply the properties of operations to generate equivalent expressions.. ● 6.EE.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). ● 6.EE.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.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.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.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. Represent and analyze quantitative relationships between dependent and independent variables. ● 6.EE.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.	***vocabulary:*** algebraic expression, terms, coefficient, constant, variable, equivalent expressions, like terms, equation, inverse operations, equation in two variables, solution of an equation in two variables, independent variable, dependent variable, inequality, solution set, solution of an inequality, graph of an inequality.	
Content Area Literacy Standards		***21st Century Skills***

RST.6-8.3 Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks. RST.6-8.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6-8 texts and topics. WHST.6-8.1 Write arguments focused on discipline-specific content. WHST.6-8.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.	● ***Reason Effectively*** ● ***Solve Problems*** ● ***Communicate Clearly*** ● ***Make Judgments and Decisions*** ● ***Use Systems Thinking***

Grade 6: Ratios and Proportional Relationships

Stage 1 Desired Results

ESTABLISHED GOALS:

Competencies:

- ***Students will demonstrate the ability to apply and extend mathematical properties in order to solve problems.***
- ***Students will demonstrate the ability to communicate and justify reasoning in order to support mathematical arguments.***

Content Standards:

- 6.RP.1. Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities.
- 6.RP.2. Understand the concept of a unit rate a/b associated with a ratio a:b with b ≠ 0, and use rate language in the context of a ratio relationship.
- 6.RP.3. 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.
  - 6.RP.3a. 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.
  - 6.RP.3b. Solve unit rate problems including those involving unit pricing and constant speed.
  - 6.RP.3c. Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity

Transfer

*Students will be able to independently use their learning to **solve real world problems and explain or defend the reasonableness of the solution.***

Meaning

ENDURING UNDERSTANDINGS

Students will understand that…

- ratios express relationships.
- ratios, fractions, decimals and percentages are related.
- ratios have many real-world applications..

ESSENTIAL QUESTIONS

- How can ratios help us solve problems?
- What real-world applications use ratios and rates?

Acquisition

Students will know…

- that a ratio is a comparison of two quantities.
- that ratios can be part-to-part, part-to-whole, or whole-to part comparisons.
- that equivalent ratios describe the same relationship.
- that ratio tables organize equivalent ratios.
- that a rate is a ratio of two quantities using different units.
- that a unit rate compares a quantity of one to another unit.
- that equivalent rates have the same unit rate.
- that a percent is a part-to-whole ratio.

vocabulary: ratio, equivalent ratios, ratio table, rate, unit rate, equivalent rates, percent, U.S customary system, metric system, conversion factor, unit analysis.

Students will be skilled at…

- applying and recognizing real world ratios, rates and unit rates.
- applying unit rate with ratio to talk about the ratio relationship
- comparing ratios using tables.
- fInding percents as a rate per 100.
- solving problems involving finding the whole, given a part and the percent.
- using ratio reasoning to convert measurement units.

means 30/100 times the quantity); solve problems involving finding the whole, given a part and the percent. ○ 6.RP.3d. Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities.		
Content Area Literacy Standards		***21st Century Skills***
RST.6-8.3 Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks. RST.6-8.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6-8 texts and topics. WHST.6-8.1 Write arguments focused on discipline-specific content. WHST.6-8.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.		● ***Reason Effectively*** ● ***Solve Problems*** ● ***Communicate Clearly*** ● ***Make Judgments and Decisions***

Grade 6: Statistics

Stage 1 Desired Results

ESTABLISHED GOALS:

Competencies:

- ***Students will demonstrate the ability to apply and extend mathematical properties in order to solve problems.***
- ***Students will demonstrate the ability to communicate and justify reasoning in order to support mathematical arguments***.

Content Standards:

- 6.SP.1 Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers.
- 6.SP.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.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.
- 6.SP.4 Display numerical data in plots on a number line, including dot plots, histograms, and box plots.
- 6.SP.5 Summarize numerical data sets in relation to their context

Transfer

Students will be able to independently use their learning to ***solve real world problems and explain or defend the reasonableness of the solution.***

Meaning

ENDURING UNDERSTANDINGS

Students will understand that…

- written descriptions, tables, graphs, and equations are useful in representing and investigating relationships between varying quantities.
- different representations of the relationships between varying quantities may show different strengths and weaknesses which can cause data to appear misleading.

ESSENTIAL QUESTIONS

- When is one data display better than another?
- How do mathematicians choose to display data in strategic ways?
- When is one statistical measure better than another?
- What makes a good statistical question?

Acquisition

Students will know…

- that measures of center for a numerical set of data are summaries of the values using a single number.
- that measures of variability describe the variation of the values in the data set using a single number.
- that median and mean are measures of center.
- that interquartile range and mean absolute deviation are measures of variability.
- that distribution is the arrangement of the values in a data set.
- that statistical questions and the answers account for variability in the data.
- that the distribution of a data set is described by its center, spread, and overall shape.

Students will be skilled at…

- identifying statistical questions.
- determining if questions anticipate variability in the data related to the question and accounting for it in the answers.
- representing a set of data collected to answer a statistical question and describe it by its center, spread, and overall shape.
- representing and explaining the difference between measures of center and measures of variability.
- displaying numerical data in plots on a number line.
- displaying numerical data in dot plots.
- displaying numerical data in histograms.
- displaying numerical data in box plots.
- using language to summarize numerical data sets in relation to their context.
- reporting the number of observations.

	vocabulary: statistics, statistical question, mean, outlier, measure of center, median, mode, measure of variation, range, quartiles, first quartile, third quartile, interquartile range, mean absolute deviation stem-and-leaf plot, stem, leaf, frequency table, frequency, histogram, box-and-whisker plot, five-number summary variation, median, mean, center, interquartile range, distribution	• describing the nature of the attribute under investigation. • giving quantitative measures of center and variability as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered. • relating the choice of measures of center and variability to the shape of the data distribution and the context in which the data were gathered.
Content Area Literacy Standards		***21st Century Skills***
RST.6-8.3 Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks. RST.6-8.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6-8 texts and topics. WHST.6-8.1 Write arguments focused on discipline-specific content. WHST.6-8.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.		• ***Reason Effectively*** • ***Solve Problems*** • ***Communicate Clearly*** • ***Make Judgments and Decisions***

Grade 6: Geometry

Stage 1 Desired Results

ESTABLISHED GOALS:

Competencies:

- ***Students will demonstrate the ability to apply and extend mathematical properties in order to solve problems.***
- ***Students will demonstrate the ability to communicate and justify reasoning in order to support mathematical arguments.***

Content Standards:

- 6.G.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.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 = l w h and V = b h to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems.
- 6.G.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.

