

M2C3 MATH MODELING LESSON OVERVIEW

LESSON TITLE: Making Slime Task

STANDARDS ALIGNMENT:

GRADE 3	GRADE 4	GRADE 5
<p>3.OA.A.1 Interpret products of whole numbers, e.g., interpret 5×7 as the total number of objects in 5 groups of 7 objects each.</p> <p>3.OA.A.3 Use multiplication and division within 100 to solve word problems in situations involving equal groups and measurement quantities.</p> <p>3.OA.D.8 Solve two-step word problems using the four operations. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding</p> <p>3.MD.A.2 Measure and estimate liquid volumes and masses of objects using standard units. Add, subtract, multiply, or divide to solve one-step word problems involving masses or volumes that are given in the same units.</p>	<p>4.NBT.B.4 Fluently add and subtract multi-digit whole numbers using the standard algorithm.</p> <p>4.NF.B.3.C Add and subtract mixed numbers with like denominators, e.g., by replacing each mixed number with an equivalent fraction, and/or by using properties of operations and the relationship between addition and subtraction.</p> <p>4.NF.B.3.D Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators, e.g., by using visual fraction models and equations to represent the problem.</p> <p>4.NF.B.4 Apply and extend previous understandings of multiplication to multiply a fraction by a whole number.</p> <p>4.MD.A.2 Use the four operations to solve word problems involving liquid volumes and masses of objects, including problems involving simple fractions or decimals.</p>	<p>5.NBT.A.3 Read, write, and compare decimals.</p> <p>5.NBT.B.7 Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.</p> <p>5.NF.B.6 Solve real world problems involving multiplication of fractions and mixed numbers, e.g., by using visual fraction models or equations to represent the problem.</p> <p>5.MD.A.1 Convert among different-sized standard measurement units within a given measurement system, and use these conversions in solving multi-step, real world problems.</p>

<p>MP: 1 Make sense of problem and persevere in solving them.</p> <p>MP: 3 Construct viable arguments and critique the reasoning of others.</p> <p>MP: 4 Model with Mathematics</p>	<p>MP: 1 Make sense of problem and persevere in solving them.</p> <p>MP: 3 Construct viable arguments and critique the reasoning of others.</p> <p>MP: 4 Model with Mathematics</p>	<p>MP: 1 Make sense of problem and persevere in solving them.</p> <p>MP: 3 Construct viable arguments and critique the reasoning of others.</p> <p>MP: 4 Model with Mathematics</p>
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CONNECTIONS (Consider while planning):

- Previous Math Knowledge: *What prior math knowledge and experiences does this lesson consider and/or build on?*

Measurement in cups, teaspoons, tablespoons
 Working with money (amounts in whole and half dollars)
 Adding and multiplying fractions

- Cultural/Community/Family Connections: *How does the lesson connect to, or build on the knowledge, practices, or experiences of children and families? On community contexts??*

Students will have seen their family members follow a recipe and may have helped them measure and mix the ingredients. They may have played with slime. They may have made slime and have experiences with different recipes for slime.

Language Considerations: specialized terms: criteria, rating, and ranking

TASK:

Mathematizing World - Open Ended (10 minute) - [Introduce Slime - Show slide2.] Use initial slides to connect to students' experiences with playing with slime. Identify the different types of slime in the pictures.

- What do you notice? What does this picture make you wonder about? Brief class discussion.

Mathematizing World - Specific Questions (20 minute) Sensemaking and assumption building.

The 2nd graders are going to make slime for a science celebration. They need your help to decide which slime they should make. You can choose from a few popular slime recipes.

- What do you know about slime?
- What do you know about recipes?
- What do you need to know?
- What assumptions do you need to make?

Full Modeling Task (60-90 minute) Students participate in entire modeling cycle

In this task students will create determine which slime recipe they want to use to make slime.

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PART 1 Version A: Calculating Costs

First, the 2nd graders want to know **how much it will cost** to make each of the slime recipes.

- Use the information in “Cost of Slime Ingredients” table to calculate the cost for making a “class portion” of each type of slime.
- Write an equation to show how you figured out the cost of a “class portion” of each type of slime.
- Include unit labels so that it is clear what each number means.

Then add the cost to the “Comparing Slime Recipes” table.

PART 1 Version B: Making Slime: How much will it cost? (Slide 23) Note: This version is written for 5th grade students and can be an extension of Task A or a stand-alone task.

We’re going to focus on three slime recipes:

Fluffy

Flubber

Glow in the Dark

We want to find out how much each type of slime would cost for one portion and for a class portion.

Keep in mind that ingredients are sold differently!

Use the information in the Task B Tables to determine the cost.

Explain the assumptions you made and show the mathematics you used.

PART 2: Comparing Slime Options

Cost is not the only factor to consider.

Use the information in the “Comparing Slime Recipes” table to compare and contrast the different types of slimes.

- Decide which information is most important in your decision
- Use the information to rate and rank the different slime recipes . Note: Students may not know how to rank the recipes. You might want to talk about ranking their favorite foods or TV shows.

PART 3: Write a Recommendation:

- Tell the 2nd graders which slime recipe you think they should make for their science celebration, and why
- What information you considered in your decision, and what information (or factors) was the most important and the least important
- Your assumptions
- How much the slime will cost to make
- How others could use your plan to choose a slime recipe for their class

Use pictures, numbers and/or words to show that your plan will work.

ANTICIPATED STUDENT ASSUMPTIONS for Making Slime

Students may assume

- They should use ingredients they have in their classroom or can bring from home.
- They will have money to pay for ingredients.
- They can just buy the exact amount they need for the recipe.
- The best slime is the sparkle or glow in the dark.
- They should not make slime that could burn your skin.
- They may not understand that the rank of one is the best rank.

ANTICIPATED STUDENT STRATEGIES for Making Slime

Students may:

- Change decimal money to fractions to add amounts (\$3.50 to 3 ½ dollars)
- Add all the costs in the table or in one column without looking at the recipe.
- Decide that a class is 25 students. For ingredients that are listed as table portions (4-5 students) amounts they could use 5 table portions for a class portion.
- For items listed as whole class (i.e. food coloring) they would divide by 5, (i.e. $\$3.50/5 = \$.70$.)
- An equation with labels includes Cost of Fluffy Slime = 5 x (Cost of ½ cup of Glue + Cost of ½ tsp Baking Soda +Cost of 1 can of Shaving Cream + Cost of 1 tbl Saline Solution + Cost of Food Coloring.
- Find the cost of one portion (table portion) student could find the class portion and divide by 5 (or 4). Or they could calculate the cost of the few items that are only given for the whole class (i.e. liquid starch \$7.00) and divide by 4 or 5. $\$7.00/5= \1.40 .
- Say that they have to buy the whole amount anyway and thus include the total cost even if they will not use it all.
- Once they have the price of each slime, they may want to consider how the slime looks or how easy it is to make to help them rank their favorites. One group might want glitter or glow in the dark, but choose glitter as their recommendation because glow in the dark could irritate some students' hands.
- Version B – Measures are given in fluid ounces and cups. Students will need to convert between fl oz and cup measures. They can look up conversion amounts

and apply them to the recipes: 8 fl oz = 1 cup , 1teaspoon = 0.167 fluid ounce.

Materials:

Slime_ Student Task

Slime_ Lesson Slides

Realia – Slime or materials to make slime.