Los Angeles Unified School District
Office of Curriculum, Instruction and School Support

COURSE DESCRIPTION

Common Core Math 6 Tutorial Lab is designed to provide foundational knowledge and intervention for students enrolled in or preparing to enroll in *Common Core Math 6*. This course serves not only as intervention, but also as support for students experiencing difficulty in mastering the core standards and academic language constraints of the *Common Core Math 6* course. *Common Core Math 6 Tutorial Lab* is an elective mathematics course provided to students as a supplemental course to enhance the student's knowledge of prerequisite skills and academic language that is required in order to successfully access the standards-based *Common Core Math 6* course.

COURSE SYLLABUS

The structure of this course is divided into four separate, but coherent, units mirroring the *Common Core Math 6* course. Additionally, **an immense element of this intervention course is an emphasis on student engagement with the Standards for Mathematical Practice on a daily basis.** Students enrolled in this intervention course **need to be assessed** on an ongoing basis to determine their needs for support and intervention. Teachers are encouraged to adapt their instruction through ongoing formative assessments to provide genuine, differentiated instruction. The outcome of the initial and ongoing assessments are to analyze and identify key skills and concepts required for students to access the Common Core State Standards, compare those requirements to the student's existing skill set, and analyze any potential student deficits.

The goal of this intervention course is to support *Common Core Math 6* and to provide explicit, systematic, and intensive instruction for at-risk populations. As teachers strive to assist struggling students to reach the Common Core State Standards' expectations, they must be able to accurately identify areas of student deficit and match students to an appropriate academic intervention plan. An expectation from the *Common Core Math 6 Tutorial Lab* is to create evidence-based intervention plans that are customized to individual students, and that are also tied to specific Common Core Standards.

According to the California CCSS Mathematics Framework (November 2013),

> "Universal Access in education is a concept which utilizes strategies for planning for the widest variety of learners from the beginning of the lesson design and not 'added on' as an afterthought. Universal Access is not a set of curriculum materials or specific time set aside for additional assistance but rather a schema. For students to benefit from universal access, teachers may need assistance in planning instruction, differentiating curriculum, infusing Specially Designed Academic Instruction in English (SDAIE) techniques, using the California English Language Development Standards (CA ELD standards), and using grouping strategies effectively."

Therefore, through careful planning for modifying curriculum, instruction, grouping, and assessment techniques, teachers are well prepared to adapt instruction to meet the needs of diverse learners in their classrooms.

RATIONALE FOR SELECTED STANDARDS TO SUPPORT CC MATH 6

In analyzing the 6th Grade Common Core State Standards listed in the LAUSD Curriculum Maps, the standards that were selected for this course are based on prerequisite standards needed to successfully master the Common Core State Standards for 6th Grade mathematics. The objective is to support students transitioning from the 1997 California Content Standards to the Common Core State Standards and to help ensure success in CC Math 6.

Standards that have been added to the 6th grade with this transition include: unit rate; measurement unit conversions; opposite and absolute values on the number line; vertical and horizontal distances on the coordinate plane; the distributive property and factoring; the introduction of independent and dependent variables; volume of right rectangular prisms with fractional edges; surface area with nets; dot plots; histograms; box plots; and statistical variability.

MULTI-TIER MATHEMATICS INTERVENTIONS

Gersten et. al. (2009) in the Practice Guide "Assisting Students Struggling with Mathematics: RtI for Elementary and Middle School" presented evidence for the effectiveness of combinations of systematic and explicit instruction that include teacher demonstrations and think alouds early in the lesson, unit, or module; student verbalization of how a problem was solved; scaffolded practice; and immediate corrective feedback. In instruction that is systematic, concepts are introduced in a logical, coherent order and students have many opportunities to apply each concept. Below are the recommendations (Recommendations 3 and 4 received strong evidence rating).

Recommendation 1. Screen all students to identify those at risk for potential mathematics difficulties and provide interventions to students identified as at risk. *It is suggested that you use any of the following instruments to screen students: MDTP, Scholastic Math Inventory, Easy CMB, etc.*

Recommendation 2. Instructional materials for students receiving interventions should focus intensely on in-depth treatment of whole numbers in kindergarten through grade 5 and on rational numbers in grades 4 through 8. These materials should be selected by committee.

Recommendation 3. Instruction during the intervention should be explicit and systematic. This includes providing models of proficient problem solving, verbalization of thought processes, guided practice, corrective feedback, and frequent cumulative review.