Transfer

Students will be able to independently use their learning to ***solve real world problems and explain or defend the reasonableness of the solution.***

Meaning

ENDURING UNDERSTANDINGS

Students will understand that…

- there are many different ways to describe & represent three-dimensional figures.
- there are many useful applications of surface area and volume in the real-world.
- a composite figure is made up of triangles, squares, rectangles and other two-dimensional figures.
- mathematical concepts and relationships can be represented symbolically and the expression can be utilized in solving real-world problems.

ESSENTIAL QUESTIONS

- What kinds of problems can be solved using surface areas of rectangular and triangular prisms?
- What kinds of problems can be solved using volumes of fundamental solid figures?
- What makes a quadrilateral “special”?
- Does knowing the area of one shape help you to figure out the area of another?

Acquisition

Students will know…

- the importance of number sense.
- the properties of both 2-dimensional and 3-dimensional shapes.
- the formula for finding surface area.
- the formula for finding volume.
- the formula for finding the area of a rectangle.
- that formulas may be used to compute the areas of polygons and volumes of rectangular prisms.
- that manipulatives and the construction of nets may be used in computing the surface area of rectangular and triangular prisms, and volume of right rectangular prism.
- that appropriate units of measure should be used when computing the area (square units)

Students will be skilled at…

- determining which formulas are needed in the application of solving real-world problems.
- finding areas of triangles, special quadrilaterals, and polygons.
- finding the distance between two points with the same x or y coordinate.
- drawing polygons in the coordinate plane given vertices and finding the lengths of their sides.
- creating nets to assist them in solving a problem involving surface area.
- multiplying and dividing with fractions.
- performing operations with decimals and fractions.
- finding the volumes of prisms with fractional edge lengths.

● 6.G.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.	of polygons, and surface area (square units) and volume of prisms (cubic units). ***vocabulary:*** solid, polyhedron, face, edge, vertex, prism, pyramid, surface area, net, volume, polygon, composite figure,	
Content Area Literacy Standards		***21st Century Skills***
RST.6-8.3 Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks. RST.6-8.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6-8 texts and topics. WHST.6-8.1 Write arguments focused on discipline-specific content. WHST.6-8.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.		● ***Reason Effectively*** ● ***Solve Problems*** ● ***Communicate Clearly*** ● ***Make Judgments and Decisions***

Grade 6: The Number System

Stage 1 Desired Results

ESTABLISHED GOALS:

Competencies:

- ***Students will demonstrate the ability to apply and extend mathematical properties in order to solve problems.***
- ***Students will demonstrate the ability to communicate and justify reasoning in order to support mathematical arguments.***

Content Standards:

- 6.NS.1 Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions
- 6.NS.2 Fluently divide multi-digit numbers using the standard algorithm.
- 6.NS.3 Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.
- 6.NS.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.
- 6.NS.5 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.

Transfer

Students will be able to independently use their learning to ***solve real world problems and explain or defend the reasonableness of the solution.***

Meaning

ENDURING UNDERSTANDINGS

Students will understand that…

- multiplication yields a larger product.
- division yields a smaller quotient.
- estimating can help students check the reasonableness of their answers.

ESSENTIAL QUESTIONS

- Which model is better for multiplying fractions? For dividing?
- How are multiplying whole numbers and fractions related?
- How can you describe how far an object is from sea level?

Acquisition

Students will know…

- the steps for long division.
- the distributive property expresses a sum of two whole numbers.
- that positive and negative numbers are used in correlation to each other.
- that rational numbers consist of decimals and fractions.
- that absolute value is the a number's distance from zero.
- that the coordinate plane is made up of 4 quadrants, 2 axes and the origin.

vocabulary: power, base, exponent, perfect square, numerical expression, evaluate, order of operations, factor pair, prime factorization,factor tree, Venn diagram, common factors, greatest common factor, common multiples, least common multiple, least common denominator, reciprocals, positive numbers, negative numbers, opposites, integers, absolute value, coordinate plane, origin, quadrants

Students will be skilled at…

- dividing fluently using the standard algorithm.
- writing and evaluating with whole number expressions.
- finding the prime factorization of a number.
- finding the GCF and LCM of two whole numbers.
- dIviding fractions and mixed numbers
- Adding, subtracting and dividing decimals efficiently.
- describing quantities with positive and negative numbers.
- comparing and ordering integers and absolute value numbers.
- graphing ordered pairs in all four quadrants of the coordinate plane.

● 6.NS.6 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. ● 6.NS.7 Understand ordering and absolute value of rational numbers. ● 6.NS.8 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.		
Content Area Literacy Standards		***21st Century Skills***
RST.6-8.3 Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks. RST.6-8.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6-8 texts and topics. WHST.6-8.1 Write arguments focused on discipline-specific content. WHST.6-8.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.		● ***Reason Effectively*** ● ***Solve Problems*** ● ***Making Judgments AND Decisions*** ● ***Communicate Clearly***

Math 7 Unit 1: Integers and Rational Numbers

Stage 1 Desired Results

ESTABLISHED GOALS:

Competencies:

- ***Students will demonstrate the ability to apply and extend mathematical properties in order to solve problems.***
- ***Students will demonstrate the ability to communicate and justify reasoning in order to support mathematical arguments.***

Content Standards:

- **7.NS.1** Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram.
  - 7.NS.1a Describe situations in which opposite quantities combine to make 0.
  - 7.NS.1b Understand p+q as the number located a distance lql from p, in the positive or negative direction depending on whether q is positive or negative. Show that a number and its opposite have a sum of 0 (are additive inverses). Interpret sums of rational numbers by describing real-world contexts.
  - 7.NS.1c Understand subtraction of rational numbers as adding the additive inverse, p - q = p + -q. Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in real-world contexts.

Transfer

*Students will be able to independently use their learning to **solve real world problems and explain or defend the reasonableness of the solution.***

Meaning

ENDURING UNDERSTANDINGS

Students should understand that...

- integers can be used to represent real-life situations like temperature and velocity.
- a rational number is an integer divided by an integer.

ESSENTIAL QUESTION

- Why is the product of two negative rational numbers positive?

