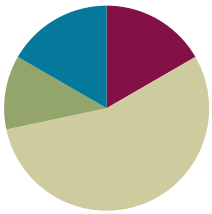
Lesson 16

Objective: Solve elapsed time problems involving whole hours and a half hour.

Suggested Lesson Structure

Fluency Practice	(10 minutes)
Application Problem	(7 minutes)
Concept Development	(33 minutes)
Student Debrief	(10 minutes)
Total Time	**(60 minutes)**



Fluency Practice (10 minutes)

- Subtraction with Renaming **2.NBT.7** (5 minutes)
- Grade 2 Core Fluency Differentiated Practice Sets **2.OA.2** (5 minutes)

Subtraction with Renaming (5 minutes)

Materials: (S) Personal white board, hundreds place value chart (Lesson 3 Fluency Template)

Note: This fluency activity reviews the application of a chip model while recording with the algorithm. Allow students work time between each problem, and reinforce place value understandings by having students say their answer in both unit form and in standard form. Students use their personal white boards and a place value chart to solve.

T: Slide the place value chart template into your personal white board.

T: (Write 600 – 356 horizontally on the board.) Let's use a chip model to subtract. On your personal white board, record your work using the algorithm.

S: (Solve.)

T: 600 – 356 is…?

S: 244.

Continue with the following possible sequence: 406 – 218, 507 – 269, 314 – 185, 672 – 274, and 842 – 296.

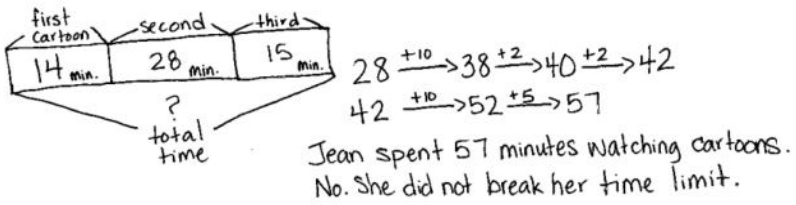
Grade 2 Core Fluency Differentiated Practice Sets (5 minutes)

Materials: (S) Core Fluency Practice Sets from Lesson 3

Note: During Topic D and for the remainder of the year, each day's Fluency Practice includes an opportunity for review and mastery of the sums and differences with totals through 20 by means of the Core Fluency Practice Sets or Sprints. The process is detailed, with Practice Sets provided, in Lesson 3.

Application Problem (7 minutes)

On Saturdays, Jean may only watch cartoons for one hour. Her first cartoon lasts 14 minutes, and the second lasts 28 minutes. After a 5-minute break, Jean watches a 15-minute cartoon. How much time does Jean spend watching cartoons? Did she break her time limit?



NOTES ON MULTIPLE MEANS OF REPRESENTATION:

Scaffold the Application Problem for students working below grade level by encouraging them to draw what they know or by providing them with a blank number bond to use. Help them make sense of the 5-minute break in the problem: "When Jean took a break, was she watching cartoons? Should we count those 5 minutes?"

Note: This Application Problem provides an opportunity to practice mental addition and double-digit addition within 100. Students must pay careful attention not to add in the 5-minute break. If they do, they will think Jean has broken the time limit.

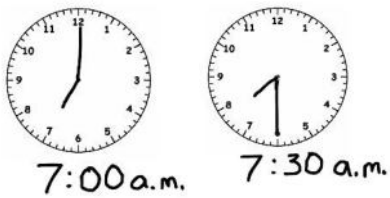
Concept Development (33 minutes)

Materials: (T) Demonstration clock (can be clock from Lessons 13–14) (S) Student clocks, personal white board, 1 piece of chart paper, and a few markers (per group)

Draw analog clocks representing 7:00 and 7:30 on the board, or show two demonstration clocks set to those times. Then, display the time on the board or on clocks for each of the following problems.

Problem 1

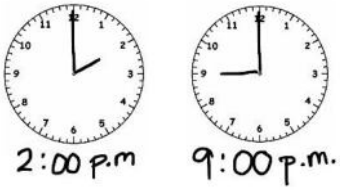
Kalpana gets up at 7:00 a.m. She leaves the house at 7:30 a.m. How long does it take her to get ready?



