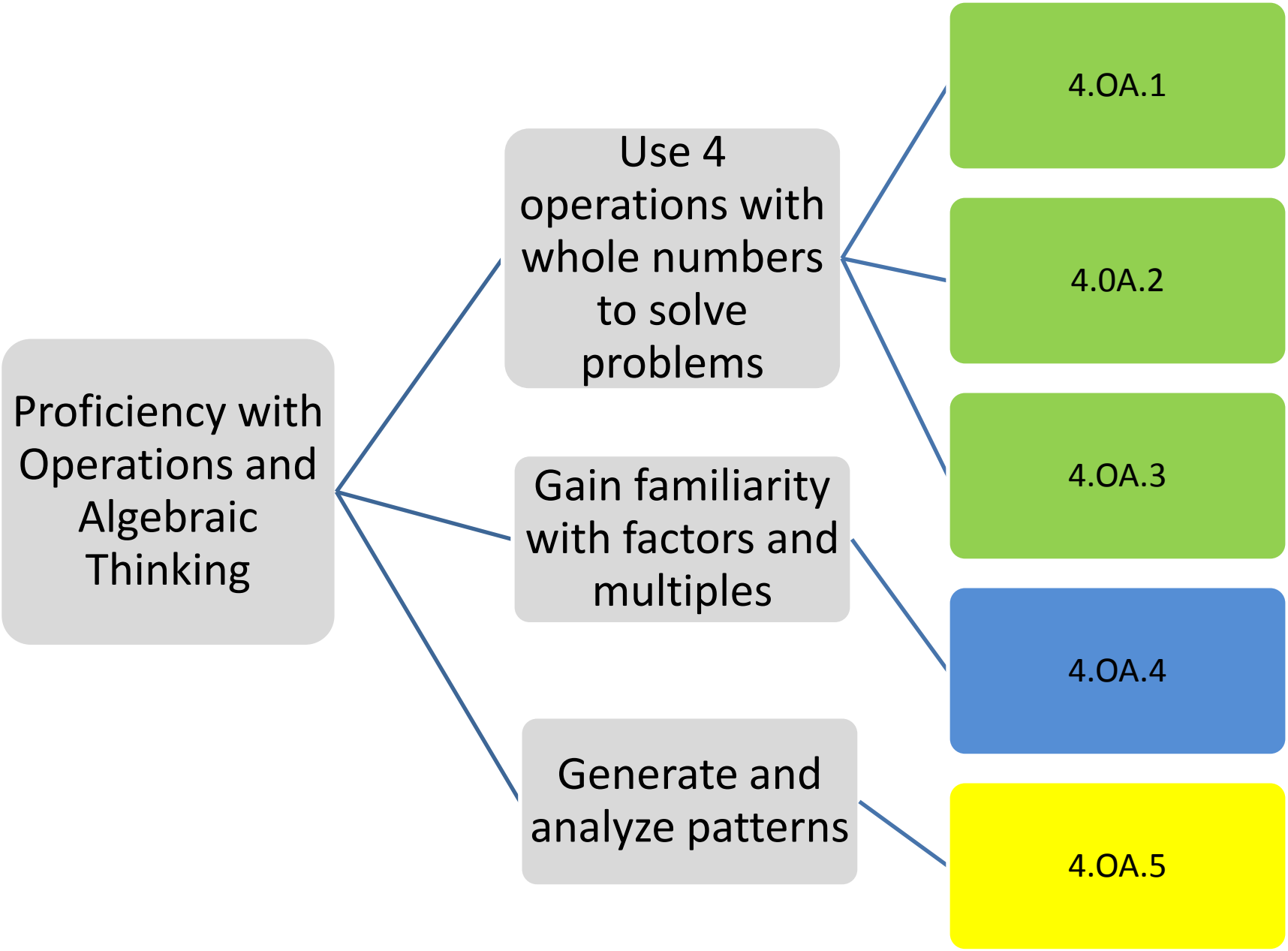
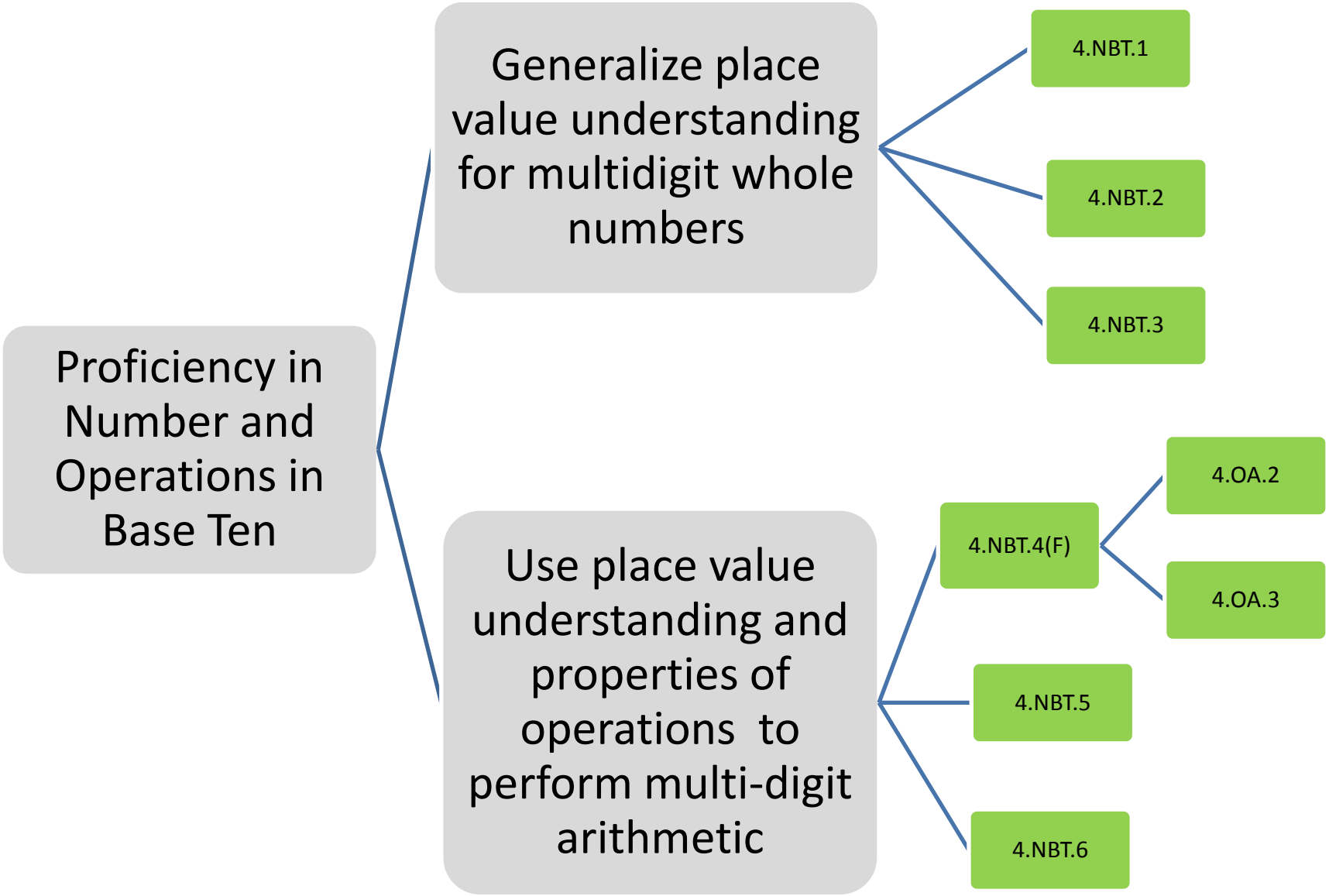
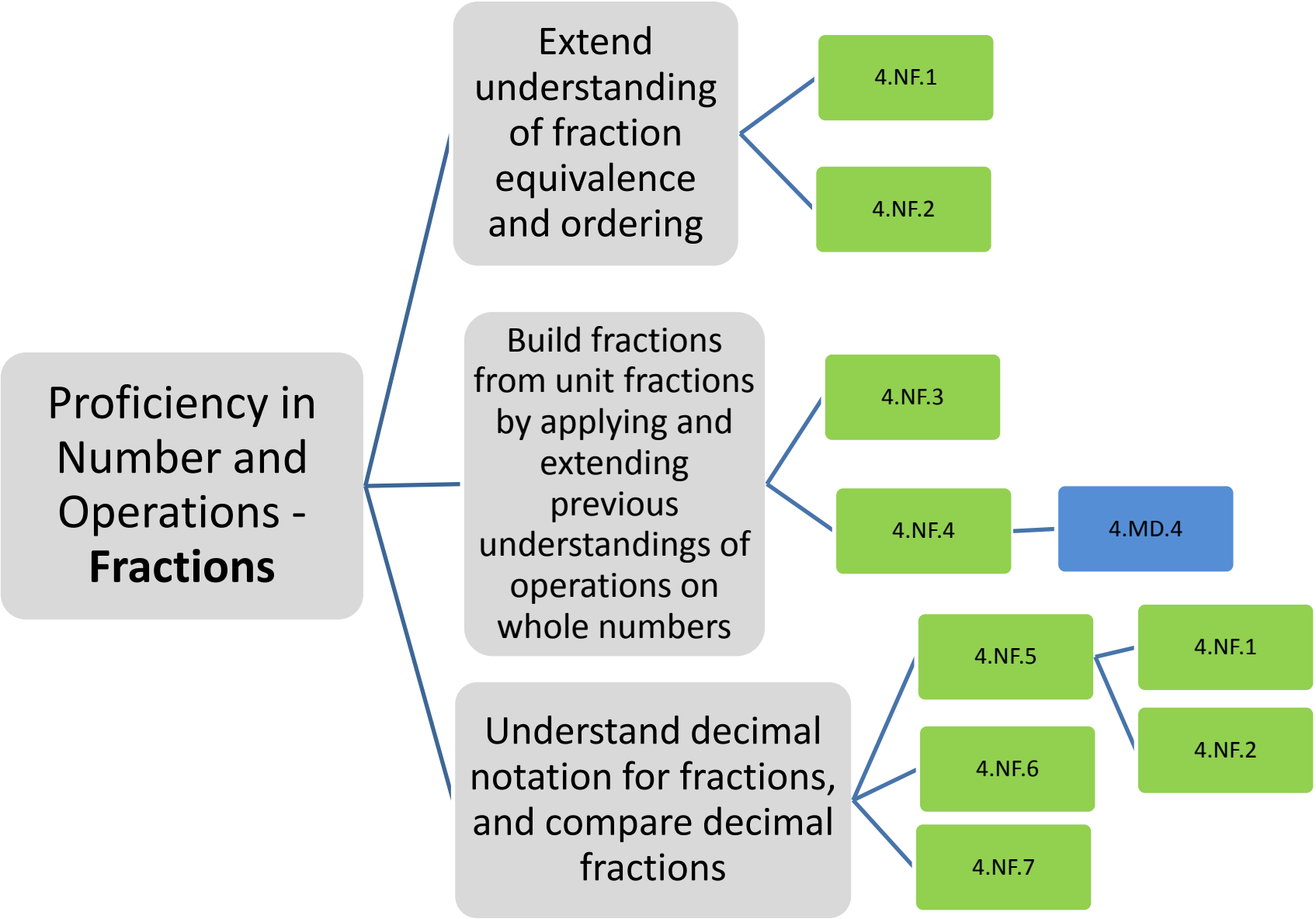
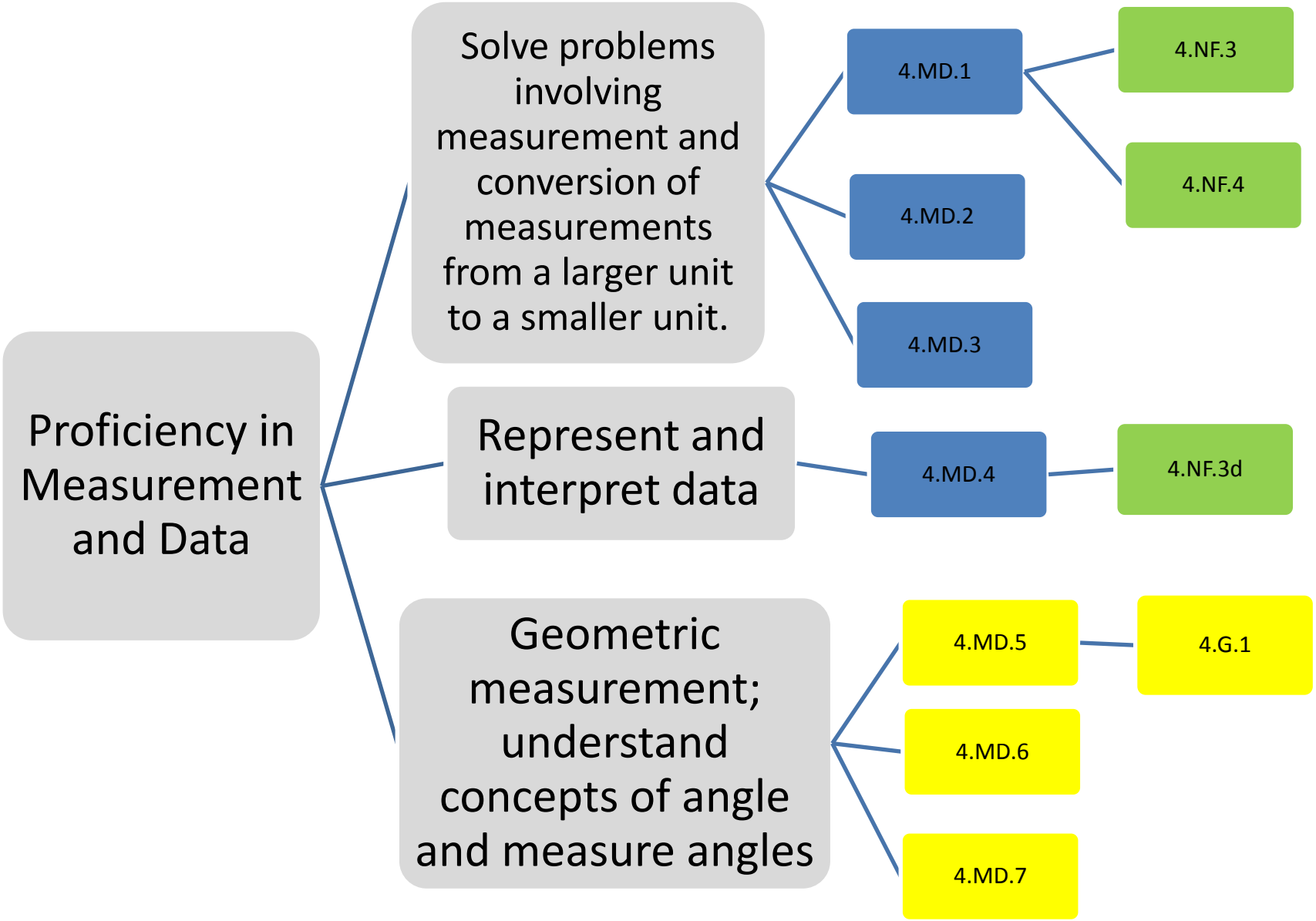
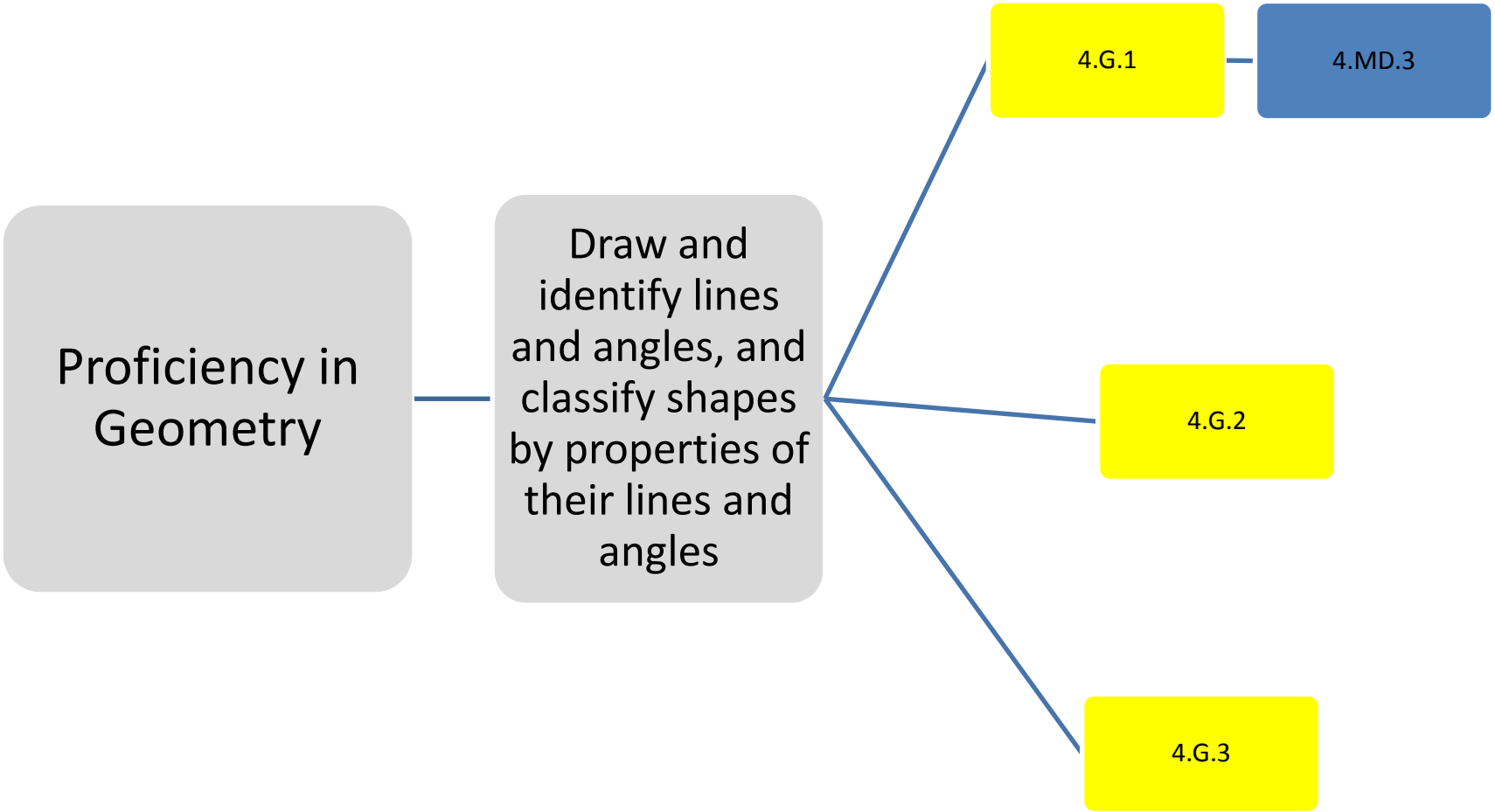

