Homework Helpers

Grade 4 Module 2

G4-M2-Lesson 1

1. Find the equivalent measures.

   a. 3 km = 3,000 m

   I know that 1 kilometer equals 1,000 meters.

   b. 4 m = 400 cm

   I know that 1 meter equals 100 centimeters.

2. Find the equivalent measures.

   a. 2 km 345 m = 2,345 m

   b. 4 m 23 cm = 423 cm

   c. 12 km 45 m = 12,045 m

   I know that 12 kilometers equals 12,000 meters, so I add 12,000 meters plus 45 meters.

   d. 24 m 3 cm = 2,403 cm

   I know that 24 meters equals 2,400 centimeters, so I add 2,400 meters plus 3 centimeters.

3. Solve.

   a. 3 m – 42 cm

Sample Student A Response:

3 m = 300 cm

	2	9	10	
	~~3~~	~~0~~	~~0~~	cm
–		4	2	cm
	2	5	8	cm

Before subtracting, I make like units. 3 meters is equal to 300 centimeters.

I'll use the arrow way to add up. I add centimeters and meters that make the next whole.

Sample Student B Response:

(+ 8 cm) (+ 50 cm) (+ 2 m)

42 cm → 50 cm → 1 m → 3 m

8 cm + 50 cm + 2 m = 2 m 58 cm

I add 8 cm to make the next ten, 50 cm. I add 50 cm to make the next meter, and 1 meter is 2 meters away from 3 meters.

Now I'll add all the parts circled, finding 2 meters 58 centimeters is the difference of 3 meters and 42 centimeters.

b. 32 m 14 cm − 8 m 63 cm

Sample Student A Response:

	2	11		0	11		
	~~3~~	~~1~~		~~1~~	~~1~~	4	
	~~3~~	~~2~~	m		~~1~~	~~4~~	cm
−		8	m		6	3	cm
	2	3	m		5	1	cm

14 cm is not enough to take away 63 cm, so I rename 1 meter as 100 cm to make 114 cm.

Sample Student B Response:

+ 37 cm + 23 m + 14 cm

8 m 63 cm → 9 m → 32 m → 32 m 14 cm

37 cm + 23 m + 14 cm = 23 m 51 cm

Using the arrow way, I'll add up from 8 m 63 cm until I reach 32 m 14 cm. It's almost like a number line!

c. 3 km 742 m + 9 km 473 m

Sample Student A Response:

	3	km		7	4	2	m
+	9	km		4	7	3	m
				1			
1	2	km	1	2	1	5	m

1 km 215 m

13 km 215 m

1,215 meters can be renamed using a number bond as 1 km 215 m.

Sample Student B Response:

742 m + 473 m

700 42 300 173

I pull out 700 m and 300 m to make 1 km.

700 m + 300 m = 1 km

42 m + 173 m = 215 m

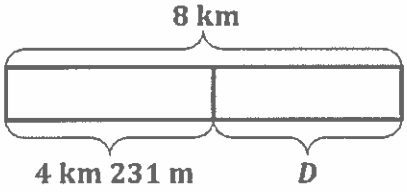
I add the remaining meters.

3 km + 9 km + 1 km = 13 km

13 km 215 m

Use a tape diagram to model each problem. Solve using a simplifying strategy or an algorithm, and write your answer as a statement.

4. Kya's mom drove 4 km 231 m from work to the grocery store. She drove some more miles from the grocery store to her house. If she drove a total of 8 km, how far was it from her work to her house?



	7			9	9	10	
	~~8~~	km		1	0	0	m
−	4	km		2	3	1	m
	3	km		7	6	9	m

I rename 8 km as 7 km 1000 m so that I have meters to subtract from.

It is 3 km 769 m *from her work to her house.*

G4-M2-Lesson 2

1. Complete the conversion table.

Mass	
kg	g
3	3,000
5	5,000
7	7,000

I know that 1 kilogram equals 1,000 grams.

2. Convert the measurements.

a. 4 kg 650 g = 4,650 g

b. 51 kg 45 g = 51,045 g

In 51,945, there are 51 thousands 945 ones. 1 thousand grams equals 1 kilogram, so 51 thousand grams 945 grams equals 51 kilograms 945 grams.

3. Solve.

a. 7 kg − 860 g

I make like units. 7 kilograms is equal to 7,000 grams.

$7\text{ kg} = 7,000\text{ g}$

Sample Student A Response:

$$\begin{array}{rrrrr} & & {\scriptstyle 9} & & \\ & {\scriptstyle 6} & {\scriptstyle 10} & {\scriptstyle 10} & \\ & 7, & \not{0} & \not{0} & 0\ \text{g} \\ - & & 8 & 6 & 0\ \text{g} \\ \hline & 6, & 1 & 4 & 0\ \text{g} \end{array}$$

I subtract grams from grams.