T: Read the problem.
S: (Read the problem chorally.)
T: (Pause.) How long does it take Kalpana to get ready?
S: 30 minutes. → Half an hour.
T: How did you figure this problem out? Turn and talk.
S: I used my clock and saw the fraction, half an hour. → 7:30 is 30 minutes after 7:00. You just look at the minutes and subtract. 30 minus 0 is easy, 30. → I skip-counted by fives until I got to 7:30.
T: Great! Let's try another problem.

Problem 2

Tony goes bowling on Saturday at 2:00 p.m. He gets home at 9:00 p.m. How long did he stay out?

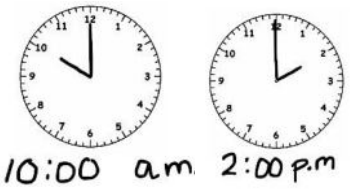


Have students read the problem chorally.

T: Work with a partner to try to solve this problem. (Allow students time to work.)
T: How long did Tony stay out?
S: 7 hours!
T: How did you figure that out?
S: I counted on the clock: 3, 4, 5, 6, 7, 8, 9, so 7 hours. → I subtracted 2 hours from 9 hours to get 7 hours.

Problem 3

Students arrive at the museum at 10:00 a.m. They leave at 2:00 p.m. How long are students at the museum?



T: Read the problem, and then solve it with a partner. (Allow students time to work.)
T: How long are students at the museum?
S: 4 hours!
T: How do you know?
S: I counted 11, 12, 1, 2, so 4 hours. → I know that it's 2 hours from 10 to 12 and then another 2 hours from 12 to 2. Since 2 + 2 = 4, it was 4 hours. → I went back in time. It's 2 hours from 2 to noon and then 2 hours from noon to 10.
T: Let's try another problem that goes from a.m. to p.m.

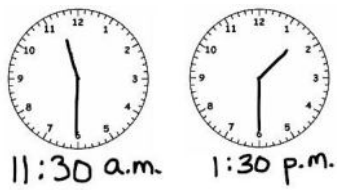
NOTES ON MULTIPLE MEANS OF ENGAGEMENT:

Scaffold Problem 4 for students who might need it by creating a number line starting with 11:30 a.m. (marked with a.m. and perhaps a picture of a shining sun to signal daytime), and extend it to 1:30 p.m. (also with the sun shining to signal daytime) for students to use. For Problem 5, make the number line extend from 8:00 p.m. (with a crescent moon) to 3:30 a.m. (with a crescent moon to signal nighttime). Use the clocks and the number line together to show how to count elapsed time.

Problem 4

A movie starts at 11:30 a.m. It finishes at 1:30 p.m. How long does the movie last?

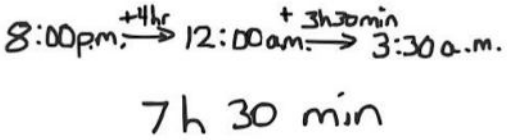
T: Work with a partner to try to solve this problem. (Allow students time to work.)
T: How long does the movie last?
S: 2 hours.
T: How did you figure it out?
S: I couldn't just subtract because it's not 10 hours long. It goes from a.m. to p.m. → I used my clock. One hour, 2 hours. It's 2 hours! → It turns into p.m. at 12. So, from 11:30 a.m. to 12:30 p.m. is an hour, and then it's another hour to 1:30 p.m. 2 hours!



T: Some students noticed that we are going from a.m. to p.m., so we can't just subtract. We have to count the hours forward. Remember, you can use your clocks to help if you like.

Problem 5

Beth goes to bed at 8:00 p.m. She wakes up at 3:30 a.m. to go to the airport. How much time did she sleep?



T: Work with a partner to figure this out. (Allow students time to work.)

T: How long, or how much time, did Beth sleep?

S: Seven and a half hours. → Seven hours and 30 minutes.

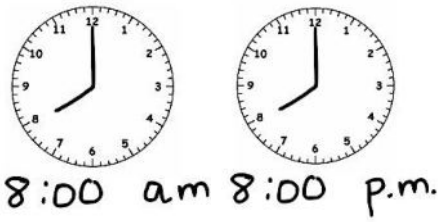
MP.7

T: For this problem, could we use the arrow way with hours and minutes to make solving easier? Turn and talk.

