

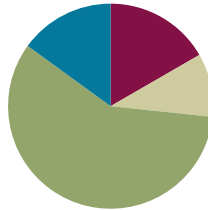
Lesson 14

Objective: Use place value understanding to decompose to smaller units up to 3 times using the standard subtraction algorithm, and apply the algorithm to solve word problems using tape diagrams.

Related Topics: [More Lesson Plans for the Common Core Math](#)

Suggested Lesson Structure

■ Fluency Practice	(10 minutes)
■ Application Problem	(6 minutes)
■ Concept Development	(35 minutes)
■ Student Debrief	(9 minutes)
Total Time	(60 minutes)



Fluency Practice (10 minutes)

- Base Ten Thousand Units **4.NBT.2** (2 minutes)
- Find the Difference **4.NBT.4** (4 minutes)
- Convert Units **4.MD.1** (4 minutes)

Base Ten Thousand Units (2 minutes)

Materials: (S) Personal white boards, place value chart to ten thousands

Note: Reviewing this fluency will help students work towards mastery of understanding base ten units.

T: (Project 8 ten thousands = ____.) Write the number in standard form.

S: 80,000.

Continue with the following possible sequence: 9 ten thousands, 10 ten thousands, 13 ten thousands, 19 ten thousands, 20 ten thousands, 30 ten thousands, 70 ten thousands, 700 ten thousands, 715 ten thousands, 347 ten thousands.

Find the Difference (4 minutes)

Materials: (S) Personal white boards

Note: Reviewing this mental math fluency will prepare students for understanding the importance of the subtraction algorithm.

T: (Write $735 - 203 = \underline{\quad}$.) Write a subtraction sentence horizontally or vertically.

S: (Students write $735 - 203 = 532$.)

Repeat process and sequence for $7,045 - 4,003$; $845 - 18$; $5,725 - 915$; and $34,736 - 2,806$.

Convert Units (4 minutes)

Note: Reviewing these unit conversions that were learned in third grade will help prepare the students to solve problems with metric measurement and its relationship to place value in Module 2.

T: (Write $1 \text{ m} = \underline{\quad} \text{ cm}$.) How many centimeters are in a meter?

S: $1 \text{ m} = 100 \text{ cm}$.

Repeat process for 2 m, 3 m, 8 m, 8 m 50 cm, 7 m 50 cm, and 4 m 25 cm.

T: (Write $100 \text{ cm} = \underline{\quad} \text{ m}$.) Say the answer.

S: $100 \text{ m} = 1 \text{ m}$.

T: (Write $150 \text{ cm} = \underline{\quad} \text{ m } \underline{\quad} \text{ cm}$.) Say the answer.

S: $150 \text{ cm} = 1 \text{ m } 50 \text{ cm}$.

Repeat process for 250 cm, 350 cm, 950 cm, and 725 cm.

Application Problem (6 minutes)

In one year, the animal shelter bought 25,460 pounds of dog food. That amount was 10 times the amount of cat food purchased in the month of July. How much cat food was purchased in July?

Bonus: If the cats ate 1,462 pounds of the cat food, how much cat food was left?

25,460 is 10 times as many as 2,546.
 2,546 pounds of cat food was purchased in the month of July.

Bonus:
$$\begin{array}{r} 2,546 \\ - 1,462 \\ \hline 1,084 \end{array}$$
 1,084 pounds of cat food was left.

Note: This application problem incorporates prior knowledge of 10 times as many with the objective of decomposing to smaller units in order to subtract.

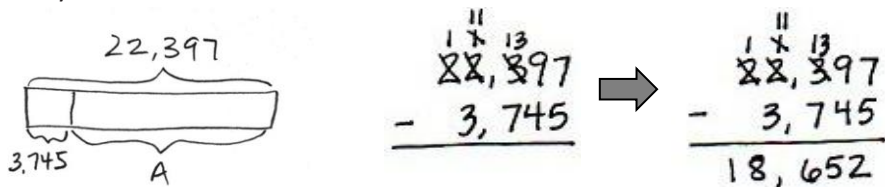
Concept Development (35 minutes)

Materials: (T) Place value chart (S) Personal white boards

Problem 1

Subtract, decomposing twice.

