Unit:1.1	Rational Numbers	Days :20

Essential Questions	
How do you write rational numbers as decimals and as fractions? **How do you multiply rational numbers?** **How do you divide rational numbers?** **How do you add and subtract fractions with unlike denominators?** **How do you solve equations that contain rational numbers?** **How do you solve equations that contain multiple operations?**	
Content to be Learned	**Skills**
1.1 Rational Numbers **1.2 Multiplying Rational Numbers** **1.3 Dividing Rational Numbers** **1.4 Adding and Subtracting with Unlike Denominators** **1.5 Solving Equations with Rational Numbers** **1.6 Solving Two-Step Equations**	Writing rational numbers as decimals and fractions as well as multiplying and dividing rational numbers. The sum and difference of fractions with unlike denominators will be found using a common denominator as well as solving equations with rational numbers. Learn to identify and apply the appropriate property of equality for a given real world situation. Practice writing and solving two-step equations for real world situations.
Assessments	**Standards**
1.1/1.2/1.3 Quiz (9 days) **1.4/1.5 Quiz (7 days)** **1.6 Unit Test (4 days)**	**8.NS.1** **8.EE.7b**
Sample Instructional Activities	**Resources**
Converting Decimal Representations of Rational Numbers to Fraction Representations Converting Repeating Decimals to Fractions	**Explorations in Core Math** **Illustrative Mathematics**

Unit: 1.1	Multiplying and Dividing Rational Numbers	Lesson 1 of 2	Days 9

Lesson Focus

1. Standards Addressed	2. Content to be Learned	3. Mathematical Practices	4. Essential Questions
8.NS.1 **8.EE.7b**	Writing rational numbers as decimals and fractions as well as multiplying and dividing rational numbers.	Standard 2. Reason abstractly and quantitatively. Standard 7. Look for and make use of structure.	How do you write rational numbers as decimals and as fractions? How do you multiply rational numbers? How do you divide rational numbers?
5. Prerequisite Knowledge	**6. Essential Vocabulary**	**7. Possible Misconceptions**	**8. Teaching Materials**
Converting fractions into decimals. Rational numbers Rewriting mixed numbers as improper fractions Rewriting improper fractions as mixed numbers	Rational number Irrational number Repeating decimal Terminating decimal Reciprocals Inverse	The difference between a terminating and non-terminating decimal. Not multiplying by the reciprocal when dividing. How many places to move the decimal point when multiplying or dividing. Translating from horizontal form to the "division house" form. (not knowing the difference between the dividend and the divisor)	Explorations in CORE MATH Converting Decimal Representations of Rational Numbers to Fraction Representations Converting Repeating Decimals to Fractions

Suggested Learning Practices

9. Instruction Practices (What are the teachers doing)	10. Learning Practices (What are the students doing)
Lesson on Rational Numbers • Show QR Reader video and then read the Essential question. Ask students to brainstorm some rational numbers. • Direct students to do Example 1. Have the students pay special attention to whether or not their decimal terminates or repeats. • Have students do Example 2. (may want to do a quick mini lesson on repeating decimals and their fraction representation) • Have students practice some problems and close with the essential question.	• Students will watch the video taking notes. The class will discuss the video and the students will highlight the Essential question; how do you write rational numbers as decimals and as fractions? Student led discussion on the rational numbers they have shared with the class. • Students will work on Example 1 in their groups and follow with a student led discussion on the difference between a terminating and repeating decimal. • Students will discuss their results and share them with their classmates. • Students will work on their practice problems and then discuss the Essential question; how do you write rational numbers as decimals and as fractions?
Lesson on Multiplying Rational Numbers • Show QR Reader video and then read the Essential question. Remind students that whole numbers/integers can be written as fractions with a denominator of 1. • Have students do Example 1. Remind students about the reasonableness of their solutions. • Instruct students to do Example 2. (You may want to do a quick mini lesson on changing mixed numbers to improper fractions and improper fractions to mixed numbers). Also remind students about rules when multiplying positive and negative numbers. • Have students practice some problems and close with the essential question.	• Students will watch the video taking notes. The class will discuss the video and the students will highlight the Essential question; how do you multiply rational numbers? • Students will work on Example 1 in their groups and discuss whether their solutions make sense. • Students work on Example 2 as well as discussing how to go from mixed numbers to improper fractions and improper fractions to mixed numbers. • Students will work on the problems while sharing their solutions and then discuss the Essential question; how do you multiply rational numbers?

Lesson on Dividing Rational Numbers • Show QR Reader video and then read the Essential question. • Have students work on Example 1. Remind students that they need to be careful with decimal placement. Can also remind them that they can use multiplication to check their decimal division. Same rules apply when multiplying positive and negative numbers. • Instruct students to do Example 2. Remind them when dividing fractions they are actually multiplying by the reciprocal or inverse. • Have students practice some problems and close with the essential question. Remind students about moving the decimal point as well as multiplying by the reciprocal when working with fractions.	• Students will watch the video taking notes. The class will discuss the video and the students will highlight the Essential question; how do you divide rational numbers? • Students will work on Example 1 in their groups and discuss their results. • Students work on Example 2 as well as discussing how to check their results. • Students will work on the problems while sharing their solutions and then discuss the Essential question; how do you divide rational numbers?

Unit: 1.1	Adding and Subtracting Fractions and Solving Equations	Lesson 2 of 2	Days 11

Lesson Focus

1. Standards Addressed	2. Content to be Learned	3. Mathematical Practices	4. Essential Questions
8.EE.7b	The sum and difference of fractions with unlike denominators will be found using a common denominator as well as solving equations with rational numbers. Learn to identify and apply the appropriate property of equality for a given real world situation. Practice writing and solving two-step equations for real world situations.	Standard 2. Reason abstractly and quantitatively.	How do you add and subtract fractions with unlike denominators? How do you solve equations that contain rational numbers? How do you solve equations that contain multiple operations?
5. Prerequisite Knowledge	**6. Essential Vocabulary**	**7. Possible Misconceptions**	**8. Teaching Materials**
Adding and subtracting with like denominators. Solving equations with integers.	Numerator Denominator Linear equation Variable Term Coefficient Constant	Adding denominators when adding/subtracting fractions. Not finding a common denominator when adding or subtracting. Not following proper steps when solving equations. (not using the properties of equality the correct way) When dividing by a fraction not multiplying by the inverse.	Explorations in CORE MATH

Suggested Learning Practices	
9. Instruction Practices (What are the teachers doing)	**10. Learning Practices (What are the students doing)**
Lesson on Adding and Subtracting with Unlike Denominators • Show QR Reader video and then read the Essential question. • Instruct students to do Example 1. Remind them that in order to add and subtract fractions with unlike denominators that they must find a common denominator. Ask some groups to share how they arrived at their solutions. • Instruct students to practice some problems. Let them know you will be reviewing them one problem at a time as groups complete the task. • Close with the Essential question and then ask students for the key points.	• Students will watch the video taking notes. The class will discuss the video and the students will highlight the Essential question; how do you add and subtract fractions with unlike denominators? • Students will work on Example 1 in their groups and discuss whether their solutions make sense. Some students will present their results to the class explaining their steps. • Students will work on their problems in their groups and present their result to the entire class. • Students will brainstorm some key points sharing their results with the class.
Lesson on Solving Equations with Rational Numbers • Show QR Reader video and then read the Essential question. • Instruct students to begin Example 1. Emphasize the importance of defining a variable. Remind them that they are looking to isolate the variable to make the equation true, while using the properties of equality to keep the equation balanced. (Explain that they can check their work by plugging in their solution to the original problem) • Instruct students to begin Example 2, once again emphasize the importance of defining a variable. Also give the students a friendly reminder on needing a common denominator when adding or subtracting. • Have students do Example 3. Remind them that you undo multiplication by using the opposite operation division. Point out that the word descended indicates a negative amount. • Have students do Example 4. Remind them that you undo division by using the opposite operation multiplication. • Have students practice some problems and close with the essential question. Remind students about the properties of equality when	• Students will watch the video taking notes. The class will discuss the video and the students will highlight the Essential question; how do you solve equations that contain rational numbers? • Students will work on Example 1. They will share their results. Have a student led discussion on the steps they used to solve the equation. • Students will work on Example 2 and share their results with the class. • Students will work on the example and share their solutions with the class. • Students work on Example 4 sharing their solutions. • Students will work on the problems while sharing their solutions

