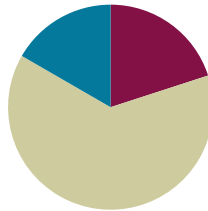


Lesson 16

Objective: Solve word problems involving money.

Suggested Lesson Structure

■ Fluency Practice	(12 minutes)
■ Concept Development	(38 minutes)
■ Student Debrief	(10 minutes)
Total Time	(60 minutes)



Fluency Practice (12 minutes)

- Sprint: Add Decimal Fractions **4.NF.5** (9 minutes)
- State the Value of a Set of Coins **4.MD.2** (3 minutes)

Sprint: Add Decimal Fractions (9 minutes)

Materials: (S) Add Decimal Fractions Sprint

Note: This Sprint reviews Lesson 13.

State the Value of a Set of Coins (3 minutes)

Materials: (S) Personal white board

Note: This fluency activity reviews Lesson 15.

T: (Write 2 quarters 4 dimes.) What is the value of 2 quarters and 4 dimes?

S: 90¢.

T: Write 90 cents as a fraction of a dollar.

S: (Write $\frac{90}{100}$ dollar.)

T: Write 90 cents in decimal form using the dollar symbol.

S: (Write \$0.90.)

T: Write 130 cents in decimal form using the dollar symbol.

S: (Write \$1.30.)

T: What is the value in cents of 3 quarters and 7 dimes?

S: 145¢.

T: Write 145 cents as a fraction of a dollar.

S: (Write $\frac{145}{100}$ dollar.)

T: Write 145 cents in decimal form using the dollar symbol.

S: (Write \$1.45.)

Continue with the following possible sequence: 1 quarter 9 dimes 12 pennies, 3 quarters 5 dimes 20 pennies.

Concept Development (38 minutes)

Materials: (S) Problem Set

Suggested Delivery of Instruction for Solving This Lesson's Word Problems

Note: Lesson 15 closed with students finding sums of dollar and cents amounts in unit form. If necessary, begin this lesson with a short segment revisiting that process.

1. Model the problem.

Have two pairs of students model the problem at the board while the others work independently or in pairs at their seats. Review the following questions before beginning the first problem:

- Can you draw something?
- What can you draw?
- What conclusions can you make from your drawing?

As students work, circulate. Reiterate the questions above. After two minutes, have the two pairs of students share only their labeled diagrams. For about one minute, have the demonstrating students receive and respond to feedback and questions from their peers.

2. Calculate to solve and write a statement.

Give students two minutes to finish their work on that question, sharing their work and thinking with a peer. All should then write their equations and statements of the answer.

3. Assess the solution for reasonableness.

Give students one to two minutes to assess and explain the reasonableness of their solution.



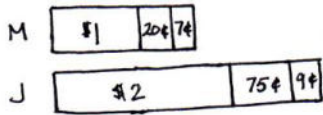
NOTES ON MULTIPLE MEANS OF ENGAGEMENT:

Give everyone a fair chance to be successful by providing appropriate scaffolds. Demonstrating students may use translators, interpreters, or sentence frames to present and respond to feedback. Models shared may include concrete manipulatives, computer software, or other adaptive materials.

If the pace of the lesson is a consideration, prepare presenters beforehand. The first problem may be most approachable for students working below grade level.

Problem 1

Miguel has 1 dollar bill, 2 dimes, and 7 pennies. John has 2 dollar bills, 3 quarters, and 9 pennies. How much money do the two boys have in all?



Solution A

$$\begin{aligned}
 & 1 \text{ dollar } 27 \text{ cents} + 2 \text{ dollars } 84 \text{ cents} \\
 & = 3 \text{ dollars } 111 \text{ cents} \\
 & \quad \quad \quad \begin{array}{c} \wedge \\ 100 \quad 11 \end{array} \\
 & = 4 \text{ dollars } 11 \text{ cents} \\
 & = \$4.11
 \end{aligned}$$

Solution B

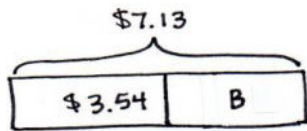
$$\begin{aligned}
 & 1 \text{ dollar } 27 \text{ cents} + 2 \text{ dollars } 84 \text{ cents} \\
 & \quad \quad \quad \begin{array}{c} \wedge \\ 11 \quad 16 \end{array} \\
 & = 1 \text{ dollar } 11 \text{ cents} + 2 \text{ dollars } 100 \text{ cents} \\
 & = 4 \text{ dollars } 11 \text{ cents} \\
 & = \$4.11
 \end{aligned}$$

Miguel and John have \$4.11 in all.