Recommendation 4. Interventions should include instruction on solving word problems that is based on common underlying structures. *Teachers may consider using some of the strategies in "Improving Mathematical Problem Solving in Grades 4 Through 8" in teaching students problem solving*.

Recommendation 5. Intervention materials should include opportunities for students to work with visual representations of mathematical ideas and interventionists should be proficient in the use of visual representations of mathematical ideas.

Recommendation 6. Interventions at all grade levels should devote about 10 minutes in each session to building fluent retrieval of basic arithmetic facts.

Recommendation 7. Monitor the progress of students receiving supplemental instruction and other students who are at risk.

Unit 1 **Using Concepts of Rate and Ratio to Solve Problems**		
Concepts/Clusters	**Prerequisite Standards to Support CC Math 6**	**Suggested Resources**
Understand ratio concepts and use ratio reasoning to solve problems.	**4.OA.2:** Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison. **4.MD.1:** Know relative sizes of measurement units within one system of units including km, m, cm; kg, g; lb, oz.; l, ml; hr, min, sec. Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. Record measurement equivalents in a two-column table. *For example, know that 1 ft is 12 times as long as 1 in. Express the length of a 4 ft snake as 48 in. Generate a conversion table for feet and inches listing the number pairs (1, 12), (2, 24), (3, 36), ...* **5.NF.5:** Interpret multiplication as scaling (resizing),	1. **Illustrative Mathematics:** Comparing Money Raised https://www.illustrativemathematics.org/illustrations/263 2. **EngageNY:** Unit Conversion and Problem Solving with Metric Measurement https://www.engageny.org/sites/default/files/resource/attachments/math-g4-m2-full-module.pdf 3. **LearnNC:** Does One Cup of Anything Weigh the Same? http://www.learnnc.org/?standards=Mathematics--Grade_4--Measurement_and_Data 4. **Illustrative Mathematics:** Running a Mile https://www.illustrativemathematics.org/illustrations/22 5. **EngageNY:** Multiplication and Division of Fractions and Decimal Fractions https://www.engageny.org/sites/default/files/resource/attachments/math-g5-m4-full-module.pdf 6. **NCTM Illuminations:** *Exploring Equal Sets* http://illuminations.nctm.org/LessonDetail.aspx?ID=L317 7. **NCTM Illuminations:** *Finding Products*

Concepts/Clusters	Prerequisite Standards to Support CC Math 6	Suggested Resources
	by: a. Comparing the size of a product to the size of one factor on the basis of the size of the other factor, without performing the indicated multiplication. b. Explaining multiplying a given number by a fraction greater than 1 results in a product greater than the given number (recognizing multiplication by whole numbers greater than 1 as a familiar case); explaining why multiplying a given number by a fraction less than 1 results in a product smaller than the given number; and relating the principle of fraction equivalence $a/b = (n \times a)/(n\ b)$ to the effect of multiplying a/b by 1. **5.NF.3:** Interpret a fraction as division of the numerator by the denominator ($a/b = a \div b$). Solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers, e.g., by using visual fraction models or equations to represent the problem. *For example, interpret 3/4 as the result of dividing 3 by 4, noting that 3/4 multiplied by 4 equals 3, and that when 3 wholes are shared equally among 4 people each person has a share of size 3/4. If 9*	http://illuminations.nctm.org/LessonDetail.aspx?ID=L528 8. **NCTM Illuminations:** *Hopping on the Number Line* http://illuminations.nctm.org/LessonDetail.aspx?ID=L316 9. **NCTM Illuminations:** *Keeping It All Together* http://illuminations.nctm.org/LessonDetail.aspx?ID=L329 10. **NCTM Illuminations:** *Multiplication Stories* http://illuminations.nctm.org/LessonDetail.aspx?ID=L529 11. **NCTM Illuminations:** *Problem Solving Tasks* http://illuminations.nctm.org/Lessons/Architect/Architect-AS-ProbSolvTasks.pdf

Concepts/Clusters	Prerequisite Standards to Support CC Math 6	Suggested Resources
	people want to share a 50-pound sack of rice equally by weight, how many pounds of rice should each person get? Between what two whole numbers does your answer lie? **5.NF.7:** Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions.	

Examples of Essential Questions for Unit 1	Standards for Mathematical Practice
1. How might comparisons help us to problem solve? 2. How is a ratio different from a fraction? 3. Why is a unit rate important for solving problems? 4. Why does each mathematical operation (addition, subtraction, multiplication, division) have an opposite? 5. Why might division be the opposite of multiplication? 6. How might division be used to help to solve multiplication problems? 7. In what ways might a division problem look different but still remain the same? 8. How might someone use rate and ratio in real world situations?	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.