solving equations. **Lesson on Solving Two-Step Equations** • Show QR Reader video and then read the Essential question. Remind students that when solving a two-step equation that you typically undo the operations in reverse order. You undo addition and subtraction before you undo multiplication and division. • Instruct students to begin Example 1. (Explain that they can check their work by plugging in their solution to the original problem) • Instruct students to begin Example 2, once again emphasize the importance of defining a variable. • Have students practice some problems and close with the essential question. Remind students about the properties of equality when solving equations.	and then discuss the Essential question; how do you solve equations that contain rational numbers? • Students will watch the video taking notes. The class will discuss the video and the students will highlight the Essential question; how do you solve equations that contain multiple operations? • Students will work on Example 1. They will share their results. Have a student led discussion on the steps they used to solve the equation. • Students will work on Example 2 and share their results with the class. • Students will work on the problems while sharing their solutions and then discuss the Essential question; how do you solve equations that contain multiple operations?

Unit:1.2	Graphs and Functions	Days : 12

Essential Questions	
How do you determine whether an ordered pair is a solution to an equation? **How do you locate and name points in the coordinate plane?** **How can you describe a relationship given a graph and sketch a graph given a description?** **How do you represent a function with a table or graph?** **How can you use equations, tables, and graphs to represent relationships between two variables?**	
Content to be Learned	**Skills**
2.1 Ordered Pairs **2.2 Graphing on a Coordinate Plane** **2.3 Interpreting Graphs** **2.4 Functions** **2.5 Equations, Tables, and Graphs**	Determining whether ordered pairs are solutions to equations as well as locating points on a coordinate plane. Describe relationships given a graph while sketching a graph given a description. Represent functions with a table or graph as well as using equations, tables, and graphs to represent relationships between two variables.
Assessments	**Standards**
2.1/2.2 Quiz (3 days) **2.3/2.4 Quiz (5 days)** **2.1-2.5 Unit Test (4 days)**	**8.EE.8** **8.SP.1** **8.F.5** **8.F.1** **8.F.4**
Sample Instructional Activities	**Resources**
http://ccssmath.org/?page_id=707 **Graphing Stories**	**Explorations in CORE MATH**

Unit: 1.2	Graphs and Functions	Lesson 1 of 1	Days 12

Lesson Focus

1. Standards Addressed	2. Content to be Learned	3. Mathematical Practices	4. Essential Questions
8.EE.8 **8.SP.1** **8.F.5** **8.F.1** **8.F.4**	Determining whether ordered pairs are solutions to equations as well as locating points on a coordinate plane. Describe relationships given a graph while sketching a graph given a description. Represent functions with a table or graph as well as using equations, tables, and graphs to represent relationships between two variables.	Standard 2. Reason abstractly and quantitatively. Standard 6. Attend to Precision. Standard 3. Construct viable arguments and critique the reasoning of others. Standard 4. Model with Mathematics.	How do you determine whether an ordered pair is a solution to an equation? How do you locate and name points in the coordinate plane? How can you describe a relationship given a graph and sketch a graph given a description? How do you represent a function with a table or graph? How can you use equations, tables, and graphs to represent relationships between two variables?
5. Prerequisite Knowledge	**6. Essential Vocabulary**	**7. Possible Misconceptions**	**8. Teaching Materials**
Solving one variable equations. Solutions Ordered pairs	Coordinate plane Function Linear function nonlinear function Rate of change Input, output Ordered pair Origin Quadrant x-axis, x-coordinate y-axis, y-coordinate	Reversing the (x, y) coordinates when graphing. Not labeling graphs the proper way. (time is always represented as the independent variable) Some students may confuse the rate of change (change in y/change in x) and do the opposite.	Explorations in CORE MATH **Graphing Stories**

Suggested Learning Practices

9. Instruction Practices (What are the teachers doing)	10. Learning Practices (What are the students doing)
Lesson on Ordered Pairs • Show QR Reader video and then read the Essential question.	• Students will watch the video taking notes. The class will discuss

• Instruct students to do Example 1. Remind students that when plugging in the ordered pair (3, 15) (x, y); the value 3 represents the x-value and the value 15 represents the y-value. Thus *order* in an *ordered pair* is important. • Have students practice some problems and close with the Essential question.	the video and the students will highlight the Essential question; how do you determine whether an ordered pair is a solution of an equation? • Students do Example 1 showing their solutions to the class. • Students will work on the problems while sharing their solutions and then discuss the Essential question; how do you determine whether an ordered pair is a solution of an equation?
Lesson on Graphing on a Coordinate Plane: • Show QR Reader video and then read the Essential question.	• Students will watch the video taking notes. The class will discuss the video and the students will highlight the Essential question; how do you locate and name points in the coordinate plane?
• Instruct students to do Example 1. Remind them once again that the coordinate plane is formed by two number lines. The **x-axis** or horizontal number line and the **y-axis** or the vertical number line. These axes intersect at right angles to divide the plane into four **quadrants.** The point where the two axes intersect is the **origin** and labeled by the ordered pair (0, 0). In an ordered pair ***(x, y)*** the first number is the **x-coordinate**. It tells how many units to move **right or left**. The **y-coordinate** tells how many units to move **up or down**. • Have students practice some problems and discuss the Essential question.	• Students will work on Example 1 and discuss their solutions in a student led discussion. • Students will work on the problems while sharing their solutions and then discuss the Essential question; how do you locate and name points in the coordinate plane?
Lesson on Interpreting Graphs • Show QR Reader video and then read the Essential question.	• Students will watch the video taking notes. The class will discuss the video and the students will highlight the Essential question; how can you describe a relationship given a graph and sketch a graph given a description?
• Instruct students to do Explore 1. Point out that time is always graphed on the x-axis. • Instruct students to do Explore 2 paying special attention to the three situations in the three graphs. • Instruct students to do Explore 3.	• Students will do Explore 1 as a group and provide their solutions to the class when done. • Students will do Explore 2 and share their solutions to the class. • Students will do Explore 3 and share their solutions to the class. • Students will work on the problems while sharing their solutions and then discuss the Essential question; how can you describe a

• Have students practice some problems and close with the Essential question. **Lesson on Functions** • Show QR Reader video and then read the Essential question. • Instruct students to do Explore 1. • Instruct students to do Explore 2 reminding them that in a table the left column or input represents x, while the right column or output represents y. • Instruct students to do Explore 3. • Have students practice some problems and close with the Essential question. **Lesson on Equations, Tables, and Graphs** • Show QR Reader video and then read the Essential question. • Have students do Example 1. Remind the students that they have used equations to make tables and graphs and will now be moving in the opposite direction to write equations from tables. • Have students practice some problems and close with the Essential question.	relationship given a graph and sketch a graph given a description? • Students will watch the video taking notes. The class will discuss the video and the students will highlight the Essential question; how do you represent a function with a table or graph? • Students will do Explore 1 as a group and provide their solutions to the class when done. • Students will do Explore 2 and share their solutions to the class. • Students will do Explore 3 and share their solutions to the class. • Students will work on the problems while sharing their solutions and then discuss the Essential question; how do you represent a function with a table or graph? • Students will watch the video taking notes. The class will discuss the video and the students will highlight the Essential question; how can you use equations, tables, and graphs to represent relationships between two variables? • Students will do Example 1 sharing their solutions with their classmates. • Students will work on the problems while sharing their solutions and then discuss the Essential question; how can you use equations, tables, and graphs to represent relationships between two variables?