Students use their knowledge of mixed metric unit addition from Module 2 to add amounts of money. Each amount is expressed using the units of dollars and cents. Students know that 100 cents is equal to 1 dollar. Solution A shows a student decomposing 111 cents after finding the sum of the dollars and cents. Solution B shows a student decomposing Miguel’s 27 cents to make 1 dollar before finding the total sum.

Problem 2

Suilin needs 7 dollars 13 cents to buy a book. In her wallet, she finds 3 dollar bills, 4 dimes, and 14 pennies. How much more money does Suilin need to buy the book?



Solution A

$$\begin{aligned}
 & 7 \text{ dollars } 13 \text{ cents} - 3 \text{ dollars } 54 \text{ cents} \\
 & = 6 \text{ dollars } 113 \text{ cents} - 3 \text{ dollars } 54 \text{ cents} \\
 & = 3 \text{ dollars } 59 \text{ cents} \\
 & = \$3.59
 \end{aligned}$$

Solution B

$$\begin{aligned}
 & 7 \text{ dollars } 13 \text{ cents} - 3 \text{ dollars } 54 \text{ cents} \\
 & \quad \quad \quad \begin{array}{c} \wedge \\ 13 \quad 41 \end{array} \\
 & = 4 \text{ dollars } - 41 \text{ cents} \\
 & \quad \quad \quad \begin{array}{c} \wedge \\ \$3 \quad 100 \text{¢} \end{array} \\
 & = 3 \text{ dollars } 59 \text{ cents} \\
 & = \$3.59
 \end{aligned}$$

Solution C

$$3 \text{ dollars } 54 \text{ cents} \xrightarrow{+46\text{¢}} 4 \text{ dollars} \xrightarrow{+\$3} 7 \text{ dollars} \xrightarrow{+13\text{¢}} 7 \text{ dollars } 13 \text{ cents}$$

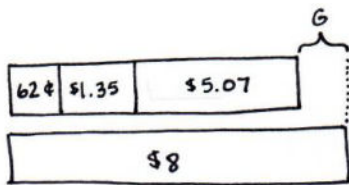
$$\begin{array}{r} \$3 + 46\text{¢} + 13\text{¢} \\ \swarrow \searrow \\ 59\text{¢} \\ = \$3.59 \end{array}$$

Suilin needs \$3.59 more to buy the book.

Students solve using unit form because they do not learn addition and subtraction of decimals until Grade 5. Solution A shows unbundling 1 dollar as 100 cents, making 113 cents to subtract 54 cents from. Solution B decomposed the cents in the subtrahend to more easily subtract from 1 dollar or 100 cents. Solution C adds up using the arrow way. Each solution shows conversion of the mixed unit into a decimal for dollars and cents.

Problem 3

Vanessa has 6 dimes and 2 pennies. Joachim has 1 dollar, 3 dimes, and 5 pennies. Jimmy has 5 dollars and 7 pennies. They want to put their money together to buy a game that costs \$8.00. Do they have enough money to buy the game? If not, how much more money do they need?



Solution A

$$62 \text{ cents} + 1 \text{ dollar } 35 \text{ cents} + 5 \text{ dollars } 7 \text{ cents}$$

$$\begin{aligned} &= 6 \text{ dollars } 104 \text{ cents} \\ &\quad \quad \quad \uparrow \quad \quad \quad \uparrow \\ &\quad \quad \quad 100 \quad 4 \\ &= 7 \text{ dollars } 4 \text{ cents} \\ &= \$7.04 \end{aligned}$$

$$\begin{aligned} &8 \text{ dollars} - 7 \text{ dollars } 4 \text{ cents} \\ &\quad \quad \quad \uparrow \quad \quad \quad \uparrow \\ &\quad \quad \quad \$7 \quad 100\text{¢} \\ &= 96 \text{ cents} \\ &G = \$0.96 \end{aligned}$$

