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| **Targeted Content Standard(s):** | | | | | **Student Friendly Learning Targets** | |
| **7.RP.1** Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units. *For example, if a person walks 1/2 mile in each 1/4 hour, compute the unit rate as the complex fraction 1/2/1/4miles per hour, equivalently 2 miles per hour.* | | | | | *I can…*   * Recognize complex fractions * Compute unit rates to make comparisons * Convert complex fractions to unit rates in contexts | |
| **Targeted Mathematical Practice(s):** | | | | |
| 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 an express regularity in repeated reasoning | | | | |
| **Supporting Content Standard(s):** *(optional)* | | | | |
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| **Purpose of Lesson:** | | | | | | |
| Students will be able to solve complex fractions to make comparisons and to model real world situations**.** | | | | | | |
| **Explanation of Rigor:** *(Fill in those that are appropriate.)* | | | | | | |
| **Conceptual**: Students develop a concept of what complex fractions represent and how they relate to unit rates.(6.RP.2) | | **Procedural:** Students compute unit rates, including those presented as complex fractions. (7.RP.1) | | | | **Application:** Create and solve real life problems involving complex fractions and unit rates including ratios of lengths, areas and other quantities measured in like or different units. (7.RP.1) |
| **Vocabulary:** | | | | | | |
| Complex Fraction  Unit Rate | | | Ratio  Rate | | | |
| **Evidence of Learning (Assessment):** | | | | | | |
| **Pre-Assessment:** Unit 1 Pre-assessment [Segment 1],What is a unit rate?[Segment 2]  **Formative Assessment(s):** Fraction Scavenger Hunt checklist [Segment 3]  **Summative Assessment:** 7 RP.1 Summative Assessment  **Self-Assessment:** 7RP.1 Skeleton | | | | | | |
| **Lesson Segments:**   1. Pre-Assessment (Unit Rate and Division of Fractions) 2. Introducing Complex Fractions 3. Converting complex fractions and applying them to real life situations. 4. Apply complex fractions to real life situations using unit rates. 5. Create and solve complex fractions. 6. Summative Assessment of 7.RP.1 | | | | | | |
| **Lesson Procedure:** | | | | | | |
| Segment 1 | | | | | | |
| **Approximate Time Frame:**  40-50 minutes | | **Lesson Format:**  Whole Group  Small Group  Independent  Modeled  Guided  Collaborative  Assessment | | | | **Resources:**  Unit 1 Pre-assessment  Vocabulary Memory |
| **Focus:**  Pre-assessing unit rate and division of fractions | | **Modalities Represented:**  Concrete/Manipulative  Picture/Graph  Table/Chart  Symbolic  Oral/Written Language  Real-Life Situation |
| **Math Practice Look For(s):**  **MP1:** Students will make sense of the word problems included in this pre-assessment so that they can demonstrate understanding of previously learned concepts or show that they know concepts that were intended to be taught within this unit.  **MP6:** Students will attend to the precise language of the word problems in this document so that they can make sense of the problems. | | | **Differentiation for Remediation**  **Differentiation for English Language Learners:**  **Differentiation for Enrichment:** | | | |
| **Potential Pitfall(s):**  Students may need more time to complete Pre-test and/or the vocabulary activity. Vocabulary may be moved to segment 2, if necessary. | | | **Independent Practice (Homework):**  Possible completion of Vocabulary Memory. | | | |
| **Steps:**   1. Give students the Pre-Assessment for Unit 1. 2. After the Pre-Assessment is given, introduce the vocabulary words for this unit.  * Ratio, rate, unit rate, proportion, complex fraction, equivalency  1. Teachers are encouraged to ensure that students have a working knowledge of these words. 2. The idea presented in the unit is for a memory game. Directions are included on the worksheet. | | | | **Teacher Notes/Reflections:** | | |

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| Segment 2 | | | | |
| **Approximate Time Frame:**  40-50 minutes | **Lesson Format:**  Whole Group  Small Group  Independent  Modeled  Guided  Collaborative  Assessment | | | **Resources:**  Vocabulary Words  What is unit rate?  7RP.1 Complex Fractions and Unit Rates |