Acquisition

Students will know…

- that addition and subtraction of integers and rational numbers can be represented using a number line.
- that rational numbers can be converted to decimals using long division.
- that the sum of a number and its opposite is equal to 0.
- that mathematical equations can be used to represent real world situations.
- that subtraction is equivalent to adding the additive inverse.
- that operations of integers and rational numbers are governed by a set of properties and associated rules that need to be followed.
- that 0 cannot be a divisor.

vocabulary: Additive Inverse, Opposite, Rational number, Repeating decimals , Terminating decimals

Students will be skilled at…

- representing addition and subtraction problems with integers and rational numbers on a number line.
- converting rational numbers to decimals.
- finding the opposite or additive inverse for integers and rational numbers.
- writing equations using integers and rational numbers for real world situations.
- solving real-life problems using rational numbers.
- following properties and rules when performing operations using integers and rational numbers.
- adding, subtracting, multiplying, and dividing rational numbers.

○ 7.NS.1d Apply properties of operations as strategies to add and subtract rational numbers. ● **7.NS.2** Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers. ○ 7.NS.2a Understand that multiplication is extended from fractions to rational numbers by requiring that operations continue to satisfy the properties of operations, particularly the distributive property, leading to products such as (-1)(-1) = 1 and the rules for multiplying signed numbers. Interpret products of rational numbers by describing real-world contexts. ○ 7.NS.2b Understand that integers can be divided, provided that the divisor is not zero, and every quotient of integers (with non-zero divisor) is a rational number. If *p* and *q* are integers, then -(*p*/*q*) = (-*p*)/*q* = *p*/(-*q*). Interpret quotients of rational numbers by describing real-world contexts. ○ 7.NS.2c Apply properties of operations as strategies to multiply and divide rational numbers. ○ 7.NS.2d Convert a rational number to a decimal using long division; know that the decimal form of a rational number terminates in 0s or eventually repeats. ● **7.NS.3** Solve real-world and mathematical problems involving the four operations with rational numbers.		
Content Area Literacy Standards		***21st Century Skills***
RST.6-8.3 Follow precisely a multi-step procedure when carrying out experiments, taking measures, or performing technical tasks. RST.6-8.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6-8 texts and topics. WHST.6-8.1 Write arguments focused on discipline-specific content. WHST.6-8.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.		● ***Reason Effectively*** ● ***Solve Problems*** ● ***Communicate Clearly*** ● ***Access and Evaluate Information*** ● ***Use and Manage Information***

	● ***Make Judgments and Decisions*** ● ***Collaborate with Others*** ● ***Apply Technology Effectively***

Math 7 Unit 2: Expressions, Equations and Inequalities

Stage 1 Desired Results

ESTABLISHED GOALS:

Competencies:

- ***Students will demonstrate the ability to apply and extend mathematical properties in order to solve problems.***
- ***Students will demonstrate the ability to communicate and justify reasoning in order to support mathematical arguments.***

Content Standards:

- 7.EE.1. Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.
- 7.EE.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.
- 7.EE.3. Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies.
- 7.EE.4. Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities.
    - 7.EE.4a. Solve word problems leading to equations of the form px + q = r and p(x + q) = r, where p, q, and r are specific rational numbers. Solve equations of these forms fluently. Compare an

Transfer

Students will be able to independently use their learning to ***identify and analyze variables to solve real world problems.***

Meaning

ENDURING UNDERSTANDINGS

Students will understand that…

- rational numbers can be positive or negative and are often used to solve problems in everyday life.
- positive and negative rational numbers can be added, subtracted, multiplied, and divided interchangeably.
- properties of real number hold for all rational numbers.
- negative numbers can be used to represent real life concepts.

ESSENTIAL QUESTIONS

- What is the relationship between positive and negative numbers?
- What strategies are most useful in helping me compute rational numbers?

Acquisition

Students will know…

- that equations are solved using reverse order of operations after being simplified.
- that equations are used to solve multi-step real-life problems.
- that variables are used to represent the unknown in an equation.
- that the solutions to an inequality are infinite.
- that in the context of a real-life problem not all solutions that are possible to an inequality are solutions to the real-life problem.

vocabulary: Absolute value, The real number system, Equations with rational numbers, Linear equations with rational numbers

Students will be skilled at…

- expressing rational numbers in the form of a/b when a and b are integers.
- computation with rational numbers.
- writing, solving, and interpreting equations with rational numbers.
- comparing, ordering, and graphing rational numbers on a number line.
- applying properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.
- realizing 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.
- strategically solving multi-step real-life and mathematical problems posed with positive

algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. ○ 7.EE.4b. Solve word problems leading to inequalities of the form px + q > r or px + q < r, where p, q, and r are specific rational numbers. Graph the solution set of the inequality and interpret it in the context of the problem.		and negative rational numbers in any form (whole numbers, fractions, and decimals). ● applying properties of operations to calculate with numbers in any form; convert between forms as appropriate. ● assessing the reasonableness of answers using mental computation and estimation strategies. ● using variables to represent quantities in a real-world or mathematical problem, and constructing simple equations and inequalities to solve problems by reasoning about the quantities. ● fluently solving word problems leading to equations of the form px + q = r and p(x + q) = r, where p, q, and r are specific rational numbers. ● comparing an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. ● solving word problems leading to inequalities of the form px + q > r or px + q < r, where p, q, and r are specific rational numbers. ● graphing the solution set of the inequality and interpret it in the context of the problem.
Content Area Literacy Standards		***21st Century Skills***
RST.6-8.3 Follow precisely a multi-step procedure when carrying out experiments, taking measures, or performing technical tasks. RST.6-8.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6-8 texts and topics. WHST.6-8.1 Write arguments focused on discipline-specific content. WHST.6-8.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.		● ***Reason Effectively*** ● ***Solve Problems*** ● ***Communicate Clearly*** ● ***Access and Evaluate Information*** ● ***Use and Manage Information*** ● ***Make Judgments and Decisions*** ● ***Collaborate with Others*** ● ***Apply Technology Effectively***

Math 7 Unit 3: Ratios, Proportions and Percentages

Stage 1 Desired Results

ESTABLISHED GOALS:

Competencies:

- ***Students will demonstrate the ability to apply and extend mathematical properties in order to solve problems.***
- ***Students will demonstrate the ability to communicate and justify reasoning in order to support mathematical arguments.***

Content Standards:

- 7.RP.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.2. Recognize and represent proportional relationships between quantities.
  - 7.RP.2a. Decide whether two quantities are in a proportional relationship,
  - 7.RP.2b. Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.
  - 7.RP.2c. Represent proportional relationships by equations.
  - 7.RP.2d. Explain what a point (x, y) on the graph of a proportional relationship means in terms of the situation, with special attention to the points (0, 0) and (1, r) where r is the unit rate.
- 7.RP.3. Use proportional relationships to solve multistep ratio and percent problems.