Unit:2-1	Multi-Step Equations	Days :15

Essential Questions	
How do you simplify algebraic expressions? **How do you solve equations by collecting like terms and multiplying expressions?** **How can you give examples of equations with a given number of solutions?** **How can you solve a system of equations algebraically?**	
Content to be Learned	**Skills**
7.1 Simplify Algebraic Expressions **7.2 Solving Multi-Step Equations** **7.3 Solving Equations with Variables on Both Sides** **7.4 Systems of Equations**	Solve one variable equations with variables on both sides of the equal sign and then determine if the equation has one solution, infinitely many solutions, or no solutions. Understand that the solution to the equation is the value(s) of the variable, which makes a true equality when substituted back into the equation. Using the Distributive Property and combining like terms. Solve systems of two linear equations in two variables algebraically. Solve real-world and mathematical problems leading to two linear equations in two variables.
Assessments	**Standards**
7.1 Quiz (4 days) **7.2/7.3 Quiz (6 days)** **7.4 Quiz/Unit Test (5 days)**	**8.EE.7** **8.EE.7a; 8.EE.7b** **8.EE.8b; 8.EE.8c**
Sample Instructional Activities	**Resources**
8.EE Solving Equations 8.EE Cell Phone Plans	**Explorations in CORE MATH** **Illustrative Mathematics**

Unit: 2.1	Simplifying Algebraic Expressions and Solving Multi-Step Equations with Variables on Both Sides	Lesson 1 of 2	Days 10

Lesson Focus

1. Standards Addressed	2. Content to be Learned	3. Mathematical Practices	4. Essential Questions
8.EE.7 **8.EE.7a** **8.EE.7b**	Write, simplify, and evaluate algebraic expressions. Solve linear equations whose solutions require expanding expressions using the distributive property and collecting like terms. Solve equations in one variable with one solution, infinitely many solutions, and no solutions.	Standard 1. Make sense of problems and persevere in solving them. Standard 2. Reason abstractly and quantitatively. Standard 4. Model with Mathematics. Standard 7. Look for and make use of structure.	How do you simplify algebraic expressions? How do you solve equations by collecting like terms and multiplying expressions? How can you give examples of equations with a given number of solutions?
5. Prerequisite Knowledge	**6. Essential Vocabulary**	**7. Possible Misconceptions**	**8. Teaching Materials**
Algebraic expressions Identifying like terms Solving equations in one variable Solving multi-step equations	Like terms Complement Supplement	Students turn equations into expressions when working with variables on both sides thus rendering the opposite of the desired solution. Not distributing to all terms inside of the grouping symbols.	Explorations in CORE MATH Solving Equations

Suggested Learning Practices	
9. Instruction Practices (What are the teachers doing)	**10. Learning Practices (What are the students doing)**
Lesson on Simplifying Algebraic Expressions • Activate prior knowledge and ask students to give some examples of algebraic expressions. Could use QR Reader and show video to class. Ask for a volunteer to read the Essential question. • Instruct students to do Example 1 paying special attention to the reflect question and the significance in the context of the problem. • Instruct students to do Example 2. Ask students the benefit or advantages of the simplified expression over the original. • Have students practice some problems and close with the essential question.	• Students will give examples of algebraic expressions. After reading the essential question; how do you simplify algebraic expressions, have a student-led discussion on how they have simplified them in the past. • Students will do Example 1in their groups and then discuss the significance of what the variable represents in simplified form. • Students will do Example 2 in their groups and then discuss the differences of writing a two variable expression to a one variable expression. • Students will work on their practice problems and then discuss as a group the Essential question; how do you simplify algebraic expressions?
Lesson on Solving Multi-Step equations • Show QR Reader video and then read the Essential question. Remind students about the importance of combining like terms or simplifying before solving. • Instruct students to do Example 1 and Try These examples. Ask students why or if their solution makes sense to Ex. 1. • Instruct students to do Explore 2 paying special attention to the **keywords** used for each expression. • Have students practice some problems and close with the essential question. Remind students to define variables and circle keywords when changing verbal phrases to algebraic expressions.	• Students will watch the video taking notes. The class will discuss the video and the students will highlight the Essential question; how do you solve equations by collecting like terms and multiplying expressions? • Students will work on Example 1in their groups and discuss their results with the class. • Students will work on example 2 and discuss their solutions with the class. • Students will work on their practice problems and then discuss the Essential question; how do you solve equations by collecting like terms and multiplying expressions?
Solving Equations with Variables on Both Sides • Show QR Reader video and then read the Essential question. • Have students do Explore 1. Remind students to use properties of equality with once again the goal being to isolate the variable. Explain to the students that in the past when solving equations they found a single solution and now they will find equations with one	• Students will watch the video taking notes. The class will discuss the video and the students will highlight the Essential question; how can you give examples of equations with a given number of solutions? • Students will do Explore 1 in their groups and discuss as they present the 3 different possibilities that can occur when solving

solution, an infinite number of solutions, and no solutions. • Have students highlight the KEY Concept and discuss as a class what the chart shows. • Have students do Explore 2. • Have students do Explore 3. Remind students to define variables and circle keywords before writing their equation. • Have students practice some problems and then close with the Essential question asking students for the key points from the lesson.	equations. • Students will highlight the KEY Concept and discuss the chart. • Students will discuss their results for Explore 2. • Students will discuss their results for Explore 3. • Students will work on their practice problems and then discuss the Essential question; how can you give examples of equations with a given number of solutions?

Unit: 2.1	Systems of Equations	Lesson 2 of 2	Days 5

Lesson Focus

1. Standards Addressed	2. Content to be Learned	3. Mathematical Practices	4. Essential Questions
8.EE.8b **8.EE.8c**	Solve systems of two linear equations algebraically. Solve real-world mathematical problems in two variables.	Standard 5. Use appropriate tools strategically.	How can you solve a system of equations algebraically?
5. Prerequisite Knowledge	**6. Essential Vocabulary**	**7. Possible Misconceptions**	**8. Teaching Materials**
Solving systems of equations graphically Slope-intercept form	Systems of equations	Substitution method may be confusing to some students. Not using properties of equality the correct way.	Explorations in CORE MATH Cell Phone Plans

Suggested Learning Practices

9. Instruction Practices (What are the teachers doing)	10. Learning Practices (What are the students doing)
Lesson on Systems of Equations • Show QR Reader video and then read the Essential question. Explain to the students that it may be difficult to solve equations with very large values or when the solution has non-integer coordinates. In cases like this solving a system algebraically makes more sense.	• Students will watch the video taking notes. The class will discuss the video and the students will highlight the Essential question; how can you solve a system of equations algebraically? The class will then have a student-led discussion on what may happen when working with very large numbers or when a solution has non-integer solutions.
• Have students do Example 1 as well as the reflect question when the example is completed. • Have students do Example 2 by graphing and then algebraically. Ask the students which way they think is the better method. • Omit Example 3. • Have students practice some problems and then close with the Essential question asking students for the key points from the lesson.	• Students will work on the example in their groups and discuss how they can check their answer. • Students will work on Example 2. They will then have a class-led discussion on which way they prefer. • Students will work on their practice problems and then discuss the Essential question; how can you solve a system of equations algebraically?