Performance Objectives for Unit 1 *Students will grow in their ability to:*	*Guiding Questions for Implementing Standards for Mathematical Practices #1 and #2
1. Compare and describe situations that involve multiplicative comparison. 2. Multiply and/or divide to solve word problems. 3. Determine and use a variety of representations to model problems that involve multiplicative comparison. 4. Translate comparative situations into equations with an unknown and solve.	1. How might you describe this problem in your own words? 2. What are some other problems that are similar to this problem? 3. What do you notice about …? 4. What information is given in the problem? 5. Share with me the steps you've used up to this point. 6. What are some other strategies you might try? 7. Which steps in the process are you confident about?

Performance Objectives for Unit 1 *Students will grow in their ability to:*	***Guiding Questions for Implementing** **Standards for Mathematical Practices #1 and #2**
5. Compare different units of measure within the same system. 6. Convert large units of measurement into smaller units of measurement (in the same system) 7. Use a t-chart to convert larger units into smaller units. 8. Analyze how numbers are changed when multiplied by fractions. 9. Know that scaling (resizing) involves multiplication. 10. Compare the size of a product to the size of one factor 11. Draw pictures to model situations of scaling. 12. Interpret a fraction as division of the numerator by the denominator. 13. Interpret the remainder of a solution as a fractional part of the problem. 14. Know and understand the relationship between multiplication and division.	8. Describe what you have already tried. What might you change? 9. Describe the relationship between the two figures. 10. How is … related to …? 11. What is the relationship between … and …? 12. What properties might we use to find a solution? 13. How did you come to the decision that you needed to use …? 14. What might the numbers used in the problem represent? 15. What does this (figure, symbol, quantity, etc.) mean to you?

Unit 2
Extending the Understanding of the Number System

Concepts/Clusters	**Prerequisite Standards to Support CC Math 6**	**Suggested Resources**
Apply and extend previous understandings of multiplication and division to divide fractions by fractions.	**5.NF.4:** Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction. a. Interpret the product $(a/b) \times q$ as a parts of a partition of q into b equal parts; equivalently, as the result of a sequence of operations $a \times q \div b$. *For example, use a visual fraction model to show $(2/3) \times 4 = 8/3$, and create a story context for this equation. Do the same with $(2/3) \times (4/5) = 8/15$. (In general, $(a/b) \times (c/d) = ac/bd$.)*	1. **Illustrative Mathematics:** Conner and Makayla Discuss Multiplication https://www.illustrativemathematics.org/illustrations/321 2. **Illustrative Mathematics:** Folding Strips of Paper https://www.illustrativemathematics.org/illustrations/965 3. **NYCDOE:** Time For Recess http://schools.nyc.gov/NR/rdonlyres/B8B8BDAD-2EF2-4BF8-AE93-114C48B563E2/130938/NYCDOEG5Math_TimeforRecess_Final.pdf 4. **Fraction Bars:** Multiplying Fractions http://fractionbars.com/CommonCore/Gd5Les/CCSSMultiStep3Gd5.pdf

Concepts/Clusters	Prerequisite Standards to Support CC Math 6	Suggested Resources
	b. Find the area of a rectangle with fractional side lengths by tiling it with unit squares of the appropriate unit fraction side lengths, and show that the area is the same as would be found by multiplying the side lengths. Multiply fractional side lengths to find areas of rectangles, and represent fraction products as rectangular areas.	5. **Inside Mathematics:** Party Time – Level B http://www.insidemathematics.org/assets/problems-of-the-month/party%20time.pdf
Compute fluently with multi-digit numbers and find common factors and multiples.	**5.NBT.5:** Fluently multiply multi-digit whole numbers using the standard algorithm. **5.NBT.6:** Find whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models. **5.NBT.7:** Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.	6. **Illustrative Mathematics:** Through the Grapevine http://www.insidemathematics.org/assets/problems-of-the-month/through%20the%20grapevine.pdf 7. **Illustrative Mathematics:** The Value of Education https://www.illustrativemathematics.org/illustrations/1293 8. **Illustrative Mathematics:** Elmer's Multiplication Error https://www.illustrativemathematics.org/illustrations/1812 9. **Illustrative Mathematics:** Minutes and Days https://www.illustrativemathematics.org/illustrations/878 10. **Illustrative Mathematics:** The Value of Education https://www.illustrativemathematics.org/illustrations/1293 11. **EngageNY:** Grade 5 Module 2 https://www.engageny.org/taxonomy/term/9561 12. **CCSS Math**: 5.NBT.7 http://ccssmath.org/?page_id=444