| **Focus:**  Introducing complex fractions. | **Modalities Represented:**  Concrete/Manipulative  Picture/Graph  Table/Chart  Symbolic  Oral/Written Language  Real-Life Situation |
| **Math Practice Look For(s):**   * **MP6**: Look for students to use vocabulary terms rate, ratio, unit rate, and complex fraction appropriately. * **MP2 & 3**: Look for students to articulate their reasoning. | | **Differentiation for Remediation:**  If students are not ready to use complex fractions, have them begin with whole numbers and then move towards complex fractions.  **Differentiation for English Language Learners:**  **Differentiation for Enrichment:** Use rational numbers. | | |
| **Potential Pitfall(s):**  Some students may have difficulty rewriting whole numbers as fractions. | | **Independent Practice (Homework):**  Only send home the practice for homework if students seem to be ready for independent practice after showing success working with partner/group.  In preparation for tomorrow’s discussion, find an example of complex fractions used in the real world. | | |
| **Steps:**  1. (15-20 min. pre-assessment) Entry slip with partner. Students fill out the entry slip with their partner and then share out.*What is a unit rate?* Discuss the terms ratio, rate, and unit rate. | | | **Teacher Notes/Reflections:** | |
| 2. (10 min.) – Introduce the term complex fraction by giving examples of what they may have previously seen. Draw upon previous knowledge to foster new learning. Examples should include:   * Students have seen fractions divided by a whole number.   2  6  (remind students that a whole number can always be written as a fraction with a denominator of 1)   * Fractions divided by fractions. | | |
| Teacher should build the transition from ‘dividing fractions’ to complex fractions.  2  then becomes    6 then becomes  then becomes  then becomes  Discussion should include  Rewriting division of fractions into complex fractions. | | | **Teacher Notes/Reflections:** | |
| 3. (15-20 min.) Teacher should present examples to solve complex fractions and give students time to practice.  Examples: | | |
| 4. (5-10 min.) Students will share any observations from practicing. | | |

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| Segment 3 | | | | |
| **Approximate Time Frame:**  60-80 minutes | **Lesson Format:**  Whole Group  Small Group  Independent  Modeled  Guided  Collaborative  Assessment | | | **Resources:**  Fraction Scavenger Hunt  Fraction Scavenger Hunt checklist |
| **Focus:**  Converting units in complex fractions and applying them to real life situations. | **Modalities Represented:**  Concrete/Manipulative  Picture/Graph  Table/Chart  Symbolic  Oral/Written Language  Real-Life Situation |
| **Math Practice Look For(s):**   * **MP2-3**: Look for students to articulate their reasoning. Using checklist, listen for student discussion of matches. (Step 1) * **MP1:** Look for students to make sense of the situation by representing it in an accurate model. (Step 2) | | **Differentiation for Remediation:** Have students create complex fraction expressions.  **Differentiation for English Language Learners:**  **Differentiation for Enrichment:** | | |
| **Potential Pitfall(s):** Some students may have difficulty writing complex fractions with multiple representations. Monitor that students use proper notation and that they attend to precisionwhen solving. | | **Independent Practice (Homework):** | | |
| **Steps:**  1. (20-25 min.) Working in pairs, student will complete suggested activity Fraction Scavenger Hunt. Students will need a sheet of paper to show their work.  Here is how the Scavenger Hunt works: You will need two sets of the cards. One set will be randomly taped around the room. Using the other set, each student or pair, will receive one card. Each card has an expression to evaluate as well as the answer to a *different* expression (in grey.) When they evaluate the expression on the card, they search the room for the answer (in grey.) On that card is their new expression. They repeat the process of evaluating (on their paper) and searching for the answer.  This activity will allow the teacher to circulate the room and should be an informal way to begin to assess student understanding. Use the Scavenger Hunt checklist as a guide when observing. | | | **Teacher Notes/Reflections:** | |