Solution B

$$\begin{aligned} 8 \text{ dollars} &\xrightarrow{-\$5} 3 \text{ dollars} \xrightarrow{-7\text{¢}} 2 \text{ dollars } 93 \text{ cents} \\ 2 \text{ dollars } 93 \text{ cents} &\xrightarrow{-\$1} 1 \text{ dollar } 93 \text{ cents} \xrightarrow{-35\text{¢}} 1 \text{ dollar } 58 \text{ cents} \\ 158 \text{ cents} &\xrightarrow{-62\text{¢}} 96 \text{ cents} \end{aligned}$$

$$G = \$0.96$$

They don't have enough money. They need \$0.96 more to buy the game.



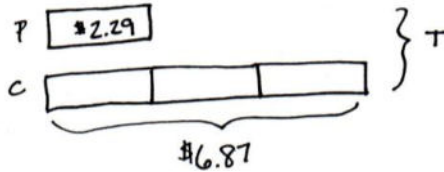
**NOTES ON
MULTIPLE MEANS
FOR ACTION AND
EXPRESSION:**

Scaffold solving Problem 3 for students working below grade level by facilitating their management of information from the word problem. A labeled tape diagram, table, place value chart, or another organizational aid may help learners with cognitive disabilities keep information organized.

In this multi-step problem, students may first find the sum of three money amounts and then subtract to find out how much more money they need, as shown in Solution A. Solution B shows the arrow way, subtracting each person’s money one at a time.

Problem 4

A pen costs \$2.29. A calculator costs 3 times as much as a pen. How much do a pen and a calculator cost together?



Solution A

$$\$2.29 = 229 \text{ cents}$$

$$\begin{array}{r} 229 \text{ cents} \\ \times 3 \\ \hline 687 \text{ cents} \end{array}$$

$$6 \text{ dollars } 87 \text{ cents} + 2 \text{ dollars } 29 \text{ cents}$$

$$= 8 \text{ dollars } 116 \text{ cents}$$

$$= 9 \text{ dollars } 16 \text{ cents}$$

$$T = \$9.16$$

Solution B

$$\$2.29 = 229 \text{ cents}$$

$$\begin{array}{r} 229 \\ \times 4 \\ \hline 916 \end{array}$$

$$916 \text{¢} = \$9.16$$

$$T = \$9.16$$

Solution C

$$230 \text{ cents}$$

$$\begin{array}{r} 230 \text{ cents} \\ \times 4 \\ \hline 920 \text{ cents} \end{array}$$

$$T = \$9.16$$

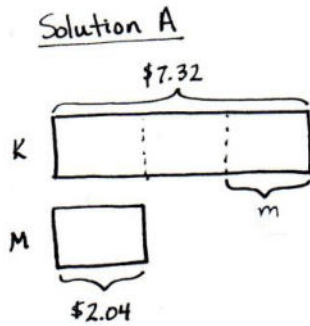
$$920 \text{ cents} - 4 \text{ cents} = 916 \text{ cents}$$

A pen and a calculator cost \$9.16 together.

In this multiplicative comparison word problem, students have to contemplate how to multiply money when they have not learned how to multiply with decimals. Solution A shows a student first solving for the cost of the calculator, then multiplying to find the total number of cents, and finally adding the cost of the pen after expressing the amount of each item as dollars and cents. Solution B is a more efficient method, solving for both items concurrently using cents. Solution C uses a compensation strategy to simplify the multiplication. Instead of a unit size of \$2.29, the student adds 1 penny to each of the 4 units in the problem, finds 4 groups of \$2.30, and then subtracts the 4 pennies that were added.