Concepts/Clusters	Prerequisite Standards to Support CC Math 6	Suggested Resources
Apply and extend previous understandings of numbers to the system of rational numbers.	**5.G.1:** Use a pair of perpendicular number lines, called axes, to define a coordinate system, with the intersection of the lines (the origin) arranged to coincide with the 0 on each line and a given point in the plane located by using an ordered pair of numbers, called its coordinates. Understand that the first number indicates how far to travel from the origin in the direction of one axis, and the second number indicates how far to travel in the direction of the second axis, with the convention that the names of the two axes and the coordinates correspond (e.g., *x*-axis and *x*-coordinate, *y*-axis and *y*-coordinate).	13. **Illustrative Mathematics:** Battle Ship Using Grid Paper https://www.illustrativemathematics.org/illustrations/489 14. **Inside Mathematics:** Granny's Balloon Trip http://www.insidemathematics.org/assets/common-core-math-tasks/granny%27s%20balloon%20trip.pdf 15. **EngageNY:** Grade 5 Module 6 https://www.engageny.org/resource/grade-5-mathematics-module-6

Examples of Essential Questions for Unit 2	Standards for Mathematical Practice
1. Why am I able to use multiplication to solve a fractional division problem? 2. How can finding the greatest common factors make it easier to solve problems? 3. How are positive and negative integers related to zero on the number line? 4. What strategies might we use to find the area of a rectangle with fractional side lengths? 5. Why is precision important when solving multi-digit whole number and decimal problems? 6. Why is the standard algorithm of multiplication an efficient method for multiplying? 7. Why is it essential to have efficient strategies in place for adding, subtracting, multiplying, and dividing decimals? 8. Why is it important to know the essential parts of the coordinate	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.

Concepts/Clusters	Prerequisite Standards to Support CC Math 6	Suggested Resources
	system? How might these specific parts inform us on what to do?	

Performance Objectives for Unit 2 *Students will grow in their ability to:*	***Guiding Questions for Implementing Standards for Mathematical Practices #3 and #4**
1. Multiply fractions by whole numbers. 2. Multiply fractions by fractions 3. Interpret the product of a fraction verbally, using academic language. 4. Accurately and efficiently multiply multi-digit whole numbers using a variety of computational methods. 5. Illustrate and explain division calculations by using equations, rectangular arrays, and/or an area model. 6. Perform numerical operations on numbers, including dividing decimals to the hundredths place, using concrete models or drawings. 7. Identify locations on a coordinate plane. 8. Identify all parts of the coordinate system.	1. What mathematical evidence supports your thinking? 2. What made you choose that strategy? 3. How can you be sure that …? 4. How could you prove that …? 5. Will your approach still work if …? 6. What were you considering when …? 7. How did you decide on that strategy? 8. How did you test whether or not your approach is correct? 9. How did you decide what the problem was asking you to find? 10. Did you initially try a method that did not work? What hunches might you have for why it didn't work? 11. What is the same and what is different about …? 12. How might you demonstrate a counterexample? 13. What mathematical model might you construct to represent the problem? 14. What are some ways to represent the quantities? 15. Where do you see one of the quantities in the task in your solution? 16. What are some ways to visually represent …? 17. What might be an expression or equation that matches the … (diagram, figure, table, etc.)? 18. Would it help to create a mathematical model (diagram, graph, table, etc.)?

Unit 3
Understanding Expressions and Equations

Concepts/Clusters	Standards to Support CC Math 6	Suggested Resources
Apply and extend previous understandings of arithmetic to algebraic expressions.	**4.OA.4:** Find all factor pairs for a whole number in the range 1–100. Recognize that a whole number is a multiple of each of its factors. Determine whether a given whole number in the range 1–100 is a multiple of a given one-digit number. Determine whether a given whole number in the range 1–100 is prime or composite. **5.OA.2:** Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them. *For example, express the calculation "add 8 and 7, then multiply by 2" as 2 × (8 + 7). Recognize that 3 × (18932 + 921) is three times as large as 18932 + 921, without having to calculate the indicated sum or product.* **5.OA.2.1:** **Express a whole number in the range 2–50 as a product of its prime factors. For example, find the prime factors of 24 and express 24 as 2x2x2x3. CA** **5.OA.3:** Generate two numerical patterns using two given rules. Identify apparent relationships between corresponding terms. Form ordered pairs consisting of corresponding terms from the two patterns, and graph the ordered pairs on a coordinate plane. *For example, given the*	(4.OA.4) **NCTM Illuminations:** 1. Finding Products 2. Making Your Own Product Game 3. Multiplication Stories 4. Product Game 5. The Factor Game 6. The Product Game (5.OA.2) **Khan Academy** 7. Expressions with parentheses (5.OA.3) **Khan Academy** 8. Visualizing and interpreting relationships between patterns (5.OA.3) **NCTM Illuminations** 9. Running Races 10. Two Runners (5.OA.3) **Online Practice from IXL** 11. Algebra: Function tables 12. Algebra: Convert graphs to input/output tables