Unit:2.2	Graphing Lines	Days :22

Essential Questions	
How do you find rate of change? **How can you show that the slope of a line is the same between any two points on the line?** **How can you use slopes and intercepts to write and graph linear equations?** **How can you develop the point-slope form of an equation of a line?** **How can you identify a direct variation?** **How can you solve a system of equations by graphing?**	
Content to be Learned	**Skills**
8.1 Graphing Linear Equations **8.2 Slope of a Line** **8.3 Using Slopes and Intercepts** **8.4 Point-Slope Form** **8.5 Direct Variation** **8.6 Solving Systems of Linear Equations by Graphing**	Find rate of change and show that the slope of a line is the same between any two points on the line. Use slopes and intercepts to write and graph linear equations. Develop the slope-intercept form and the point-slope form of an equation. Identify a direct variation. Solve a system of equations by graphing.
Assessments	**Standards**
8.1/8.2 Quiz (7 days) **8.3 Quiz (4 days)** **8.4/8.5 Quiz (5 days)** **8.6 Quiz followed by a Unit Test (6 days)**	**8.F.4** **8.EE.6** **8.EE.5** **8.F.3** **8.EE.8a**
Sample Instructional Activities	**Resources**
Find the Change Equations of Lines DVD Profits, Variation 1 Proportional relationships, lines, and linear equations 8.EE The Intersection of Two Lines	**Explorations in Core Math** **Illustrative Mathematics** **https://www.illustrativemathematics.org/8**

iUnit: 2.2	Finding Rate of Change and Graphing Linear Equations Using Slope and Intercepts	Lesson 1 of 1	Days: 22

Lesson Focus

1. Standards Addressed	2. Content to be Learned	3. Mathematical Practices	4. Essential Questions
8.F.4 **8.EE.6** **8.EE.5** **8.F.3** **8.EE.8a** **8.EE.8c**	**8.1 Graphing Linear Equations** **8.2 Slope of a Line** **8.3 Using Slopes and Intercepts** **8.4 Point-Slope Form** **8.5 Direct Variation** **8.6 Solving Systems of Linear Equations by Graphing**	Standard 2: Reason abstractly and quantitatively. Standard 7: Look for and make use of structure. Standard 4: Model with mathematics.	How do you find rate of change? How can you show that the slope of a line is the same between any two points on the line? How can you use slopes and intercepts to write and graph linear equations? How can you develop the point-slope form of an equation of a line? How can you identify a direct variation? How can you solve a system of equations by graphing?
5. Prerequisite Knowledge	**6. Essential Vocabulary**	**7. Possible Misconceptions**	**8. Teaching Materials**
Ordered pairs Graphing on a coordinate plane Proportional relationships Solving equations	Rate of Change Slope y-intercept x-intercept Slope-intercept form Direct variation	Using a horizontal change over a vertical change resulting in the inverse for slope. ~~(run/rise)~~ When finding slope using the formula making errors with signs.	**Explorations in Core Math** **Illustrative Mathematics** **https://www.illustrativemathematics.org/8**

Suggested Learning Practices

9. Instruction Practices (What are the teachers doing)	10. Learning Practices (What are the students doing)
Lesson on Graphing Linear Equations • Show QR Reader video and then read the Essential question. • Do Example 1 as a class. Use direct instruction and questioning strategies from the Teacher Manuel as a guide.	• Students will watch the video taking notes. The class will discuss the video and the students will highlight the Essential question; how do you find rate of change? • Students will be guided by their teacher as they work through Example 1 in their groups. Students will ask and answer questions that arise as they make

• Instruct students to do Explore 2. Have students pay special attention to rate of change and unit rate. • Have students practice some problems and then close with the Essential question asking students for the key points from the lesson.	their way through the process. • Students will work on Explore 2 in their groups and discuss questions from the problem. • Students will work on their practice problems and then discuss the Essential question; how do you find rate of change?
Lesson on Slope of a Line • Show QR Reader video and then read the Essential question.	• Students will watch the video taking notes. The class will discuss the video and the students will highlight the Essential question; how can you show that the slope of a line is the same between any two points on the line?
• Have students do Explore 1. Ask students what the slope represents. (When they complete the problem reinforce that the slope of a line is the ratio of the change in y-values (rise) for a segment of the graph to the corresponding change in x-values (run)). • Omit Explore 2 it is very confusing.	• Students will work on Explore 1 followed by a student-led discussion on some of the questions from the problem.
• Have students do Practice problems.	• As the students work in their groups discuss the results from the Practice problems.
• Close with the Essential question asking students for the key points from the lesson.	• Discuss the Essential question; how can you show that the slope of a line is the same between any two points on the line?
Lesson on Using Slopes and Intercepts • Show QR Reader video and then read the Essential question.	• Students will watch the video taking notes. The class will discuss the video and the students will highlight the Essential question; how can you use slopes and intercepts to write and graph linear equations?
• Have students do Explore 1. Before they start let them know the formula they are finding is derived from the formula to find the slope of a line given any two points that lie on the line. (When completed have students highlight the formula $y = mx + b$ with m representing the slope and b representing the y-intercept).	• Students will work on Explore 1 in their groups. When they complete the task they will highlight the formula $y = mx + b$.
• Direct students to do Example 2 and the Try This problems. • Direct students to do Explore 3 and pay special attention to the Reflect piece. (it might help some students if they redraw the table vertically)	• Students will work on the Example and the practice problems in their groups and share their work with the class. • Students will work on Explore 3 followed by a student-led discussion on the process involved to derive the equation from the table.

• Direct students to do Explore 4 as well as the Reflect and the TRY THIS section. (some students may need a hint in finding the points to use from the graph) • Direct students to do Explore 5 along with the Reflect part of the problem. • Have students do Practice problems. • Close with the Essential question asking students for the key points from the lesson.	• Students will work on Explore 4 followed by a student-led discussion on the reflection piece as well as the problem they tried on their own. • Students will work on Explore 5 followed by a student-led discussion on making predictions based on the equation derived. • Students will work on practice problems and share their results with the rest of the class. • Discuss the Essential question; how can you use slopes and intercepts to write and graph linear equations?
Lesson on Point-Slope Form • Show QR Reader video and then read the Essential question. • Have students do Explore 1. Point out to them to pay special attention to the Reflect piece at the end of the problem. (when through have them highlight the equation for point-slope form $y - y_1 1 = m(x - x_1 1)$. • Have students do Practice problems. • Close with the Essential question asking students for the key points from the lesson.	• Students will watch the video taking notes. The class will discuss the video and the students will highlight the Essential question; how can you develop the point-slope form of an equation of a line? • Students will work on Explore 1 followed by a student-led discussion on the process involved to derive the equation. They will then highlight the formula for point-slope form. • Students will work on practice problems and share their results with the rest of the class. • Discuss the Essential question; how can you develop the point-slope form of an equation of a line?
Lesson on Direct Variation • Show QR Reader video and then read the Essential question. • Have students do Example 1. When completed emphasize the differences in the two graphs. • Have students do Practice problems. • Close with the Essential question asking students for the key points from the lesson.	• Students will watch the video taking notes. The class will discuss the video and the students will highlight the Essential question; how can you identify a direct variation? • Students will complete Example 1 in their groups followed by a student-led discussion on the differences in the two graphs. • Students will work on practice problems and share their results with the rest of the class. • Discuss the Essential question; how can you identify a direct variation?
Lesson on Solving Systems of Linear Equations by Graphing • Show QR Reader video and then read the Essential	• Students will watch the video taking notes. The class will discuss the video and the students will highlight the Essential question; how can you solve a

question. • Have students do Explore 1. Emphasize checking the solution by plugging it in to both original problems when the graphing is completed. • Have students do Example 2. (When students have completed the three graphs reinforce the concept that there may be one solution, infinitely many solutions, or no solutions). Have students compare the differences or similarities in the slopes and y-intercepts of all three graphs. • Have students do Example 3. Instruct them to pay special attention to the conjecture in the Reflect piece. • Have students do Practice problems. • Close with the Essential question asking students for the key points from the lesson.	system of equations by graphing? • Students will do Explore 1 in their groups sharing their work with the class when they are done. • Students will work on Example 2 followed by a discussion on the problems with the emphasis on the slopes and the y-intercepts of the graphs. • Students will work on the example with a discussion on the key points of the problem and the conjecture piece. • Students will work on practice problems and share their results with the rest of the class. • Discuss the Essential question; how can you solve a system of equations by graphing?

