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| **TEAM Lesson Plan Template** |
| Teacher: |
| Subject/Grade: 5th grade Math |
| Lesson Title: “Multiplying A Whole Number by a Fraction” |
| **STANDARDS:** |
| Standard: 5.NF.B.4a: Interpret the product of a fraction (a/b) and a whole number (q).  This lesson emphasizes:   * multiplying a whole number by a fraction using visual models to understand. * understanding that the product of a whole number and a fraction less than 1 whole will be smaller than the whole number. |
| **OBJECTIVES:** |
| I can statements:   * I can multiply a whole number by a fraction. (level 3) |
| **MATERIALS AND RESOURCES:** |
| Materials:   * Each student is given blank paper. * Each student will need colored pencils, crayons, markers, or highlighters.   What if technology is not working?   * Ideally, this is shown under document cameras and observations are recorded on a whiteboard; however, circulating around the room and writing observations on butcher paper works as well.   Routine for distributing materials:   * Distribute these supplies based on your class expectations and outline expectations of use. |
| **ACCOMMODATIONS/ADAPTATIONS:** |
| Accommodations:   * Preferential seating   + Close to teacher for behavior or attention needs   + Close to a peer for students with math difficulties   + Instead of giving students blank paper and allowing them to draw their own models, have the wholes pre-drawn.   + Ask specific students or entire class to pick one color or ask everyone to use the same color, as needed, to help with attention needs   + This lesson could be modified to be more hands on if you gave children playdough. They could roll out one ball of playdough and then physically cut it with a pencil to show what one half of it would be, etc… I would not recommend using playdough during cold and flu season unless you intend for them to take it home at the end of the lesson. \*\*GERMS!\*\*   Enrichment option:   * Students will be given visual models and asked to determine the multiplication problem using the models to justify their answer. (These should be created before hand). * Example below shows a model the student may receive.  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | |  |  |  | | --- | --- | --- | |  |  |  | | |  |  |  | | --- | --- | --- | |  |  |  | | |  |  |  | | --- | --- | --- | |  |  |  | | |  |  |  | | --- | --- | --- | |  |  |  | | |  |  |  | | --- | --- | --- | |  |  |  | | | Sample response: I know that this model represents 5 x 1/3 (or 1/3 x 5) because I see that 5 wholes have been partitioned into 3 equal parts and 1 of those parts have been shaded in each of the wholes. The answer is 1/3 + 1/3 + 1/3 + 1/3 + 1/3, 5/3, or 1 2/3. \*\*You’ll want to encourage your students to always give the answer in as many possible variations as they/you can think of. It will help them continue to build an understanding of fractions. | | | | |  * Student will be asked to create their own models to represent problems and switch with other students in need of enrichment to solve each other’s work. |
| **MOTIVATING STUDENTS/ANTICIPATORY SET:** |
| Put the following question on the board:   * Reese’s father, a farmer, has 3 fields, and each field is one acre in size. He planted ¼ of each field with carrots. What portion of an acre has been seeded with carrots? * An alternate way to ask this question: Reese’s father, a farmer, has 3 fields of equal size. He planted ¼ of each field with carrots. What fraction of the 3 fields has been seeded with carrots? * Students will write their answer on a post stick note and place at the front of the room. Make sure to explain that they will have the opportunity to revise their answer later on, so have them write neatly and put their name or student # on it for easy identification. |
| **INSTRUCTIONAL PROCEDUCRES:** |
| **Lesson Layout**  Introduction:   * Pass out paper and ask students to get the required coloring/shading materials. * Lead the class through folding the paper so that there are 4 boxes on the front and back of the paper. This will allow them to have space for 8 problems. This routine also helps some students better space their work. * Instruct the students to draw a square or rectangle in the first box, then shade in half of it. After an appropriate amount of time, ask the students, “What is one half of one?” (Continue to use this phrasing and the word “of” as this is how multiplication is worded) After they determine the correct answer, ask them what happened to the model. Use assessing and advancing questions to get them to tell you that they took a part of the whole and that is why the amount is smaller. This is a key concept that you will translate into the rest of the lesson. * Explain that you have in fact modeled 1 x ½ or ½ of 1. Again, make sure to focus on “of” by taking the time to point out the word and explaining to students that it is indicating that we multiplied. Optional: have students write “1 x ½ = ½” and/or “1/2 of 1 = ½” in the same square. This page could easily be put in a notebook as notes. * Also, this is a time to discuss how 1 whole can be represented as a fraction (1/1). This brings in the math problem (1x1) / (1x2) = ½. This is key for the students to understand in order to be able to solve this type of problem without a model. \*\*Optional: add this to the notes. * Allow time here for the class discussion to deepen understanding. Use assessing and advancing questions and accountable talk practices; encourage the students to lead. You may want to add good observations to a class created anchor chart.   