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| Segment 4 | | | |
| **Approximate Time Frame:**  60-80 minutes | **Lesson Format:**  Whole Group  Small Group  Independent  Modeled  Guided  Collaborative  Assessment | | **Resources:**  Converting Units in Complex Fractions |
| **Focus:**  Converting units in complex fractions and applying them to real life situations. | **Modalities Represented:**  Concrete/Manipulative  Picture/Graph  Table/Chart  Symbolic  Oral/Written Language  Real-Life Situation |
| **Math Practice Look For(s):**   * **MP2-3**: Look for students to articulate their reasoning. Using checklist, listen for student discussion of matches. (Step 1) * **MP1:** Look for students to make sense of the situation by representing it in an accurate model. (Step 2) | | **Differentiation for Remediation:** Have students create complex fraction expressions.  **Differentiation for English Language Learners:**  **Differentiation for Enrichment:** | |
| **Potential Pitfall(s):** Some students may have difficulty writing complex fractions with multiple representations. Monitor that students use proper notation and that they attend to precisionwhen solving. | | **Independent Practice (Homework):**  Students will create and solve at least one of their own real-world problems involving unit rates and complex fractions. | |
| **Steps:**  1. (15-20 min.) Expand class discussion to real-life examples and unit rates. Students should be able to translate the word problems into equations.  Examples -   * Sharon runs 7/10 mile in 6 minutes. How many miles does she run in one minute? In one hour?   or  Discussion should include the reason why changing 6 minutes into a fraction of an hour is necessary (in order to match the units.) How do you represent 6 minutes as a fraction of an hour?  =  What would the new equation look like? Will you get the same answer? | | **Teacher Notes/Reflections:** | |
| * A small airplane used 7 1/3 gallons of fuel to fly a 3 hour trip. How many gallons were used each hour? Each day?   Have students solve the problem using hours as a fraction of a day.   * Michael drove 350 miles to his grandmother’s house. The trip took him 3 1/3 hours. What was his average speed in miles per hour? * David and his dad are building a room in the basement. They want the room to have an area of 150 ft2. If one wall is 11.25 ft. long, how long must the other wall be?   Homework based on discussion: Have students create and solve at least one real-world problem involving unit rates and complex fractions. | | **Teacher Notes/Reflections:** | |

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| Segment 5 | | | | | |
| **Approximate Time Frame:**  40-60 minutes | **Lesson Format:**  Whole Group  Small Group  Independent  Modeled  Guided  Collaborative  Assessment | | | | **Resources:**  Unit Rate Matching Activity |
| **Focus:**  Apply complex fractions to real life situations using unit rates. | **Modalities Represented:**  Concrete/Manipulative  Picture/Graph  Table/Chart  Symbolic  Oral/Written Language  Real-Life Situation |
| **Math Practice Look For(s):**   * **MP1**: Look for students to make sense of the situation, representing it in an accurate model and explain the representation to others. * **MP6**: Look for students to attend to the precise language of the problem. | | **Differentiation for Remediation:**  **Differentiation for English Language Learners:**  **Differentiation for Enrichment:** | | | |
| **Potential Pitfall(s):** Students may confuse units when representing equivalent proportions. | | **Independent Practice (Homework):** Optional homework should include problems similar to those used in the Unit Rate activity. | | | |
| **Steps:**  1. (10-15 min.) Begin the day with a discussion of the real-world complex fractions they created for homework. Students may share on board, overheard, Elmo, etc. | | | | **Teacher Notes/Reflections:** | |