Unit: 3.1	Title: Exponents	Days: 13

Essential Questions	
How can you evaluate negative exponents? **How can you develop and use the properties of integer exponents?** **How can you use scientific notation to express very small and very large quantities?** **How can you add, subtract, multiply, and divide using scientific notation?**	
Content to be Learned	**Skills**
3.1 Integer Exponents **3.2 Properties of Exponents** **3.3 Scientific Notation** **3.4 Operating with Scientific Notation**	Simplify Expressions involving positive and negative exponents. Operations with scientific notation.
Assessments	**Standards**
3.1/3.2 Quiz (7 days) **3.3/3.4 Quiz (6 days)**	**8.EE.1** **8.EE.3** **8.EE.4**
Sample Instructional Activities	**Resources**
http://www.illustrativemathematics.org/illustrations/395 **http://www.illustrativemathematics.org/illustrations/823**	**Explorations in CORE MATH**

Unit 3.1	Title: Properties of Integer Exponents	Lesson 1 of 2	Days 7

Lesson Focus

1. Standards Addressed	2. Content to be Learned	3. Mathematical Practices	4. Essential Questions
8.EE.1	Simplify Expressions involving positive and negative exponents.	Standard 1. Make sense of problems and persevere in solving them. Standard 8. Look for and express regularity in repeated reasoning.	How can you evaluate negative exponents? How can you develop and use the properties of integer exponents?
5. Prerequisite Knowledge	**6. Essential Vocabulary**	**7. Possible Misconceptions**	**8. Teaching Materials**
Order of Operations Meaning of an exponent Base	Integers Exponents Base Power Factors	Negative Exponents, not being a negative number for ex: 2^{-3} is not -8. Any number raised to the zero power is not zero. Some may confuse Product Rule of Exponents with Power Rule of Exponents.	Explorations in CORE MATH http://www.illustrativemathematics.org/illustrations/395 http://www.illustrativemathematics.org/illustrations/823

Instruction

9. Instruction Practices (What are the teachers doing)	10. Learning Practices (What are the students doing)
Lesson on Integer Exponents • Activate prior knowledge and ask students to give some examples of exponents. Could use QR Reader • Teacher facilitates as students do Explore 1. Explain that exponents are a shorthand version for writing numbers. • Discuss some of the patterns that the students have found. (Teacher may have to cue/hint that as the	• Students will orally give examples of what they know. • Students do Explore 1 as a group. • Have student-led open discussion on what they may have discovered.

value of the exponent decreases the value of the power is divided by the base. A number with a negative exponent should be written as the inverse of a number with a positive exponent). • Once students have found patterns discuss rules ($2^{\dagger}0 = 1, 2^{\dagger}(-1) = 1/2^{\dagger}1$) highlighted in their workbook. • Close with Essential Question. How can you evaluate negative exponents?	• Students will highlight rules in their workbook. • Students will answer Essential Question based on what they have learned.
Lesson on Properties of Exponents • Connect to prior learning by reviewing Commutative and Associative Properties of Multiplication. Explain to them how these properties will make operations with numbers in exponential form easier. • Teacher facilitates as students do Explore I. • Discuss the three **Conjecture** pieces from Explore 1 and the importance of the three new Power Rules. $5^2 \cdot 5^5 = 5^{2+5} = 5^7$ $\frac{6^8}{6^3} = 6^{8-3} = 6^5$ $(7^2)^4 = 7^{2 \cdot 4} = 7^8$ • Remind students as they begin Example 2 of the Order of Operations. Have students work through the example by highlighting the operation they will do first. • Close with Essential Question. How can you develop and use properties of integer exponents	• Students will write Properties in their notebooks. • Students do Explore 1 as a group. • Have a student-led open discussion while students highlight three new rules from the **Conjecture** piece in their workbooks. • Students do Example 2A as a group. Students do Example 2B individually. • Students will answer Essential question based on what they have learned.

Unit 3.1	Title: Scientific Notation	Lesson 2 of 2	Days: 6

Lesson Focus

1. Standards Addressed	2. Content to be Learned	3. Mathematical Practices	4. Essential Questions
8.EE.3 8.EE.4	Operations with scientific notation.	Standard 2. Model with Mathematics. Standard 5. Use appropriate tools strategically.	How can you use scientific notation to express very small and very large quantities? How can you add, subtract, multiply, and divide using scientific notation?
5. Prerequisite Knowledge	**6. Essential Vocabulary**	**7. Possible Misconceptions**	**8. Teaching Materials**
Multiplying and Dividing Exponents Operations in Base 10	Scientific Notation	Multiplying by 10^3 means to add 3 zeros? Writing a number in scientific notation and forgetting one of the factors must be; $1 \leq n < 10$ Students may think that a negative exponent means a negative number. Moving decimal points the wrong way!!	3.3 & 3.4 Explorations in CORE MATH http://www.illustrativemathematics.org/illustrations/476

Instruction

9. Instruction Practices (What are the teachers doing)	10. Learning Practices (What are the students doing)
Lesson on Scientific Notation • QR Reader (optional) – video shows a couple examples of scientific notation to standard form. • Ask a student to read essential question. • Activate prior knowledge of scientific notation before students begin Explore 1.	• Students will be watching short video about the lesson while taking notes. Student led discussion on video. • Students are brainstorming very large and very small numbers. • Students will work in groups to complete the examples in their groups.

• Begin Explore 1 with Student led discussion on the Key Concept Box. Example 2 • Writing a number in scientific notation. • Teacher may want to do an example before starting Ex 2. • Have students work through Ex. 2 in groups. Example 3 • Students can work in groups to complete Ex. 3a & 3b. Example 4 • Comparing Numbers in Scientific Notation • Go over the different forms of measurement.	• Students will work on Explore 1 and then highlight the KEY Concept on Writing Numbers in Scientific Notation. • Students will do Example 2. Class will discuss as a group and come up with a rule when translating between scientific notation and standard notation. • Students will work on Example 3 and discuss when completed. • Students will work on Example 4 and then answer the essential question; how can you use scientific notation to express very large and very small quantities?
<u>Lesson on Operating with Scientific Notation</u> • QR Reader showing some operations with addition and subtraction using scientific notation. • Discuss essential question and then direct students to begin Explore 1. • Direct students to try Explore 2. (Remind them about the rule on dividing powers with the same base). • Skip Example 3. • Direct students to practice 2-3 problems. • Close with the Essential question.	• Students will be watching short video about the lesson while taking notes. Student led discussion on video and what they know about scientific notation. • Students will highlight the essential question then work on Explore. Discuss when completed. • Students will work on Explore 2 and then discuss their results. • Have students show their solutions to their peers. • Have students answer the Essential question; how do you add, subtract, multiply, and divide using scientific notation?

Unit: 3.2	Real Numbers, Roots and Pythagorean Theorem	Days : 14

Essential Questions	
How do you estimate and compare irrational numbers? How can you tell whether a number is rational or irrational? How can you use the Pythagorean theorem to solve problems? How can you prove the Pythagorean theorem and its converse?	
Content to be Learned	**Skills**
3.5 Squares and Square Roots 3.6 Estimating with Square Roots 3.7 Real Numbers 3.8 The Pythagorean Theorem 3.9 Applying the Pythagorean Theorem and its Converse.	You will find and estimate square and cube roots. Determine whether a number is rational or irrational. Prove the Pythagorean theorem and its converse. Use the Pythagorean theorem to solve problems.
Assessments	**Standards**
Quiz 3-5, 3-6. **Quiz 3-7, 3-8, 3-9.** **Unit 3 Test (Optional)**	8.EE.2 8.NS.1 8.G.7 8.G.8 8.G.6
Sample Instructional Activities	**Resources**
http://www.illustrativemathematics.org/illustrations/60 http://www.illustrativemathematics.org/illustrations/1417 http://www.illustrativemathematics.org/illustrations/1302 http://www.illustrativemathematics.org/illustrations/1245 http://www.illustrativemathematics.org/illustrations/334	

