

Eureka Math™ Homework Helper

2015–2016

Grade 4 Module 2 *Lessons 1–5*

Eureka Math, A Story of Units®

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G4-M2-Lesson 1

1. Find the equivalent measures.

a. $3 \text{ km} = \underline{3,000} \text{ m}$

b. $4 \text{ m} = \underline{400} \text{ cm}$

I know that 1 kilometer equals 1,000 meters.

I know that 1 meter equals 100 centimeters.

2. Find the equivalent measures.

a. $2 \text{ km } 345 \text{ m} = \underline{2,345} \text{ m}$

b. $4 \text{ m } 23 \text{ cm} = \underline{423} \text{ cm}$

c. $12 \text{ km } 45 \text{ m} = \underline{12,045} \text{ m}$

d. $24 \text{ m } 3 \text{ cm} = \underline{2,403} \text{ cm}$

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

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

3. Solve.

a. $3 \text{ m} - 42 \text{ cm}$

Sample Student A Response:

$$\begin{array}{r}
 3 \text{ m} = 300 \text{ cm} \\
 \begin{array}{r}
 2 \quad 9 \quad 10 \\
 \cancel{3} \quad \cancel{0} \quad \cancel{0} \text{ cm} \\
 - \quad \quad 4 \quad 2 \text{ cm} \\
 \hline
 2 \quad 5 \quad 8 \text{ cm}
 \end{array}
 \end{array}$$

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:

$$\begin{array}{c}
 \textcircled{+ 8 \text{ cm}} \quad \textcircled{+ 50 \text{ cm}} \quad \textcircled{+ 2 \text{ m}} \\
 42 \text{ cm} \longrightarrow 50 \text{ cm} \longrightarrow 1 \text{ m} \longrightarrow 3 \text{ m} \\
 8 \text{ cm} + 50 \text{ cm} + 2 \text{ m} = 2 \text{ m } 58 \text{ cm}
 \end{array}$$

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. $32\text{ m } 14\text{ cm} - 8\text{ m } 63\text{ cm}$

Sample Student A Response:

$$\begin{array}{r}
 \begin{array}{r}
 2 \quad 11 \\
 \cancel{3} \quad \cancel{1} \\
 3 \quad 2 \quad \text{m} \\
 - \quad 8 \quad \text{m} \\
 \hline
 2 \quad 3 \quad \text{m}
 \end{array}
 \quad
 \begin{array}{r}
 0 \quad 11 \\
 \cancel{1} \quad \cancel{1} \quad 4 \\
 1 \quad 4 \quad \text{cm} \\
 - \quad 6 \quad 3 \quad \text{cm} \\
 \hline
 5 \quad 1 \quad \text{cm}
 \end{array}
 \end{array}$$

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:

$$\begin{array}{l}
 (+ 37\text{ cm}) \quad (+ 23\text{ m}) \quad (+ 14\text{ cm}) \\
 8\text{ m } 63\text{ cm} \rightarrow 9\text{ m} \rightarrow 32\text{ m} \rightarrow 32\text{ m } 14\text{ cm} \\
 37\text{ cm} + 23\text{ m} + 14\text{ cm} = 23\text{ m } 51\text{ cm}
 \end{array}$$

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. $3\text{ km } 742\text{ m} + 9\text{ km } 473\text{ m}$

Sample Student A Response:

$$\begin{array}{r}
 3 \text{ km} \quad 7 \quad 4 \quad 2 \text{ m} \\
 + 9 \text{ km} \quad 4 \quad 7 \quad 3 \text{ m} \\
 \hline
 1 \quad 2 \text{ km} \quad 1 \quad 2 \quad 1 \quad 5 \text{ m}
 \end{array}$$

$$\begin{array}{l}
 1 \text{ km} \quad 215 \text{ m} \\
 13 \text{ km } 215 \text{ m}
 \end{array}$$

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

Sample Student B Response:

$$\begin{array}{l}
 742\text{ m} + 473\text{ m} \\
 700 \quad 42 \quad 300 \quad 173
 \end{array}$$

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

$$700\text{ m} + 300\text{ m} = 1\text{ km}$$

$$42\text{ m} + 173\text{ m} = 215\text{ m}$$

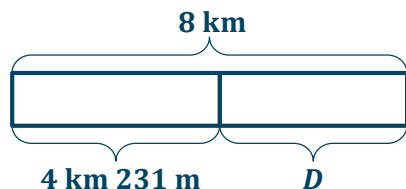
I add the remaining meters.

$$3\text{ km} + 9\text{ km} + 1\text{ km} = 13\text{ km}$$

$$13\text{ km } 215\text{ m}$$

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?



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

$$\begin{array}{r}
 \begin{array}{r}
 7 \quad 9 \quad 9 \quad 10 \\
 \cancel{8} \quad \cancel{0} \quad \cancel{0} \quad \cancel{0} \\
 4 \quad \text{km} \quad 2 \quad 3 \quad 1 \quad \text{m} \\
 - \quad 4 \quad \text{km} \quad 2 \quad 3 \quad 1 \quad \text{m} \\
 \hline
 3 \quad \text{km} \quad 7 \quad 6 \quad 9 \quad \text{m}
 \end{array}
 \end{array}$$

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

7 kg = 7,000 g

Sample Student A Response:

$$\begin{array}{r}
 \begin{array}{ccccccc}
 & 6 & 10 & 10 & & & \\
 7, & 0 & 0 & 0 & \text{g} & & \\
 - & 8 & 6 & 0 & \text{g} & & \\
 \hline
 6, & 1 & 4 & 0 & \text{g} & &
 \end{array}
 \end{array}$$

I subtract grams from grams.