- T: (Write $22,397 - 3,745$ vertically on the board.)
- T: Let's read this subtraction problem together. Watch as I draw a tape diagram labeling the whole, the known part and the unknown part using a variable. Now, your turn.
- T: Record the problem on your board.
- T: Look across the digits. Am I ready to subtract?
- S: No!
- T: We look across the top number to see if I have enough units in each column. Is the number of units in the top number of the ones column greater than or equal to that of the bottom number?
- S: Yes, 7 ones is greater than 5 ones.
- T: Is the number of units in the top number of the tens column greater than or equal to that of the bottom number?
- S: Yes, 9 tens is greater than 4 tens.
- T: Is the number of units in the top number of the hundreds column greater than or equal to that of the bottom number?
- S: No, 3 hundreds is less than 7 hundreds. We can unbundle 1 thousand as 10 hundreds to make 1 thousand and 13 hundreds. I can subtract the hundreds column now.
- T: Watch as I record that. Now, it's your turn to record the change.
- T: Is the number of units in the top number of the thousands column greater than or equal to that of the bottom number?
- S: No, 1 thousand is less than 3 thousands. We can unbundle 1 ten thousand to 10 thousands to make 1 ten thousand and 11 thousands. I can subtract in the thousands column now.
- T: Watch as I record. Now, it's your turn to record the change.
- T: Is the number of units in the top number of the ten thousands column greater than or equal to that of the bottom number?
- S: Yes.
- T: Are we ready to subtract?
- S: Yes, we're ready to subtract!



- T: 7 ones minus 5 ones?
 S: 2 ones. (Record 2 in the ones column.)

Continue subtracting across the problem always naming the units.

- T: Say the complete equation with me.
 S: 22,397 minus 3,745 equals 18,652.
 T: Check your answer using addition.
 S: Our answer is correct because $18,652 + 3,745 = 22,397$.
 T: What is the value of A in the tape diagram?
 S: A equals 18,652.

Problem 2

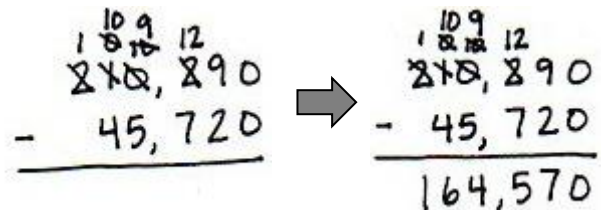
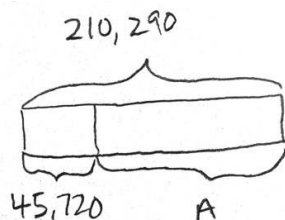
Subtract: $210,290 - 45,720$, decomposing three times.

- T: (Write $210,290 - 45,720$ vertically on the board.)
 T: With your partner, draw a tape diagram to represent the whole, the known part, and the missing part.
 T: Record the subtraction problem on your board.
 T: Look across the numbers. Are we ready to subtract?
 S: No!
 T: Look across the top number’s digits to see if we have enough units in each column. Is the number of units in the top number of the ones column greater than or equal to that of the bottom number? (Point to the zeros in the ones column.)
 S: Yes, 0 equals 0.
 T: We are ready to subtract in the ones column. Is the number of units in the top number of the tens column greater than or equal to that of the bottom number?
 S: Yes, 9 is greater than 2.
 T: We are ready to subtract in the tens column. Is the number of units in the top number of the hundreds column greater than or equal to that of the bottom number?
 S: No, 2 hundreds is less than 7 hundreds.
 T: There are no thousands to unbundle so we look to the ten thousands. We can unbundle 1 ten thousand to 10 thousands. Unbundle 10 thousands to make 9 thousands and 12 hundreds. Now we can subtract the hundreds column.

MP.5

Repeat questioning for the thousands, ten thousands, and hundred thousands place, recording the renaming of units in the algorithm.

- T: Are we ready to subtract?
 S: Yes, we’re ready to subtract!



- T: 0 ones minus 0 ones?
- S: 0 ones.
- T: 9 tens minus 2 tens?
- S: 7 tens.

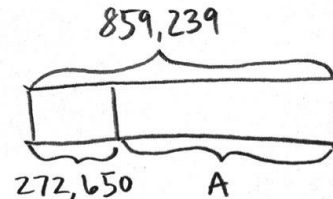
Have partners continuing subtracting across the algorithm right to left always naming the units.

- T: Read the entire equation to your partner and complete your tape diagram by labeling the variable.
- S: The difference between 210,290 and 45,720 is 164,570.

Problem 3

Use the subtraction algorithm to solve a word problem, modeled with a tape diagram, decomposing units 3 times.

Bryce needed to purchase a large order of computer supplies for his company. He was allowed to spend \$859,239 on computers. However, he ended up only spending \$272,650. How much money did Bryce have left?



$$\begin{array}{r}
 7158 \overset{11}{\times} 13 \\
 859,239 \\
 - 272,650 \\
 \hline
 586,589
 \end{array}$$

- T: Read the problem with me. Tell your partner the information we know.
- S: We know he can spend \$859,239. And we know he only spent \$272,650.
- T: Draw a tape diagram to represent the information in the problem. Label the whole, the known part and the unknown part using a variable.
- T: Tell me the problem we must solve and write it on your board.
- S: $\$859,239 - \$272,650$.
- T: Work with your partner, asking if the top unit is greater than or equal to that of the bottom unit. Regroup when needed. Then ask, "Are we ready to subtract?" before you begin subtracting.
- S: (Students solve.)
- S: $\$859,239 - \$272,650 = \$586,589$.
- T: Say your answer as a statement.
- S: Bryce has \$586,589 left.