Unit 3.2	Title: Squares and Square Roots	Lesson 1 of 2	Days 6

Lesson Focus

1. Standards Addressed	2. Content to be Learned	3. Mathematical Practices	4. Essential Questions
8.EE.2	You will find and estimate square and cube roots.	Standard 4. Model with mathematics. Standard 8. Regularity and repeated reasoning.	How do you evaluate square roots and cube roots?
5. Prerequisite Knowledge	**6. Essential Vocabulary**	**7. Possible Misconceptions**	**8. Teaching Materials**
Operations with Exponents Perfect Squares Number sense, estimation Order of Operations	Square Root Cube Root Perfect Square Perfect Cube Principle Square Root Irrational Number Rational Number	That a square root is half of a number. That a cube root is one-third of a number. That the square roots of certain numbers are between integers. ($\sqrt{38}$ is between the integers 6 and 7 and not between 37 and 39)	Explorations in CORE MATH

Instruction

9. Instruction Practices (What are the teachers doing)	10. Learning Practices (What are the students doing)
Lesson on Squares and Square Roots • Activate prior knowledge and ask students what they know about squares and square roots and then read the Essential question. • Show QR Reader video. • Direct students to begin Explore 1. • Pass out cube shaped models ($2x2x2$); ($3x3x3$); ($4x4x4$). Discuss the characteristics of their models from worksheet. • Direct students to try Explore 2. • Direct students to try Example 3. • Have students practice some problems and close with the essential question. **Lesson on Estimating Square Roots**	• Students will discuss what they know about squares and square roots and then watch the video taking notes. They will also highlight the Essential question. • Students will complete Explore 1 and then discuss as a group. • Students will answer questions from the worksheet as they investigate with their manipulative. • Students will work on Explore 2 and then discuss as a group. • Students will work on Example 3 and then discuss as a group. • Discuss results of practice problem and then answer the Essential question; how do you evaluate square roots and cube roots?

• Show QR Reader video and then read the Essential question. • Emphasize the difference between the phrases rational numbers and irrational numbers and give examples of both. (rational numbers terminate or repeat while irrational numbers are non-terminating with the most famous being π) • Direct students to begin Explore 1. (May want to do as a class as it is a very difficult concept for most students) • Direct students to do Example 2. (Review inequality symbols $<, >$) • Direct students to do Example 3 reminding students smaller numbers are to the left of larger numbers. • Have students practice some problems and close with the essential question.	• Students will watch the video taking notes. The class will discuss the video and the students will highlight the essential question; how do you estimate and compare irrational numbers? • Students will make a 2-column chart which shows examples of rational and irrational numbers. • Students will do Explore 1 as a whole class hopefully asking questions as they make their way through the practice. • Students will do Example 2 in their individual groups and then discuss their results as a class. • Students will do Example 3 in their individual groups and then discuss their results as a class. • Review the results from each of the groups and then answer the Essential question; how do you estimate and compare irrational numbers?

Unit 3.2	Title: Real Numbers and Pythagorean Theorem	Lesson 2 of 2	Days 8

Lesson Focus

1. Standards Addressed	2. Content to be Learned	3. Mathematical Practices	4. Essential Questions
8.NS.1 8.G.7 8.G.8 8.G.6	Determine whether a number is rational or irrational. Prove the Pythagorean theorem and its converse. Use the Pythagorean theorem to solve problems.	Standard 2. Reason abstractly and quantitatively. Standard 3. Construct viable arguments and critique the reasoning of others.	How do you estimate and compare irrational numbers? How can you tell whether a number is rational or irrational? How can you use the Pythagorean theorem to solve problems? How can you prove the Pythagorean theorem and its converse?
5. Prerequisite Knowledge	**6. Essential Vocabulary**	**7. Possible Misconceptions**	**8. Teaching Materials**
Squares and square roots Solving equations Terminating and Repeating Decimals Integers Rational Numbers Irrational Numbers	Hypotenuse Legs Whole Numbers Natural Numbers Converse	The chart on pg, 117 is confusing What is NOT a real number? $\frac{a}{0}$ or $\sqrt{-a}$ Irrational numbers are not real numbers.	Explorations in CORE MATH http://www.illustrativemathematics.org/illustrations/60 http://www.illustrativemathematics.org/illustrations/1417 http://www.illustrativemathematics.org/illustrations/1302 http://www.illustrativemathematics.org/illustrations/1245 http://www.illustrativemathematics.org/illustrations/334

Instruction	
9. Instruction Practices (What are the teachers doing)	**10. Learning Practices (What are the students doing)**
Lesson on Real Numbers • Show QR Reader video and then read the Essential question. • Direct students to the t-chart they created in the previous lesson. • Direct students to the flow chart and do Example 1 as a whole class with the emphasis on the flow chart. • Direct student to do Practice in their individual groups and then ask the Essential question.	• Students will watch the video taking notes. The class will discuss the video and the students will highlight the essential question; how can you tell whether a number is rational or irrational? • Student led discussion on the t-chart and rational and irrational numbers. Groups will brainstorm and give more examples of both. • Students will complete Example 1 in their workbooks and will be directed to ask any questions they may have. • Have students present their solutions as a class and then answer the Essential question; how can you tell whether a number is rational or irrational?
Lesson on The Pythagorean Theorem • Show QR Reader video and then read the Essential question. • Re-draw a right triangle identifying the key parts and direct students to the KEY Concept from their workbook, which identifies the formula for the Pythagorean Theorem. (Pass out graph paper) • Do Example 1 as a whole class. This is a good review for solving equations with variables and will show the students how to solve equations that have variables squared. • Direct the students to do Example 2 in their groups. • Direct student to do Example 3. (If possible have some boxes similar to the one used in the example. It creates a great visual) • Have students practice some problems and close with the Essential question.	• Students will watch the video taking notes. The class will discuss the video and the students will highlight the essential question; how can you use the Pythagorean Theorem to solve problems? • Students will create different right triangles using graph paper in their groups identifying key parts. The students will then highlight the Key concept with the emphasis on the Theorem $a^2 + b^2 = c^2$ *or* $(leg)^2 + (leg)^2 = (hypotenuse)^2$. • Students will follow along in their workbooks and then will individually try to answer the reflect question from Example 1. • Students will do Example 2 and present their solutions to the class. They will then do the Try This! And Reflect once again presenting to the class. • Students will do Example 3 followed by the Try This! Presenting their solutions to the class. • Students will correct their practice problems and then answer the Essential question; how can you use the Pythagorean Theorem to solve problems?
Lesson on Applying The Pythagorean Theorem and Its Converse	

• Show QR Reader video and then read the Essential question. • Skip Explore 1. It is too confusing and time consuming. • Use direct instruction pointing out that the Pythagorean Theorem says, "If a triangle is a right triangle, then $a^2 + b^2 = c^2$. The *converse* of the Pythagorean Theorem says, "If $a^2 + b^2 = c^2$, then the triangle is a right triangle. • Have students practice some problems and close with the Essential question.	• Students will watch the video taking notes. The class will discuss the video and the students will highlight the essential question; how can you prove the Pythagorean Theorem and its Converse? • Students will copy the Theorem and the *Converse* from the notes given by their instructor and then begin Explore 2 as well as the Reflect piece that goes with it. They will present their solutions to the class. • Students will correct their practice problems and then answer the Essential question; how can you prove the Pythagorean Theorem and Its Converse?

