**M2C3 Math Modeling Lesson Plan Template**

**LESSON TITLE: Making Picture Frames to Honor Loved Ones**

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| GRADE 3 | GRADE 4 | GRADE 5 |
| 3.0A: Represent and solve problems involving multiplication and division.3.0A 3: Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities.  | 4.0A Use the four operations with whole numbers to solve problems. Gain familiarity with factors and multiples.4.OA 3. Solve multistep word problems posed with whole numbers and having whole number answers using the four operations, including problems in which remainders must be interpreted...Assess the reasonableness of answers using mental computation and estimation strategies including rounding.  | 5.OA Write and interpret numerical expressions.5.NBT Perform operations with multi-digit whole numbers and with decimals to hundredths.5.NBT 6. Find whole-number quotients of whole numbers with up to four digit dividends and two-digit divisors, using strategies based on place value, the properties of operations and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations  |

***CONNECTIONS (Consider while planning):***

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| **Prior Math Knowledge** | **Family/Community/Cultural Connections** | **Language Considerations** |
| -equal groups-skip counting by a given number-repeated addition, repeated subtraction-multiplication (equal group model)-division with leftovers-reasoning about the meaning of “remainders” or “leftovers”-linear measurement (for string) | -family or cultural or community traditions to honor family members (i.e., dia de los muertos traditions)-experiences making crafts with popsicle sticks | -packages-frames-for each, for one, for all -per frame, per package |

**TASK:**

Our class is going to make picture frames for a class display to honor our loved ones and important people in our community. Our frames will be made with popsicle sticks. How many packages of popsicle sticks do you need so that every student in our class can make at least one picture frame (using your designs) for the class display?

**Possible Adaptations to Task:**

• 1 or 2 frame designs per group

• 1 or 2 types of popsicle sticks (jumbo sticks, multicolor sticks)

• display for class, grade level, school, community

• logistics/location of display that might impact other materials needed (rubber bands, magnets, ribbon)

**POSSIBLE ASSUMPTIONS:**

Students may make assumptions related to the packages of popsicle sticks. For example:

* Even though a package states there are 100 sticks per package, some packages may have less, some may have more
* Some sticks in each package may not be usable because they are warped, cracked, or broken

Students may make assumptions related to the number of frames that each student would want to make, or the frame designs that might be more/less popular. For example:

* Each student may want to make 1 frame, or 2 frames
* All students will want to make 1 frame, but some students may want to make a second frame
* Teachers may also want to make frames
* We may want to have extra frames to honor other special people in the school or community
* Frame #1 may be more popular, so more students may want to make that one

**ANTICIPATED STUDENT STRATEGIES:**

Students might design a frame with one kind of stick, and then multiply the number of sticks needed times the number of frames to be made. (6 jumbo sticks per frame x 25 frames =150 jumbo sticks needed).

Students might design a frame with two kinds of sticks, and then multiply the number of sticks of each kind needed times the number of frames to be made. (6 jumbo sticks per frame x 25 frames =150 jumbo sticks needed; 9 multi-color sticks per frame x 25 frames = 175 multi-color sticks).

To figure out the number of packages needed, students may skip count by the number of sticks in one package until they reach/pass the number of sticks needed. For example, if there are 60 jumbo sticks in a package, students could count 60 (1 package), 120 (2 packages),180 (3 packages). If 150 sticks are needed they could reason that 3 packages is enough. .

Alternatively, students could divide the total number of sticks needed by the number of sticks in a package. For example, 175 multi-color sticks needed divided by 100 sticks per package = 1, remainder 75. Students would then need to reason that the remainder of 75 means that 75 more sticks are needed, thus 2 packages are needed, versus one. Students may have misunderstandings about the meaning of the remainder and may think that a remainder of 75 means that they are 75 sticks leftover.

If students design two different frames, they will need to calculate the number of each kind of stick needed for each frame, and then add to find the total number of each stick needed. For example, if you need 80 jumbo sticks for Frame #1, and 124 jumbo sticks for Frame #2, that means you need 204 jumbo sticks in all. Students may decide to add all sticks together to find the total number of sticks needed (i.e., 204 jumbo sticks needed plus 180 multi color sticks needed means we need 384 sticks total). However this method will not help students to determine the number of packages needed (as the popsicle sticks are sold by type).

**LESSON OUTLINE**

### **BEFORE:** Lesson Launch

• Notice & Wonder: Show images of ofrendas (e.g. altars for Dia de Los Muertos), tables, walls with family pictures on them

• Launch slides: What do you notice about these picture frames? (guide students to think about types of popsicle sticks, number of popsicle sticks in each frame)

**DURING**: Lesson Exploration

**•** Warm up Task: Students work in pairs or small group to design one frame (or two frames) and to figure out the materials needed •Pose the Main Task (how many packages of popsicle sticks needed), and discuss what students know, need to know, and need to assume to help them work on the task •Small group work time. Offer optional tools to organize work, or to organize posters/presentations.

**AFTER**: Lesson Summary

• Create a class chart to summarize the key components of each group’s plan

• Ask students to compare/contrast the plans (What is different or similar about number of frames? Number of packages? Number of leftovers?

• Represent each group’s model using expressions and equations

•Decide on a recommendation (how many packages are needed to make frames for class display)