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

Sample Student B Response:

$$\begin{array}{c}
 (+40\text{ g}) \quad (+100\text{ g}) \quad (+6,000\text{ g}) \\
 860\text{ g} \rightarrow 900\text{ g} \rightarrow 1,000\text{ g} \rightarrow 7,000\text{ g}
 \end{array}$$

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

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:

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

23 kg = 23,000 g

23,000 g + 1,151 g = 24,151 g

I add and then convert the answer to grams.

Sample Student B Response:

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

I rename 23 kg 625 grams as grams before adding.

- c. Express the answer in mixed units: $18 \text{ kg } 604 \text{ g} - 3,461 \text{ g}$.

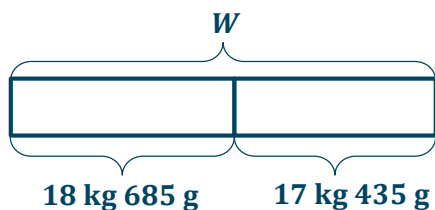
$$3,461 \text{ g} = 3 \text{ kg } 461 \text{ g}$$

$$\begin{array}{r} \text{kg } 604 \text{ g} \\ - \text{kg } 3461 \text{ g} \\ \hline 15 \text{ kg } 143 \text{ g} \end{array}$$

I convert grams to kilograms before subtracting.

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?



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

$$\begin{array}{r} \text{kg } 685 \text{ g} \\ + \text{kg } 435 \text{ g} \\ \hline 35 \text{ kg } 1120 \text{ g} \end{array}$$

$\swarrow \searrow$
 $1,000 \text{ g} \quad 120 \text{ g}$
 1 kg

$$36 \text{ kg } 120 \text{ g}$$

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. $26 \text{ L } 38 \text{ mL} = \underline{26,038} \text{ mL}$

b. $427,009 \text{ mL} = \underline{427} \text{ L } \underline{9} \text{ mL}$

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

3. Solve.

- a. Express the answer in the smaller unit:

$32 \text{ L } 420 \text{ mL} + 685 \text{ mL}$

$$\begin{array}{r}
 32,420 \text{ mL} \\
 + \quad 685 \text{ mL} \\
 \hline
 33,105 \text{ mL}
 \end{array}$$

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:

$62 \text{ L } 608 \text{ mL} - 35 \text{ L } 739 \text{ mL}$

$$\begin{array}{r}
 62 \text{ L } 608 \text{ mL} \\
 - 35 \text{ L } 739 \text{ mL} \\
 \hline
 26 \text{ L } 869 \text{ mL}
 \end{array}$$

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?
<i>ten</i>	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
- $=$
- .

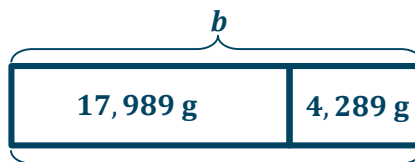
740,259 mL $>$ 74 L 249 mL

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 kg = 1,000 g

$$\begin{array}{r} 17,989 \text{ g} \\ + 4,289 \text{ g} \\ \hline 22,278 \text{ g} \end{array}$$

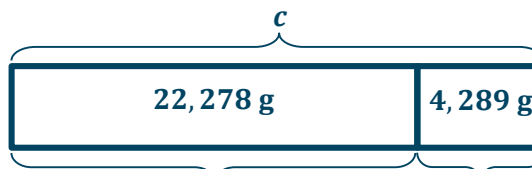


$$b = 22,278 \text{ g}$$

Mikal's weight

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

$$\begin{array}{r} 22,278 \text{ g} \\ + 4,289 \text{ g} \\ \hline 26,567 \text{ g} \end{array}$$



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

Mikal

backpack

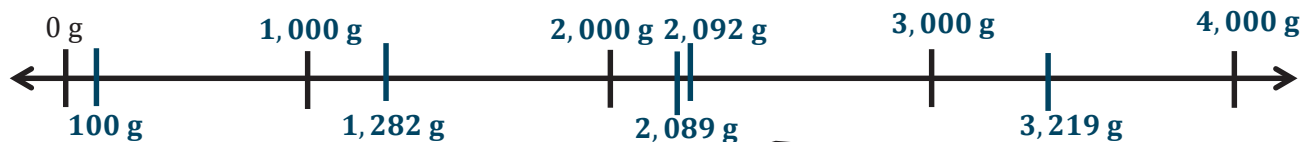
I add to find the
total weight.

Altogether Mikal and his backpack weigh 26,567 g or 26 kg 567 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?

David

46,089 g

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

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

Adam

 a

3,741 g

Joseph

 j

2,801 g

$$\begin{array}{r} 4 0 8 9 \text{ g} \\ - 3 7 4 1 \text{ g} \\ \hline 4 2 3 4 8 \text{ g} \end{array}$$

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

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

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

$$\begin{array}{r} 4 2 3 4 8 \text{ g} \\ - 2 8 0 1 \text{ g} \\ \hline 3 9 5 4 7 \text{ g} \end{array}$$

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?

Box A 30,490 g

Box B B 6,790 g

Box C 13,757 g

C

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.

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

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

$$\begin{array}{r} ^2 ^9 ^{14} \\ 30,490 \text{ g} \\ - 6,790 \text{ g} \\ \hline 23,700 \text{ g} \end{array}$$

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.

$$\begin{array}{r} ^2 ^3 ^7 ^0 ^0 \\ 23,700 \text{ g} \\ + 13,757 \text{ g} \\ \hline 37,457 \text{ g} \end{array}$$

Box A 30,490 g

Box C 37,457 g

D

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

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

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

$$\begin{array}{r} ^{13} ^6 ^3 ^{15} \\ 37,457 \text{ g} \\ - 30,490 \text{ g} \\ \hline 6,967 \text{ g} \end{array}$$

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