Transfer

*Students will be able to independently use their learning to **analyze proportional relationships and use them to solve real-world problems.***

Meaning

ENDURING UNDERSTANDINGS

Students will understand that…

- ratios and proportions are useful to solve problems.
- a ratio is a comparison of 2 numbers expressed as a fraction in lowest terms.
- a percentage can be represented by a ratio with 100 as a denominator.

ESSENTIAL QUESTIONS

- What are real life examples of rates?
- How can proportions help you decide when things are fair?

Acquisition

Students will know…

- that rates describe real-life problems.
- that the cross products property is used to determine proportional relationships.
- that writing proportions from word problems is a way to solve real-life problems using the cross products property.
- that given a graph the slope of the line represents rate.
- that percents can be written as decimals and fractions.
- that the percent proportion is used to solve for missing part, whole of percent of a real-world problem.
- that percent change is the percent of increase or decrease to the original amount.
- that percent discount and percent markup are used to find selling prices.
- that the simple interest formula is used to find interest earned or paid, annual interest rate and amounts paid on loans.

Students will be skilled at…

- computing unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units.
- recognizing and representing proportional relationships between quantities.
- deciding whether two quantities are in a proportional relationship.
- identifying the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.
- representing proportional relationships by equations.
- explaining what a point (x, y) on the graph of a proportional relationship means in terms of the situation, with special attention to the points (0, 0) and (1, r) where r is the unit rate.
- using proportional relationships to solve multistep ratio and percent problems.

	vocabulary: ratios, proportional relationships, constant of proportionality, rate, unit rate,complex fraction, cross products, slope, direct variation, percent of change, percent of increase, percent of decrease, percent error, discount, markup, interes, principal, simple interest.	
Content Area Literacy Standards		***21st Century Skills***
RST.6-8.3 Follow precisely a multi-step procedure when carrying out experiments, taking measures, or performing technical tasks. RST.6-8.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6-8 texts and topics. WHST.6-8.1 Write arguments focused on discipline-specific content. WHST.6-8.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.		● ***Reason Effectively*** ● ***Solve Problems*** ● ***Communicate Clearly*** ● ***Access and Evaluate Information*** ● ***Use and Manage Information*** ● ***Make Judgments and Decisions*** ● ***Collaborate with Others*** ● ***Apply Technology Effectively***

Math 7 Unit 4: Geometry (Math 7 only)

Stage 1 Desired Results

ESTABLISHED GOALS:

Competencies:

- ***Students will demonstrate the ability to apply and extend mathematical properties in order to solve problems.***
- ***Students will demonstrate the ability to communicate and justify reasoning in order to support mathematical arguments.***

Content Standards:

- 7.G.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.2. Draw (freehand, with ruler and protractor, and with technology) geometric shapes with given conditions. Focus on constructing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle.
- 7.G.3. Describe the two-dimensional figures that result from slicing three dimensional figures, as in plane sections of right rectangular prisms and right rectangular pyramids.
- 7.G.4. Know the formulas for the area and circumference of a circle and use them to solve problems; give an informal derivation of the relationship between the circumference and area of a circle.
- 7.G.5. Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure.

Transfer

Students will be able to independently use their learning to ***recognize the role geometry plays in the world around them.***

Meaning

ENDURING UNDERSTANDINGS

Students will understand that…

- geometry and spatial sense offer ways to interpret and reflect on our physical environment.
- angles make up geometric figures as well as appear in our environment in real life objects.
- perimeter and area measure are two different aspects of geometric figures.
- surface area and volume provide important real world measurements of 3D figures.

ESSENTIAL QUESTIONS

- How are pie and pi related?
- Can you describe all 3D figures using the same attribute?

Students will know…

- that missing angles can be found using known angles.
- that a triangle's angle measures are equal to 180□.
- that a quadrilateral's angles measures are equal to 360□.
- that scale and scale factor can be used to find missing measures.
- that the formula for the area of a circle is πr^2.
- that the formula for the circumference of a circle is 2π r.
- that the formulas for perimeter and area of two-dimensional figures are applied to find measurements of composite figures.
- that the formulas for surface area of three-dimensional figures are derived from the areas of the faces of the two-dimensional nets of the figure.

Students will be skilled at…

- identifying adjacent and vertical angles.
- finding angle measures using adjacent and vertical angles.
- classifying pairs of angles as complementary, supplementary, or neither
- finding angles using complementary or supplementary angles.
- constructing angles and triangles with given angle measures
- constructing triangles with given side lengths
- finding missing angles in triangles or quadrilaterals
- constructing quadrilaterals
- using scale drawings to find actual distances
- finding scale factors
- using scale drawings to find actual perimeters and areas
- recreating scale drawings at a different scale

● 7.G.6. Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.	● that the formula for the volume of a prism is V=Bh, where the volume is equal to the area of the base times the height of the figure. ● that a pyramid's volume is equal to one third the volume of a prism with the same base and height. ***vocabulary:*** supplementary, complementary, vertical angles, adjacent angles, congruent, scale, scale model, acute triangle, obtuse triangle, right triangle, equiangular triangle, scalene triangle, isosceles triangle, equilateral triangle, two-dimensional, three-dimensional, radius, diameter, semicircle, pi, circumference, area, composite figure, derivation, volume, surface area, triangles, quadrilaterals, polygons, cubes, and right prisms, regular pyramid, slant height, cylinder, cross section, lateral surface area.	● describing a circle in terms of radius and diameter ● understanding the concept of pi ● finding circumference of circles and perimeters of semicircles. ● finding perimeters of composite figures ● finding areas of circles and semicircles ● finding areas of composite figures by separating them into familiar figures ● solving real-life problems ● using two-dimensional nets to represent three-dimensional solids ● finding surface areas of rectangular and triangular prisms ● finding surface areas of of regular pyramids ● finding surface areas of cylinders ● finding volumes of prisms ● Solving 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. ● drawing geometric shapes with given conditions. ● constructing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle. ● describing the two-dimensional figures that result from slicing three dimensional figures, as in plane sections of right rectangular prisms and right rectangular pyramids. ● knowing the formulas for the area and circumference of a circle and use them to solve problems. ● giving an informal derivation of the relationship between the circumference and area of a circle. ● using facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure.