S: Yes. First, I figured out how long it is until midnight, or 12:00 a.m., which is 4 hours. Then, it's another 3 and a half hours till 3:30. So, 7 and a half hours. → I know that halfway around the clock is 6 hours. Then, I just added another hour and a half to get to 3:30. Altogether, that's 7 and a half hours.

Problem 6

Draw or show two clocks, one showing 8:00 a.m. and one showing 8:00 p.m.



T: Are these clocks showing the same time or two different times?

S: Different! → They're the same except one clock shows a.m., and one clock shows p.m.

T: Turn and talk. If these times occur on the same day, how much time has passed between the first time and the second?

S: (Count hours.) 12 hours. → I know it's 12 hours in half a day, so 12 hours. → The difference between the same time of day in a.m. or p.m. is 12 hours.

Continue with the following sequence: 4:30 p.m. and 1:30 p.m., 7:00 a.m. and 2:30 a.m.

Extension

Organize desks into groups of three or four, as students complete this last activity in cooperative groups. Distribute a piece of chart paper and a few markers to each group.

T: Can you believe it? This is our last math lesson of the year! I have one final question for you: In how many days will you be third-graders?

T: As a team, use what you know about months, weeks, and days to solve this problem.

T: Let's review. How many days in a week?

S: 7 days.

T: About how many weeks in a month?

S: 4 weeks.

T: And about how many days in a month?

S: It depends on the month, usually 31. → Sometimes 30 and sometimes 31, except for February.

T: Yes! Our last day of school is [month, day, year]. And our first day next year is [month, day, year].

T: On your chart paper, use pictures, words, or numbers to solve the problem. Get to work!

If time permits, have students present their solutions and explain their thinking. Otherwise, hang charts around the room, and have a quick gallery walk before distributing the last Problem Set.

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 should solve these problems using the RDW approach used for Application Problems.

Note: There may not be time for the Problem Set and the challenge question. If time runs short, select the option that best fits students' needs.

Student Debrief (10 minutes)

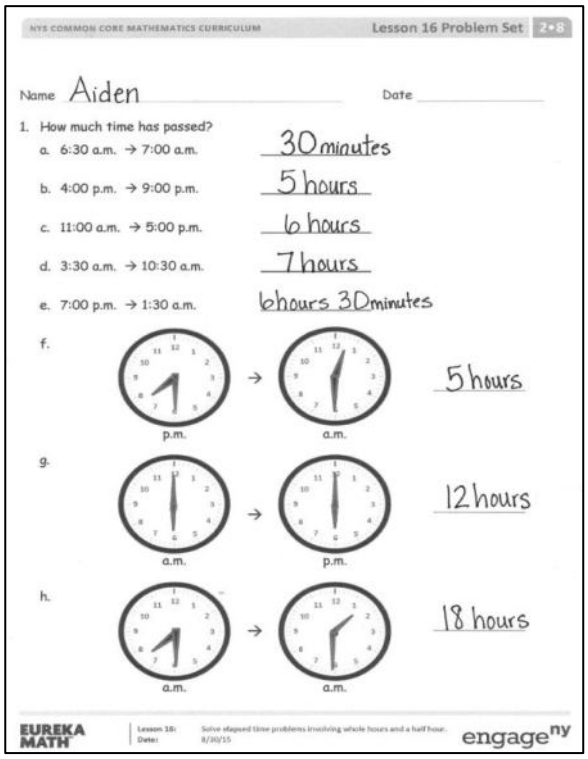
Lesson Objective: Solve elapsed time problems involving whole hours and a half hour.

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.

- For Problem 1(e), explain to your partner how you figured out how much time passed between 7:00 p.m. and 1:30 a.m. What were you most likely doing during that time?
- For Problem 1(h), Jovan argues that the elapsed time is 7 hours. Why is he incorrect? What most likely happened?
- For Problem 2(a), if Tracy leaves and comes home on the half hour, why isn't she in school for 8 and a half hours?
- For Problem 2(d), what observations can you make about the times Marcus drove on Monday and Tuesday? Does this make solving easier for you?