	rule "Add 3" and the starting number 0, and given the rule "Add 6" and the starting number 0, generate terms in the resulting sequences, and observe that the terms in one sequence are twice the corresponding terms in the other sequence. Explain informally why this is so. **5.NBT.2:** Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10.	13. Algebra: Graph linear functions 14. Coordinate graphs: Coordinate graphs review – whole numbers only (5.NBT.2) **Khan Academy** 15. Patterns in zeros 16. Understanding moving the decimal
Examples of Essential Questions for Unit 3		**Standards for Mathematical Practice**
1. Why might knowing whether a number is prime or composite helpful when factoring? 2. Why is the number 1 neither prime nor composite? 3. Why is it essential to use grouping symbols (parentheses, brackets, and braces) when evaluating an expression? 4. Why might it be important to identify apparent relationships between corresponding terms? 5. In what ways might we compare numerical patterns? 6. What role does a digit's position play on affecting its value? 7. Why might we choose to represent powers of 10 in multiple forms, such as 10 raised to an exponent, the expanded form, and standard notation? 8. What patterns may be seen in the number of zeros of a product when a number is multiplied by powers of ten? 9. What patterns might exist in the placement of the decimal point when a decimal is multiplied or divided by a power of 10?		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.

Performance Objectives for Unit 3 *Students will grow in their ability to:*	***Guiding Questions for Implementing** **Standards for Mathematical Practices #5 and #6**
1. Define prime and composite numbers. 2. Identify whether a whole number is prime or composite. 3. Identify all factor pairs for any whole number from 1-100. 4. Translate expressions from words to numbers, and vice-versa. 5. Understand operation and grouping symbols to interpret the meaning of expressions. 6. Express a whole number in the range of 2-50 as a product of its prime factors. 7. Generate two numerical patterns using two given rules. 8. Write rules for patterns. 9. Identify and analyze relationships between corresponding terms in the two numerical patterns. 10. Graph generated ordered pairs on a coordinate plane. 11. Compare numerical data. 12. Analyze and explain the relationship between corresponding terms in two numerical patterns. 13. Describe patterns including seeing that multiplying by a power of 10 by a given number, shifts the digits of a whole number or decimal that many places to the left. 14. Use whole-number exponents to represent powers of 10. 15. Explain the relationship of the placement of a decimal point when a decimal point is multiplied or divided by a power of 10.	1. What mathematical tools could we use to visualize and represent the situation? 2. What information have we been given? 3. What do you know that is not stated explicitly in the problem? 4. What approach are you considering trying first? 5. In this situation, what might be helpful to use (a ruler, graph paper, number line, diagram, patty paper, calculator, manipulative, etc.)? 6. What can using a … show us that … may not? 7. What might it be helpful to use a …? 8. What mathematical terms apply in this situation? 9. How did you know your solution was reasonable? 10. Explain how you might show that your solution satisfies the problem. 11. Is there a more efficient strategy? 12. What symbols or mathematical notations are important in this problem? 13. What domain-specific language can you use to explain …? 14. How might you test your solution to see if it answers the problem?