		• solving real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.
Content Area Literacy Standards		***21st Century Skills***
RST.6-8.3 Follow precisely a multi-step procedure when carrying out experiments, taking measures, or performing technical tasks. RST.6-8.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6-8 texts and topics. WHST.6-8.1 Write arguments focused on discipline-specific content. WHST.6-8.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.		• ***Reason Effectively*** • ***Solve Problems*** • ***Communicate Clearly*** • ***Access and Evaluate Information*** • ***Use and Manage Information*** • ***Make Judgments and Decisions*** • ***Collaborate with Others*** • ***Apply Technology Effectively***

Math 7 Unit 5: Probability and Statistics

Stage 1 Desired Results

ESTABLISHED GOALS:

Competencies:

- ***Students will demonstrate the ability to apply and extend mathematical properties in order to solve problems.***
- ***Students will demonstrate the ability to communicate and justify reasoning in order to support mathematical arguments.***

Content Standards:

- 7.SP.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.2. Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions.
- 7.SP.3. Informally assess the degree of visual overlap of two numerical data distributions with similar variabilities, measuring the difference between the centers by expressing it as a multiple of a measure of variability.
- 7.SP.4. Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations.
- 7.SP.5. Understand that the probability of a chance event is a number between 0 and 1 that expresses the

Transfer

*Students will be able to independently use their learning to **make valid predictions using appropriate sampling techniques.***

Meaning

ENDURING UNDERSTANDINGS

Students will understand that…

- samples should be representative of the population to draw valid inferences.
- two populations can be compared using the measures of center of valid samples.
- probability is the likelihood of an event occuring expressed as a number from 0 to 1.
- probability of compound events is the probability of all of the events happening.

ESSENTIAL QUESTIONS

- Is asking only the members of the school band about the favorite school activity representative of the schools population?
- Is the probability of it raining on Saturday and Sunday 75% if there is a 25% of rain on Saturday and 50% chance on Sunday?

Acquisition

Students will know…

- that there are outcomes to probability events.
- that probability is the chance something with happen.
- that the more a probability experiment is performed the closer the experimental probability with be to the theoretical probability.
- that you can use tree-diagrams, tables or a formula to find the number of possible outcomes of compound events.
- that independent event do not affect each other and dependant events do.
- that for a sample to be a good sample it must be representative of the population.
- that a good sample can be used to make predictions about the larger population.
- that measures of center and variation are used to compare populations.

Students will be skilled at…

- realizing that statistics can be used to gain information about a population by examining a sample of the population.
- realizing that generalizations about a population from a sample are valid only if the sample is representative of that population.
- realizing that random sampling tends to produce representative samples and support valid inferences.
- using data from a random sample to draw inferences about a population with an unknown characteristic of interest.
- generating multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions.
- assessing the degree of visual overlap of two numerical data distributions with similar variabilities, measuring the difference

likelihood of the event occurring. Larger numbers indicate greater likelihood. A probability near 0 indicates an unlikely event, a probability around 1/2 indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event. ● 7.SP.6. Approximate the probability of a chance event by collecting data on the chance process that produces it and observing its long-run relative frequency, and predict the approximate relative frequency given the probability. ● 7.SP.7. Develop a probability model and use it to find probabilities of events. Compare probabilities from a model to observed frequencies; if the agreement is not good, explain possible sources of the discrepancy. ● 7.SP.7a. Develop a uniform probability model by assigning equal probability to all outcomes, and use the model to determine probabilities of events. ● 7.SP.7b. Develop a probability model (which may not be uniform) by observing frequencies in data generated from a chance process. ● 7.SP.8. Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation. ● 7.SP.8a. 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.8b. Represent sample spaces for compound events using methods such as organized lists, tables and tree diagrams. For an event described in everyday language (e.g., "rolling double sixes"), identify the outcomes in the sample space which compose the event. ● 7.SP.8c. Design and use a simulation to generate frequencies for compound events.	***vocabulary:*** experiment, outcomes, event, favorable outcomes, probability, relative frequency, experimental probability, theoretical probability, sample space, Fundamental Counting Principle, compound event, independent events, dependent events, simulation, population, sample, unbiased sample, biased sample	between the centers by expressing it as a multiple of a measure of variability. ● using measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations. ● realizing 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. A probability near 0 indicates an unlikely event, a probability around 1/2 indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event. ● approximating the probability of a chance event by collecting data on the chance process that produces it and observing its long-run relative frequency. ● predicting the approximate relative frequency given the probability. ● developing a probability model and use it to find probabilities of events. ● comparing probabilities from a model to observed frequencies; if the agreement is not good, explain possible sources of the discrepancy. ● developing a uniform probability model by assigning equal probability to all outcomes. ● using the model to determine probabilities of events. ● developing a probability model (which may not be uniform) by observing frequencies in data generated from a chance process. ● finding probabilities of compound events using organized lists, tables, tree diagrams, and simulation. ● realizing 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. ● representing sample spaces for compound events using methods such as organized lists, tables and tree diagrams.

		• identifying the outcomes in the sample space which compose the event. • designing and using a simulation to generate frequencies for compound events.
Content Area Literacy Standards		***21st Century Skills***
RST.6-8.3 Follow precisely a multi-step procedure when carrying out experiments, taking measures, or performing technical tasks. RST.6-8.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6-8 texts and topics. WHST.6-8.1 Write arguments focused on discipline-specific content. WHST.6-8.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.		• ***Reason Effectively*** • ***Solve Problems*** • ***Communicate Clearly*** • ***Access and Evaluate Information*** • ***Use and Manage Information*** • ***Make Judgments and Decisions*** • ***Collaborate with Others*** • ***Apply Technology Effectively***

Math 7 Unit 6: Geometry (accelerated 7/8)

Stage 1 Desired Results

ESTABLISHED GOALS:

Competencies:

- ***Students will demonstrate the ability to apply and extend mathematical properties in order to solve problems.***
- ***Students will demonstrate the ability to communicate and justify reasoning in order to support mathematical arguments.***

Content Standards:

- 8.G.1. Verify experimentally the properties of rotations, reflections, and translations:
  - 8.G.1a. Lines are taken to lines, and line segments to line segments of the same length.
  - 8.G.1b. Angles are taken to angles of the same measure.
  - 8.G.1c. Parallel lines are taken to parallel lines.
- 8.G.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; given two congruent figures, describe a sequence that exhibits the congruence between them.
- 8.G.3. Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.
- 8.G.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 the similarity between them.

Transfer

Students will be able to independently use their learning to ***construct and apply viable arguments about similarity and congruence.***

Meaning

ENDURING UNDERSTANDINGS

Students will understand that…

- real life problems students encounter everyday can be expressed and solved geometrically.
- there exists relationships between angles in specific figures and transversals.
- that volume represents the 3D space within an object.
- a combination of transformations of a figure creates congruent figures.