Proficiency with Operations and Algebraic Thinking
Use 4 operations with whole numbers to solve problems
Gain familiarity with factors and multiples
Generate and analyze patterns
4.OA.1
4.0A.2
4.OA.3
4.OA.4
4.OA.5


Proficiency in Number and Operations in Base Ten
Generalize place value understanding for multidigit whole numbers
4.NBT.1
4.NBT.2
4.NBT.3
Use place value understanding and properties of operations to perform multi-digit arithmetic
4.NBT.4(F)
4.OA.2
4.OA.3
4.NBT.5
4.NBT.6


Proficiency in Number and Operations - **Fractions**
Extend understanding of fraction equivalence and ordering
4.NF.1
4.NF.2
Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers
4.NF.3
4.NF.4
4.MD.4
Understand decimal notation for fractions, and compare decimal fractions
4.NF.5
4.NF.1
4.NF.2
4.NF.6
4.NF.7


Proficiency in Measurement and Data
Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit.
4.MD.1
4.NF.3
4.NF.4
4.MD.2
4.MD.3
Represent and interpret data
4.MD.4
4.NF.3d
Geometric measurement; understand concepts of angle and measure angles
4.MD.5
4.G.1
4.MD.6
4.MD.7


Proficiency in Geometry
Draw and identify lines and angles, and classify shapes by properties of their lines and angles
4.G.1
4.MD.3
4.G.2
4.G.3

Unit Map 2012-2013

Monroe #2 - Orleans BOCES (Regional Collaboration)

Collaboration / Math 4* / Grade 4 (Math Regional Curriculum)

Wednesday, October 31, 2012, 10:04AM

Standard/Module: Mathematical Practice (Week 1, 39 Weeks)

Stage 1: Desired Results

Standards Focus

- Major (70%)
- Supporting (20%)
- Additional (10%)

Standards

NYS: CCLS:Mathematics, NYS: 4th Grade , Mathematical Practice

The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students.

- 1. Make sense of problems and persevere in solving them.
- 2. Reason abstractly and quantitatively.
- 3. Construct viable arguments and critique the reasoning of others.
- 4. Model with mathematics.
- 5. Use appropriate tools strategically.
- 6. Attend to precision.
- 7. Look for and make use of structure.
- 8. Look for and express regularity in repeated reasoning.

Enduring Understandings	Essential Questions

Critical Content

Skills	Vocabulary

Stage 2: Assessment Evidence

Assessments

Stage 3: Learning Plan

Learning Activities	Resources

Differentiation Opportunities

<< Previous Year

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Unit Map 2012-2013

Monroe #2 - Orleans BOCES (Regional Collaboration)

Collaboration / Math 4* / Grade 4 (Math Regional Curriculum)

Wednesday, October 31, 2012, 10:05AM

Standard/Module: Proficiency in Operations & Alg. Thinking - 4.OA.3 (Week 1, 39 Weeks)

Stage 1: Desired Results

Standards Focus

- Major (70%) Connects to 4.OA.1 and 4.OA.2

4th Grade Proficiency Map.pdf

Standards

NYS: CCLS:Mathematics, NYS: 4th Grade , Operations & Algebraic Thinking

4.OA Use the four operations with whole numbers to solve problems.

- 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.

Enduring Understandings	Essential Questions
1. The four operations can be used to solve word problems. 2. Estimation is a useful tool when checking for reasonableness. 3. Answers can be whole numbers or decimals. 4. A variable represents an unknown. 5. Equations can be written to represent word problems and solved.	1. How do you write an equation given a word problem? 2. What does a variable represent? 3. How do you interpret a remainder in the context of a word problem? 4. What steps do you use when solving an equation? 5. How do you assess the reasonableness of answers? 6. What are some strategies you

	use when solving multi-step word problems?

Critical Content

Multi-step Word Problems

Whole Numbers/whole number Answers

Four operations

Remainders

Equations

Variables

Answers

Mental Computation

Estimation Strategies

Rounding

Skills	**Vocabulary**
1. Solve multi-step word problems posed with whole numbers and having whole number answers using the four operations. 2. Students will be able to solve problems where they have to interpret remainders. 3. Students will represent problems using equations and variables. 4. Students will assess the reasonableness of answers using mental computation estimation strategies using rounding.	Tier 2: operations, expressions, answers, computation, estimate, round Tier 3: Whole numbers, remainder, variable

Stage 2: Assessment Evidence

Assessments

Problems in Context with Four Operations
Formative: Test: Written

Students are asked to do a series of context problems that involve knowing what operation(s) to choose and showing their solution pathway. The tasks should be graded against a holistic rubric similar to what the state test uses on constructed response items.

Stage 3: Learning Plan

Learning Activities	Resources
Students are presented with multiple opportunities to solve problems in context using the four operations, and combinations of operations. Problems should be as authentic as possible and not contrived-- the problems should be "worth doing." Students give presentations to the class about the problems that they are assigned and clearly explain solution pathways.	www.illustrativemathematics.org www.illuminations.nctm.org

Differentiation Opportunities

When students are placed into groups to work on problems in context, it is less threatening for students who struggle because they can work together to interpret and solve the problems.

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Unit Map 2012-2013

Monroe #2 - Orleans BOCES (Regional Collaboration)

Collaboration / Math 4* / Grade 4 (Math Regional Curriculum)

Wednesday, October 31, 2012, 10:06AM

Standard/Module: Proficiency in Base Ten - 4.NBT.1 (Week 1, 6 Weeks)

Stage 1: Desired Results

Standards Focus

- Major (70%) Connects with 4.NB.2 and 4.NBT.3

4th Grade Proficiency Map.pdf

Standards

NYS: CCLS:Mathematics, NYS: 4th Grade , Number & Operations in Base Ten
4.NBT Generalize place value understanding for multi-digit whole numbers.

- 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.

Enduring Understandings	Essential Questions
1. The placement of numbers in a multi-digit whole number is very important because it will always have ten times the value as the digit to the right of it.	1. In a multi-digit whole number, what is the pattern between a given digit and the digit to the right?
2. When comparing numbers you have to compare the entire numbers, not just the first digit of each multi-digit number.	2. How do you multiply or divide the value of a digit in a multi-digit number by 10?
	3. Given two numbers, how do you determine which one is bigger?

Critical Content

1. place value
2. multiplication by 10
3. division by 10
4. multi-digit whole number
5. value of a digit
6. digit

Skills	Vocabulary

1. Students will recognize the place value of each digit in a multi-digit number. 2. Students will identify the value of each digit in a multi-digit number. 3. Students will recognize that in a multi-digit number, a digit in one place represents ten times what it represents in the place to its right. 4. Students will recognize that 700 divided by 10 equals 70.	Tier 2: digit, Tier 3: multi-digit whole number, ten times, place value, division, value

Stage 2: Assessment Evidence

Assessments

Missing Place Values
Formative: Test: Standardized

Students fill in missing place values in number sentences in both expanded form and in standard notation.

Stage 3: Learning Plan

Learning Activities	Resources
Students experiment with patterns of ten. Students can "build" large numbers using models of 10, 100 and 1000 using concrete methods, which eventually get dropped for more abstract methods. Students then expand their findings to work on building numbers that are not multiples of ten.	www.illustrativemathematics.org www.illuminations.nctm.org ZOOM! app for the iPad *If You Made a Million* by David Schwartz *How Much Is a Million* by David Schwartz

Differentiation Opportunities

Students work in groups to build large numbers. Students who need enrichment can work on building large numbers that are not multiples of ten and explaining how at least two ways in which the number can be built. Students begin to generalize their work to using numbers without manipulatives.

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Unit Map 2012-2013

Monroe #2 - Orleans BOCES (Regional Collaboration)

Collaboration / Math 4* / Grade 4 (Math Regional Curriculum)

Wednesday, October 31, 2012, 10:24AM

Standard/Module: Proficiency in Base Ten - 4.NBT.2 (Week 1, 6 Weeks)

Stage 1: Desired Results

Standards Focus

- Major (70%) Connects with 4.NBT.1 and 4.NBT.3

4th Grade Proficiency Map.pdf

Standards

NYS: CCLS:Mathematics, NYS: 4th Grade , Number & Operations in Base Ten

4.NBT Generalize place value understanding for multi-digit whole numbers.

- 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.

Enduring Understandings	Essential Questions
1. Multi-digit whole numbers can be read by using base-ten numerals, number names, and expanded form. 2. Multi-digit whole numbers can be written using base-ten numerals, number names, and expanded form. 3. Two multi-digit whole numbers can be compared based on meanings of the digits in each place using greater than, less than, and equal to symbols.	1. How do you read a multi-digit whole number using base-ten numerals, number names, and expanded form? 2. How do you write a multi-digit whole number using base-ten numerals, number names, and expanded form? 3. How do you compare two multi-digit numbers?