Problem 5

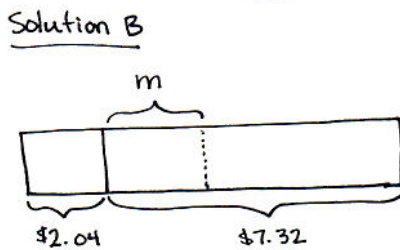
Krista has 7 dollars and 32 cents. Malory has 2 dollars and 4 cents. How much money does Krista need to give Malory so that each of them has the same amount of money?



$$\begin{aligned}
 &7 \text{ dollars } 32 \text{ cents} - 2 \text{ dollars } 4 \text{ cents} \\
 &= 5 \text{ dollars } 28 \text{ cents} \\
 &= 528 \text{ cents}
 \end{aligned}$$

$$\begin{array}{r}
 264 \\
 2 \overline{)528} \\
 \underline{4} \\
 12 \\
 \underline{12} \\
 08 \\
 \underline{08} \\
 0
 \end{array}$$

264 cents = \$2.64
m = \$2.64



$$\begin{aligned}
 &7 \text{ dollars } 32 \text{ cents} + 2 \text{ dollars } 4 \text{ cents} \\
 &= 9 \text{ dollars } 36 \text{ cents} \\
 &= 936 \text{ cents}
 \end{aligned}$$

$$\begin{array}{r}
 468 \\
 2 \overline{)936} \\
 \underline{8} \\
 13 \\
 \underline{12} \\
 16 \\
 \underline{16} \\
 0
 \end{array}$$

468 cents = \$4.68

$$\begin{aligned}
 &2 \text{ dollars } 4 \text{ cents} \xrightarrow{+64¢} 2 \text{ dollars } 68 \text{ cents} \xrightarrow{+42¢} 4 \text{ dollars } 68 \text{ cents} \\
 &m = \$2.64
 \end{aligned}$$

Malory needs \$2.64 from Krista.

This challenging multi-step word problem requires students to divide money, similarly to Problem 4 with multiplication, by finding the total amount of cents since decimal division is a Grade 5 standard. Solution A divides the difference of money the girls have. Solution B divides the total amount of money, requiring an additional step either by finding how much more money Malory needs or subtracting from Krista's money.

Student Debrief (10 minutes)

Lesson Objective: Solve word problems involving money.

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.

Any combination of the questions below may be used to lead the discussion.

- Why does money relate so closely to our study of fractions and decimals?
- How could you use rounding to find the reasonableness of your answer to Problem 4? With your partner, estimate the cost of a pen and a calculator. Are your answers reasonable?
- In Problem 5, we saw two different tape diagrams drawn. How can the way you draw affect which strategy you choose to solve?
- Problem 5 can be challenging at first read. Think of an alternative scenario that may help a younger student solve a similar problem. (Consider using smaller numbers like 9 and 5 and a context like pieces of candy.)

Exit Ticket (3 minutes)

After the Student Debrief, instruct students to complete the Exit Ticket. A review of their work will help with assessing students' understanding of the concepts that were presented in today's lesson and planning more effectively for future lessons. The questions may be read aloud to the students.

NYS COMMON CORE MATHEMATICS CURRICULUM Lesson 16 Problem Set 4•6

Name: Jack Date: _____

Use RDW to solve. Write your answer as a decimal.

1. Miguel had 1 dollar bill, 2 dimes, and 7 pennies. John had 2 dollar bills, 3 quarters, and 9 pennies. How much money did the two boys have in all?

M: $\$1.27 = 127¢$
 J: $\$2.84 = 284¢$

$$\begin{array}{r} 127 \\ + 284 \\ \hline 411 \end{array}$$

M = 411¢ = \$4.11

The two boys have \$4.11.

2. Sulin needed 7 dollars 13 cents to buy a book. In her wallet, she found 3 dollar bills, 4 dimes, and 14 pennies. How much more money does Sulin need to buy the book?

$\$7.13 = 713 \text{ cents}$
 $\$3.54 = 354 \text{ cents}$

$$\begin{array}{r} 713 \\ - 354 \\ \hline 359 \end{array}$$

B = 359 cents = \$3.59

Sulin needs \$3.59 more to buy the book.

3. Vanessa has 6 dimes and 2 pennies. Joachim has 1 dollar, 3 dimes, and 5 pennies. Jimmy has 5 dollars and 7 pennies. They want to put their money together to buy a game that cost \$8.00. Do they have enough money to buy the game? If not, how much more money do they need?

$\$8.00$

$$\begin{array}{r} 62 \\ + 907 \\ \hline 969 \end{array}$$

G = 96 cents = 96¢ = \$0.96

They don't have enough. They need \$0.96 more for the game.

