

M2C3 MATH MODELING LESSON OVERVIEW

LESSON TITLE: Conserving Water While Brushing Teeth

STANDARDS ALIGNMENT:

GRADE 3	GRADE 4	GRADE 5
3.OA: Represent and solve problems involving multiplication and division. 3.OA 3: Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities. 3. MD 2: Measure and estimate liquid volumes and masses using standard units of grams(g), kilograms (kg), and liters.	4.OA.1 Use the four operations with whole numbers to solve problems. 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. 4.MD.1-2 Solve problems involving measurement and conversion of measurements	5.OA.1-2 Write and interpret numerical expressions. 5.NBT.5 Perform operations with multi-digit whole numbers and with decimals to hundredths. 5.MD.1 Convert like measurement units within a given measurement system 5.MD.3 Understand concepts of volume.
MP: 1. Make sense of problem and persevere in solving them. MP: 2 Reasoning abstractly and quantitatively. MP: 3. Construct a viable argument and critique the argument of others. MP: 4. Model with Mathematics	MP: 1. Make sense of problem and persevere in solving them. MP: 2 Reasoning abstractly and quantitatively. MP: 3. Construct a viable argument and critique the argument of others. MP: 4. Model with Mathematics	MP: 1. Make sense of problem and persevere in solving them. MP: 2 Reasoning abstractly and quantitatively. MP: 3. Construct a viable argument and critique the argument of others. MP: 4. Model with Mathematics

CONNECTIONS (Consider while planning):

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

Four operations (addition, subtraction, multiplication and division) using numbers between 0-1000.
 Measurement quantities: gallons, liters, etc.
 Understanding of rates: gallons per minute, gallons per day

- 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??*

Water use in daily home activities (bathing, cooking, cleaning, watering); Family/Community water conservation activities; Teeth brushing practices, and water use during teeth brushing.

TASK VARIATIONS (to numbers, context, structure):

Routine 1: Mathematizing World - Open Ended (10 minute) - [Show video of water use while brushing

teeth, or image related to water conservation]

- What do you notice? What does this video/image make you wonder about? Brief class discussion.
- What questions do you have? What would you need to do to answer those questions?

Routine 2: Mathematizing World - Specific Questions (20 minute) Sensemaking and assumption building [Show video/image related to water conservation, and elicit and/or pose specific questions that can be answered using mathematics; consider using anchor chart to record “math” questions using questions stems - How much? How many? How much more/less; How big/small?]:

- What mathematical questions can you ask? Or What questions do you have that you can use mathematics to answer?
- How much water do you use when you are brushing your teeth?
- How much water do you use if you turn the water off while you are brushing?
- What if you leave the water on, then how much water do you use?

Routine 3: Full Modeling Task (60-90 minute) Students participate in entire modeling cycle

VERSION A: Individual Student Water Conservation While Brushing Teeth

A newspaper says that you can save A LOT of water every year if you turn off the water while brushing your teeth.

How much water can **you** save in **one week** if you turn off the water while brushing your teeth?

Questions to think about:

- o What do you know?
- o What do you need to find out?
- o What do you need to *assume*?

Create a model using pictures, numbers, words and symbols that shows:

- The amount of water you save each time you brush your teeth if you turn off the water
- The amount of water you would save in one week

VERSION B: Class Water Conservation While Brushing Teeth

A newspaper says that you can save A LOT of water every year if you turn off the water while brushing your teeth.

How much water can **our class** save in **one day** if we all turn off the water while brushing our teeth?

How much water can we save in **one week**?

Questions to think about:

- o What do you know?
- o What do you need to find out?
- o What do you need to *assume*?

Create a model to support your argument.

You can use pictures, numbers and words in your model.

VERSION C: Family Water Conservation While Brushing Teeth

A newspaper says that you can save A LOT of water every year if you turn off the water while brushing your teeth.

Your friend claims that in one month his **family** can fill up 100 buckets with the water they waste while brushing their teeth.

Do you believe him? What could make his claim reasonable?

Create a model to support your argument.

You can use pictures, numbers and words in your model.

Going further: How could your family test this claim at home?