Sample Student B Response:

$860\text{ g} \xrightarrow{+40\text{ g}} 900\text{ g} \xrightarrow{+100\text{ g}} 1,000\text{ g} \xrightarrow{+6,000\text{ g}} 7,000\text{ g}$

$40\text{ g} + 100\text{ g} + 6,000\text{ g} = 6,140\text{ g}$

Just like in Lesson 1, I add up using the arrow way.

b. Express the answer in the smaller unit: 23 kg 625 g + 526 g.

Sample Student A Response:

$$\begin{array}{rrrrrrrrr} & 2 & 3 & \text{kg} & & 6 & 2 & 5 & \text{g} \\ + & & & & & 5 & 2 & 6 & \text{g} \\ \hline & & & & & & {\scriptstyle 1} & & \\ & 2 & 3 & \text{kg} & 1 & 1 & 5 & 1 & \text{g} \end{array}$$

$23\text{ kg} = 23,000\text{ g}$

$23,000\text{ g} + 1,151\text{ g} = 24,151\text{ g}$

I add and then convert the answer to grams.

Sample Student B Response:

$$\begin{array}{rrrrrrr} & 2 & 3, & 6 & 2 & 5 & \text{g} \\ + & & & 5 & 2 & 6 & \text{g} \\ \hline & & {\scriptstyle 1} & & {\scriptstyle 1} & & \\ & 2 & 4, & 1 & 5 & 1 & \text{g} \end{array}$$

I rename 23 kg 625 grams as grams before adding.

c. Express the answer in mixed units: 18 kg 604 g – 3,461 g.

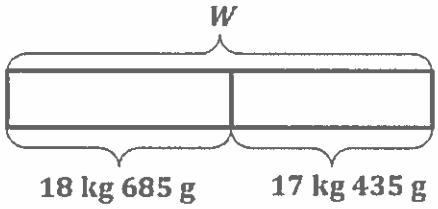
$3,461\text{ g} = 3\text{ kg }461\text{ g}$

I convert grams to kilograms before subtracting.

				5	10		
	1	8	kg	6	0	4	g
−		3	kg	4	6	1	g
	1	5	kg	1	4	3	g

Use a tape diagram to model each problem. Solve using a simplifying strategy or an algorithm, and write your answer as a statement.

4. One crate of watermelon weighs 18 kilograms 685 grams. Another crate of watermelon weighs 17 kilograms 435 grams. What is their combined weight?



$18\text{ kg }685\text{ g} + 17\text{ kg }435\text{ g} = W$

	1	8	kg	6	8	5	g
+	1	7	kg	4	3	5	g
	1			1	1		
	3	5	kg	1	1	2	0	g

~~1,000 g~~ 120 g

1 kg

36 kg 120 g

I can leave my answer as 35 kg 1,120 g, but I choose to rename in largest units. 1,120 g is equal to 1 kg 120 g.

The combined weight of the crates of watermelon is 36 kg 120 g.

G4-M2-Lesson 3

1. Complete the conversion table.

Liquid Capacity	
L	mL
6	6,000
18	18,000
32	32,000

There are 1,000 milliliters in 1 liter. The rule for converting is the same from Lesson 1 and 2.

2. Convert the measurements.

a. 26 L 38 mL = 26,038 mL

b. 427,009 mL = 427 L 9 mL

I remember doing these conversions in Lessons 1 and 2, just with different units.

3. Solve.

a. Express the answer in the smaller unit:

32 L 420 mL + 685 mL

	3	2,	4	2	0	mL
+			6	8	5	mL
		1	1			
	3	3,	1	0	5	mL

Before adding, I rename 32 L 420 mL as milliliters since the answer is to be in the smaller unit.

b. Express the answer in mixed units:

62 L 608 mL − 35 L 739 mL

	5	11		0	14	9	18		
	~~6~~	~~1~~		~~1~~	~~6~~	~~0~~	~~8~~		
	~~6~~	~~2~~	L		~~6~~	~~0~~	~~8~~	mL	
−	3	5	L		7	3	9	mL	
	2	6	L		8	6	9	mL	

I can subtract mixed units as given, or I can rename the units to the smallest unit, subtract, and then rename as mixed units.

G4-M2-Lesson 4

1. Complete the table.

Smaller Unit	Larger Unit	How Many Times as Large as?
ten	thousand	100

I ask myself, "One thousand is 100 times as large as what unit?" I know 1 thousand is 100 tens (1 × 100 tens). So, my smaller unit is ten.

