**M2C3 Math Modeling Lesson Plan Template**

**LESSON TITLE: Safe Drinking Water at School (GRADE 3 version)**

**STANDARDS ALIGNMENT:**

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| GRADE 3 |
| 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.  3.MD Solve problems involving measurement and estimation of intervals of time, liquid volume, and masses of objects. |

* MP: 1  Make sense of problem and persevere in solving them.

MP: 3 Construct viable arguments and critique the reasoning of others.

MP: 4  Model with Mathematics

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

|  |  |  |
| --- | --- | --- |
| **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”  -volume liquid measurement (cups, oz) | -local schools and communities checking water supplies  -drinking water from plastic bottles or reusable bottles  -Portables in some schools have water dispensers with large jugs  -measuring cup (8 oz) from cooking | -Water dispenser  -contamination  -measuring cups |

**TASK:**

Every year, schools check the drinking water for poisonous chemicals such as lead and copper. In some schools, water fountains are not safe. Signs are posted, “do not use.” If our school water fountains were unsafe, each classroom would use a water dispenser with a large jug of water to make sure everyone has enough water to drink.

**How many large jugs of water would we need so that everyone in our class has enough drinking water for:** **1 day of school? 1 week of school?** **1 month of school?**

**Additional information sheet:**

• 1 large jug holds 5 gallons of water

• 16 cups of water in 1 gallon

**HOW MUCH WATER DO WE NEED TO DRINK EACH DAY?**

Here are recommendations for how much water people should drink each day.

|  |  |
| --- | --- |
| Age | How many cups of water per day? |
| 4 to 8 years old | 5 cups |
| 9 to 13 years old | 7-8 cups |
| 14-18 years old, and adults | 8-10 cups |

**POSSIBLE ASSUMPTIONS:**

Students may make assumptions related to:

• Number of students vs number of People in class (e.g. Count adults? Do you count students who bring their own water bottles?)

• How much water 1 person or student will drink in one day

• Whether the daily drinking need will be met during school only.

• Amount of water each student/person will drink (see information sheet)

• Consider time of year (spring, summer, fall, winter)

**ANTICIPATED STUDENT STRATEGIES:**

Students will need some guidance about the volume of a cup. In this case we are talking about a **measuring cup (8 oz)** not a “drinking cup” which could range from 8oz, 12 oz, 16 oz 32 oz (big gulp). Students will need to determine how many **cups** a person might drink daily.

•Some students might use ratios: determine 1 gallon for 2 students, 2 gallons for 4 students. Students might decide that each child will drink 8 cups. 2 students will drink 16 cups and 16 cups is 1 gallon. They might keep track of gallons and number of students, in this case 20 students are in a class.

Gallon 1 2 3 4 5 … 9 10

Kids 2 4 6 8 10 … 18 20

Then they would use the fact that 1 jug is 5 gallons, and they figured the class needed 10 gallons of water, the kids could reason that the class of 20 students would need 2 jugs.

• Some students might use repeated addition 8+8+8+8…. Or 5+5+5+5… to get the number of cups needed for the class. Depending on the assumption made about cups per person per day. 8 cups, 5 cups.

• Some students might skip count by twos using fingers to get X amount of total cups, if each student drinks 2 cups.

***MATERIALS NEEDED:***  PPT, Student Task Handouts, Information sheet, Recording sheet

**LESSON OUTLINE**

### **BEFORE:** Lesson Launch

• Notice & Wonder: Images related to clean water as a human right, water fountains with caution tape.

• CNN student video – Flint Water Crisis (January 2016)

• Launch task and use table What do we KNOW, what do we NEED TO KNOW, and what ASSUMPTIONS or Decisions to we have to make.

• Point students to additional information sheet

• Review recording sheet to show their work and solution.

**DURING**: Lesson Exploration

• Some students try to guess how many jugs before writing down ideas. Encourage students to express their ideas with numbers and pictures so we understand their “guess” about then number of jugs.

• Encourage students to look at fact sheet to help them make decisions**.**

**AFTER**: Lesson Summary

* • How did you determine the daily needs? How did you handle the range?
* •What is different/similar about the plans?
* • What is similar/different about the number of jugs needed?
* • What were some important decisions or assumptions made in your plan?