Problem Set (10 minutes)

Students should do their personal best to complete the Problem Set within the allotted 10 minutes. For some classes, it may be appropriate to modify the assignment by specifying which problems they work on first. Some problems do not specify a method for solving. Students solve these problems using the RDW approach used for Application Problems.

Student Debrief (9 minutes)

Lesson Objective: Use place value understanding to decompose to smaller units up to 3 times using the standard subtraction algorithm, and apply the algorithm to solve word problems using tape diagrams.

The Student Debrief is intended to invite reflection and active processing of the total lesson experience.

Invite students to review their solutions for the Problem Set. They should check work by comparing answers with a partner before going over answers as a class. Look for misconceptions or misunderstandings that can be addressed in the Debrief. Guide students in a conversation to debrief the Problem Set and process the lesson. You may choose to use any combination of the questions below to lead the discussion.

- What pattern did you notice between Problems 1(a) and 1(b)?
- How was setting up the problem to complete Problem 4 different from setting up the other problems? What did you need to be sure to do? Why?
- Explain to your partner how to solve Problem 1(e). How can you make more ones when there aren't any tens from which to regroup?
- How is the complexity of this lesson different from the complexity of yesterday's lesson?
- In which column can you begin subtracting, when you are ready to subtract? (Any column.)
- You are using a variable, or a letter, to represent the unknown in each tape diagram. Tell your partner how you determine what variable to use and how it helps you to solve the problem.
- Our tape diagram shows us we are looking for a missing part when subtracting. After subtracting, if we add the two parts together, what should the sum be?

NYS COMMON CORE MATHEMATICS CURRICULUM Lesson 14 Worksheet 4•1

Name Jack Date _____

1. Use the standard algorithm to solve the following subtraction problems.

a.
$$\begin{array}{r} 2,460 \\ -1,370 \\ \hline 1,090 \end{array}$$

b.
$$\begin{array}{r} 2,460 \\ -1,470 \\ \hline 990 \end{array}$$

c.
$$\begin{array}{r} 97,684 \\ -49,700 \\ \hline 47,984 \end{array}$$

d.
$$\begin{array}{r} 2,460 \\ -1,472 \\ \hline 988 \end{array}$$

e.
$$\begin{array}{r} 24,306 \\ -3,117 \\ \hline 21,189 \end{array}$$

f.
$$\begin{array}{r} 97,684 \\ -4,705 \\ \hline 92,979 \end{array}$$

g.
$$\begin{array}{r} 124,006 \\ -121,117 \\ \hline 2,889 \end{array}$$

h.
$$\begin{array}{r} 97,684 \\ -47,705 \\ \hline 49,979 \end{array}$$

i.
$$\begin{array}{r} 224,060 \\ -31,117 \\ \hline 192,943 \end{array}$$

Directions: Draw a tape diagram to represent each problem. Use numbers to solve and write your answer as a statement. Check your answers.

2. There are 86,400 seconds in one day. If Mr. Liegel is at work for 28,800 seconds a day, how many seconds a day is he away from work?

$$\begin{array}{r} 86,400 \\ -28,800 \\ \hline 57,600 \end{array}$$

check
$$\begin{array}{r} 28,800 \\ +57,600 \\ \hline 86,400 \end{array}$$

Mr. Liegel is away from work 57,600 seconds.

COMMON CORE Lesson 14: Use place value understanding to decompose to smaller units up to three times using the standard subtraction algorithm, and apply the algorithm to solve word problems using tape diagrams. engage^{ny} 1.E.7

NYS COMMON CORE MATHEMATICS CURRICULUM Lesson 14 Worksheet 4•1

3. A newspaper company delivered 240,900 newspapers before 6 a.m. on Sunday. There were a total of 525,600 newspapers to deliver. How many more newspapers needed to be delivered on Sunday?

$$\begin{array}{r} 525,600 \\ -240,900 \\ \hline 284,700 \end{array}$$

check
$$\begin{array}{r} 240,900 \\ +284,700 \\ \hline 525,600 \end{array}$$

284,700 more newspapers needed to be delivered on Sunday.

4. A theater holds a total of 2,013 chairs. 197 chairs are in the VIP section. How many chairs are not in the VIP section?

$$\begin{array}{r} 2,013 \\ -197 \\ \hline 1,816 \end{array}$$

check
$$\begin{array}{r} 1,816 \\ +197 \\ \hline 2,013 \end{array}$$

1,816 chairs are not in the VIP section.