2. Fill in the unknown unit in word form.

125 is 1 ___*hundred*___ 25 ones.

I ask myself, "125 ones is the same as 1 of what larger unit and 25 ones?"

125 cm is 1 ___*meter*___ 25 cm.

The units are centimeters. I can make a larger unit. 100 centimeters equals 1 meter. So, 1 meter 25 cm is the same as 125 cm.

3. Write the unknown number.

___142,728___ is 142 thousands 728 ones.

I can decompose 142 thousands 728 into smaller units. 142 thousands is the same as 142,000 ones. So, 142 thousands 728 ones is 142,728.

___142,728___ mL is 142 L 728 mL.

I know 1 liter equals 1,000 milliliters. So, 142 liters equals 142,000 milliliters, and 142 liters 728 milliliters equals 142,728 milliliters.

4. Fill in each with >, <, or =.

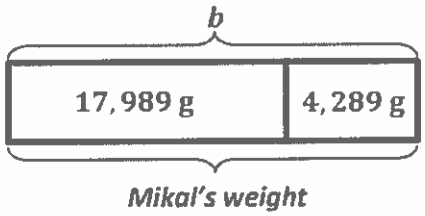
740,259 mL (>) 74 L 249 mL

74 L 249 mL is the same as 74,249 mL. 74 ten thousands is greater than 7 ten thousands.

5. Mikal's backpack weighs 4,289 grams. Mikal weighs 17 kilograms 989 grams more than his backpack. How much do Mikal and his backpack weigh in all?

$1\text{ kg} = 1{,}000\text{ g}$

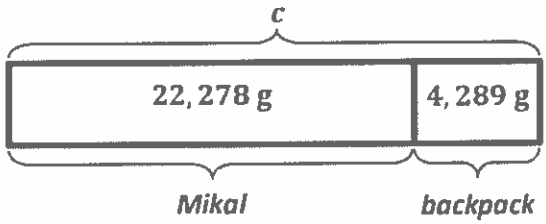
$$\begin{array}{r} 1\ 7,\ 9\ 8\ 9\ \text{g} \\ +\quad 4,\ 2\ 8\ 9\ \text{g} \\ \hline 2\ 2,\ 2\ 7\ 8\ \text{g} \end{array}$$



$b = 22{,}278\text{ g}$

To find Mikal's weight, I add. Mikal weighs 22,278 g.

$$\begin{array}{r} 2\ 2,\ 2\ 7\ 8\ \text{g} \\ +\quad 4,\ 2\ 8\ 9\ \text{g} \\ \hline 2\ 6,\ 5\ 6\ 7\ \text{g} \end{array}$$



$c = 26{,}567\text{ g}$

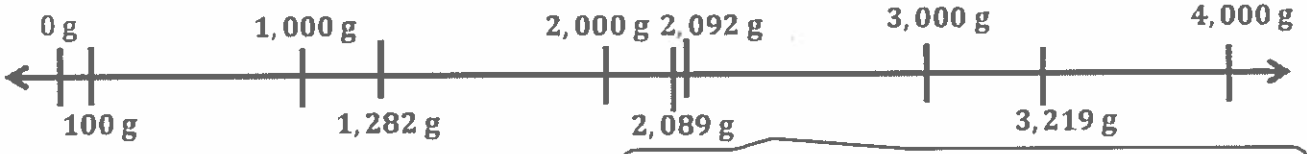
I add to find the total weight.

Altogether Mikal and his backpack weigh $26{,}567\text{ g}$ *or* $26\text{ kg }567\text{ g}$.

6. Place the following measurements on the number line:

1 kg 282 g 2,089 g 2 kg 92 g 3,219 g 100 g

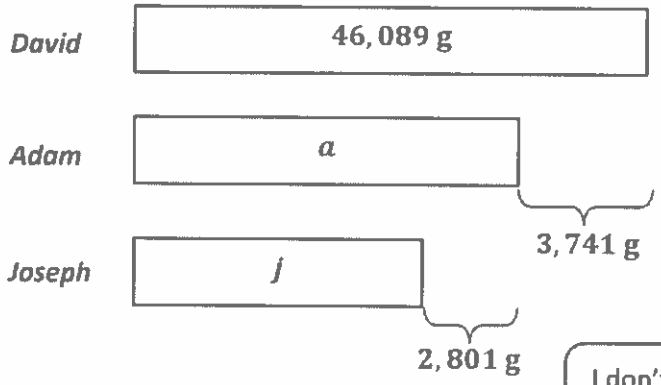
Each unit on the number line is 1,000 g. I label each tick mark.