COMMON CORE Lesson 16: Solve word problems involving money. Date: 3/24/14 engage^{ny} 6.E.25

NYS COMMON CORE MATHEMATICS CURRICULUM Lesson 16 Problem Set 4•6

4. A pen costs \$2.29. A calculator costs 3 times as much as a pen. How much do a pen and a calculator cost together?

P: $\$2.29$
 C: _____

T = 4 units of \$2.29
 = 916 cents
 = \$9.16

A pen and a calculator cost \$9.16.

5. Krista has 7 dollars and 32 cents. Malory has 2 dollars and 4 cents. How much money does Krista need to give Malory so that each of them has the same amount of money?

K: $\$7.32 = 732 \text{ cents}$
 M: $\$2.04 = 204 \text{ cents}$

$$\begin{array}{r} 732 \\ - 204 \\ \hline 528 \end{array}$$

$$\begin{array}{r} 264 \\ 2 \overline{)528} \\ \underline{-4} \\ 12 \\ \underline{-12} \\ 08 \end{array}$$

M = 264 cents = \$2.64

Krista needs to give Malory \$2.64.

COMMON CORE Lesson 16: Solve word problems involving money. Date: 3/24/14 engage^{ny} 6.E.26

Number Correct: _____

A

Add Decimal Fractions

1.	$\frac{1}{10} =$	.
2.	$\frac{1}{100} =$	.
3.	$\frac{1}{10} + \frac{1}{100} =$	.
4.	$\frac{3}{10} =$	.
5.	$\frac{3}{100} =$	.
6.	$\frac{3}{10} + \frac{3}{100} =$	.
7.	$\frac{5}{10} =$	.
8.	$\frac{5}{100} =$	.
9.	$\frac{5}{10} + \frac{5}{100} =$	.
10.	$\frac{7}{10} =$	.
11.	$\frac{9}{100} =$	.
12.	$\frac{7}{10} + \frac{9}{100} =$	.
13.	$\frac{9}{100} + \frac{7}{10} =$	.
14.	$\frac{4}{10} =$	.
15.	$\frac{6}{100} =$	.
16.	$\frac{4}{10} + \frac{6}{100} =$	.
17.	$\frac{4}{100} + \frac{6}{10} =$	.
18.	$\frac{8}{10} + \frac{5}{100} =$	.
19.	$\frac{9}{10} + \frac{2}{100} =$	.
20.	$\frac{1}{100} + \frac{8}{10} =$	.
21.	$\frac{4}{100} + \frac{1}{10} =$	.
22.	$\frac{7}{100} + \frac{4}{10} =$	.

23.	$\frac{2}{10} =$	.
24.	$\frac{20}{100} =$	.
25.	$\frac{2}{10} + \frac{20}{100} =$	.
26.	$\frac{3}{10} =$	.
27.	$\frac{30}{100} =$	.
28.	$\frac{3}{10} + \frac{30}{100} =$	.
29.	$\frac{5}{10} + \frac{20}{100} =$	.
30.	$\frac{8}{10} + \frac{10}{100} =$	.
31.	$\frac{8}{10} + \frac{20}{100} =$	.
32.	$\frac{8}{10} + \frac{30}{100} =$	.
33.	$\frac{8}{10} + \frac{50}{100} =$	.
34.	$\frac{9}{10} + \frac{40}{100} =$	.
35.	$\frac{9}{10} + \frac{47}{100} =$	.
36.	$\frac{7}{10} + \frac{50}{100} =$	.
37.	$\frac{7}{10} + \frac{59}{100} =$	.
38.	$\frac{6}{10} + \frac{60}{100} =$	.
39.	$\frac{6}{10} + \frac{64}{100} =$	.
40.	$\frac{65}{100} + \frac{6}{10} =$	.
41.	$\frac{91}{100} + \frac{7}{10} =$	.
42.	$\frac{8}{10} + \frac{73}{100} =$	.
43.	$\frac{9}{10} + \frac{82}{100} =$	.
44.	$\frac{98}{100} + \frac{9}{10} =$	.