Critical Content

1. Base-ten numerals in multi-digit whole numbers
2. Number names of multi-digit whole numbers
3. Expanded form of multi-digit whole numbers
4. Comparing multi-digit whole numbers using greater than, less than, or equal to symbols

Skills	Vocabulary
	Tier 2: multi-digit whole number, compare, symbol,

1. Students will be able to read multi-digit whole numbers using base-ten numerals, number names, and expanded form. 2. Students will be able to write multi-digit whole numbers using base-ten numerals, number names, and expanded form. 3. Students will compare two multi-digit numbers based on meanings of the digits in each place using the greater than, less than, or equal to symbols.	number name Tier 3: expanded form, base-ten numeral, greater than, less than, equal to

Stage 2: Assessment Evidence

Assessments

Comparing Large Numbers
Formative: Test: Standardized

Students are given sets of numbers to compare and must determine which number is larger. Students also must write three numbers that are greater or smaller than a given number by changing only one place value and explaining why their new numbers are greater or smaller than the given number.

Stage 3: Learning Plan

Learning Activities	Resources
Students use what they know from building numbers out of tens, hundreds and thousands to compare numbers. Students should be able to write numbers that are larger or smaller than a given number. Students will eventually move away from concrete representations of number into more abstract forms. Games like "Close to 1000" or "Close to 0" will serve to reinforce these skills.	www.illustrativemathematics.org www.illuminations.nctm.org

Differentiation Opportunities

Use virtual base-ten blocks to help students with comparing numbers.

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Unit Map 2012-2013

Monroe #2 - Orleans BOCES (Regional Collaboration)

Collaboration / Math 4* / Grade 4 (Math Regional Curriculum)

Wednesday, October 31, 2012, 10:25AM

Standard/Module: Proficiency in Base Ten - 4.NBT.3 (Week 1, 6 Weeks)

Stage 1: Desired Results

Standards Focus

- Major (70%) Connects with 4.NBT.1 and 4.NBT.3

4th Grade Proficiency Map.pdf

Standards

NYS: CCLS:Mathematics, NYS: 4th Grade , Number & Operations in Base Ten

4.NBT Generalize place value understanding for multi-digit whole numbers.

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

Enduring Understandings

1. Multi-digit whole numbers can be rounded to any place by utilizing your understanding of the place value of each digit.
2. Rounding can be a useful tool one uses in real world math.
3. If you don't know place value, you cannot round.

Essential Questions

1. What are the steps you should go through when rounding?
2. What is the purpose of rounding?
3. Can you give a few examples of where rounding would be used in every day life?

Critical Content

1. Place value of digits in multi-digit whole numbers
2. Rounding multi-digit whole numbers to any place
3. Understand that a "5" in any place value implies the "half way" point within that place value
4. Understanding why the "process" of rounding works:

- Underline place value you are rounding to
- Make arrow to the right
- If number to the right is greater than or = to 5, then add one to place value
- If number to the right is less than 5, then leave place value alone

Skills

1. Students will identify the place value of each digit in a multi-digit whole number.
2. Students will use place value understanding to round multi-digit whole numbers to any

Vocabulary

Tier 2: place value, multi-digit whole number

place.	Tier 3: round

Stage 2: Assessment Evidence

Assessments

Round and Explain
Formative: Test: Written

Students are given numbers to round based on criteria for the place value to be rounded to, and students justify their answers/work. Students also examine rounding practices of a mystery student to determine whether the rounding was done correctly or not, and if not, what the error was and what the correct process would be.

Stage 3: Learning Plan

Learning Activities	Resources
Students work on rounding numbers and justifying their answers using "rounding rules." If there is a student textbook or internet article about rounding, ask students to cite the rules for rounding as they work on problems (ELA Common Core connection).	www.illustrativemathematics.org www.illuminations.nctm.org

Differentiation Opportunities

Use white boards or interactive white boards to help students with rounding. Also, the "Show Me" app or the
"Educreations" app for iPad/iPod touch is a good way for students to show their work and record their own voice explaining how they completed the task.

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Unit Map 2012-2013

Monroe #2 - Orleans BOCES (Regional Collaboration)

Collaboration / Math 4* / Grade 4 (Math Regional Curriculum)

Wednesday, October 31, 2012, 10:26AM

Standard/Module: Proficiency in Base Ten - 4.NBT.4(F) (Week 1, 6 Weeks)

Stage 1: Desired Results

Standards Focus

- Major (70%) Connects with 4.NBT.5, 4.NBT.6, 4.OA.2, and 4.OA.3

4th Grade Proficiency Map.pdf

Standards

NYS: CCLS:Mathematics, NYS: 4th Grade , Number & Operations in Base Ten

4.NBT Use place value understanding and properties of operations to perform multi-digit arithmetic.

- 4. Fluently add and subtract multi-digit whole numbers using the standard algorithm.

Enduring Understandings

1. The addition and subtraction algorithms are a process that allows you to solve any addition or subtraction problem.
2. Place value and strategies using properties of can operations can help when adding and/or subtracting whole numbers.

Essential Questions

1. What is a whole number?
2. What are the steps you go through when adding multi-digit whole numbers?
3. What are the steps you go through when subtracting multi-digit whole numbers?
4. Why is place value important when adding and subtracting?
5. Can you subtract a larger number from a smaller number?
6. What is "borrowing" and when do you have to use this?
7. When do you "carry" a number?

Critical Content

1. Multi-digit whole numbers
2. Review of place value
3. Review of properties of operations
4. Addition algorithm/subtraction algorithm

Note: Students should be fluent in adding and subtraction within 1,000,000

Skills

1. Add and subtract multi-digit whole numbers using the addition and subtraction algorithm.
2. Use place value and property of operation strategies to reinforce the addition and subtraction algorithms.

Vocabulary

Tier 2: add, subtract

	Tier 3: multi-digit whole number, standard addition and subtraction algorithm

Stage 2: Assessment Evidence

Assessments

Add and Subtract
Formative: Test: Standardized

Students are given a variety of addition and subtraction problems to solve. These problems should include re-grouping across 9's and 0's, problems that involve re-grouping in some place values, but not in others, and problems involving re-grouping across all place values. Watch for patterns of mistakes in certain types of problems.

Stage 3: Learning Plan

Learning Activities	Resources
Daily practice with adding and subtracting multi-digit numbers. Error analysis of "mystery student" work	www.illustrativemathematics.org www.illuminations.nctm.org

Differentiation Opportunities

This is a skill that is often challenging for struggling learners to master. Practice with easy numbers first, and be sure to give a variety of problems. Often times the problems occur when students over-generalize a regrouping strategy and this often happens when students have not seen a variety of problems (such as re-grouping in some place values but not in others). Base-ten blocks (both physical and virtual) might be helpful for this. Gradually move students away from the base ten blocks into using only numbers.

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Unit Map 2012-2013

Monroe #2 - Orleans BOCES (Regional Collaboration)

Collaboration / Math 4* / Grade 4 (Math Regional Curriculum)

Wednesday, October 31, 2012, 10:26AM

Standard/Module: Proficiency in Measurement/Data - 4.MD.1 (Week 7, 33 Weeks)

Stage 1: Desired Results

Standards Focus

- Supporting (20%) Connects with 4.MD.1, 4.MD.3, 4.NF.3, and 4.NF.4

4th Grade Proficiency Map.pdf

Standards

NYS: CCLS:Mathematics, NYS: 4th Grade , Measurement & Data

4.MD Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit.

- 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.

Enduring Understandings

1. Metric units of length include meter, centimeter, and kilometer.
2. Metric units of mass include gram and kilogram.
3. Metric units of volume include liter and milliliter.
4. Customary units of weight include pound and ounce.
5. Units of time include hour, minute, and second.
6. Within a single system of measurement, measurements in a larger unit can be expressed in terms of a smaller unit.
7. Measurement equivalents can be expressed in a two – column table using conversions.

Essential Questions

1. What is a Metric unit?
2. What is a Customary unit?
3. How can we express measurements in a larger unit in terms of a smaller unit?
4. How do we record measurement equivalents in a two-column table?

Critical Content

1. Meter
2. Centimeter
3. Kilometer
4. Gram
5. Kilogram
6. Pound
7. Ounce
8. Liter

9. Milliliter
10. Hour
11. Minute
12. Second
13. Larger unit
14. Smaller unit
15. Measurement equivalents
16. Two-column table
17. Conversion
18. Metric unit

Skills	Vocabulary
1. Students will recognize the relative sizes of measurement units within one system of units including m, cm, km; g, kg; lb, oz,; l, ml; hr, min, sec. 2. Students will express measurements in a larger unit in terms of a smaller unit within a single system of measurement. 3. Students will record measurement equivalents in a two – column table. 4. Students will recognize metric units as well as customary units.	Tier 2: express Tier 3: relative size, measurement, units, system, larger unit, smaller unit, equivalents, two-column table, meter, centimeter, kilometer, gram, kilogram, pound, ounce, liter, milliliter, hour, minute, second, conversion, metric unit, customary unit

Stage 2: Assessment Evidence

Assessments

Measuring around us
Formative: Performance: Skill Demonstration

Students decide what measurement would be appropriate for a given item and then carry out the measurement of the item. If possible, students would have to say how many of that item would it take to get to the next unit. For example, a bookshelf is about one meter wide. I would have to put 1000 bookshelves side by side to make a kilometer of bookshelves.

Stage 3: Learning Plan

Learning Activities	Resources
It is important for students to see these measurements as much as possible. Given classroom constraints, it isn't always feasible to show students a physical, real-world example of these measurements. One way to foster an understanding of these units is to talk about how one might travel a distance for linear measurements, put items on a scale to show g vs. kg, and show a liter versus a mL and ask students to estimate how many eye droppers (mL) go into a liter bottle of soda. Students can use an analog clock face to	www.illustrativemathematics.org www.illuminations.nctm.org *Is a Blue Whale the Biggest Thing There Is?* by Robert Wells

count units of time and write equivalents. Use a two-column chart to document equivalents.	

Differentiation Opportunities

Putting all measurements on one two-column chart might be very confusing for the students, and they should be taught there are different categories of measurement (linear, capacity, mass, time, etc). Students should create separate two-column charts for each category or measurement and attach it to a graphic organizer about a category of measurement. For example, a two-column chart showing equivalencies between linear metric unit measurements and another two-column chart showing equivalence between standard units might go into a Frayer Model or other graphic organizer (a foldable maybe?) that describes what linear measurement is and what it is used for. Students could explore real-world items that would be measured in linear measurements, and identify which unit would be best suited to the item. That would also go into the graphic organizer.

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Unit Map 2012-2013

Monroe #2 - Orleans BOCES (Regional Collaboration)

Collaboration / Math 4* / Grade 4 (Math Regional Curriculum)

Wednesday, October 31, 2012, 10:27AM

Standard/Module: Proficiency in Measurement/Data - 4.MD.2 (Week 7, 33 Weeks)

Stage 1: Desired Results

Standards Focus

- Supporting (20%) Connects with 4.MD.1 and 4.MD.3

4th Grade Proficiency Map.pdf

Standards

NYS: CCLS:Mathematics, NYS: 4th Grade , Measurement & Data

4.MD Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit.

- 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.

Enduring Understandings	Essential Questions
1. Using the four operations solve word problems involving distances, intervals of time, liquid volume, masses of objects, and money. 2. Using the four operations solve word problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. 3. Measurement quantities can be represented using diagrams such as number line diagrams that feature a measurement scale.	1. How do we solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money? 2. How do we represent measurement quantities using diagrams?

Critical Content

1. Four operations
2. Problem solving
3. Distance units of measurement
4. Liquid volume units of measurement
5. Units of mass
6. Intervals of time
7. Number line
8. Measurement scale
9. Money

10. Simple fractions
11. Decimals

Skills	Vocabulary
1. Students will use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money. 2. Students will represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale.	Tier 2: word problems, money, fraction, decimal, diagram Tier 3: operations, solve, distances, intervals of time, liquid volumes, masses, simple fraction, larger unit, smaller unit, number line, measurement scales

Stage 2: Assessment Evidence

Assessments

Measuring Around Us
Formative: Performance: Skill Demonstration

Students decide what measurement would be appropriate for a given item and then carry out the measurement of the item. If possible, students would have to say how many of that item would it take to get to the next unit. For example, a bookshelf is about one meter wide. I would have to put 1000 bookshelves side by side to make a kilometer of bookshelves.

Stage 3: Learning Plan

Learning Activities	Resources
It is important for students to see these measurements as much as possible. Given classroom constraints, it isn't always feasible to show students a physical, real-world example of these measurements. One way to foster an understanding of these units is to talk about how one might travel a distance for linear measurements, put items on a scale to show g vs. kg, and show a liter versus a mL and ask students to estimate how many eye droppers (mL) go into a liter bottle of soda. Students can use an analog clock face to count units of time and write equivalents. Use a two-column chart to document equivalents.	www.illustrativemathematics.org www.illuminations.nctm.org Yardsticks(meter sticks) and rulers (marked with customary and metric units) Teaspoons and tablespoons Graduated measuring cups (marked with customary and metric units)

In order for students to have a better understanding of the relationships between units, they need to use measuring devices in class.	*Is a Blue Whale the Biggest Thing There Is?* by Robert Wells

Differentiation Opportunities

Students may use a two-column chart to convert from larger to smaller units and record equivalent measurements. They make statements such as, if one foot is 12 inches, then 3 feet has to be 36 inches because there are 3 groups of 12.

Present word problems as a source of students' understanding of the relationships among inches, feet and yards.

Present problems that involve multiplication of a fraction by a whole number (denominators are 2, 3, 4, 5 6, 8, 10, 12 and 100). Scaffold the difficulty level. Problems involving addition and subtraction of fractions should have the same denominators.