I compare 2,092 and 2,089. 9 tens are more than 8 tens. So, 2,092 is more than 2,089.

G4-M2-Lesson 5

1. David weighs 46 kilograms 89 grams. Adam weighs 3,741 grams less than David. Joseph weighs 2,801 grams less than Adam. How much does Joseph weigh?



$a = 46,089\text{ g} - 3,741\text{ g}$

$a = 42,348\text{ g}$

$$\begin{array}{r} {\scriptstyle 5\quad 10} \\ 4\ \not{6},\ \not{0}\ 8\ 9\ \text{g} \\ -\quad 3,\ 7\ 4\ 1\ \text{g} \\ \hline 4\ 2,\ 3\ 4\ 8\ \text{g} \end{array}$$

I don't know Adam's weight. I label this unknown with letter a. I subtract to solve for a.

$j = 42,348\text{ g} - 2,801\text{ g}$

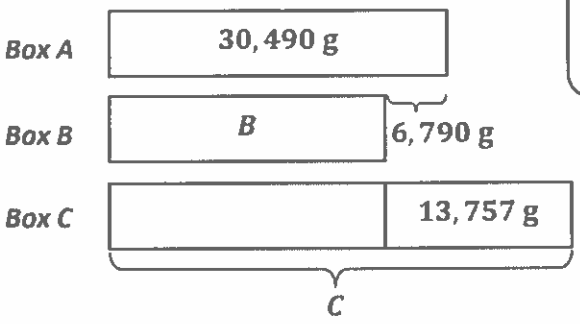
$j = 39,547\text{ g}$

$$\begin{array}{r} {\scriptstyle 3\quad 11\quad 13} \\ \not{4}\ \not{2},\ \not{3}\ 4\ 8\ \text{g} \\ -\quad 2,\ 8\ 0\ 1\ \text{g} \\ \hline 3\ 9,\ 5\ 4\ 7\ \text{g} \end{array}$$

Now that I know Adam's weight, I solve for j (Joseph's weight).

Joseph weighs $39,547$ *grams.*

2. Box A weighs 30 kilograms 490 grams. Box B weighs 6,790 grams less than Box A. Box C weighs 13 kilograms 757 grams more than Box B. What is the difference, in grams, between the weights of Box C and Box A?



I know Box B weighs 6,790 grams less than Box A. I label this part and subtract to solve for "B". Box B weighs 23,700 g.

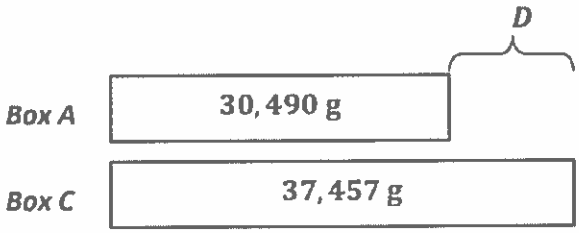
$B = 30,490\text{ g} - 6,790\text{ g}$

$B = 23,700\text{ g}$

$$\begin{array}{rrrrrr} & {\scriptstyle 2} & {\scriptstyle 9} & {\scriptstyle 14} & & \\ & \cancel{3} & \cancel{0}, & \cancel{4} & 9 & 0\ \text{g} \\ - & & 6, & 7 & 9 & 0\ \text{g} \\ \hline & 2 & 3, & 7 & 0 & 0\ \text{g} \end{array}$$

I know Box C weighs 13,757 grams more than Box B. If Box B weighs 23,700 grams, I can add to find "C". Box C weighs 37,457 g.

$$\begin{array}{rrrrrr} & 2 & 3, & 7 & 0 & 0\ \text{g} \\ + & 1 & 3, & 7 & 5 & 7\ \text{g} \\ \hline & {\scriptstyle 1} & & & & \\ & 3 & 7, & 4 & 5 & 7\ \text{g} \end{array}$$



I know the weights of Boxes A and C. I can subtract to find the difference, D.

$D = 37,457\text{ g} - 30,490\text{ g}$

$D = 6,967\text{ g}$

$$\begin{array}{rrrrrr} & & {\scriptstyle 6} & {\scriptstyle 13} & {\scriptstyle 15} & \\ & 3 & \cancel{7}, & \cancel{4} & \cancel{5} & 7\ \text{g} \\ - & 3 & 0, & 4 & 9 & 0\ \text{g} \\ \hline & & 6, & 9 & 6 & 7\ \text{g} \end{array}$$

The difference between the weights of Box C and Box A is $6,967$ g.