Unit 4
Geometry and Statistical Thinking

Concepts/Clusters	**Standards to Support CC Math 6**	**Suggested Resources**
Develop understanding of statistical variability and summarize and	**5.MD.2:** Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Use operations on fractions for this grade to solve problems involving information	1. http://ccss5.watchknowlearn.org/Video.aspx?VideoID=53574&CategoryID=15559 2. https://www.youtuhttp://nlvm.usu.edu/en/nav/category_g_2_t_3.h

Concepts/Clusters	Standards to Support CC Math 6	Suggested Resources
describe distributions.	presented in line plots. *For example, given different measurements of liquid in identical beakers, find the amount of liquid each beaker would contain if the total amount in all the beakers were redistributed equally.*	tmlbe.com/watch?feature=player_embedded&v=4smVBLi3DxU 3. https://www.youtube.com/watch?feature=player_embedded&v=fVsxYtXOlXg 4. http://www.internet4classrooms.com/common_core/make_line_plot_display_data_set_measurement_data_fifth_5th_grade_math_mathematics.htm 5. https://www.engageny.org/sites/default/files/resource/attachments/math-g5-m4-lessons-1-12.pdf 6. https://www.khanacademy.org/math/cc-fourth-grade-math/cc-4th-measurement-topic/cc-4th-data/e/interpreting-line-plots-with-fraction-addition-and-subtraction 7. http://www.ixl.com/math/grade-5/interpret-line-plots 8. http://www.ixl.com/math/grade-5/create-line-plots 9. http://www.k-5mathteachingresources.com/support-files/fractionsonalineplot.pdf 10. https://www.illustrativemathematics.org/illustrations/1563 11. http://www.k-5mathteachingresources.com/support-files/sacksofflour.pdf 12. http://www.insidemathematics.org/assets/problems-of-the-month/pick%20a%20pocket.pdf

Concepts/Clusters	Standards to Support CC Math 6	Suggested Resources
Solve real-world and mathematical problems involving area, surface area, ad volume.	**4.MD.3:** Apply the area and perimeter formulas for rectangles in real world and mathematical problems. *For example, find the width of a rectangular room given the area of the flooring and the length, by viewing the area formula as a multiplication equation with an unknown factor.* **5.MD.5:** Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume. a. Find the volume of a right rectangular prism with whole-number side lengths by packing it with unit cubes, and show that the volume is the same as would be found by multiplying the edge lengths, equivalently by multiplying the height by the area of the base. Represent threefold whole-number products as volumes, e.g., to represent the associative property of multiplication. b. Apply the formulas $V = l \times w \times h$ and $V = B \times h$ for rectangular prisms to find volumes of right rectangular prisms with whole-number edge lengths in the context of solving real world and mathematical problems.	1. https://learnzillion.com/lessonsets/380-apply-formulas-for-area-and-perimeter 2. https://www.oercommons.org/browse/alignment/CCSS.Math.Content.4.MD.A.3 3. https://www.splashmath.com/common-core-math/fourth-grade/measurement-and-data/3 4. https://www.illustrativemathematics.org/illustrations/1308 5. https://learnzillion.com/lessonsets/365-relating-volume-to-the-operations-of-multiplication-and-addition 6. https://learnzillion.com/lessonsets/284-understand-volume-as-an-attribute-of-threedimensional-figures-measure-volume-by-counting-unit-cubes-relate-volume-to-multiplication-and-addition 7. https://grade5commoncoremath.wikispaces.hcpss.org/5.G.2 8. http://www.mathsolutions.com/documents/0-941355-48-9_L2.pdf 9. http://www.insidemathematics.org/assets/common-core-math-tasks/granny%27s%20balloon%20trip.pdf 10. http://www.opusmath.com/common-core-standards/5.g.2-represent-real-world-and-mathematical-problems-by-graphing-points-in-the 11. http://www.mathworksheetsland.com/5/29points/lesson.pdf

Concepts/Clusters	Standards to Support CC Math 6	Suggested Resources
	c. Recognize volume as additive. Find volumes of solid figures composed of two non-overlapping right rectangular prisms by adding the volumes of the non-overlapping parts, applying this technique to solve real world problems. **5.G.2:** Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation.	

Examples of Essential Questions for Unit 4	Standards for Mathematical Practice
1. Why is the collection, organization, interpretation, and display of data important to finding a solution to a question? 2. Why is precision important when making a line plot to display a data set of measurements? 3. How does knowing that "B is the area of the base" help to remember the formula for a rectangular prism? A triangular prism? Or, a cylinder?	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.

Performance Objectives for Unit 4 *Students will grow in their ability to:*	*Guiding Questions for Implementing Standards for Mathematical Practices #7 and #8
1. Make a line plot to display a data set of measurements in fractions of a unit. 2. Solve problems involving data from line plots.	1. What observations have you made about …? 2. What do you notice when …? 3. What parts of the problem might you eliminate?