5. Chuck's mom spent \$19,155 on a new car. She had \$30,064 in her bank account. How much money does Chuck's mom have after buying the car?

$$\begin{array}{r} 30,064 \\ -19,155 \\ \hline 10,909 \end{array}$$

check
$$\begin{array}{r} 19,155 \\ +10,909 \\ \hline 30,064 \end{array}$$

Chuck's mom has \$10,909 after buying the car.

COMMON CORE Lesson 14: Use place value understanding to decompose to smaller units up to three times using the standard subtraction algorithm, and apply the algorithm to solve word problems using tape diagrams. engage^{ny} 1.E.8

Exit Ticket (3 minutes)

After the Student Debrief, instruct students to complete the Exit Ticket. A review of their work will help you assess the students' understanding of the concepts that were presented in the lesson today and plan more effectively for future lessons. You may read the questions aloud to the students.

Name _____

Date _____

1. Use the standard algorithm to solve the following subtraction problems.

$$\begin{array}{r} a. \quad 2,460 \\ -1,370 \\ \hline \end{array}$$

$$\begin{array}{r} b. \quad 2,460 \\ -1,470 \\ \hline \end{array}$$

$$\begin{array}{r} c. \quad 97,684 \\ -49,700 \\ \hline \end{array}$$

$$\begin{array}{r} d. \quad 2,460 \\ -1,472 \\ \hline \end{array}$$

$$\begin{array}{r} e. \quad 124,306 \\ -31,117 \\ \hline \end{array}$$

$$\begin{array}{r} f. \quad 97,684 \\ -4,705 \\ \hline \end{array}$$

$$\begin{array}{r} g. \quad 124,006 \\ -121,117 \\ \hline \end{array}$$

$$\begin{array}{r} h. \quad 97,684 \\ -47,705 \\ \hline \end{array}$$

$$\begin{array}{r} i. \quad 124,060 \\ -31,117 \\ \hline \end{array}$$

Directions: Draw a tape diagram to represent each problem. Use numbers to solve and write your answer as a statement. Check your answers.

2. There are 86,400 seconds in one day. If Mr. Liegel is at work for 28,800 seconds a day, how many seconds a day is he away from work?

3. A newspaper company delivered 240,900 newspapers before 6 a.m. on Sunday. There were a total of 525,600 newspapers to deliver. How many more newspapers needed to be delivered on Sunday?
4. A theater holds a total of 2,013 chairs. 197 chairs are in the VIP section. How many chairs are not in the VIP section?
5. Chuck's mom spent \$19,155 on a new car. She had \$30,064 in her bank account. How much money does Chuck's mom have after buying the car?

Name _____

Date _____

Directions: Use the standard algorithm to solve the following subtraction problems.

1.
$$\begin{array}{r} 19,350 \\ - 5,761 \\ \hline \end{array}$$

2. $32,010 - 2,546$

Directions: Draw a tape diagram to represent the following problem. Use numbers to solve and write your answer as a statement. Check your answer.

3. A doughnut shop sold 1,232 doughnuts in one day. If they sold 876 doughnuts in the morning, how many doughnuts were sold during the rest of the day?

Name _____

Date _____

1. Use the standard algorithm to solve the following subtraction problems.

a.
$$\begin{array}{r} 71,989 \\ -21,492 \\ \hline \end{array}$$

b.
$$\begin{array}{r} 371,989 \\ -96,492 \\ \hline \end{array}$$

c.
$$\begin{array}{r} 371,089 \\ -25,192 \\ \hline \end{array}$$

d.
$$\begin{array}{r} 879,989 \\ -721,492 \\ \hline \end{array}$$

e.
$$\begin{array}{r} 879,009 \\ -788,492 \\ \hline \end{array}$$

f.
$$\begin{array}{r} 879,989 \\ -21,070 \\ \hline \end{array}$$

g.
$$\begin{array}{r} 879,000 \\ -21,989 \\ \hline \end{array}$$

h.
$$\begin{array}{r} 279,389 \\ -191,492 \\ \hline \end{array}$$

i.
$$\begin{array}{r} 500,989 \\ -242,000 \\ \hline \end{array}$$

Directions: Draw a tape diagram to represent each problem. Use numbers to solve and write your answer as a statement.

- Jason ordered 239,021 pounds of flour to be used in his 25 bakeries. The company delivering the flour showed up with 451,202 pounds. How many extra pounds of flour were delivered?
- In May, the New York Public Library had 124,061 books checked out. Of those books, 31,117 were mystery books. How many of checked out books were not mystery books?
- A Class A dump truck can haul 239,000 pounds of dirt. A Class C dump truck can haul 600,200 pounds of dirt. How many more pounds can a Class C truck haul than a Class A truck?