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Unit Map 2012-2013

Monroe #2 - Orleans BOCES (Regional Collaboration)

Collaboration / Math 4* / Grade 4 (Math Regional Curriculum)

Wednesday, October 31, 2012, 10:28AM

Standard/Module: Proficiency in Operations & Alg. Thinking -4.OA.1 (Week 9, 31 Weeks)

Stage 1: Desired Results

Standards Focus

- Major (70%) Links to 4.OA.2 and 4.OA.3

4th Grade Proficiency Map.pdf

Standards

NYS: CCLS:Mathematics, NYS: 4th Grade , Operations & Algebraic Thinking

4.OA Use the four operations with whole numbers to solve problems.

- 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.

Enduring Understandings	Essential Questions
1. A multiplication equation includes at least 2 factors and one product. 2. Factors can be multiplied in any order to receive the same product.	1. What makes up a multiplication equation? 2. What happens to the product when the two factors are switched?

Critical Content

1. Multiplication
2. Equation
3. Difference between an equation and an expression
4. Comparison
5. Factor
6. Product
7. Commutative Property

Skills	Vocabulary
1. Students will understand that a multiplication equation consists of at least two factors and a product. 2. Students will write and identify equations and statements for multiplicative comparisons. 3. Students will recognize that by switching the	Tier 2: multiplication, comparison Tier 3: factor, product, equation, Commutative Property

two factors, the product remains the same. 4. Students will identify the Commutative Property of multiplication.	

Stage 2: Assessment Evidence

Assessments

Assessments
Oral: Presentation

Put students in pairs with a given product and have them prepare a presentation of the different ways factors can be multiplied to get that product.

Stage 3: Learning Plan

Learning Activities	Resources
Students should be given many opportunities to write and identify equations and statements for multiplicative comparisons. It is important that students are provided many opportunities to solve contextual problems.	www.illustrativemathematics.org www.illuminations.nctm.org

Differentiation Opportunities

Manipulatives can be used to show that 2 groups of three items or three groups of two items result in the same number of items.

Smaller products can be used so students can develop a conceptual understanding of the commutative property.

Larger products can be used to challenge students.

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Unit Map 2012-2013

Monroe #2 - Orleans BOCES (Regional Collaboration)

Collaboration / Math 4* / Grade 4 (Math Regional Curriculum)

Wednesday, October 31, 2012, 10:29AM

Standard/Module: Proficiency in Operations & Alg. Thinking - 4.OA.2 (Week 9, 31 Weeks)

Stage 1: Desired Results

Standards Focus

- Major (70%) Connects to 4.OA.1 and 4.OA.3

4th Grade Proficiency Map.pdf

Standards

NYS: CCLS:Mathematics, NYS: 4th Grade , Operations & Algebraic Thinking
4.OA Use the four operations with whole numbers to solve problems.

- 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.

Enduring Understandings	Essential Questions
1. Problem solving involves drawing and writing equations with a symbol for the unknown number. 2. Multiplication is related to addition. 3. Symbols are used to represent an unknown number in an equation. 4. Additive comparisons focus on the difference between two quantities. 5. Multiplicative comparisons focus on comparing two quantities by showing that one	1. How can we use drawings and equations to solve word problems? 2. How is multiplication related to addition? 3. What is the difference between additive and multiplicative comparisons?

quantity is a specified number of times larger or smaller than the other.	

Critical Content

Word Problems

- Translation of words to equations
- Key Words that translate to math symbols (is, of, product,etc.)
- Steps to solve equations
- Checking solution by checking "into the words" of the word problem

Multiplicative Comparison using:

- Drawings
- Equations
- Difference between multiplicative and additive comparison

Skills	**Vocabulary**
1.) Students will translate words into math symbols. 2.) Students will use a symbol to represent the unknown number. 3.) Students will multiply or divide to solve word	Tier 2: multiply, divide, solve Tier 3: symbol, unknown, multiplicative comparison, additive comparison, equation

problems by using drawings and equations. 4.) Students will understand the relationship between multiplication and addition.	

Stage 2: Assessment Evidence

Assessments

Formative: Other: Quiz

Students will be given 5 comparative situations and they will translate each situation into an equation with an unknown and solve.

Stage 3: Learning Plan

Learning Activities	Resources
Students need experiences that allow them to connect mathematical statements and number sentences or equations. This allows for an effective transition to formal algebraic concepts. They need to represent an unknown number in a word problem with a symbol. Word problems which require multiplication or division are solved by using drawings and equations. Present multistep word problems with whole numbers and whole-number answers using the four operations. Students should know which operations are needed to solve the problem. Drawing pictures or using models will help students understand what the problem is asking. They should check the reasonableness of their answer using mental computation and estimation strategies.	Examples of multistep word problems can be accessed from the released questions on the NAEP (National Assessment of Educational Progress) Assessment at http://nces.ed.gov/nationsreportcard/itmrlsx/search.aspx. National Assessment of Educational Progress (NAEP) Assessments - http://nces.ed.gov/nationsreportcard/itmrlsx/search.aspx. www.illustrativemathematics.org www.illuminations.nctm.org

Students need to solve word problems involving multiplicative comparison (product unknown, partition unknown) using multiplication or division. They should use drawings or equations with a symbol for the unknown number to represent the problem. Students need to be able to distinguish whether a word problem involves multiplicative comparison or additive comparison (solved when adding and subtracting in Grades 1 and 2).	

Differentiation Opportunities

Model problems with manipulatives to reinforce the conceptual understanding.

Scaffold problems from easy to more difficult.

Create a station activity based on interest and ability level where perhaps some of the stations would give more or less support depending upon how the activity is arranged. For example, some of the stations can have written prompts or manipulatives that may guide some of the students.

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Unit Map 2012-2013

Monroe #2 - Orleans BOCES (Regional Collaboration)

Collaboration / Math 4* / Grade 4 (Math Regional Curriculum)

Wednesday, October 31, 2012, 10:30AM

Standard/Module: Proficiency in Operations & Alg. Thinking- 4.OA.4 (Week 9, 9 Weeks)

Stage 1: Desired Results

Standards Focus

- Supporting (20%)

4th Grade Proficiency Map.pdf

Standards

NYS: CCLS:Mathematics, NYS: 4th Grade , Operations & Algebraic Thinking
4.OA Gain familiarity with factors and multiples.

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

Enduring Understandings

1. Two factors can be multiplied together to make a product.
2. A whole number is a multiple of each of its factors.
3. A prime number consists of two factors.
4. A composite number consists of more than two factors.

Essential Questions

1. What is a factor pair of a whole number within the range of 1 – 100?
2. What is a multiple?
3. What is a prime number?
4. What is a composite number?
5. Is 1 a prime number?
6. Are prime numbers only odd numbers?
7. What is the difference between finding the factors of a number and finding the multiples of that same number?

Critical Content

1. Factor pairs for numbers 1 – 100
2. Multiple
3. Prime numbers 1 – 100
4. Composite numbers 1 – 100
5. Whole number
6. One – digit number

Skills

Vocabulary

1. Students will be able to find all factor pairs for whole numbers 1 – 100. 2. Students will recognize that a whole number is a multiple of each of its factors. 3. Students will determine whether a given whole number 1 – 100 is a multiple of a given one – digit number. 4. Students will recognize prime and composite numbers from 1 to 100.	Tier2: whole number, one-digit number Tier3: factor, multiple, prime, composite, factor pair

Stage 2: Assessment Evidence

Assessments

The Story of my Number
Formative: Written: Essay

Students will be given a number in the range of 1 - 100 and they will write a story describing why their number is special and unique. Students will be asked to find all the factor pairs of their number. They will need to explain how they found the factor pairs and what the relationship is between a factor and the given number (multiple). Lastly, they will have to write about whether their given number is prime or composite and why.

Stage 3: Learning Plan

Learning Activities	Resources
Students investigate whether numbers are prime or composite by • building rectangles (arrays) with the given area and finding which numbers have more than two rectangles (e.g. 7 can be made into only 2 rectangles, 1 x 7 and 7 x 1, therefore it is a prime number) • finding factors of the number	nctm.org (Illuminations): *The Factor Game* engages students in a friendly contest in which winning strategies involve distinguishing between numbers with many factors and numbers with few factors. Students are then guided through an analysis of game strategies and introduced to the definitions of prime and composite numbers. nctm.org (Illuminations): *The Product Game* – Classifying Numbers. Students construct Venn diagrams to show the relationships between the factors or products of two or more numbers in the Product Game.
Multiples can be thought of as the result of skip counting by each of the factors. When skip counting, students should be able to identify the number of factors counted e.g., 5, 10, 15, 20 (there are 4 fives in 20).	nctm.org(Illuminations) *The Product Game*--In the Product Game, students start with factors and multiply to find the product. In The Factor Game, students start with a number and find its factors.

Review vocabulary so that students have an understanding of terms such as factor, product, multiples, and odd and even numbers.	nctm.org (Illuminations): *Multiplication: It's in the Cards* – More Patterns with Products.
Students need to develop strategies for determining if a number is prime or composite, in other words, if a number has a whole number factor that is not one or itself. Starting with a number chart of 1 to 20, use multiples of prime numbers to eliminate later numbers in the chart. For example, 2 is prime but 4, 6, 8, 10, 12,… are composite. Encourage the development of rules that can be used to aid in the determination of composite numbers. For example, other than 2, if anumber ends in an even number (0, 2, 4, 6 and 8), it is a composite number.	www.illustrativemathematics.org
Using area models will also enable students to analyze numbers and arrive at an understanding of whether a number is prime or composite. Have students construct rectangles with an area equal to a given number. They should see an association between the number of rectangles and the given number for the area as to whether this number is a prime or composite number.	

Differentiation Opportunities

Scaffold activities with easy, medium, and more difficult examples.

Create activities/worksheets which allows different levels of support. For example, you may put reminders of definitions on one form of the activity and not the other. Another example may include writing a question on one form of the activity to help prompt students. Another example would be to include an outline of the steps on the form to aid students.

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Unit Map 2012-2013

Monroe #2 - Orleans BOCES (Regional Collaboration)

Collaboration / Math 4* / Grade 4 (Math Regional Curriculum)

Wednesday, October 31, 2012, 10:30AM

Standard/Module: Proficiency in Operations & Alg. Thinking - 4.OA.5 (Week 9, 9 Weeks)

Stage 1: Desired Results

Standards Focus

- Additional (10%)

4th Grade Proficiency Map.pdf

Standards

NYS: CCLS:Mathematics, NYS: 4th Grade , Operations & Algebraic Thinking

4.OA Generate and analyze patterns.

- 5. Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself.

Enduring Understandings	Essential Questions
1. Number and shape patterns can be created using a given rule. 2. There are other features of a pattern besides its given rule. 3. Patterns involving numbers or symbols eit her repeat or grow.	1. How do we generate a number pattern following a given rule? 2. How do we generate a shape pattern following a given rule? 3. What are other features of a pattern other than its rule? 4. What are some strategies you use when trying to find the rule of a pattern?

Critical Content

1. Number pattern
2. Shape pattern
3. Rule of pattern

4. Features of pattern

Skills	Vocabulary
1. Students will generate a number or shape pattern that follows a given rule. 2. Students will identify features of each pattern other than the rule itself.	Tier 2: rule Tier 3: generate, analyze, number pattern, shape pattern, features

Stage 2: Assessment Evidence

Assessments

Patterns
Formative: Performance: Skill Demonstration

Given a number or shape and a rule students will generate the pattern and describe mathematical features of the pattern.

Stage 3: Learning Plan

Learning Activities	Resources
A t-chart is a tool to help students see number patterns.	From PBS Teachers: Snake Patterns –s-s-s: Students will use given rules to generate several stages of a pattern and will be able to predict the outcome for any stage. http://www.pbs.org/teachers/mathline/lessonplans/atmp/snake/snake_procedure.shtm
As students generate numeric patterns for rules, they should be	nctm.org (Illuminations) Patterns that Grow – Growing Patterns. Students use numbers to make growing patterns. They create, analyze, and describe growing patterns and then record them. They also analyze a special growing pattern called Pascal's triangle. nctm.org (Illuminations): Patterns that Grow – Exploring Other Number Patterns. Students analyze numeric patterns, including Fibonacci numbers. They also describe

able to "undo" the pattern to determine if the rule works with all of the numbers generated. For example, given the rule, "Add 4" starting with the number 1, the pattern 1, 5, 9, 13, 17, … is generated. In analyzing the pattern, students need to determine how to get from one term to the next term. Teachers can ask students,"How is a number in the sequence related to the one that came before it?", and "If they started at the end of the pattern, will this relationship be the same?" Students can use this type of questioning in analyzing numbers patterns to determine the rule. Have a group of students create a rule	numeric patterns and then record them in table form. nctm.org (Illuminations): Patterns that Grow – Looking Back and Moving Forward. In this final lesson of the unit, students use logical thinking to create, identify, extend, and translate patterns. They make patterns with numbers and shapes and explore patterns in a variety of mathematical contexts. www.illustrativemathematics.org

Differentiation Opportunities

Provide patterns that involve shapes so that students can determine the rule for the pattern. Shapes may be more concrete for some students to see patterns with.

Provide opportunities for students to work with another student or a group of students to simply share strategies of how to determine the rule or generate the pattern following the rule. Partners can be

grouped by ability and rules or patterns can be scaffolded.

An extension of this standard could include using repeating shape patterns to make predictions and extend simple repeating patterns.

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Unit Map 2012-2013

Monroe #2 - Orleans BOCES (Regional Collaboration)

Collaboration / Math 4* / Grade 4 (Math Regional Curriculum)

Wednesday, October 31, 2012, 10:34AM

Standard/Module: Proficiency in Base Ten - 4.NBT.5 (Week 9, 31 Weeks)

Stage 1: Desired Results

Standards Focus

- Major (70%) Connects with 4.NBT.4(F) and 4.NBT.6

4th Grade Proficiency Map.pdf

Standards

NYS: CCLS:Mathematics, NYS: 4th Grade , Number & Operations in Base Ten

4.NBT Use place value understanding and properties of operations to perform multi-digit arithmetic.