Performance Objectives for Unit 4 *Students will grow in their ability to:*	***Guiding Questions for Implementing Standards for Mathematical Practices #7 and #8**
3. Provide verbal summaries for the area and perimeter of rectangles. 4. Solve multi-step, real world math problems 5. Create arrays to model the area and perimeter of rectangles. 6. Use arrays to find the area and perimeter of rectangular shapes in the real world. 7. Identify right rectangular prisms. 8. Find the volumes of right rectangular prisms by multiplying the dimensions. 9. Decompose 3-dimensional figures into right rectangular prisms to find its' volume. 10. Know that 'B', is the area of the base. 11. Use this information to solve real world problems.	4. How would you know if … makes a pattern? 5. What useful ideas have we learned before that come in handy when solving this problem? 6. How does this relate to …? 7. In what ways might this problem connect to other mathematical concepts? 8. Will the same strategy work in other situations? 9. Is this always true, sometimes true, or never? 10. How would you prove that …? 11. What is happening in this situation? 12. Could we make a mathematical rule for …? 13. What mathematical consistencies do you notice? 14. What predictions or generalizations can this pattern support?

*NOTE: The *Guiding Questions for Implementing Standards for Mathematical Practices* should be used throughout ALL units and are not exclusive to any particular unit.

TOOLS TO ENGAGE KINESTHETIC AND VISUAL LEARNERS

The following are a just a few hands-on manipulatives to engage and support the learning for our kinesthetic and visual learners.

Base Ten Materials Geoboards Cube-a-links Pattern Blocks Attribute Blocks Cuisenaire Rods Fraction Circles Fraction Pattern Blocks Geometric Shapes *(Shapes including pentagons, hexagons, octagons, triangles, parallelograms, squares, circles, half-circles, trapezoids)* Plastic Polygon Shapes	Transparent Counters Two-Colored Counters Color Tiles Algebra Tiles Assorted Number Dice Balances Colored Wooden Cubes Geometric Solids *(cones, cubes, pyramids, prisms, cylinders, spheres)* Hundred Number Wall Chart Miras Money Kits

Tangrams	Non-Linking Centimeter Cubes *(1-cm cubes)*

INSTRUCTIONAL STRATEGIES FOR IMPLEMENTING THE STANDARDS FOR MATHEMATICAL PRACTICES

The following instructional strategies represent just a short list of strategies recommended to ensure student engagement with the Standards for Mathematical Practices, as well as the Common Core College and Career Readiness Anchor Standards for Literacy (Reading, Writing, Speaking, and Listening).

Instructional Strategies	Description
1. Activating Prior Knowledge	*Activating Prior Knowledge* allows students to connect concepts learned previously to content being taught at the time. This strategy ensures coherence throughout the course.
2. Carousel	*Carousel* allows for students to collaborate on a particular problem in groups of 3-4. Students take turns with working on a problem, passing it around, round-robin style as they add to solving the problem, while checking the work of others throughout the process.
3. Corners	The *Corners* strategy works by having students select from four options (which are posted in each of the corners of the room). Once students have chosen their corners, they may be asked to defend their choice and listen to their peers' reasons for choosing a particular option, or corner.
4. Error Analysis	This strategy calls for students to analyze a problem that has been solved incorrectly. They must work with a partner to figure it out, discuss their findings, write the correct solution, and write a few paragraphs on their process and thinking.
5. Exit Tickets	*Exit Tickets* help students synthesize the learning of the day's lesson. These can be simple questions or quick-writes for students to submit at the end of the period.
6. Multiple Representations	This strategy allows students to create multiple representations in the form of pictures, tables, graphs, equations, formulas, and other models to analyze and interpret data and/or other information.

Instructional Strategies	Description
7. Poster Presentations	Students use large flip chart paper (during any stage of instruction) to collaborate, provide visuals, and solve problems. After each group is done creating posters, they may present them to the larger group or conduct a "gallery walk" to see each group's findings.
8. Questioning the Text	This strategy allows students to question the text, the problem or the situation. They can annotate and collaborate to incite discourse in the classroom.
9. Sentence Frames	Sentence Starters give students a structure for sharing their thoughts and ideas and guide accountable talk. Examples for use include: I think the best way to solve this problem is … I would not solve it this way because … I (agree/disagree) because … I don't think that will work because … I tried … I think … will happen. I solved the problem like this because … What if we tried … I have another approach to the problem. What about … I understand what you are saying, but what about … Now I understand … because … I agree with … because … At first, I though … but, now I think … I agree with … because … What I hear you saying is … I don't understand … but, I do understand … Another approach to this problem could be …
10. Think Alouds	In *Think Alouds*, students orally dictate their thought process to show their comprehension of a problem, text or situation. It helps when trying to make sense of problems and considering different access points to solving a problem.
11. Think-Pair-Share	Students engage in *Think-Pair-Share* by initially thinking about a problem or situation independently, then pair up with a classmate to share their thoughts or ideas.
12. Think-Ink-Pair-Share	An alternative to *Think-Pair-Share* is *Think-Ink-Pair-Share* which allows students to think independently, write their thoughts on paper, and then pair up with a partner to share their thoughts.

