Main idea: "Mixed unit"
- "Mixed unit" is shorthand for <u>addition</u>
  - Examples: "2 km 5 m" *means* "2 km + 5 m"
  - Preview of mixed numbers (Module 5): "$2\frac{5}{8}$" *means* "$2 + \frac{5}{8}$"
  - Minor note: we make as many of the larger unit as possible (e.g., 2005 m as a mixed unit is 2 km 5 m and not 1km 1005 m)
- Use properties of addition (associative, commutative) and distributive property to add and subtract

* Great Minds' Suggestions for Consolidation or Omissions: "Although composed of just five lessons, Module 2 has great importance in the Grade 4 sequence of modules. Module 2, along with Module 1, is paramount in setting the foundation for developing fluency with the manipulation of place value units, a skill upon which Module 3 greatly depends. Teachers who have taught Module 2 prior to Module 3 have reportedly moved through Module 3 more efficiently than colleagues who have omitted it. Module 2 also sets the foundation for work with fractions and mixed numbers in Module 5. Therefore, it is not recommended to omit any lessons from Module 2. To help with the pacing of Module 3's Topic A, consider replacing the Convert Units fluencies in Module 2, Lessons 13, with area and perimeter fluencies. Also, consider incorporating Problem 1 from Module 3, Lesson 1, into the fluency component of Module 2, Lessons 4 and 5."

A. Metric Unit Conversions

Lesson 1: Express metric length measurements in terms of a smaller unit; model and solve addition and subtraction word problems involving metric length.

Definitions:
- The mixed unit "1 km 500 m" means "1 km + 500 m"
- To "convert 1 km 500 m to meters" means to "find how long 1 km 500 m is in meters (1 km 500 = ? m)"
1. Concept Development (CD) Problems 1-2; Problem Set 1c & g, 2 b & e
   - Understanding relative sizes of 1 cm, 1 m, 1 km with concrete objects (Problem 1) and conversion calculations (1 km = 1,000 m, 1 m = 100 cm)
   - Definition of mixed unit
2. CD Problem 3; Problem Set 3c
   - Definition of mixed unit, metric units, properties of addition (associative, commutative), distributive property → "algorithm" and "simplifying strategies" for addition
     1 km 734 m + 4 km 396 m
     = 1 km **+** 734 m + 4 km **+** 396 m
     = **(1 + 4) km** + **(734 + 396) m**

     …

= 5 km + 1 km + 130 m
= 6 km **+** 130 m
= 6 km 130 m OR (6,000 m + 130 m = 6,130 m)

3. CD Problem 4; Problem Set 3d
   - Definition of mixed unit, metric units, properties of addition (associative, commutative), distributive property → "algorithm" and "simplifying strategies" for subtraction

     10 km - 3 km 140 m
     = 10 km **- (**3 km **+** 140 m**)**
     = (10 **- 3**) km **- 140** m
     = (9 + 1 - 3) km - 140 m OR 7 km - 140 m = (6 + 1) km - 140 m
     = **(9 - 3) km** + **(1000 - 140) m** OR 6 km + **(1000 - 140) m**
     …
     = 6 km **+** 860 m
     = 6 km 860 m OR (6,000 m + 860 m = 6,860 m)

4. CD Problem 5; Problem Set 5
   - CD Problems 3-4 & visual representation (number line or tape diagram) → solve word problems

Lesson 2: Express metric mass measurements in terms of a smaller unit; model and solve addition and subtraction word problems involving metric mass.

1. CD Problem 1; Problem Set 2d-e
   - Understanding relative sizes of 1 g, 1 kg with concrete objects and conversion calculations (1 kg = 1,000 g)
2. CD Problems 2-3; Problem Set 3c-d
   - Same ideas as Lesson 1 Problems 3-4
3. CD Problem 4; Problem Set 6
   - CD Problems 2-3 & visual representation (number line or tape diagram) → solve word problems

Lesson 3: Express metric capacity measurements in terms of a smaller unit; model and solve addition and subtraction word problems involving metric capacity.

1. CD Problem 1; Problem Set 2d-e
   - Understanding relative sizes of 1 mL, 1 L with concrete objects and conversion calculations (1 L = 1,000 mL)
2. CD Problems 2-3; Problem Set 3c-d
   - Same ideas as Lesson 1 Problems 3-4
3. CD Problem 4; Problem Set 5
   - CD Problems 2-3 & visual representation (number line or tape diagram) → solve word problems

B. Application of Metric Unit Conversions

Lesson 4: Know and relate metric units to place value units in order to express measurements in different units.

1. CD Problems 1-2; Problem Set 2b, f
● Relate metric units to place value units to express measurements in different units

	Hundreds	Tens	Ones
	1 m (100 cm)	10 cm	1 cm

Thousands	Hundreds	Tens	Ones
1 km (1,000 m)	100 m	10 m	1 m
1 kg (1,000 mL)	100 g	10 g	1 g
1 L (1,000 mL)	100 mL	10 mL	1 mL
Example: 1,	2	0	0

1,200 mL
= 1 x 1000 mL + 2 x 100 mL
= 1 L + 200 mL
= 1 L 200 mL

2. CD Problem 3; Problem Set 5b, 6
● CD Problem 2 & definitions of equal (<u>same point</u> on number line), greater than (to the <u>right</u> on number line), less than (to the <u>left</u> on number line) → compare metric units using place value and number line

Order 7,256 m, 7 km 246 m, 725,900 cm

	1 km (1,000 m)	100 m	10 m	1 m (100 cm)	10 cm	1 cm
7,256 m =	7	2	5	6		
7 km 246 m =	7	2	4	6		
725,900 cm =	7	2	5	9	0	0
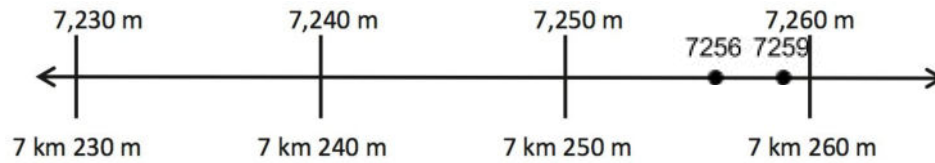
- ○ 7256 > 7246 because 7256 is to the <u>right</u> of 7246 on the number line
- ○ 7259 > 7256 because 7259 is to the <u>right</u> of 7256 on the number line
- ○ so 7 km 246 m < 7,256 m < 725,900 cm

Lesson 5: Use addition and subtraction to solve multi-step word problems involving length, mass, and capacity.

1. CD Problems 1 or 2 (Problem Set 1 or 2); Problem Set 5 or 6
   - Lessons 1-3 → solve two-step word problems
2. CD Problems 3 or 4 (Problem Set 3 or 4)
   - Lessons 1-3 → solve three-step word problems