Unit:3.3	Ratios, Proportions, and Similarity	Days :12

Essential Questions
How do you find and compare unit rates? **How can you use tables to identify and describe proportional relationships?** **How can you determine when two triangles are similar?** **How can you use coordinates to describe the result of a particular dilation?**

Content to be Learned	Skills
4.1 Ratios, Rates, and Unit Rates **4.2 Solving Proportions** **4.3 Similar Figures** **4.4 Dilations**	
Assessments	**Standards**
4.1/4.2 Quiz (5 days) **4.3/4.4 Quiz (7 days)**	8.EE.5 8.G.5 8.G.3
Sample Instructional Activities	**Resources**
8.EE Proportional relationships, lines, and linear equations 8.G Triangle congruence with coordinates 8.G Sum of angles in a triangle	

Unit 3.3	Ratios and Proportions	Lesson 1 of 2	Days 5

Lesson Focus

1. Standards Addressed	2. Content to be Learned	3. Mathematical Practices	4. Essential Questions
8.EE.5	Show how a unit rate is a subset of a rate, which in turn is a subset of a ratio. Determine whether two ratios form a proportion. .	Standard 2. Reason abstractly and quantitatively. Standard 8. Look for and express regularity in repeated reasoning.	How do you find and compare unit rates? How can you use tables to identify and describe proportional relationships?
5. Prerequisite Knowledge	**6. Essential Vocabulary**	**7. Possible Misconceptions**	**8. Teaching Materials**
Ratios Rates Common rates like words per minute, or miles per hour.	Unit rate Proportion Proportional relationship	Failure to include units in answer. The difference in cross multiplication vs. cross simplification. When solving proportions each rate must have units and that each quantity has an order in the ratio.	Explorations in CORE MATH 8.EE Proportional relationships, lines, and linear equations

Instruction

9. Instruction Practices (What are the teachers doing)	10. Learning Practices (What are the students doing)
Lesson on Ratios, Rates, and Unit Rates • Show QR Reader video and then read the Essential question. Discuss some of the misconceptions students may have on the difference between rates and unit rates. • Have students do Example 1. Emphasize the reflect piece explaining why a rate is a kind of a ratio and how it differs from other ratios. • Have students complete Example 2, once again emphasizing the reflect part of the exercise on comparing units of different measures. • Have students practice some problems and discuss the essential	• Students will watch the video taking notes. The class will discuss the video and the students will highlight the Essential question; how do you find and compare unit rates? • Students will complete Example 1, sharing their solutions and comparing the reflect piece. • Students will complete example 2 discussing questions from the lesson. • Students will correct their practice problems and then answer the

question. **Lesson on Solving Proportions** • Show QR Reader video and then read the Essential question. Emphasize the use of proportions in mathematics. • Have students do Explore 1. Emphasize the conjecture; if time was divided by distance would the ratio still be constant? • Have students do Example 2. Put an emphasis on the reflect piece at the end of the exercise. • Have students practice some problems and discuss the essential question.	Essential question; how do you find and compare unit rates? • Students will watch the video taking notes. The class will discuss the video and the students will highlight the Essential question; how can you use tables to identify and describe proportional relationships? • Students will complete Explore 1 sharing their solutions. • Students will complete the example and discuss their solutions as well as the reflect piece at the end of the lesson. • Students will correct their practice problems and then answer the Essential question; how can you use tables to identify and describe proportional relationships?

Unit 3.3	Similarity and Dilations	Lesson 2 of 2	Days 7

Lesson Focus

1. Standards Addressed	2. Content to be Learned	3. Mathematical Practices	4. Essential Questions
8.G.5 8.G.3	Show two triangles are similar if two angles of one triangle are congruent to two angles of another or if all three pairs of corresponding sides have proportional lengths. Apply the rule of the dilation to the vertices of the original figure.	Standard 2. Reason abstractly and quantitatively. Standard 7. Look for and make use of structure.	How can you determine when two triangles are similar? How can you use coordinates to describe the result of a particular dilation?
5. Prerequisite Knowledge	**6. Essential Vocabulary**	**7. Possible Misconceptions**	**8. Teaching Materials**
Ratios Graphing using all four quadrants on the coordinate plane.	Proportion Proportional relationship Dilation Center of Dilation Scale factor	When proving similarity using sides that may not necessarily be corresponding sides. Dilations change only size and not the shape of a figure.	8.G Triangle congruence with coordinates 8.G Sum of angles in a triangle

Instruction

9. Instruction Practices (What are the teachers doing)	10. Learning Practices (What are the students doing)
Lesson on Similar Figures • Show QR Reader video and then read the Essential question. Instruct students to highlight the properties of what constitutes similar figures. (Corresponding angles are congruent and corresponding sides are proportional).	• Students will watch the video taking notes. The class will discuss the video and the students will highlight the Essential question; how can you determine when two triangles are similar?
• Instruct students to begin Explore 1. Have students highlight the Angle-Angle Postulate.	• Students will discuss their results from Explore 1 and then highlight the Angle-Angle (AA) Similarity postulate with a student led discussion on what it means.
• Instruct students to do Example 2 with the emphasis on how the AA Similarity Postulate actually works.	• Students will complete Example 2 discussing their results.
• Instruct students to do Example 3. Point out using a visual what is	• Students will complete Example 3 discussing their results.

meant by corresponding sides. • Instruct students to do Example 4. (Instruct the students to redraw the original shape into 2 separate triangles.). • Have students practice some problems and discuss the essential question. (You may have to supplement with some extra problems. The lesson does not provide enough problems for instruction. Omit the problem that includes properties of parallel lines and transversals.)	• Students will complete Example 4 discussing their results. • Students will correct their practice problems and then answer the Essential question; how can you determine when two triangles are similar?
Lesson on Dilations • Show QR Reader video and then read the Essential question. Instruct students to pay special attention to the definition of dilation. Point out when dilating on the coordinate plane, the center of dilation is usually the origin. • Instruct students to do Explore 1. Instruct students to special attention to the definition of a scale factor. Have students highlight the Rule for Dilation. • Instruct students to do Example 2 emphasizing the center of dilation is the origin. • Instruct students to do Example 3 once again emphasizing the center of dilation is the origin, while also asking how the dilation affects the length of line segments. • Have students practice some problems and discuss the essential question.	• Students will watch the video taking notes. The class will discuss the video and the students will highlight the Essential question; how can you use coordinates to describe the result of dilation? • Students will discuss their results from Explore 1 and the definition of a scale factor. They will then highlight the Rule for Dilation and discuss what it means as a class. • Students will complete Example 2 discussing their results. • Students will complete Example 3 discussing their results. • Students will correct their practice problems and then answer the Essential question; how can you use coordinates to describe the result of dilation?

Unit:4.1	Title: Data, Prediction, and Linear Functions	Days :7

Essential Questions	
How do you construct and interpret scatter plot? **How can you use a trend line to make a prediction from a scatter plot?** **How do you graph a linear function?**	
Content to be Learned	**Skills**
9.1 Scatter Plots **9.2 Linear Best Fit Models** **9.3 Linear Functions**	**Bivariate data to record the relationship between two variables Represent relationships as a scatter plot consisting of points in a coordinate plane. Recognize patterns of clustering, outliers and association. Understanding that the relationship of the bivariate data will be a linear model as they interpret the slope and y-intercept to the relationship of the two variable data.**
Assessments	**Standards**
Quiz 9.1/9.2 (4 days) **Quiz 9.3 (3 days)**	**8.SP.1** **8.SP.2** **8.SP.3** **8.EE.5** **8.F.3**
Sample Instructional Activities	**Resources**
https://www.illustrativemathematics.org/illustrations/975 https://www.illustrativemathematics.org/illustrations/1097 https://www.illustrativemathematics.org/illustrations/641	**Explorations in Core Math** **Illustrative Mathematics**

Unit: 4.1	Title: Scatter Plots and Linear Best Fit Models	Lesson 1 of 2	Days: 4

Lesson Focus

1. Standards Addressed	2. Content to be Learned	3. Mathematical Practices	4. Essential Questions
8.SP.1 8.SP.2 8.SP.3	Construct and interpret scatter plots. Use trend lines to make a prediction from a scatter plot.	Standard 4. Model with mathematics. Standard 1. Make sense of problems and persevere in solving them.	How do you construct and interpret scatter plot? How can you use a trend line to make a prediction from a scatter plot?
5. Prerequisite Knowledge	**6. Essential Vocabulary**	**7. Possible Misconceptions**	**8. Teaching Materials**
Positive and negative relationship or association. Making predictions based on data graphed.	Bivariate data Clustering Frequency Scatter plot Trend line Two-way table	Drawing the line of best through the origin for graphs with a positive association.	Explorations in CORE MATH https://www.illustrativemathematics.org/illustrations/975 https://www.illustrativemathematics.org/illustrations/1097