NYS COMMON CORE MATHEMATICS CURRICULUM Lesson 16 Problem Set 2•8

Name Aiden Date

1. How much time has passed?
   a. 6:30 a.m. → 7:00 a.m. 30 minutes
   b. 4:00 p.m. → 9:00 p.m. 5 hours
   c. 11:00 a.m. → 5:00 p.m. 6 hours
   d. 3:30 a.m. → 10:30 a.m. 7 hours
   e. 7:00 p.m. → 1:30 a.m. 6 hours 30 minutes
   f. p.m. → a.m. 5 hours
   g. a.m. → p.m. 12 hours
   h. a.m. → a.m. 18 hours

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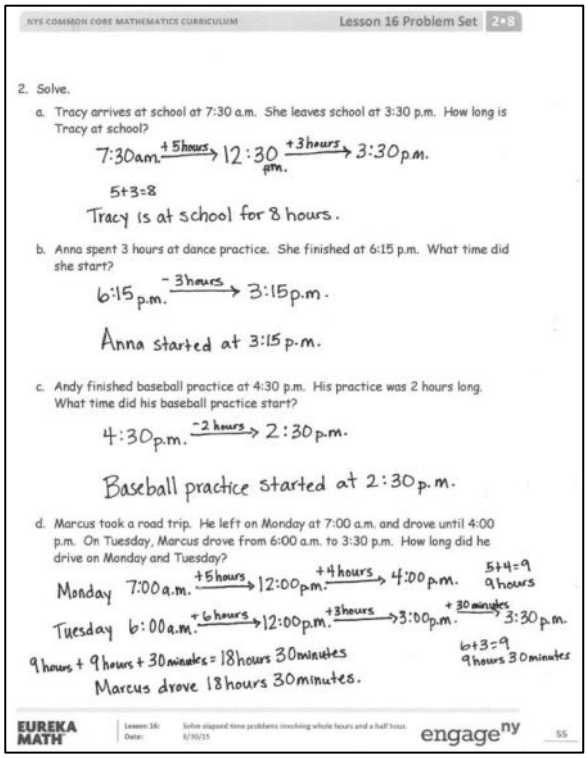
Exit Ticket (3 minutes)

After the Student Debrief, instruct students to complete the Exit Ticket. A review of their work will help with assessing the 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 2•8

2. Solve.

a. Tracy arrives at school at 7:30 a.m. She leaves school at 3:30 p.m. How long is Tracy at school?

7:30 a.m. $\xrightarrow{+5 \text{ hours}}$ 12:30 p.m. $\xrightarrow{+3 \text{ hours}}$ 3:30 p.m.

5+3=8

Tracy is at school for 8 hours.

b. Anna spent 3 hours at dance practice. She finished at 6:15 p.m. What time did she start?

6:15 p.m. $\xrightarrow{-3 \text{ hours}}$ 3:15 p.m.

Anna started at 3:15 p.m.

c. Andy finished baseball practice at 4:30 p.m. His practice was 2 hours long. What time did his baseball practice start?

4:30 p.m. $\xrightarrow{-2 \text{ hours}}$ 2:30 p.m.

Baseball practice started at 2:30 p.m.

d. Marcus took a road trip. He left on Monday at 7:00 a.m. and drove until 4:00 p.m. On Tuesday, Marcus drove from 6:00 a.m. to 3:30 p.m. How long did he drive on Monday and Tuesday?

Monday 7:00 a.m. $\xrightarrow{+5 \text{ hours}}$ 12:00 p.m. $\xrightarrow{+4 \text{ hours}}$ 4:00 p.m. 5+4=9 9 hours

Tuesday 6:00 a.m. $\xrightarrow{+6 \text{ hours}}$ 12:00 p.m. $\xrightarrow{+3 \text{ hours}}$ 3:00 p.m. $\xrightarrow{+30 \text{ minutes}}$ 3:30 p.m. 6+3=9 9 hours 30 minutes

9 hours + 9 hours + 30 minutes = 18 hours 30 minutes

Marcus drove 18 hours 30 minutes.