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

Enduring Understandings	Essential Questions
1. Many strategies can be used to multiply a 4-digit whole number by a 1-digit whole number and a 2-digit whole number by a 2-digit whole number.	1. Can you describe the algorithm used when multiplying a 4-digit whole number by a 1-digit whole number and a 2-digit whole number by a 2-digit whole number? 2. How do the properties of operations help you multiply numbers? 3. How would you represent a multiplication problem using rectangular arrays and area models?

Critical Content

1. Whole Numbers: 1-digit, 2-digit,3-digit, 4-digit whole numbers
2. Multiplication of whole numbers
3. Place Value/expanded notation
4. Properties of operations (commutative, associative, distributive, identities, inverses, zero property)

5. Multiplication strategies based on:

- place value
- properties of operations
- equations
- rectangular arrays
- area models

Skills	Vocabulary
1. Multiply a whole number of up to 4-digits by a 1-digit whole number. a.)using algorithm b.) using the "breaking apart" strategy, which involves using expanded form and the distributive property. 2. Multiply a 2-digit number by a 2-digit number. a.) using algorithm b.) using the "breaking apart" strategy, which involves using expanded form and the distributive property. 3. Model and explain how to multiply by using equations, rectangular arrays, and area models.	Tier 2: multiply, number, strategies, illustrate, model, explain , product, factors Tier 3: whole number, digit, place value, properties of operations, calculation, equations, rectangular arrays, area models, commutative, associative, distributive, additive identity, additive inverse, multiplicative identity, multiplicative inverse, zero property, algorithm, expanded form

Stage 2: Assessment Evidence

Assessments

Pair and Share
Formative: Performance: Skill Demonstration

Students will be in pairs and each student will receive 5 multiplication problems. Students will do their first problem and then they will switch problems to see if they have the same answer. Each student will have to explain the steps they went through and why they followed those steps.

Stage 3: Learning Plan	
Learning Activities	**Resources**
Students use base ten blocks, area models, partitioning, compensation strategies, etc. when multiplying whole numbers and use words and diagrams to explain their thinking. They use the terms factor and product when communicating their reasoning. Multiple strategies enable students to develop fluency with multiplication and transfer that understanding to division. When asking students to gain understanding about multiplying larger numbers, provide frequent opportunities to engage in mental math exercises. When doing mental math, it is difficult to even attempt to use a strategy that one does not fully understand. Also, it is a natural tendency to use numbers that are 'friendly' (multiples of 10) when doing mental math, and this promotes its understanding.	www.illustrativemathematics.org www.illuminations.nctm.org

Differentiation Opportunities

Specific strategies for students having difficulty with lining up similar place values in numbers as they are adding, subtracting, and multiplying is to have them write their calculations on grid paper. This assists the student with lining up the numbers more accurately.

Students should consistently be given scaffold problems and be exposed to various strategies. Students should also be given ample opportunities to think "out loud" with other students to help brainstorm strategies and present strategies to each other. Students need to be able to verbalize their understanding.

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Unit Map 2012-2013

Monroe #2 - Orleans BOCES (Regional Collaboration)

Collaboration / Math 4* / Grade 4 (Math Regional Curriculum)

Wednesday, October 31, 2012, 10:36AM

Standard/Module: Proficiency in Base Ten - 4.NBT.6 (Week 9, 9 Weeks)

Stage 1: Desired Results

Standards Focus

- Major (70%) Connects with 4.NBT.4(F) and 4.NBT.5

4th Grade Proficiency Map.pdf

Standards

NYS: CCLS:Mathematics, NYS: 4th Grade , Number & Operations in Base Ten

4.NBT Use place value understanding and properties of operations to perform multi-digit arithmetic.

- 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.

Enduring Understandings	Essential Questions
1. An algorithm as well as many other strategies can help find quotients. 2. When dividing whole numbers you can have a remainder. 3. Properties of operations help with dividing.	1. Can you explain what a quotient is? 2. Can you explain what a remainder is? 3. How do you answer a word problem involving division when you have a remainder? 4. What is a dividend and a divisor? 5. Can you explain the algorithm of division step by step? 6. How is place value important when dividing?

Critical Content

1. Whole-number quotients
2. Remainders
3. Four-digit dividends
4. One-digit divisor
5. Division Strategies based on :

- algorithm
- place value/expanded form
- properties of operations (commutative, associative, distributive, identities, inverses, zero property)

- relationship between multiplication and division
- equations
- rectangular arrays
- area models

Skills	Vocabulary
1. Find whole-number quotients and remainders with up to 4-digit dividends and 1-digit divisors. 2. Use strategies based on: ▪ place value ▪ properties of operations ▪ relationship between multiplication and division ▪ algorithm 3. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.	Tier 2: multiply, divide, strategies Tier 3: whole-number quotients, remainder, 4-digit , 1-digit, dividend, divisor, place value, expanded form, equation, rectangular array, area model, properties of operations (commutative, associative, distributive, identities, inverses, zero property)

Stage 2: Assessment Evidence

Assessments

Formative: Other: Quiz

Give students 5 division questions and ask them to draw and explain their solutions.

Stage 3: Learning Plan

Learning Activities	Resources
Students need opportunities to develop their understandings by using problems in and out of context. Start with a student's understanding of a certain strategy, and then make intentional, clear-cut connections for the student to the standard algorithm. This allows the student to gain understanding of the algorithm rather than just memorize certain steps to follow. Sometimes students benefit from 'being the teacher' to an imaginary student who is having difficulties applying standard algorithms in situations. To promote	www.illustrativemathematics.org www.illuminations.nctm.org

understanding, use examples of student work that have been done incorrectly and ask students to provide feedback about the student work. It is very important for some students to talk through their understanding of connections between different strategies and standard algorithms. Give students many opportunities to talk with classmates about how they could explain standard algorithms. Think-Pair-Share is a good protocol for all students.	

Differentiation Opportunities

Differentiated group activities should be used to assess and give multiple practice activities to students at all developmental levels.

Use tiered lessons. Break your lesson up into two or three levels of difficulty, with the lowest level being the minimum requirement for your grade level. Assign students to the level of difficulty you feel is best for them, or allow them to try a few problems from each level to find their best fit. Each student needs to complete just one of the three levels to officially complete the assignment.

Use technology. Many online games are easy to differentiate, as they offer a variety of levels of gameplay. You can assign the proper level to your students or once again allow the students to find their level of best fit.

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Unit Map 2012-2013

Monroe #2 - Orleans BOCES (Regional Collaboration)

Collaboration / Math 4* / Grade 4 (Math Regional Curriculum)

Wednesday, October 31, 2012, 10:37AM

Standard/Module: Proficiency in Measurement/Data - 4.MD.3 (Week 9, 9 Weeks)

Stage 1: Desired Results

Standards Focus

- Supporting (20%) Connects with 4.MD.1 and 4.MD.2

4th Grade Proficiency Map.pdf

Standards

NYS: CCLS:Mathematics, NYS: 4th Grade , Measurement & Data

4.MD Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit.

- 3. Apply the area and perimeter formulas for rectangles in real world and mathematical problems.

Enduring Understandings

1. Perimeter measures the distance around an object.
2. The formula for finding the perimeter of a rectangle is 2 l + 2 w or 2(l+w).
3. The answer for perimeter is always given in linear units.
4. Area measures the distance inside an object.
5. The formula for the area of a rectangle is length x width.
6. The answer for area will always be in square units.

Essential Questions

1. How do you find the area of a rectangle?
2. How do you find the perimeter of a rectangle?

Critical Content

1. area
2. perimeter
3. area formula
4. perimeter formula
5. real world and mathematical problems
6. rectangles and their properties

Skills

1. Students will apply the area formula for rectangles in real world and mathematical problems.
2. Students will apply the perimeter formula for

Vocabulary

Tier 2: real world

rectangles in real world and mathematical problems.	Tier 3: rectangle, area, perimeter, apply, formula

Stage 2: Assessment Evidence

Assessments

Perimeter and Area
Performance: Skill Demonstration

Each student will be given the task of measuring the length and width of their bedroom to the nearest inch. They will then be asked to draw a model of their bedroom and find the perimeter and area. They will also have to explain the difference of perimeter and area and give an example when knowing the perimeter and area of his/her bedroom would be useful.

Stage 3: Learning Plan

Learning Activities	Resources
This standard calls for students to generalize their understanding of area and perimeter by connecting the concepts to mathematical formulas. These formulas should be developed through experience not just memorization. A rectangle should be given on grid paper so students can actually see the direct relationship between the formulas of area and perimeter. Students should be asked to find perimeter and area using models as well as the formulas. Students should also be given opportunities to find the dimensions of a rectangle given perimeter and a side of the rectangle or area and a side of the rectangle.	www.illustrativemathematics.org www.illuminations.nctm.org

Differentiation Opportunities

Problems should scaffold with respect to ability level. One way to differentiate an assignment or activity is to have a drawing and/or the formulas available to refer to.

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Unit Map 2012-2013

Monroe #2 - Orleans BOCES (Regional Collaboration)

Collaboration / Math 4* / Grade 4 (Math Regional Curriculum)

Wednesday, October 31, 2012, 10:38AM

Standard/Module: Proficiency in Measurement/Data - 4.MD.5 (Week 18, 5 Weeks)

Stage 1: Desired Results

Standards Focus

- Additional (10%) Connects with 4.MD.6, 4.MD.7, and 4.G.1

4th Grade Proficiency Map.pdf

Standards

NYS: CCLS:Mathematics, NYS: 4th Grade , Measurement & Data

4.MD Geometric measurement: understand concepts of angle and measure angles.

- 5. Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint, and understand concepts of angle measurement:
- 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.
- 5b. An angle that turns through n one-degree angles is said to have an angle measure of n degrees.

Enduring Understandings

1. Angles are geometric shapes that are formed wherever two rays share a common endpoint.
2. An angle can be 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.
3. An angle that turns through n one-degree angles has an angle measure of n degrees.

Essential Questions

1. What is an angle?
2. How is an angle created?
3. How is an angle measured with reference to a circle?
4. How many degrees are there in a circle?
5. What is a series of " one - degree turns"?

Critical Content

1. Ray

- A ray is a half - line. It has one endpoint and then extends in one direction infinitely

2. Angle

- Geometric shapes are formed with angles
- 2 rays that share a common endpoint (vertex) is an angle
- measured in degrees
- one - degree angle

3. Circle

- Center
- Circular arc
- an angle is measured with reference to a circle with its center at the common endpoint of the rays
- an angle is the fractional part of the circular arc that intercepts at the endpoints of 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.
- n one-degree angles is said to have an angle measure of n degrees.

Skills	**Vocabulary**
1. Students will recognize angles as geometric shapes that are formed wherever two rays share a common endpoint. 2. Students will understand that 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. 3. Students will realize that an angle that turns through n one-degree angles has an angle measure of n degrees.	Tier 2: measurement, fraction Tier 3: angle, geometric shape, ray, endpoint, common endpoint, concept, reference, circular arc, one-degree angle

Stage 2: Assessment Evidence

Assessments

Angles
Formative: Oral: Presentation

Students will have to present all there is to know about angles. Their presentation will have the following criteria:

a.) description of an angle

b.) what unit an angle is measured in

c.) how to compare angles

e.) how to estimate the measure of an angle

Stage 3: Learning Plan	
Learning Activities	**Resources**
Students can understand this concept by using two rulers held together near the ends. The rulers can represent the rays of an angle. As one ruler is rotated, the size of the angle is seen to get larger. Ask students what is created when one ruler makes a complete rotation? Students can also create an angle explorer (two strips of cardboard attached with a brass fastener) to learn about angles. Students can compare angles.	Instructional Resources/Tools Cardboard cut in strips to make an angle explorer Brass fasteners Angle ruler Straws Transparencies Angle explorers www.illustrativemathematics.org www.illuminations.nctm.org

Differentiation Opportunities

Provide students with four pieces of straw, two pieces of the same length to make one angle and another two pieces of the same length to make an angle with longer rays. Students can use the straws to help compare angles.

Another way to compare angles is to place one angle over the other angle. Provide students with a transparency to compare two angles to help them conceptualize the spread of the rays of an angle. Students can make this comparison by tracing one angle and placing it over another angle. The side lengths of the angles to be compared need to be different.

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Unit Map 2012-2013

Monroe #2 - Orleans BOCES (Regional Collaboration)

Collaboration / Math 4* / Grade 4 (Math Regional Curriculum)

Wednesday, October 31, 2012, 10:38AM

Standard/Module: Proficiency in Measurement/Data - 4.MD.6 (Week 18, 5 Weeks)

Stage 1: Desired Results

Standards Focus

- Additional (10%) Connects 4.MD.5 and 4.MD.7

4th Grade Proficiency Map.pdf

Standards

NYS: CCLS:Mathematics, NYS: 4th Grade , Measurement & Data

4.MD Geometric measurement: understand concepts of angle and measure angles.

- 6. Measure angles in whole-number degrees using a protractor. Sketch angles of specified measure.

Enduring Understandings

1. A protractor can be used to measure angles in whole-number degrees.
2. Angles of a specified measure can be sketched.

Essential Questions

1. What are the steps you go through when measuring angles using a protractor?
2. What are the steps you go through when sketching angles of a specified measure?
3. Do you think it's important to be precise in measuring angles in the real-world (ex. construction) and why?

Critical Content

1. Angles
2. Whole-number degrees
3. Protractor
4. Specific Measures

Skills

1. Students will measure angles in whole-number degrees using a protractor.
2. Students will sketch angles of a specified measure.