| 2. (25-30 min.) Working alone or in pairs, students complete the Unit Rate Matching activity.  Directions: Provide students with Rate Cards and Unit Rate cards. Have them solve and match.  Note: Problems should include complex fractions and decimals. This is an opportunity for differentiation. You may want to adjust the Rate Cards to reflect student readiness. Multiple sets can be made for future use.  Students should be required to provide evidence of work and justify their answers. | | | |
| 3. (5-10 min.) Reflection exit slip: Discuss with a partner or small group how are multiplication and division of complex fractions related? | | | | **Teacher Notes/Reflections:** | |
| Segment 6 | | | | | |
| **Approximate Time Frame:**  90 minutes | **Lesson Format:**  Whole Group  Small Group  Independent  Modeled  Guided  Collaborative  Assessment | | | | **Resources:**  Scavenger Hunt Card Template  Unit Rate Cards (Used for differentiation) |
| **Focus:**  Create and solve complex fractions. | **Modalities Represented:**  Concrete/Manipulative  Picture/Graph  Table/Chart  Symbolic  Oral/Written Language  Real-Life Situation |
| **Math Practice Look For(s):**   * **MP4**: Look for students to effectively model equivalent fractions * **MP6**: Look for students to attend to the precise language of the problem. | | **Differentiation for Remediation:** Students may use a whole number in the expression.  **Differentiation for English Language Learners:**  **Differentiation for Enrichment:** The Unit Cards can be used to add labels to create real world situations. Encourage students to use different units of measure. | | | |
| **Potential Pitfall(s):** Be sure students use proper notation and labels when modeling complex fractions. Remind students that a whole number can be written as a fraction with a denominator of one. | | **Independent Practice (Homework):** | | | |
| **Steps:**  1. (5-10 min) Introduce and explain creating Fraction Scavenger Hunt Cards. | | | **Teacher Notes/Reflections:** | | |
| 2. (20 -30 min) Using the dominoes, dice, or number cubes students will create their own Fraction Scavenger Hunt using the suggested template. The dominoes, dice, or number cubes are used to generate random numbers to create the complex fractions.  Tip: The expression and its answer cannot appear on the same card (answer must be on a different card.)To avoid repeated answers, write all problems before making cards.   * Working in small groups, students will create 5 expressions. * Small groups will pair for a peer review of the problems. * After review, groups will make the game cards.   Games can be played in small groups, or as a whole class. | | | **Teacher Notes/Reflections:** | | |

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| Segment 7 | | | |
| **Approximate Time Frame:**  45-50 minutes | **Lesson Format:**  Whole Group  Small Group  Independent  Modeled  Guided  Collaborative  Assessment | | **Resources:**  7.RP.1 Formative Assessment |
| **Focus:**  Formative Assessment of 7.RP.1 | **Modalities Represented:**  Concrete/Manipulative  Picture/Graph  Table/Chart  Symbolic  Oral/Written Language  Real-Life Situation |
| **Math Practice Look For(s):**  **MP1:** Look for students to make sense of the real-life situations and how ratios and proportions are used to represent these situations.  **MP2:** Look for students to use their understanding of ratios and proportions to determine if solutions are reasonable.  **MP6:** Look for students to attend to the language in the problem when writing ratios and proportions that represent the situations. Look for them to use precision with unit labels. | | **Differentiation for Remediation:** Students may benefit from representing ratios using tactile tools like Cuisenaire rods.  **Differentiation for English Language Learners:** Pre-teach vocabulary terms for the real-world situations.  **Differentiation for Enrichment:** Challenge students to extend the real-life situations by creating follow up questions with multiple conversions. | |
| **Potential Pitfall(s):**  Students may not attend to precision in the problem and set up the ratios or proportions incorrectly. | | **Independent Practice (Homework):** | |
| **Steps:**  1. Give the 7.RP.1 Formative Assessment  After giving the assessment and scoring it, give students the self-assessment (Skeleton) for 7.RP.1 so that they can analyze their data and reflect upon their progress. | | **Teacher Notes/Reflections:** | |