ESSENTIAL QUESTIONS

- What consequences can result from manipulation?
- What would civilization be like without an understanding of geometry?

Acquisition

Students will know…

- the types of transformations and what it means to perform a transformation on a 2D object.
- that figures are congruent if they can be obtained by a sequence of transformations (excluding dilations).
- that the sum of the interior angle measures of a triangle is 180 degrees.
- that the sum of the exterior angle measures of a polygon is 360 degrees.
- that figures are similar if the corresponding side lengths are proportional and corresponding angles are congruent.
- that triangles are similar if all angles are congruent.
- that angle relationships are formed when parallel lines are cut by a transversal.
- that you can use a proportion to determine if two figures are similar.

Students will be skilled at…

- verifying the properties of translations, reflections, and rotations.
- describing translations, reflections, rotations, and dilations using coordinates.
- recognizing a transformation or similar figure.
- understanding that figures are congruent (or similar) when they can be related by a sequence of translations, reflections, and rotations (and dilations).
- describing a sequence that exhibits congruence or similarity between two figures.
- classifying and determining the measures of angles created when parallel lines are cut by a transversal.
- using indirect measurement to find missing measurements.
- demonstrating that the sum of the interior angle measures of a triangle is 180 degrees and applying this fact to find the unknown

● 8.G.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. ● 8.G.6. Explain a proof of the Pythagorean Theorem and its converse. ● 8.G.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.8. Apply the Pythagorean Theorem to find the distance between two points in a coordinate system. ● 8.G.9. Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.	● that Pythagorean Theorem can be used to find the distance between two points on a coordinate grid. ● that Pythagorean Theorem is used to determine side lengths on a right triangle. ● the formulas for the volume of a cylinder, cone, and sphere. ***vocabulary:*** congruent figures, corresponding angles, corresponding sides, transformation, image, translation, reflection, line of reflection, rotation, center of rotation, angle of rotation, similar figures, dilation, center of dilation, scale factor, transversal, interior angle, exterior angle, convex polygon, concave polygon, regular polygon, indirect measurement, theorem, legs, hypotenuse, Pythagorean Theorem, distance formula, sphere, hemisphere, similar solids	measures of angles and the sum of the angles of polygons. ● verifying the measures of exterior angles of triangles and polygons. ● explaining a proof of the Pythagorean Theorem and its converse. ● using the Pythagorean Theorem to find missing measures of right triangles and distances between points in the coordinate plane. ● applying the formulas for the volume of cones, cylinders, and spheres to solve real world and mathematical problems. ● describing a sequence that exhibits similarity between two figures. ● constructing and applying viable arguments about similarity and congruence. ● explaining and justifying reasoning.
Content Area Literacy Standards		***21st Century Skills***
RST.6-8.3 Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks. RST.6-8.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6-8 texts and topics. WHST.6-8.1 Write arguments focused on discipline-specific content. WHST.6-8.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.		● ***Reason Effectively*** ● ***Solve Problems*** ● ***Communicate Clearly*** ● ***Access and Evaluate Information*** ● ***Use and Manage Information*** ● ***Make Judgments and Decisions*** ● ***Collaborate with Others*** ● ***Apply Technology Effectively***

Math 8 Unit 1: Expressions and Equations

Stage 1 Desired Results

ESTABLISHED GOALS:

Competencies:

- ***Students will demonstrate the ability to apply and extend mathematical properties in order to solve problems.***
- ***Students will demonstrate the ability to communicate and justify reasoning in order to support mathematical arguments.***

Content Standards:

- 8.EE.1. Know and apply the properties of integer exponents to generate equivalent numerical expressions.
- 8.EE.2. Use square root and cube root symbols to represent solutions to equations of the form x^2 = p and x^3 = p, where p is a positive rational number. Evaluate square roots of small perfect squares and cube roots of small perfect cubes. Know that $\sqrt{2}$ is irrational.
- 8.EE.3. Use numbers expressed in the form of a single digit times an integer power of 10 to estimate very large or very small quantities, and to express how many times as much one is than the other.
- 8.EE.4. Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used. Use scientific notation and choose units of appropriate size for measurements of very large or very small quantities (e.g., use millimeters per year for seafloor spreading). Interpret scientific notation that has been generated by technology.

Transfer

*Students will be able to independently use their learning to **solve real-world problems and explain or defend the reasonableness of the solution.***

Meaning

ENDURING UNDERSTANDINGS

Students will understand that…

- real life problems students encounter everyday can be expressed and solved algebraically.
- lines represent solutions of equations.
- numbers can be written in many equivalent forms.
- mathematics can be used to provide models that help us interpret data and make predictions.

ESSENTIAL QUESTIONS

- How can we create an equation for any given situation?
- Do all equations have a solution?
- When there are multiple methods to solve a problem, how do you know which is best?
- Can you ever be certain that a conclusion is correct?

Acquisition

Students will know…

- inverse operations and how they correlate.
- the distributive property and to which operation it applies.
- the "order of operations" and why it is necessary.
- the integer rules.
- that there is a difference between an expression and an equation.
- that lines represent solutions of linear equations.
- the formulas for slope-intercept form, standard form, and point-slope form.
- that similar triangles can be used to explain why the slope is the same between any two points on a non-vertical line.
- that intersecting lines represent solutions of linear equations.

Students will be skilled at…

- applying and recognizing inverse operations.
- solving multi-step linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.
- solving linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.
- showing that a linear equation in one variable has one solution, infinitely many solutions, or no solution by transforming the equation into simpler forms.
- justifying steps in a computation by citing applicable laws, properties, and conventions.