Vocabulary

Tier 2: measure, whole number

Tier 3: angle, protractor, degrees, sketch, specified

	measure

Stage 2: Assessment Evidence

Assessments

Angles
Formative: Other: Quiz

Students will be given 5 questions where they will have to measure 5 different angles with a protractor and then they will be given 5 questions with 5 different angle measurements and they will have to sketch the five angles using a protractor.

Stage 3: Learning Plan

Learning Activities	Resources
Ask questions about the types of angles created when using an angle ruler or an angle explorer. Responses may be in terms of the relationship to right angles. Introduce angles as acute (less than the measure of a right angle) and obtuse (greater than the measure of a right angle). Have students draw representations of each type of angle. They also need to be able to identify angles in two-dimensional figures.	Instructional Resources/Tools Cardboard cut in strips to make an angle explorer Brass fasteners Angle ruler Protractor Angle explorers www.illustrativemathematics.org www.illuminations.nctm.org
Students can compare angles to determine whether an angle is acute or obtuse. This will allow them to have a benchmark reference for what an angle measure should be when using a tool such as a protractor or an angle ruler. Students are ready to use a tool to measure angles once they understand the difference between an acute angle and an obtuse angle. Angles are measured in degrees. There is a relationship between the number of degrees in an angle and circle which has a measure of 360 degrees. Students are to use a protractor to measure angles in whole-number degrees. They can determine if the measure of the angle is reasonable based on the relationship of the angle to a right angle. They also make sketches of angles of specified measure. Students should estimate angles, measure angles and sketch angles. They need to experience measuring angles using an angle ruler as	Nctm.org Figure This: What's My Angle? math Challenge # 10 - Students can estimate the measures of the angles between their fingers when they spread out their hand.

well as a protractor. (The angle ruler allows them to "see" the turns or rotations).	

Differentiation Opportunities

Students are confused as to which number to use when determining the measure of an angle using a protractor because most protractors have a double set of numbers. Students should have multiple experiences estimating and comparing angles to the Benchmark 90° or right angle. They should explain their reasoning by deciding first if the angle appears to be an angle that is less than the measure of a right angle (90°) or greater than the measure of a right angle (90°). If the angle appears to be less than 90°, it is an acute angle and its measure ranges from 0° to 89°. If the angle appears to be an angle that is greater than 90°, it is an obtuse angle and its measures range from 91° to 179°. Ask questions about the appearance of the angle to help students in deciding which number to use.

When drawing an angle, the initial ray can be drawn to aid students and hints can be written on worksheets reminding students of the steps of drawing an angle. Similar hints can be on worksheets when measuring angles.

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Unit Map 2012-2013

Monroe #2 - Orleans BOCES (Regional Collaboration)

Collaboration / Math 4* / Grade 4 (Math Regional Curriculum)

Wednesday, October 31, 2012, 10:39AM

Standard/Module: Proficiency in Measurement /Data - 4.MD.7 (Week 18, 5 Weeks)

Stage 1: Desired Results

Standards Focus

- Additional (10%) Connects with 4.MD.5 and 4.MD.6

4th Grade Proficiency Map.pdf

Standards

NYS: CCLS:Mathematics, NYS: 4th Grade , Measurement & Data

4.MD Geometric measurement: understand concepts of angle and measure angles.

- 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.

Enduring Understandings	Essential Questions
1. Angle measure is additive. 2. 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. 3. Solving addition and subtraction problems will help you find unknown angle measurements on a diagram.	1. What does it mean to "decompose an angle"? 2. How do you decompose an angle into non-overlapping parts? 3. How do you find the measurement of unknown angles on a diagram in real world and mathematical problems?

Critical Content

1. Angles

- Measure of an angle
- angle measure is additive
- the addition of the parts of an angle create a bigger angle

2. Decomposure (taking apart) of an angle

- non-overlapping parts

3. Problems

- Addition/Subtraction Problems involving finding unknown angles
- Include diagrams involving real-world application
- Include mathematical problems where an equation could be written and solved to find an unknown angle measure

Skills	**Vocabulary**
1. Students will recognize that angle measure is additive. 2. Students will decompose angles into non-overlapping parts. 3. Students will realize that the angle measure of the whole is the sum of the angle measures of its parts. 4. Students will utilize addition and subtraction problem solving strategies to find the measurements of unknown angles in real world and mathematical problems. 5. Students will use an equation with a symbol for the unknown angle measure.	Tier 2: measure, real world, addition, subtraction, symbol Tier 3: angle, additive, decompose, non-overlapping, sum, equation

Stage 2: Assessment Evidence

Assessments

Formative: Other: Quiz

Students will be given 10 questions where they will have to apply their knowledge of angles to create equations that represent the situation and solve.

Stage 3: Learning Plan

Learning Activities	**Resources**
Students should be given a variety of questions that require them to apply their knowledge of angles in creating an equation and solving it. White board practice so students can be guided. This standard addresses the idea of decomposing (breaking apart) an angle into smaller parts.	Instructional Resources/Tools Cardboard cut in strips to make an angle explorer Brass fasteners Angle ruler Protractor Angle explorers www.illustrativemathematics.org

Example: A lawn water sprinkler rotates 65 degrees and then pauses. It then rotates an additional 25 degrees. What is the total degree of the water sprinkler rotation? To cover a full 360 degrees how many times will the water sprinkler need to be moved? If the water sprinkler rotates a total of 25 degrees then pauses. How many 25 degree cycles will it go through for the rotation to reach at least 90 degrees?	www.illuminations.nctm.org

Differentiation Opportunities

Model different strategies.

Differentiated practice with a partner so students can problem solve and brainstorm ideas.

Provide differentiated worksheets with prompts provided on some, but the same questions on all.

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Unit Map 2012-2013

Monroe #2 - Orleans BOCES (Regional Collaboration)

Collaboration / Math 4* / Grade 4 (Math Regional Curriculum)

Wednesday, October 31, 2012, 10:39AM

Standard/Module: Proficiency in Geometry - 4.G.1 (Week 18, 5 Weeks)

Stage 1: Desired Results

Standards Focus

- Additional (10%) Connects with 4.G.2, 4.G.3, and 4.MD.3

4th Grade Proficiency Map.pdf

Standards

NYS: CCLS:Mathematics, NYS: 4th Grade , Geometry

4.G Draw and identify lines and angles, and classify shapes by properties of their lines and angles.

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

Enduring Understandings

1. Perpendicular lines meet to form a right angle.
2. Parallel lines are two straight lines that will never meet.
3. A right angle measures 90 degrees.
4. An acute angle measures less than 90 degrees.
5. An obtuse angle measures more than 90 degrees.
6. A straight angle measures 180 degrees.
7. Rays, angles, points, line segments, parallel lines, and perpendicular lines can be found in a variety of two-dimensional geometric objects.
8. Lines, line segments, rays, and angles are all created from points.

Essential Questions

1. What is the difference between perpendicular and parallel lines?
2. How are right, acute, obtuse, and straight angles different from one another?
3. How can we identify lines, points, line segments, rays, and angles in two-dimensional figures?
4. What is the difference between two-dimensional and three-dimensional objects?

Critical Content

1. Angle
2. Right angle
3. Acute angle
4. Obtuse angle
5. Line
6. Parallel line
7. Perpendicular line
8. Line segment
9. Ray
10. Point
11. Two-dimensional figure

12. Straight angle
13. Symmetry

Skills	Vocabulary
1. Students will draw points, lines (perpendicular, parallel), line segments, rays, angles (right, acute, obtuse). 2. Students will identify points, lines (perpendicular, parallel), line segments, rays, angles (right, acute, obtuse) in two-dimensional figures. 3. Students will classify shapes by the existence of lines of symmetry in sorting activities.	Tier 2: shapes, points, angles, identify Tier 3: classify, properties, lines, line segment, ray, right angle, acute angle, obtuse angle, parallel line, perpendicular line, two-dimensional figure, symmetry, three-dimensional object

Stage 2: Assessment Evidence

Assessments

Formative: Performance: Authentic Task

Students will be given a list of geometric terms (points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines) and then will be asked to draw a picture, which includes all geometric terms. Students will be given a choice to either present their picture to the class or write about their picture. Their presentation or written essay would have to explain where the geometric terms were drawn in their picture and explain the properties of each geometric term as well.

Stage 3: Learning Plan

Learning Activities	Resources
Have students identify points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines daily in the classroom setting. Students can and should make geometric distinctions about angles without measuring or mentioning	www.illustrativemathematics.org www.illuminations.nctm.org

degrees. Angles should be classified in comparison to right angles, such as larger than, smaller than or the same size as a right angle. Students can use the corner of a sheet of paper as a benchmark for a right angle. They can use a right angle to determine relationships of other angles. Students believe a wide angle with short sides may seem smaller than a narrow angle with long sides. Students can compare two angles by tracing one and placing it over the other. Students will then realize that the length of the sides does not determine whether one angle is larger or smaller than another angle. The measure of the angle does not change.	

Differentiation Opportunities

Tiered activities such as flash card practice with pictures and definitions, given a term have students draw it (perhaps students struggling can use their flash cards or notes), and given a picture have students identify certain terms (students struggling can again use flash cards or notes for support).

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Unit Map 2012-2013

Monroe #2 - Orleans BOCES (Regional Collaboration)

Collaboration / Math 4* / Grade 4 (Math Regional Curriculum)

Wednesday, October 31, 2012, 10:40AM

Standard/Module: Proficiency in Geometry - 4.G.2 (Week 18, 5 Weeks)

Stage 1: Desired Results

Standards Focus

- Additional (10%) Connects with 4.G.1 and 4.G.3

4th Grade Proficiency Map.pdf

Standards

NYS: CCLS:Mathematics, NYS: 4th Grade , Geometry

4.G Draw and identify lines and angles, and classify shapes by properties of their lines and angles.

- 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.

Enduring Understandings

1. The existence of parallel or perpendicular lines helps us to identify two-dimensional figures.
2. Two-dimensional figures can be classified by the presence or absence of acute, right, obtuse, and straight angles.
3. All right triangles will contain one right angle.
4. An isosceles right triangle contains a right angle along with two or more congruent sides.
5. A scalene right triangle contains a right angle and has no congruent sides.
6. An isosceles triangle has two congruent sides.
7. A scalene triangle has no congruent sides.

Essential Questions

1. What is a two-dimensional figure?
2. How do parallel and perpendicular lines help us to classify two-dimensional figures?
3. How does the presence or absence of acute, right, obtuse and straight angles help us identify two-dimensional figures?
4. How can we classify right triangles from other triangles?

Critical Content

1. Two-dimensional objects
2. Lines
3. Parallel lines
4. Perpendicular lines
5. Angle
6. Right angle
7. Triangle
8. Right triangle
9. Acute angle
10. Obtuse angle

11. Straight angle
12. Isosceles right triangle
13. Scalene right triangle
14. Congruent sides

Skills	Vocabulary
1. Students will classify two-dimensional figures by the presence or absence of parallel or perpendicular lines. 2. Students will classify two-dimensional figures by the presence or absence of angles of a specified size. 3. Students will identify right triangles by recognizing the right angle that can be found in every right triangle. 4. Students will recognize the difference between an isosceles right triangle and a scalene right triangle.	Tier 2: line, angle, triangle Tier 3: parallel line, perpendicular line, right angle, right triangle, two-dimensional, classify, isosceles, scalene, congruent

Stage 2: Assessment Evidence

Assessments

Formative: Written: Persuasive Essay

Students will be given four two- dimensional figures with a classification(name). Students will have to write a paragraph for each figure either defending the classification if they agree with how the figure was named according to the picture given. If students disagree with how the figure was classified they will have to re-name the figure and give supporting details as to why they are classifying the figure the way they did.

Stage 3: Learning Plan

Learning Activities	Resources
Two-dimensional shapes are classified based on relationships by the angles and sides. Students can determine if the sides are parallel or perpendicular, and classify accordingly. Characteristics of rectangles (including squares) are used to develop the concept of parallel and perpendicular lines. The characteristics and understanding of parallel and perpendicular lines are used to draw rectangles. Repeated experiences in comparing and contrasting	GeoGebra (a free software for learning and teaching); http://www.geogebra.com. www.illustrativemathematics.org www.illuminations.nctm.org

shapes enable students to gain a deeper understanding about shapes and their properties. Play the game, "What Am I?", where you describe characteristics of a special quadrilateral and have your students draw the quadrilateral based on the clues to help determine what the quadrilateral is. Divide class into groups and have each group create a poster with respect to a specific two-dimensional figure. Be specific with the criteria you would like to be on the poster and then have the groups present their poster to the class. This activity will hopefully reinforce properties of two-dimensional figures. Inquiry- based TI-Nspire activities or geometer sketchpad activities	

Differentiation Opportunities

Students may use transparencies with lines to arrange two lines in different ways to determine that the 2 lines might intersect in one point or may never intersect. Further investigations may be initiated using geometry software. These types of explorations may lead to a discussion on angles.

Differentiated group activities should be used to assess and give multiple practice activities to students at all developmental levels.

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Monroe #2 - Orleans BOCES (Regional Collaboration)

Collaboration / Math 4* / Grade 4 (Math Regional Curriculum)

Wednesday, October 31, 2012, 10:41AM

Standard/Module: Proficiency in Geometry - 4.G.3 (Week 18, 5 Weeks)

Stage 1: Desired Results

Standards Focus

- Additional (10%) Connects with 4.G.1 and 4.G.2

4th Grade Proficiency Map.pdf

Standards

NYS: CCLS:Mathematics, NYS: 4th Grade , Geometry

4.G Draw and identify lines and angles, and classify shapes by properties of their lines and angles.

- 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.

Enduring Understandings

1. A line of symmetry for a two-dimensional figure is a line across the figure such that the figure can be folded along the line into matching parts.
2. Our world has many symmetrical and non-symmetrical objects in it.
3. Art, Architecture, Construction, and Fashion deal with symmetry.

Essential Questions

1. What does a line of symmetry look like?
2. How can you tell if an object is symmetrical or not symmetrical?
3. How do you draw a line of symmetry?