Suggested Learning Practices

9. Instruction Practices (What are the teachers doing)	10. Learning Practices (What are the students doing)
Lesson on Scatter Plots •	

Unit: 4.1	Title: Linear Functions	Lesson 2 of 2	Days: 3

Lesson Focus

1. Standards Addressed	2. Content to be Learned	3. Mathematical Practices	4. Essential Questions
8.EE.5 8.F.3	Graph a linear function.	Standard 4. Model with mathematics.	How do you graph a linear function?
5. Prerequisite Knowledge	**6. Essential Vocabulary**	**7. Possible Misconceptions**	**8. Teaching Materials**
Linear equations graphed on a coordinate plane.	Linear function Linear equation		Explorations in CORE MATH https://www.illustrativemathematics.org/illustrations/641

Suggested Learning Practices

9. Instruction Practices (What are the teachers doing)	10. Learning Practices (What are the students doing)

Unit: 4.2	Title: Geometric Relationships	Days: 8

Essential Questions
How can you use angle pairs to solve problems? **What can you conclude about the angles formed by parallel lines that are cut by a transversal?** **What can you conclude about the measures of the angles of a triangle?**

Content to be Learned	Skills
5.1 Angle Relationships **5.2 Parallel and Perpendicular Lines** **5.3 Triangles**	**Angle relationships formed by intersecting lines, parallel lines cut by a transversal, complementary and supplementary angles. Properties of triangles-triangle sum theorem and exterior angle theorem.**
Assessments	**Standards**
Quiz 5.1/5.2 (5 days) **Quiz 5.3 (3 days)**	**8.G.1** **8.G.5**
Sample Instructional Activities	**Resources**
https://www.illustrativemathematics.org/illustrations/1503 https://www.illustrativemathematics.org/illustrations/56	**Explorations in Core Math** **Illustrative Mathematics**

Unit: 4.2	Title: Angle Relationships Formed by Parallel and Perpendicular Lines	Lesson 1 of 2	Days: 5

Lesson Focus

1. Standards Addressed	2. Content to be Learned	3. Mathematical Practices	4. Essential Questions
5. Prerequisite Knowledge	**6. Essential Vocabulary**	**7. Possible Misconceptions**	**8. Teaching Materials**

Suggested Learning Practices

9. Instruction Practices (What are the teachers doing)	10. Learning Practices (What are the students doing)

Unit: 4.2	Title: The Measures of the Angles of a Triangle	Lesson 2 of 2	Days: 3

Lesson Focus

1. Standards Addressed	2. Content to be Learned	3. Mathematical Practices	4. Essential Questions
5. Prerequisite Knowledge	**6. Essential Vocabulary**	**7. Possible Misconceptions**	**8. Teaching Materials**

Suggested Learning Practices

9. Instruction Practices (What are the teachers doing)	10. Learning Practices (What are the students doing)

Unit: 4.3	**Title: Similarity and Transformations**	**Days: 13**

Essential Questions	
How do you use coordinates to find scale factor? **How can you prove that two triangles are congruent?** **How can you use coordinates to describe the result of a translation, reflection, or rotation?** **What properties of a figure are preserved under a translation, reflection, or rotation?** **What is the connection between transformations and congruent figures and transformations and similar figures?**	
Content to be Learned	**Skills**
5.4 Coordinate Geometry **5.5 Congruence** **5.6 Transformations** **5.7 Similarity and Congruence Transformations** **5.8 Identifying Combined Transformations**	**Prove that two triangles are congruent by SSS and SAS.** **Apply the rule of the transformation to the vertices of the original figure with the resulting points being vertices of the image. The size and the shape of a figure are preserved under translations, reflections and rotations.**
Assessments	**Standards**
Quiz 5.4/5.5 (4 days) **Quiz 5.6/5.7 (7 days)** **Quiz 5.8 (2 days)**	**8.G.2** **8.G.3** **8.G.1a,b,c**
Sample Instructional Activities	**Resources**
https://www.illustrativemathematics.org/illustrations/1232	**Explorations in Core Math** **Illustrative Mathematics**

Unit: 4.3	Title: Coordinate Geometry and Congruence	Lesson 1 of 3	Days: 4
Lesson Focus			
1. Standards Addressed	**2. Content to be Learned**	**3. Mathematical Practices**	**4. Essential Questions**
5. Prerequisite Knowledge	**6. Essential Vocabulary**	**7. Possible Misconceptions**	**8. Teaching Materials**
Suggested Learning Practices			
9. Instruction Practices (What are the teachers doing)		**10. Learning Practices (What are the students doing)**	

Unit: 4.3	Title: Properties of Transformations Including Similarity and Congruence	Lesson 2 of 3	Days: 7

Lesson Focus

1. Standards Addressed	2. Content to be Learned	3. Mathematical Practices	4. Essential Questions
5. Prerequisite Knowledge	**6. Essential Vocabulary**	**7. Possible Misconceptions**	**8. Teaching Materials**

Suggested Learning Practices

9. Instruction Practices (What are the teachers doing)	10. Learning Practices (What are the students doing)

Unit: 4.3	Title: Identifying Combined Transformations	Lesson 3 of 3	Days: 2
Lesson Focus			
1. Standards Addressed	**2. Content to be Learned**	**3. Mathematical Practices**	**4. Essential Questions**
5. Prerequisite Knowledge	**6. Essential Vocabulary**	**7. Possible Misconceptions**	**8. Teaching Materials**
Suggested Learning Practices			
9. Instruction Practices (What are the teachers doing)		**10. Learning Practices (What are the students doing)**	

Unit: 4.4	Title: Measurement and Geometry	Days: 12

Essential Questions	
How do you find the area of a circle? How can you solve problems using the formula for the volume of a cylinder? How can you solve problems using the formula for the volume of a cone? How can you solve problems using the formula for the volume of a sphere?	
Content to be Learned	**Skills**
6.1 Circles 6.2 Volumes of Prisms and Cylinders 6.3 Volumes of Pyramids and Cones 6.4 Spheres	Develop formulas for the volume of cylinders, cones and spheres. Recognize the relationship between the volumes of cylinders and cones. Also, recognize the relationship between the volumes of cylinders and spheres.
Assessments	**Standards**
Quiz 6.1/6.2 (6 days) Quiz 6.3/6.4 (6 days)	8.G.9
Sample Instructional Activities	**Resources**
https://www.illustrativemathematics.org/illustrations/112 https://www.illustrativemathematics.org/illustrations/517	Explorations in Core Math Illustrative Mathematics

Unit: 4.4	Title: Circles and the Volume of Prisms and Cylinders	Lesson 1 of 2	Days: 6
Lesson Focus			
1. Standards Addressed	**2. Content to be Learned**	**3. Mathematical Practices**	**4. Essential Questions**
5. Prerequisite Knowledge	**6. Essential Vocabulary**	**7. Possible Misconceptions**	**8. Teaching Materials**
Suggested Learning Practices			
9. Instruction Practices (What are the teachers doing)		**10. Learning Practices (What are the students doing)**	

Unit: 4.4	Title: Spheres and the Volume of Pyramids and Cones	Lesson 2 of 2	Days: 6

Lesson Focus

1. Standards Addressed	2. Content to be Learned	3. Mathematical Practices	4. Essential Questions
5. Prerequisite Knowledge	**6. Essential Vocabulary**	**7. Possible Misconceptions**	**8. Teaching Materials**

Suggested Learning Practices

9. Instruction Practices (What are the teachers doing)	10. Learning Practices (What are the students doing)