Middle:   * Repeat this process with 2 x ½ (1/2 of 2). Allow appropriate time to draw and shade the models. This may be as guided or as modeled as you think your students can handle. The goal is that by the end of the lesson they are able to appropriately draw the correct number of wholes, partition them correctly, and shade in the correct fraction of each whole. Once they have drawn the model say, “Turn to your partner and determine how much of the model is shaded.” Then bring the class back together to discuss the answer. Follow this with, “How did we multiply 2 and get an answer less than 2?” Again, allow time for students to discuss in partners or groups than bring the class back together. Allow time for students to explain their reasoning and encourage class discussion so that all students understand that the answer is smaller that the original whole number because a part, or fraction, of each whole was taken. * Repeat this discussion with the following problems all the while circulating to make sure all students are able to accurately model and explain their models:   + 3 x 1/5 and 2 x 2/3 (drawing models, then writing the problem)   + 4 x 1/3 and 2 x 4/5 (encourage students to try it without the model first, then they may draw the model to prove their answer)   + 2 x 3/7 and 5 x 6/9 (without models – explain that these are large models and are much quicker by just using the algorithm)   End/Closure:   * Put the original hook question about Reese back on the board. Instruct students to get their post stick notes and rethink their first answer. They can NOT erase the original answer, but they can write that they’ve changed it and why, or they can add to their original explanation to make it clearer and more math focused. Have them turn in their post stick note. This is now used by the teacher to see each child’s understanding of the concept. * Instruct students to clean up their fraction tiles and collect them.   **Motivating Students**   * Verbal praise; make sure to praise the *process* and not the end result. This helps encourage those struggling learners and keeps them engaged in putting forth the effort.   **Presenting Instructional Content**   * Hands-on/Drawing models * Class discussion with teacher assessing and advancing questioning and accountable talk   **Instructional Strategies**  Input:   * Hook   Exploration and Discussion:   * Hands on work/Drawing models * Teacher guides exploration through assessing and advancing questions   Check for Understanding:   * Check for understanding through questioning and observing student models   + Struggling Students: Give more 1 on 1 attention during partner/group work; question individually to see where the misunderstanding lies and help aid in understanding.   + Challenging Students: Extend thinking using higher level of questioning and include more advanced fractions; challenge to complete comparisons without the fraction models or challenge them to determine the answer of ½ of 1/2. |
| **QUESTIONING/THINKING/PROBLEM SOLVING:** |
| Questioning - These questions will occur throughout the activity as prompts based on groups’ or individual students’ progress and needs. These are also meant to be springboards to other questions.  Knowledge:   * Do 1 and 1/1 represent the same amount (2 and 2/1, etc)? Why? Can you draw a model to prove this? * What is ½ of 1? * What operation does “of” describe?   Comprehension:   * As you multiply a whole number greater than one by a fraction less than one, what are you noticing about the size of the product? * How does the product compare to the factors?   Application:   * Why is the product less than the whole number (clarify with: when the whole number is greater than one)? * Why is the product greater than the fraction? * ~~Is the product less than both factors?~~ Why or why not? \*\*The answer is no. The product is only smaller than the whole number because the fraction is less than one. The answer is larger than the fraction because it is being multiplied by a number greater than 1 (unless it IS being multiplied by 1).\*\*   **Thinking**  Practical:   * What total fraction of the three fields did Reese’s dad plant with carrots?   Analytical:   * Application questions – discovering why the product is less than the whole number.   What am I going to do to give students an opportunity to:   * Generate a variety of ideas?   + Use assessing and advancing questions during the class discussion.   + Allow students to explore the concept of multiplying whole numbers and fractions through drawing models (or dividing playdough). * Analyze problems from multiple viewpoints?   + Facilitate class discussions and encourage a variety of thoughts/ideas from different levels of students.   **Problem Solving**  Experimenting:   * Allow plenty of time for students to explore the concept through drawing and interpreting the models. * Student discovery of the best way to prove the answer for various problems (Is the model or the algorithm more effective and efficient?).   Predicting outcomes:   * Students will predict outcomes as they experiment with determining what amount of the field is being planted.   Improving solutions:   * Teacher-led discussion using assessing and advancing questions based on student ideas * Exit ticket |
| **ASSESSMENT** |
| * Hook and Exit Ticket |
| **CLOSURE** |
| Students go and get their “hook” post stick note. They must leave their original work, but can change their answer or add to their original explanation to reflect their learning. ALL students will write and explanation to justify their answer. |

**NOTES:**

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