Critical Content

1. Two-dimensional figure
2. Line of symmetry
3. Line-symmetric figures
4. Matching Parts
5. Symmetrical vs. Non-symmetrical
6. Regular/Non-regular polygons

Skills

1. Students will recognize lines of symmetry in two-dimensional figures.

Vocabulary

Tier 2: two-dimensional, line, figure

2. Students will identify line-symmetric figures. 3. Students will be able to draw lines of symmetry. 4. Students will be able to describe the difference between symmetrical and non-symmetrical two - dimensional figures.	Tier 3: symmetric, line of symmetry, non-symmetric, polygon, regular polygon

Stage 2: Assessment Evidence

Assessments

Formative: Other: Quiz

Students will be given 10 questions. Each question will have a two-dimensional figure drawn and students will be asked to draw the lines of symmetry.

Stage 3: Learning Plan

Learning Activities	Resources
When introducing line of symmetry, provide examples of geometric shapes with and without lines of symmetry. Shapes can be classified by the existence of lines of symmetry in sorting activities. This can be done informally by folding paper, tracing, creating designs with tiles or investigating reflections in mirrors. With the use of a dynamic geometric program, students can easily construct points, lines and geometric figures. They can also draw lines perpendicular or parallel to other line segments. Symmetry can be related to experiences in art	**Instructional Resources/Tools** Mirrors Geoboards GeoGebra (a free software for learning and teaching); http://www.geogebra.com. www.illustrativemathematics.org www.illuminations.nctm.org

Differentiation Opportunities

Students need experiences with figures which are symmetrical and non-symmetrical. Figures include both regular and non-regular polygons. Folding cut-out figures will help students determine whether a figure has one or more lines of symmetry.

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Monroe #2 - Orleans BOCES (Regional Collaboration)

Collaboration / Math 4* / Grade 4 (Math Regional Curriculum)

Wednesday, October 31, 2012, 10:41AM

Standard/Module: Proficiency in Fractions - 4.NF.1 (Week 23, 9 Weeks)

Stage 1: Desired Results

Standards Focus

- Major (70%) Connects with 4.NF.2

4th Grade Proficiency Map.pdf

Standards

NYS: CCLS:Mathematics, NYS: 4th Grade , Number & Operations—Fractions

4.NF Extend understanding of fraction equivalence and ordering.

- 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.

Enduring Understandings

1. Fraction a/b is equivalent to fraction (nxa)/(nxb).
2. The number and size of the parts of two fractions may differ, even though the two fractions themselves are the same size; equivalent fractions.
3. The identity property help find equivalent fractions.

Essential Questions

1. How do we know if fractions are equivalent?
2. What do equivalent fractions look like?
3. Can you explain why equivalent fractions may have different numbers in the numerators and denominators, but can represent the same quantity?

Critical Content

1. Fractions

- unit fractions (1/b)
- benchmark fractions (1/2, 1/3, 1/4, 3/4, 2/3)
- Numerator
- Denominator

2. Visual fraction models

- area models
- linear models(number lines)

5. Equivalent fractions

- **Must** multiply by one, in the form of b/b to get an equivalent fraction

Skills	Vocabulary
1. Students will use visual fraction models to explain why a fraction a/b is equivalent to a fraction (nxa)/(nxb). 2. By using the visual fraction models, students will recognize how the number and size of the parts differ even though the fractions themselves are the same size. 3. Students will recognize and generate equivalent fractions.	Tier 2: visual, differ Tier 3: fraction, fraction models, equivalent fractions, numerator, denominator

Stage 2: Assessment Evidence

Assessments

Formative: Other: Quiz

Given five fractions, students will be asked to generate an equivalent fraction and explain why they're equivalent in words or with models/drawings.

Stage 3: Learning Plan

Learning Activities	Resources
This standard refers to visual fraction models. This includes area models, linear models (number lines) or it could be a collection/set models. This standard extends the work in third grade by using additional denominators (5, 10, 12, and 100). Students can use visual models or applets to generate equivalent fractions.	www.illustrativemathematics.org www.illuminations.nctm.org Technology Connection: http://illuminations.nctm.org/activitydetail.aspx?id=80

Differentiation Opportunities

Activities and assignments can be tiered regarding difficulty level.

Assignments and activities will need tiered levels of support as well. For example, manipulatives can be used in class and prompts and reminders can be on some students' papers.

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Monroe #2 - Orleans BOCES (Regional Collaboration)

Collaboration / Math 4* / Grade 4 (Math Regional Curriculum)

Wednesday, October 31, 2012, 10:42AM

Standard/Module: Proficiency in Fractions - 4.NF.2 (Week 23, 9 Weeks)

Stage 1: Desired Results

Standards Focus

- Major (70%) Connects with 4.NF.1

4th Grade Proficiency Map.pdf

Standards

NYS: CCLS:Mathematics, NYS: 4th Grade , Number & Operations—Fractions

4.NF Extend understanding of fraction equivalence and ordering.

- 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

Enduring Understandings

1. Fractions with different numerators and denominators can be compared.
2. Comparisons are valid only when the two fractions refer to the same whole.
3. In order to compare fractions common denominators need to be found or visual fraction models can be used.

Essential Questions

1. How do we compare two fractions with different numerators and different denominators?
2. How do we find a common denominator?
3. What are some ways that we can justify our conclusions when comparing fractions?
4. How can benchmark fractions help you compare fractions?

Critical Content

1. Fraction
2. Numerator
3. Denominator
4. Common denominators and numerators
5. Benchmark fractions
6. Visual fraction models(Focus should be here)
7. Comparing fractions

- use symbols <, >, = to compare

Skills

Vocabulary

1. Students will compare two fractions with different numerators and different denominators by creating common denominators or numerators. 2. Students will compare two fractions with different numerators and different denominators by comparing to a benchmark fraction such as ½. 3. Students will recognize that comparisons are valid only when the two fractions refer to the same whole. 4. Students will record the comparisons using greater than, less than, or equal to symbols and justify the conclusions; ex. using a visual fraction model. 5. Students will draw fraction models to help them compare and use reasoning skills based on fraction benchmarks.	Tier 2: compare, fractions, symbols, visual fraction model Tier 3: numerator, denominator, common denominators and numerators, benchmark fraction, valid, conclusion, greater than, less than, equal, justify

Stage 2: Assessment Evidence

Assessments

Formative: Other: Quiz

Students will be given 5 word problems involving comparing fractions with unlike denominators. Students will be asked to find the answer by making model drawings.

Stage 3: Learning Plan

Learning Activities	Resources
Students should use models to compare two fractions with different denominators by creating common denominators or numerators. The models should be the same (both fractions shown using fraction bars or both fractions using circular models) so that the models represent the same whole. The models should be represented in drawings. Students should also use **benchmark fractions** such as 1/2 to compare two fractions and explain their reasoning. The result of the comparisons should be recorded using >, < and = symbols.	www.illustrativemathematics.org www.illuminations.nctm.org

Students think that when generating equivalent fractions they need to multiply or divide either the numerator or denominator, such as, changing 1/2 to sixths. They would multiply the denominator by 3 to get 1/6, instead of multiplying the numerator by 3 also. Their focus is only on the multiple of the denominator, not the whole fraction. It's important that students use a fraction in the form of **one** such as 3/3 so that the numerator and denominator do not contain the original numerator or denominator.	

Differentiation Opportunities

Model different strategies.

Differentiated practice with a partner so students can problem solve and brainstorm ideas.

Provide differentiated worksheets with prompts provided on some, but the same questions on all.

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Monroe #2 - Orleans BOCES (Regional Collaboration)

Collaboration / Math 4* / Grade 4 (Math Regional Curriculum)

Wednesday, October 31, 2012, 10:43AM

Standard/Module: Proficiency in Fractions - 4.NF.3 (Week 23, 9 Weeks)

Stage 1: Desired Results

Standards Focus

- Major (70%) Connects with 4.NF.4

4th Grade Proficiency Map.pdf

Standards

NYS: CCLS:Mathematics, NYS: 4th Grade , Number & Operations—Fractions

4.NF Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.

- 3. Understand a fraction a/b with a > 1 as a sum of fractions 1/b.
- 3a. Understand addition and subtraction of fractions as joining and separating parts referring to the same whole.
- 3b. Decompose a fraction into a sum of fractions with the same denominator in more than one way, recording each decomposition by an equation. Justify decompositions, e.g., by using a visual fraction model.
- 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.
- 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.

Enduring Understandings

1. Addition and subtraction of fractions is the joining and separating of parts referring to the same whole.
2. A fraction can be decomposed into a sum of fractions with the same denominator.
3. Mixed numbers with like denominators can be added together by using equivalent fractions, properties of operations, and knowing the relationship between addition and subtraction.
4. Word problems involving addition and subtraction of fractions referring to the same whole and having like denominators, can be solved by using visual fraction models and equations to represent each problem.

Essential Questions

1. How is the addition and subtraction of fractions related when referring to the same whole?
2. What are the different ways that we can decompose a fraction into a sum of fractions with the same denominator?
3. What does it mean to "decompose" a fraction?
4. How do we add and subtract mixed numbers with like denominators?
5. How can we solve word problems involving the addition and subtraction of fractions with like denominators referring to the same whole?

Critical Content

1. Fractions

- unit fractions (1/b)
- non unit fractions (a/b)
- numerator/denominator
- part/whole
- equivalent fractions
- identity property to find equivalent fractions

2. Addition of fractions

- key word -" sum"
- decompose, represent with equation
- justify decompositions using visual models

3. Mixed Numbers

- conversion from mixed numbers to improper fractions
- add/subtract mixed numbers with like denominators with and without converting mixed numbers to improper fractions

4. Strategies for solving word problems

- translation of key words from words to symbols
- visual models
- algorithms
- properties of operations
- equations

Skills	**Vocabulary**
1. Students will understand that a fraction a/b with a greater than 1, is a sum of fractions 1/b. 2. Students will realize that the addition and subtraction of fractions involves the joining and separating of parts referring to the same whole. 3. Students will decompose a fraction into a sum of fractions with the same denominator in more than one way. 4. Students will record each decomposition using an equation. 5. Students will justify decompositions through using a visual fraction model or a variety of other methods. 6. Students will add and subtract mixed numbers with like denominators utilizing a variety of methods: by replacing each mixed number with an equivalent fraction, using properties of operations and the relationship between addition and subtraction.	Tier 2: fraction, addition, subtraction, word problems, numerator, denominator, visual fraction model, whole Tier 3: sum, joining, separating, mixed numbers, like denominators, properties, operations, relationship, decompose, justify, equivalent fractions

Stage 2: Assessment Evidence

Assessments

Formative: Other: Quiz
Students will be given 10 word problems that will involve decomposing fractions into a sum of fractions with the same denominator and adding and subtracting mixed numbers with like denominators. Students will be required to write an equation as well as a visual model to support their answers.

Stage 3: Learning Plan

Learning Activities	Resources
A fraction with a numerator of one is called a **unit fraction.** When students investigate fractions other than unit fractions, such as 2/3, they should be able to decompose the non-unit fraction into a combination of several unit fractions. Example: 2/3 = 1/3 + 1/3 Being able to visualize this decomposition into unit fractions helps students when adding or subtracting fractions. Students need multiple opportunities to work with mixed numbers and be able to decompose them in more than one way. Students may use visual models to help develop this understanding. **Example:**	www.illustrativemathematics.org www.illuminations.nctm.org fraction tiles

1 ¼ - ¾ = 4/4 + ¼ = 5/4 5/4 – ¾ = 2/4 or ½ Mixed numbers are introduced for the first time in Fourth Grade. Students should have ample experiences of adding and subtracting mixed numbers where they work with mixed numbers or convert mixed numbers into improper fractions. Keep in mind **Concrete-Representation-Abstract (CRA)** approach to teaching fractions. Students need to be able to show their thinking using concrete and/or representations BEFORE they move to abstract thinking.	

Differentiation Opportunities

Differentiated group activities should be used to assess and give multiple practice activities to students at all developmental levels.

Use tiered lessons. Break your lesson up into two or three levels of difficulty, with the lowest level being the minimum requirement for your grade level. Assign students to the level of difficulty you feel is best for them, or allow them to try a few problems from each level to find their best fit. Each student needs to complete just one of the three levels to officially complete the assignment.

Use technology. Many online games are easy to differentiate, as they offer a variety of levels of gameplay. You can assign the proper level to your students or once again allow the students to find their level of best fit.

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Unit Map 2012-2013

Monroe #2 - Orleans BOCES (Regional Collaboration)

Collaboration / Math 4* / Grade 4 (Math Regional Curriculum)

Wednesday, October 31, 2012, 10:43AM

Standard/Module: Proficiency in Fractions - 4.NF.4 (Week 23, 9 Weeks)

Stage 1: Desired Results

Standards Focus

- Major (70%) Connects with 4.NF.3 and 4.MD.4

4th Grade Proficiency Map.pdf

Standards

NYS: CCLS:Mathematics, NYS: 4th Grade , Number & Operations—Fractions

4.NF Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.

- 4. Apply and extend previous understandings of multiplication to multiply a fraction by a whole number.
- 4a. Understand a fraction a/b as a multiple of 1/b.
- 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.
- 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.

Enduring Understandings

1. A fraction a/b is a multiple of 1/b.
2. You can multiply a fraction by a whole number by using visual fraction models and knowing that n x (a/b) = (n x a)/b.
3. Word problems involving multiplication of a fraction by a whole number can be solved by using visual fraction models and equations to represent each problem.

Essential Questions

1. How do we multiply a fraction by a whole number?
2. How do we use visual fraction models to help us solve word problems involving multiplication of a fraction by a whole number?
3. How do we write an equation to represent a word problem that involves multiplication of a fraction by a whole number?