● 8.EE.5. Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways. ● 8.EE.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 for a line through the origin and the equation y = mx + b for a line intercepting the vertical axis at b. ● 8.EE.7. Solve linear equations in one variable. ● 8.EE.7a. Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions. Show which of these possibilities is the case by successively transforming the given equation into simpler forms, until an equivalent equation of the form x = a, a = a, or a = b results (where a and b are different numbers). ● 8.EE.7b. Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms. ● 8.EE.8. Analyze and solve pairs of simultaneous linear equations. ● 8.EE.8a. Understand that solutions to a system of two linear equations in two variables correspond to points of intersection of their graphs, because points of intersection satisfy both equations simultaneously. ● 8.EE.8b. Solve systems of two linear equations in two variables algebraically, and estimate solutions by graphing the equations. Solve simple cases by inspection. ● 8.EE.8c. Solve real-world and mathematical problems leading to two linear equations in two variables.	● the perfect small squares up to 15 and cubes up to 8. ● that scientific notation can be used to express very small or very large quantities. ***vocabulary:*** literal equation, inverse operations, linear equation, solution of a linear equation, slope, x-intercept, y-intercept, slope-intercept form, standard form, point-slope form, system of linear equations, solution to a system of linear equations, square root, perfect square, radical sign, radicand, cube root, perfect cube, power, base, exponent, scientific notation	● using similar triangles to explain why the slope is the same between any two points on a non-vertical line. ● writing and graphing proportional relationships and interpreting the unit rate as slope. ● verifying slope of lines by using two points or from tables. ● identifying parallel and perpendicular lines and proving so using slope. ● graphing and writing linear equations in slope-intercept form and standard form. ● writing an equation using a slope and a point. ● writing equations of lines using two points. ● understanding that the solution of a system of two linear equations in two variables corresponds to the point of intersection of their graphs. ● solving systems of two linear equations in two variables graphically and algebraically. ● solving real world mathematical problems leading to systems of two linear equations in two variables. ● evaluating square roots and cube roots, including those resulting from solving equations. ● using the properties of integer exponents to generate equivalent expressions. ● writing and evaluating expressions using integer exponents. ● using scientific notation to estimate very large or very small quantities. ● performing operations with numbers expressed in scientific notation and other forms. ● interpreting scientific notation that has been generated by technology.
Content Area Literacy Standards		***21st Century Skills***
RST.6-8.3 Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.		● ***Reason Effectively*** ● ***Solve Problems***

RST.6-8.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6-8 texts and topics. WHST.6-8.1 Write arguments focused on discipline-specific content. WHST.6-8.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.	• ***Communicate Clearly*** • ***Use and Manage Information*** • ***Use Systems Thinking***

Math 8 Unit 2: Geometry

Stage 1 Desired Results

ESTABLISHED GOALS:

Competencies:

- ***Students will demonstrate the ability to apply and extend mathematical properties in order to solve problems.***
- ***Students will demonstrate the ability to communicate and justify reasoning in order to support mathematical arguments.***

Content Standards:

- 8.G.1. Verify experimentally the properties of rotations, reflections, and translations:
  - 8.G.1a. Lines are taken to lines, and line segments to line segments of the same length.
  - 8.G.1b. Angles are taken to angles of the same measure.
  - 8.G.1c. Parallel lines are taken to parallel lines.
- 8.G.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; given two congruent figures, describe a sequence that exhibits the congruence between them.
- 8.G.3. Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.
- 8.G.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 the similarity between them.

Transfer

Students will be able to independently use their learning to ***construct and apply viable arguments about similarity and congruence.***

Meaning

ENDURING UNDERSTANDINGS

Students will understand that…

- real life problems students encounter everyday can be expressed and solved geometrically.
- there exists relationships between angles in specific figures and transversals.
- that volume represents the 3D space within an object.
- a combination of transformations of a figure creates congruent figures.

ESSENTIAL QUESTIONS

- What consequences can result from manipulation?
- What would civilization be like without an understanding of geometry?

Acquisition

Students will know…

- the types of transformations and what it means to perform a transformation on a 2D object.
- that figures are congruent if they can be obtained by a sequence of transformations (excluding dilations).
- that the sum of the interior angle measures of a triangle is 180 degrees.
- that the sum of the exterior angle measures of a polygon is 360 degrees.
- that figures are similar if the corresponding side lengths are proportional and corresponding angles are congruent.
- that triangles are similar if all angles are congruent.
- that angle relationships are formed when parallel lines are cut by a transversal.
- that you can use a proportion to determine if two figures are similar.

Students will be skilled at…

- verifying the properties of translations, reflections, and rotations.
- describing translations, reflections, rotations, and dilations using coordinates.
- recognizing a transformation or similar figure.
- understanding that figures are congruent (or similar) when they can be related by a sequence of translations, reflections, and rotations (and dilations).
- describing a sequence that exhibits congruence or similarity between two figures.
- classifying and determining the measures of angles created when parallel lines are cut by a transversal.
- using indirect measurement to find missing measurements.
- demonstrating that the sum of the interior angle measures of a triangle is 180 degrees and applying this fact to find the unknown

● 8.G.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. ● 8.G.6. Explain a proof of the Pythagorean Theorem and its converse. ● 8.G.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.8. Apply the Pythagorean Theorem to find the distance between two points in a coordinate system. ● 8.G.9. Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.	● that Pythagorean Theorem can be used to find the distance between two points on a coordinate grid. ● that Pythagorean Theorem is used to determine side lengths on a right triangle. ● the formulas for the volume of a cylinder, cone, and sphere. ***vocabulary:*** congruent figures, corresponding angles, corresponding sides, transformation, image, translation, reflection, line of reflection, rotation, center of rotation, angle of rotation, similar figures, dilation, center of dilation, scale factor, transversal, interior angle, exterior angle, convex polygon, concave polygon, regular polygon, indirect measurement, theorem, legs, hypotenuse, Pythagorean Theorem, distance formula, sphere, hemisphere, similar solids	measures of angles and the sum of the angles of polygons. ● verifying the measures of exterior angles of triangles and polygons. ● explaining a proof of the Pythagorean Theorem and its converse. ● using the Pythagorean Theorem to find missing measures of right triangles and distances between points in the coordinate plane. ● applying the formulas for the volume of cones, cylinders, and spheres to solve real world and mathematical problems. ● describing a sequence that exhibits similarity between two figures. ● constructing and applying viable arguments about similarity and congruence. ● explaining and justifying reasoning.
Content Area Literacy Standards		***21st Century Skills***
RST.6-8.3 Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks. RST.6-8.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6-8 texts and topics. WHST.6-8.1 Write arguments focused on discipline-specific content. WHST.6-8.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.		● ***Reason Effectively*** ● ***Solve Problems*** ● ***Communicate Clearly*** ● ***Access and Evaluate Information*** ● ***Use and Manage Information*** ● ***Make Judgements and Decisions*** ● ***Collaborate with Others*** ● ***Apply Technology Effectively***

Math 8 Unit 3: Intro to Functions

Stage 1 Desired Results

ESTABLISHED GOALS:

Competencies:

- ***Students will demonstrate the ability to apply and extend mathematical properties in order to solve problems.***
- ***Students will demonstrate the ability to communicate and justify reasoning in order to support mathematical arguments.***

Content Standards:

- 8.F.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.1
- 8.F.2. Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).
- 8.F.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.
- 8.F.4. Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (x, y) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values.
- 8.F.5. Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear). Sketch a graph that exhibits the qualitative features of a function that has been described verbally.

