

Liquid Measure Quest

Estimate first, measure, then solve

GRADE 5 • 5.MG.1.b.iii

5.MG.1.b.iii "Estimate and measure to solve contextual problems that involve metric units: liquid volume (milliliters and liters)."

NAME _____

DATE _____

Record real observations. Show equations for numerical decisions. Keep your first estimates even if they differ from your measurements.

Materials and setup

Graduated jug marked every 25 or 50 mL, water, tray, container A and an unmarked container B with a fill line.

Teacher: prepare A with 450-900 mL and B with a fill-line capacity of 200-600 mL. Keep both amounts unknown. Reset water between tasks; save all records.

Build understanding

Use 1 L = 1,000 mL. Estimate before measuring. Put the jug on a level surface and read the scale at eye level. Convert to a common unit before comparing or combining amounts.

Try it together

A teacher estimates a jug has 0.5 L, then measures 450 mL. A plant tray needs 600 mL. How much more water is needed?

Teacher demonstration

Record	Amount
Estimate	0.5 L
Measured	450 mL

The measured amount is 450 mL. $600 - 450 = 150$ mL. The tray needs 150 mL more; use the measured amount for the decision.

1. Measure A

Estimate the water in A in liters. Measure it with the jug in mL, then express that measurement in L. Record all three amounts. How far was your estimate from the measurement?

Container A

Record	Amount
Estimate (L)	
Measured (mL)	
Measured (L)	

2. Measure B

Estimate how much B holds to its fill line in mL. Use water and the graduated jug to measure that capacity. Record the actual amount in mL and L.

Container B

Record	Amount
Estimate (mL)	
Measured (mL)	
Measured (L)	

3. Enough for one fill?

Use your measured amounts. Is the water in A enough to fill B once to its line? Find how much water would remain, or how much more would be needed.

4. Build one liter

Reset the jug. Measure 250 mL of water, then add 150 mL. Read and record the combined amount. How much more measured water would bring the total to 1 L?

5. Two equal fills

The class has exactly 1 L of water. It needs to fill two containers like B to the same line. Use your measured B capacity. Is 1 L enough? Find water remaining or extra water needed.

6. Plan the combined amount

A display needs the amounts from A and a full B combined. Add your original estimates in a common unit. Then add the measured amounts. Was the estimated total too high, too low, or exact? Give the difference.

7. Judge two estimates

Before measuring B, Priya estimated 0.4 L and Alex estimated 450 mL. Use your actual B measurement to decide whose estimate was closer, or whether they tied. Show both differences.

Teacher notes

Use each student's recorded observations. Check estimating before measuring, correct tool reading and unit conversion, then reasoning. Accept precision consistent with the jug scale. Sample or expected values never replace actual measurements.

Task 1

Answers vary. Convert the estimate to mL, compare with measured mL and state the absolute difference. Measured L = measured mL / 1,000. The estimate must precede measuring.

Task 2

Answers vary. Check the recorded first estimate and actual fill-line capacity. Divide measured mL by 1,000 for L; do not assume B has a fixed capacity.

Task 3

Answers vary. If $A \geq B$, subtract B from A for water remaining. If $A < B$, subtract A from B for water needed. Equal amounts leave 0 mL.

Task 4

Expected total is 400 mL, needing 600 mL more. Check the actual reading and pouring precision. With an observed total M mL, the needed amount is $1,000 - M$ mL.

Task 5

Answers vary. Required mL = 2 times measured B. Compare with 1,000 mL. Subtract smaller from larger and state remaining water or additional water needed.

Accept equivalent correct reasoning with the stated units and evidence.

Task 6

Answers vary. Convert A estimate from L to mL before adding B estimate. Compare that estimated sum with measured A + measured B. State direction and absolute difference.

Accept equivalent correct reasoning with the stated units and evidence.

Task 7

Answers vary. Priya estimated 400 mL. Compare $|B - 400|$ with $|B - 450|$ in mL. The smaller difference is closer; equal differences mean a tie (at $B = 425$ mL).