Critical Content

1. Multiplication

- review multiples
- review fraction vs. whole number
- apply multiple concept with fractions

2. Word Problems

- translation/interpretation of problem
- Visual fraction model

- Equation

Skills	Vocabulary
1. Students will apply and extend previous understandings of multiplication to multiply a fraction by a whole number. 2. Students will understand that a fraction a/b is a multiple of 1/b. For example, 5/4 equals 5 x 1/4. 3. Students will apply the understanding that a multiple of a/b is a multiple of 1/b to multiply a fraction by a whole number. For example, 3 x 2/5 can be expressed as 6 x 1/5 with a product of 6/5. (n x (a/b)) = (n x a)/b. 4. Students will solve word problems involving multiplication of a fraction by a whole number by using visual fraction models and equations to represent the problem.	Tier 2: multiplication, fraction, whole number, word problem Tier 3: multiple, visual fraction model, equation

Stage 2: Assessment Evidence

Assessments

Formative: Other: Quiz

Students will be given 10 word problems involving multiplication of a fraction by a whole number. Students will be asked to solve the word problem by using visual fraction models and equations.

Stage 3: Learning Plan

Learning Activities	Resources
Students need many opportunities to work with problems in context to understand the connections between models and corresponding equations. Contexts involving a whole number times a fraction lend	www.illustrativemathematics.org www.illuminations.nctm.org

themselves to modeling and examining patterns. This standard builds on students' work of adding fractions and extending that work into multiplication.	

Differentiation Opportunities

Station activity with tiered level stations.

Appropriate hints or promting on assignments.

Guided practice using white boards

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Monroe #2 - Orleans BOCES (Regional Collaboration)

Collaboration / Math 4* / Grade 4 (Math Regional Curriculum)

Wednesday, October 31, 2012, 10:44AM

Standard/Module: Proficiency in Measurement/Data - 4.MD.4 (Week 23, 9 Weeks)

Stage 1: Desired Results

Standards Focus

- Supporting (20%) Connects with 4.NF.3d

4th Grade Proficiency Map.pdf

Standards

NYS: CCLS:Mathematics, NYS: 4th Grade , Measurement & Data

4.MD Represent and interpret data.

- 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.

Enduring Understandings

1. A line plot can represent a data set of measurements in fractions of a unit (1/2, ¼, 1/8).
2. Information presented in line plots can be used to solve problems involving the addition and subtraction of fractions based on the data in the line plot.

Essential Questions

1. How do we display a data set of measurements in fractions of a unit?
2. How do we create a line plot?
3. How do we use the information presented on a line plot to solve problems involving the addition and subtraction of fractions?

Critical Content

1. Line plot

- Know steps in creating a line plot using a data set of measures in unit fractions
- Need to be able to use information from line plot to answer problems

2. Problems involving:

- Addition of fractions
- Subtraction of fractions

Skills	Vocabulary
1. Students will generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. 2. Students will display the data by making a line plot , where the horizontal scale is marked off in appropriate units – whole numbers, halves, or quarters. 3. Students will solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators by using visual fraction models and equations to represent the problem.	Tier 2: fraction, addition, subtraction, measurement Tier 3: line plot, display, data, unit

Stage 2: Assessment Evidence

Assessments

Formative: Performance: Skill Demonstration

Students measure objects in their desk to the nearest ½, ¼, or 1/8 inch. They display their data collected on a line plot. They answer how many objects measured ¼ inch? ½ inch? They also answer the question,"If you put all the objects together end to end what would be the total length of **all** the objects?"

Stage 3: Learning Plan

Learning Activities	Resources
This standard provides a context for students to work with fractions by measuring objects to an eighth of an inch. Students are making a line plot of this data and then adding and subtracting fractions based on data in the line plot. Have students create line plots with fractions of a unit (1/2, 1/4 , 1/8) and plot data showing multiple data points for each fraction. <u>Pose questions that students may answer, such as:</u>	**Instructional Resources/Tools** Fraction bars or strips Number Lines www.illustrativemathematics.org www.illuminations.nctm.org

• "How many one-eighths are shown on the line plot?" Expect two one-eighths as the answer. Then ask, "What is the total of these two one-eighths?" Encourage students to count the fractional numbers as they would with whole-number counting, but using the fraction name. • "What is the total number of inches for insects measuring 3/8 inches?" Students can use skip counting with fraction names to find the total, such as, three-eighths, six-eighths, nine-eighths. The last fraction names the total. Students should notice that the denominator did not change when they were saying the fraction name. Have them make a statement about the result of adding fractions with the same denominator. • "What is the total number of insects measuring 1/8 inch or 5/8 inches?" Have students write number sentences to represent the problem and solution such as, 1/8 + 1/8 + 5/8 = 7/8 inches. Use visual fraction strips and fraction bars to represent problems to solve problems involving addition and subtraction of fractions.	

Differentiation Opportunities

Differentiate activities and assignments by interest, ability-level, and hints/prompts.

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Unit Map 2012-2013

Monroe #2 - Orleans BOCES (Regional Collaboration)

Collaboration / Math 4* / Grade 4 (Math Regional Curriculum)

Wednesday, October 31, 2012, 10:44AM

Standard/Module: Proficiency in Fractions - 4.NF.5 (Week 32, 4 Weeks)

Stage 1: Desired Results

Standards Focus

- Major (70%) Connects with 4.NF.6, 4.NF.7. 4.NF.1, and 4.NF.2

4th Grade Proficiency Map.pdf

Standards

NYS: CCLS:Mathematics, NYS: 4th Grade , Number & Operations—Fractions

4.NF Understand decimal notation for fractions, and compare decimal fractions.

- 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.

Enduring Understandings

1. A fraction with a denominator of 10 can be expressed as an equivalent fraction with a denominator of 100.
2. Two fractions with respective denominators of 10 and 100 can be added together using the equivalent fraction technique.

Essential Questions

1. How do we express a fraction with a denominator of 10 as an equivalent fraction with a denominator of 100?
2. How can we apply the equivalent fraction technique to add two fractions with respective denominators of 10 and 100?

Critical Content

1. Fraction

- numerator/denominator
- denominator of 10, denominator of 100
- equivalent fraction

2. Addition of fractions with denominators of 10 and 100

- Find common denominator
- Find equivalent fractions using identity
- Use algorithm to add fractions

Skills

1. Students will express a fraction with a denominator of 10 as an equivalent fraction

Vocabulary

Tier 2: fraction, denominator

with a denominator of 100. 2. Students will be able to add two fractions with respective denominators of 10 and 100. For example, express 3/10 as 30/100, and add 3/10 + 4/100 = 34/100.	Tier 3: express, equivalent fraction, technique

Stage 2: Assessment Evidence

Assessments

Formative: Other: Quiz

Students will be given a quiz that has 5 questions where they will be given a fraction with a denominator of 10 and they will have to express an equivalent fraction with a denominator of 100. The next 5 questions will involve adding fractions that have denominators of 10 and 100.

Stage 3: Learning Plan

Learning Activities	Resources
This standard continues the work of equivalent fractions by having students change fractions with a 10 in the denominator into equivalent fractions that have a 100 in the denominator. In order to prepare for work with decimals (4.NF.6 and 4.NF.7), experiences that allow students to shade decimal grids (10x10 grids) can support this work. **Student experiences should focus on working with grids rather than algorithms.** Students can also use base ten blocks and other place value models to explore the relationship between fractions with denominators of 10 and denominators of 100. This work in fourth grade lays the foundation for performing operations with decimal numbers in fifth grade. It is important that students make connections	**Instructional Resources/Tools** Length or area models 10 x 10 square on a grid Decimal place-value mats Base-ten blocks Number lines Nctm.org (Illuminations): *A Meter of Candy* – In this series of three hands-on activities, students develop and reinforce their understanding of hundredths as fractions, decimals and percentages. Students explore with candy pieces as they physically make and connect a set and linear model (meter) to produce area models (grids and pie graphs). At this time, students are not to do percents. The relationships among fractions, decimals and percents are developed in Grade 6. www.illustrativemathematics.org

between fractions and decimals. They should be able to write decimals for fractions with denominators of 10 or 100. Have students say the fraction with denominators of 10 and 100 aloud. Also, have students represent decimals in word form with digits and the decimal place value, such as 4/10 would be 4 tenths. When comparing two decimals, remind students that as in comparing two fractions, the decimals need to refer to the same whole. Allow students to use visual models to compare two decimals. They can shade in a representation of each decimal on a 10 x 10 grid. The 10 x 10 grid is defined as one whole. The decimal must relate to the whole.	

Differentiation Opportunities

Students should be given different manipulatives to help them see the relationship between fractions that have a denominator of 10 and 100. These manipulatives should be made available for students who need extra support.

Tiered guided activities should be created.

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Unit Map 2012-2013

Monroe #2 - Orleans BOCES (Regional Collaboration)

Collaboration / Math 4* / Grade 4 (Math Regional Curriculum)

Wednesday, October 31, 2012, 10:45AM

Standard/Module: Proficiency in Fractions - 4.NF.6 (Week 32, 4 Weeks)

Stage 1: Desired Results

Standards Focus

- Major (70%) Connects with 4.NF.5 and 4.NF.7

4th Grade Proficiency Map.pdf

Standards

NYS: CCLS:Mathematics, NYS: 4th Grade , Number & Operations—Fractions

4.NF Understand decimal notation for fractions, and compare decimal fractions.

- 6. Use decimal notation for fractions with denominators 10 or 100

Enduring Understandings

1. Fractions with a denominator of 10 or 100 can be expressed as decimals.
2. Connections should be made with place value between representing a fraction with a denominator of 100 and 10 and reading the fraction as a decimal.
3. All decimals can be found on a number line.

Essential Questions

1. How do you write fractions with a denominator of 10 or 100 as a decimal?
2. Where do you place a decimal on the number line?
3. What is the connection between fractions with denominators of 10 and 100 and how you read or say these numbers as a decimal?

Critical Content

1. Fraction

- Denominator
- creating equivalent fractions that have denominators of 10 and 100

2. Decimal notation

- Represent fractions as decimals
- Use Number line diagrams to see connections

Skills

1. Students will be able to use decimal notation to represent fractions with denominators of 10 or 100.
2. Students will be able to locate a decimal up to

Vocabulary

Tier 2: fraction, denominator

the hundredths place on a number line.	Tier 3: decimal, decimal notation, number line diagram

Stage 2: Assessment Evidence

Assessments

Formative: Other: Quiz

Students will be given a quiz with 10 questions. The 10 questions will basically ask students to write an equivalent decimal for the given fraction. All fractions will have a denominator of 10 or 100.

Stage 3: Learning Plan

Learning Activities	Resources
Students make connections between fractions with denominators of 10 and 100 and the place value chart. By reading fraction names, students say 32/100 as thirty-two hundredths and rewrite this as 0.32. Students use the representations explored in 4.NF.5 to understand 32/100 can be expanded to 3/10 and 2/100. Students represent values such as 0.32 or 32/100 on a number line. 32/100 is more than 30/100 (or 3/10) and less than 40/100 (or 4/10). It is closer to 30/100 so it would be placed on the number line near that value.	www.illustrativemathematics.org www.illuminations.nctm.org **Instructional Resources/Tools** Length or area models 10 x 10 square on a grid Decimal place-value mats Base-ten blocks Number lines

Differentiation Opportunities

Manipulatives should be made available to help support students.

Tiered activities and assignments.

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Monroe #2 - Orleans BOCES (Regional Collaboration)

Collaboration / Math 4* / Grade 4 (Math Regional Curriculum)

Wednesday, October 31, 2012, 10:46AM

Standard/Module: Proficiency in Fractions - 4.NF.7 (Week 32, 4 Weeks)

Stage 1: Desired Results

Standards Focus

- Major (70%) Connects with 4.NF.5 and 4.NF.6

4th Grade Proficiency Map.pdf

Standards

NYS: CCLS:Mathematics, NYS: 4th Grade , Number & Operations—Fractions

4.NF Understand decimal notation for fractions, and compare decimal fractions.

- 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

Enduring Understandings

1. Two decimals to the hundredths place can be compared by reasoning about their size.
2. Comparisons are valid only when the decimals refer to the same whole.
3. Decimals to the hundredths place can be compared by using the symbols > , < , or =.

Essential Questions

1. How do you compare two decimals to the hundredths

place?

2. Is the value of a decimal linked to the number of digits

to the right of the decimal?

Critical Content

Decimals

- Tenths
- Hundredths
- Compare by size referring to same whole
- Record results using > , < , = symbols

Conclusions

- Written Justifications and model justifications
- Visual model/area models

Skills

1. Students will compare two decimals to the

Vocabulary

hundredths by reasoning about their size. 2. Students will recognize that comparisons are valid only when the two decimals refer to the same whole. 3. Students will record the results of comparisons of decimals up to the hundredths place using the symbols > , < , and =. 4. Students will justify the conclusions of their comparisons by using a visual model.	Tier 2: compare, symbol, whole Tier 3: hundredths, tenths, reasoning, valid , conclusions, justify, visual model

Stage 2: Assessment Evidence

Assessments

Formative: Other: Quiz

Students will be given 10 questions where they will be asked to compare two decimals to hundredths by reasoning about their size. Students will need to record their answers with the symbols >, =, or <, and they will also have to justify their conclusions using a visual model.

Stage 3: Learning Plan

Learning Activities	Resources
Students build area and other models to compare decimals. Through these experiences and their work with fraction models, they build the understanding that comparisons between decimals or fractions are only valid when the whole is the same for both cases. **Common Misconception:** Students treat decimals as whole numbers when making comparison of two decimals. They think the longer the number, the greater the value. For example, they think that .03 is greater than 0.3.	www.illustrativemathematics.org www.illuminations.nctm.org **Instructional Resources/Tools** Length or area models 10 x 10 square on a grid Decimal place-value mats Base-ten blocks Number lines

Differentiation Opportunities

Provide models/pictures to help students compare decimals.

Use money as a way to compare decimals.

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