Number Correct: _____

Improvement: _____

B

Add Decimal Fractions

1.	$\frac{2}{10} =$	.
2.	$\frac{2}{100} =$	.
3.	$\frac{2}{10} + \frac{2}{100} =$	.
4.	$\frac{4}{10} =$	.
5.	$\frac{4}{100} =$	.
6.	$\frac{4}{10} + \frac{4}{100} =$	.
7.	$\frac{6}{10} =$	.
8.	$\frac{6}{100} =$	.
9.	$\frac{6}{10} + \frac{6}{100} =$	.
10.	$\frac{4}{10} =$	.
11.	$\frac{8}{100} =$	.
12.	$\frac{4}{10} + \frac{8}{100} =$	.
13.	$\frac{8}{100} + \frac{4}{10} =$	.
14.	$\frac{5}{10} =$	.
15.	$\frac{7}{100} =$	.
16.	$\frac{5}{10} + \frac{7}{100} =$	.
17.	$\frac{7}{100} + \frac{5}{10} =$	.
18.	$\frac{9}{10} + \frac{6}{100} =$	.
19.	$\frac{8}{10} + \frac{3}{100} =$	.
20.	$\frac{1}{100} + \frac{7}{10} =$	.
21.	$\frac{3}{100} + \frac{1}{10} =$	.
22.	$\frac{8}{100} + \frac{3}{10} =$	.

23.	$\frac{1}{10} =$	.
24.	$\frac{10}{100} =$	.
25.	$\frac{1}{10} + \frac{10}{100} =$	.
26.	$\frac{4}{10} =$	.
27.	$\frac{40}{100} =$	.
28.	$\frac{4}{10} + \frac{40}{100} =$	.
29.	$\frac{5}{10} + \frac{30}{100} =$	.
30.	$\frac{7}{10} + \frac{20}{100} =$	.
31.	$\frac{7}{10} + \frac{30}{100} =$	.
32.	$\frac{7}{10} + \frac{40}{100} =$	.
33.	$\frac{7}{10} + \frac{60}{100} =$	.
34.	$\frac{9}{10} + \frac{30}{100} =$	.
35.	$\frac{9}{10} + \frac{37}{100} =$	.
36.	$\frac{8}{10} + \frac{40}{100} =$	.
37.	$\frac{8}{10} + \frac{49}{100} =$	.
38.	$\frac{7}{10} + \frac{70}{100} =$	.
39.	$\frac{7}{10} + \frac{76}{100} =$	.
40.	$\frac{78}{100} + \frac{7}{10} =$	.
41.	$\frac{81}{100} + \frac{7}{10} =$	.
42.	$\frac{9}{10} + \frac{73}{100} =$	.
43.	$\frac{9}{10} + \frac{84}{100} =$	.
44.	$\frac{84}{100} + \frac{8}{10} =$	.

4. A pen costs \$2.29. A calculator costs 3 times as much as a pen. How much do a pen and a calculator cost together?
5. Krista has 7 dollars and 32 cents. Malory has 2 dollars and 4 cents. How much money does Krista need to give Malory so that each of them has the same amount of money?

Name _____

Date _____

Use the RDW process to solve. Write your answer as a decimal.

David's mother told him that he could keep all the money he finds under the sofa cushions in their house. David finds 6 quarters, 4 dimes, and 26 pennies. How much money does David find altogether?

Name _____

Date _____

Use the RDW process to solve. Write your answer as a decimal.

1. Maria has 2 dollars, 3 dimes, and 4 pennies. Lisa has 1 dollar and 5 quarters. How much money do the two girls have in all?
2. Meiling needs 5 dollars 35 cents to buy a ticket to a show. In her wallet, she finds 2 dollar bills, 11 dimes, and 5 pennies. How much more money does Meiling need to buy the ticket?
3. Joe has 5 dimes and 4 pennies. Jamal has 2 dollars, 4 dimes, and 5 pennies. Jimmy has 6 dollars and 4 dimes. They want to put their money together to buy a book that costs \$10.00. Do they have enough? If not, how much more do they need?

4. A package of mechanical pencils costs \$4.99. A package of pens costs twice as much as a package of pencils. How much do a package of pens and a package of pencils cost together?
5. Carlos has 8 dollars and 48 cents. Alissa has 4 dollars and 14 cents. How much money does Carlos need to give Alissa so that each of them has the same amount of money?