Transfer

*Students will be able to independently use their learning to **solve real-world problems and explain or defend the reasonableness of the solution.***

Meaning

ENDURING UNDERSTANDINGS

Students will understand that…

- functions can model relationships between quantities.
- functions can be used to describe how changing one variable can affect another variable.
- mathematics can be used to provide models that help us interpret data and make predictions.

ESSENTIAL QUESTIONS

- How would you interpret the features of a function in a real world context?
- What is the meaning of the slope and intercept of a line, in the context of the situation?
- How do you make informed decisions including unknowns?

Acquisition

Students will know…

- that a function is a rule that assigns to each input exactly one output.
- that the graph of a function is a set of ordered pairs made up of an input and the corresponding output.
- that a function can be classified as linear or nonlinear.
- that functions can be represented in a variety of ways.
- that a graph can be sketched to represent the relationship between two quantities without using numerical values on the x- and y-axis.

vocabulary: slope-intercept form, point-slope form, input, output, relation, mapping diagram, function, function rule, independent variable, dependent variable, linear function, nonlinear function

Students will be skilled at…

- writing equations in slope-intercept form.
- writing equations of lines using a slope and a point.
- writing equations of lines using two points.
- comparing and writing functions represented in a variety of ways.
- interpreting the equation y=mx+b as a linear function whose graph is a straight line.
- recognizing nonlinear functions from tables, graphs, and equations.
- constructing a function to model a linear equation between two quantities.
- determining the rate of change and initial value of a function from a description of the relationship or from two (x,y) values.
- analyzing the relationship between two quantities using graphs.
- sketching graphs to represent the relationship between two quantities.

Content Area Literacy Standards	***21st Century Skills***
RST.6-8.3 Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks. RST.6-8.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6-8 texts and topics. WHST.6-8.1 Write arguments focused on discipline-specific content. WHST.6-8.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.	● ***Reason Effectively*** ● ***Solve Problems*** ● ***Communicate Clearly*** ● ***Access and Evaluate Information*** ● ***Use and Manage Information***

Math 8 Unit 4: The Real Number System

Stage 1 Desired Results

ESTABLISHED GOALS:

Competencies:

- ***Students will demonstrate the ability to apply and extend mathematical properties in order to solve problems.***
- ***Students will demonstrate the ability to communicate and justify reasoning in order to support mathematical arguments.***

Content Standards:

- 8.NS.1. Know that numbers that are not rational are called irrational. Understand informally that every number has a decimal expansion; for rational numbers show that the decimal expansion repeats eventually, and convert a decimal expansion which repeats eventually into a rational number.
- 8.NS.2. Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line diagram, and estimate the value of expressions (e.g., π ^2).

Transfer

*Students will be able to independently use their learning to **explore relationships between numbers.***

Meaning

ENDURING UNDERSTANDINGS

Students will understand that…

- not all numbers are rational.
- every number has a decimal expansion.
- all real numbers can be approximated on a number line.

ESSENTIAL QUESTIONS

- Why does one need to distinguish between rational and irrational numbers?
- How do you locate irrational numbers on a number line?

Acquisition

Students will know…

- that all real numbers fall into a category of either rational or irrational.
- that rational numbers are made up of integers, whole numbers, and natural numbers.
- that nonperfect roots can be approximated on a number line.
- that repeated decimals can be written as fractions.

vocabulary: irrational number, real number

Students will be skilled at…

- recognizing that numbers that are not rational are called irrational.
- recognizing informally that every number has a decimal expansion.
- converting a decimal expansion which repeats into a rational number.
- using rational approximations of irrational numbers to compare the size of irrational numbers.
- locating irrational numbers approximately on a number line.
- estimating the value of expressions.

Content Area Literacy Standards

RST.6-8.3 Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.
RST.6-8.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6-8 texts and topics.
WHST.6-8.1 Write arguments focused on discipline-specific content.
WHST.6-8.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

21st Century Skills

- ***Solve Problems***
- ***Access and Evaluate Information***
- ***Use and Manage Information***
- ***Make Judgements and Decisions***

Math 8 Unit 5: Probability and Statistics

Stage 1 Desired Results

ESTABLISHED GOALS:

Competencies:

- ***Students will demonstrate the ability to apply and extend mathematical properties in order to solve problems.***
- ***Students will demonstrate the ability to communicate and justify reasoning in order to support mathematical arguments.***

Content Standards:

- 8.SP.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.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. 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.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 rows or columns to describe possible association between the two variables.

Transfer

*Students will be able to independently use their learning to **analyze and describe patterns between quantities.***

Meaning

ENDURING UNDERSTANDINGS

Students will understand that…

- written descriptions, tables, graphs, and equations are useful in representing and investigating relationships between varying quantities.
- different representations of the relationships between varying quantities may show different strengths and weaknesses which can cause data to appear misleading.

ESSENTIAL QUESTIONS

- How can we model the changes one variable has on the other?
- Can you draw invalid conclusions from valid data?
- Is there one single best type of data display?

Acquisition

Students will know…

- that data can be displayed in a variety of ways not limited to the most suitable data display.
- that an equation can closely model a scatter plot that suggests a linear association.
- that straight lines are widely used to model relationships between two quantitative variables.

vocabulary: scatter plot, outliers, correlation, line of fit, line of best fit, two-way table, joint frequency, marginal frequency

Students will be skilled at…

- constructing and interpreting scatter plots for bivariate measurement data to investigate patterns of association.
- describing patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association.
- finding and assessing lines of fit for scatter plots that suggest a linear association.
- using equations of lines to solve problems in the context of bivariate measurement data and interpreting the slope and y-intercept.
- recognizing that patterns of association can also be seen in bivariate categorical data by displaying frequencies and relative frequencies in a two-way table.
- constructing and interpreting a two-way table summarizing data on two categorical variables collected from the same subjects.

		● using relative frequencies calculated for rows or columns to describe possible association between the two variables.
Content Area Literacy Standards		***21st Century Skills***
RST.6-8.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6-8 texts and topics. RST.6-8.7 Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually. RST.6-8.9 Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic. WHST.6-8.7 Conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration. WHST.6-8.8 Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation.		● ***Analyze Media*** ● ***Collaborate with Others*** ● ***Access and Evaluate Information*** ● ***Make Judgements and Decisions*** ● ***Communicate Clearly***