SAMPLE TASKS TO SUPPORT CC MATH 6

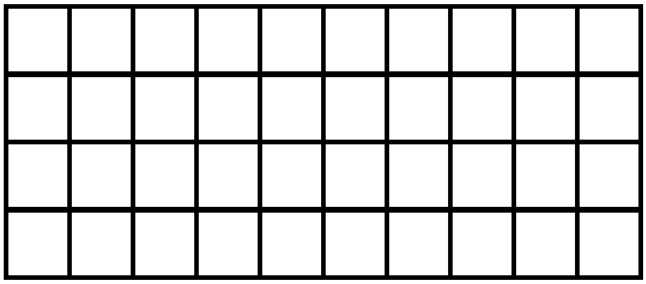
The following are a few examples to help support student learning in this course. These examples are not meant to be exhaustive, but are representative of the types of tasks that should be afforded to students enrolled in the course.

Sample Tasks to Support Common Core Math 6 Tutorial Lab

Sample Task #1: *Fractions, Decimals, and Percents*

Task:

Shade 8 of the small squares in the rectangle shown below. Then, determine the fraction, decimal, and percent represented by the shaded squares.



Using the diagram above, explain how to determine each of the following:

1. The fractional part of the shaded area

2. The decimal part of the shaded area

3. The percentage part of the shaded area

Source: Adapted from LAUSD MIG, Concept Task Grade 6

Sample Task #2: *Area and Perimeter*

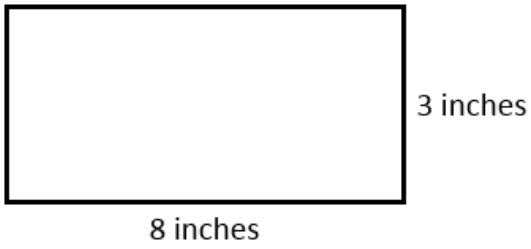
Task:

1. The perimeter of this rectangle is 2(5 + 2) = 14 inches. The area of this rectangle is 2 x 5 = 10.

a) Draw a diagram of a rectangle with the same perimeter, but a larger area. Write down the area of your rectangle.

b) Draw a diagram of a rectangle with the same perimeter, but a smaller area. Write down the area of your rectangle.

2. The perimeter of this rectangle is 22 inches. The area of this rectangle is 24 square inches.



a) Is it possible to draw a rectangle with the same area as the one above, but with a larger perimeter? Explain your reasoning.

b) Is it possible to draw a rectangle with the same area, but a smaller perimeter? Explain

Sample Tasks to Support Common Core Math 6 Tutorial Lab

	your reasoning. **Source:** Adapted from MARS Tasks (Grade 6)
Sample Task #3: *Pick Any Three* **Task**: Pick any 3-digit number where not all the digits are equal. Order the digits from highest to lowest to create the largest number. Next, order the digits from lowest to highest to create the smallest number. Find the positive difference between the two numbers. Investigate different solutions you find. Are there any patterns? If so, what patterns did you find? 1. Complete the same process for two different numbers. Would two different 3-digit numbers produce the same solution (difference) when following the process? 2. What can you predict about the solutions (differences) in terms of specific digits (hundreds, tens, ones)? 3. What other relationships are there between the digits? 4. Explain your findings. **Source:** *Problem of the Month from www.insidemathematics.org*	**Sample Task #4:** *Summer Vacation* **Task**: It is summer vacation and you can go to the museum more often. The rates change for a summer special. **Museum Summer Rate Plans** **Plan A: Pay $ 2.75 per person to visit the museum.** **Plan B: Monthly membership is $7.50 for each person, but you can go as many times as you like during the month.** **Plan C: A family membership for a month is $15.25. Everyone in your family can go as often as they like for a month.** If you and your brother want to go to the museum eight times during the three months of summer, which one plan should you use and when should you go to save the most money? What if you can't go as you originally planned? What other plans might you use? State when you would attend and the best plan(s) to use. Explain your thinking. **Source:** *Problem of the Month from www.insidemathematics.org*

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