EUREKA MATH Lesson 16: Date: Solve elapsed time problems involving whole hours and a half hour. engage^ny 55

Name _____ Date _____

1. How much time has passed?

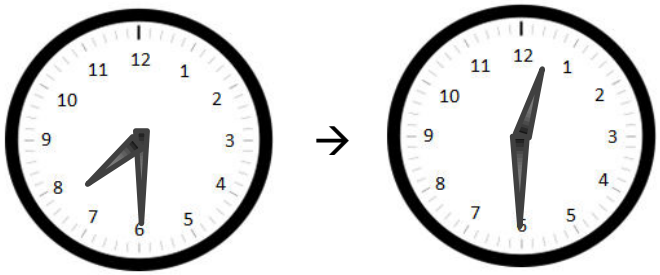
a. 6:30 a.m. → 7:00 a.m. _____

b. 4:00 p.m. → 9:00 p.m. _____

c. 11:00 a.m. → 5:00 p.m. _____

d. 3:30 a.m. → 10:30 a.m. _____

e. 7:00 p.m. → 1:30 a.m. _____

f. 

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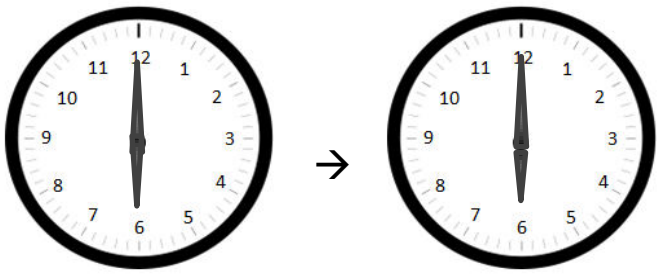
g. 

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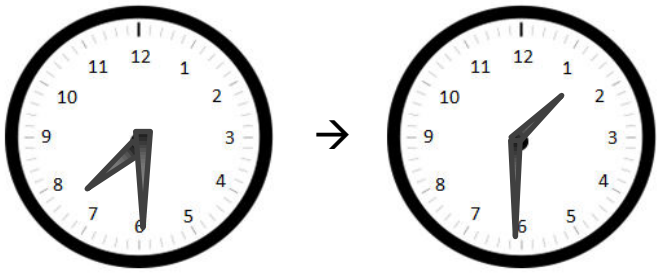
h. 

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2. Solve.

   a. Tracy arrives at school at 7:30 a.m. She leaves school at 3:30 p.m. How long is Tracy at school?

   b. Anna spent 3 hours at dance practice. She finished at 6:15 p.m. What time did she start?

   c. Andy finished baseball practice at 4:30 p.m. His practice was 2 hours long. What time did his baseball practice start?

   d. Marcus took a road trip. He left on Monday at 7:00 a.m. and drove until 4:00 p.m. On Tuesday, Marcus drove from 6:00 a.m. to 3:30 p.m. How long did he drive on Monday and Tuesday?

Name _____ Date _____

How much time has passed?

1. 3:00 p.m. → 11:00 p.m. _____

2. 5:00 a.m. → 12:00 p.m. (noon) _____

3. 9:30 p.m. → 7:30 a.m. _____

Name _____ Date _____

1. How much time has passed?

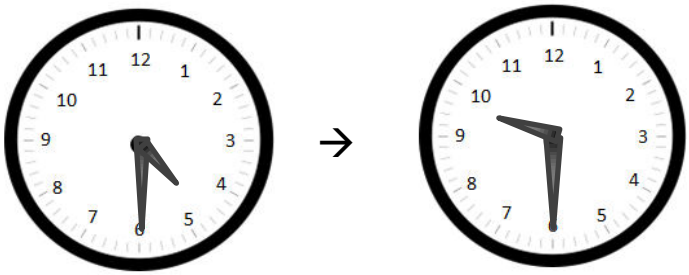
a. 2:00 p.m. → 8:00 p.m. _____

b. 7:30 a.m. → 12:00 p.m. (noon) _____

c. 10:00 a.m. → 4:30 p.m. _____

d. 1:30 p.m. → 8:30 p.m. _____

e. 9:30 a.m. → 2:00 p.m. _____

f. 

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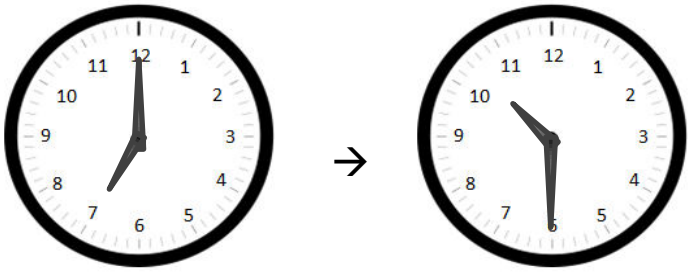
g. 

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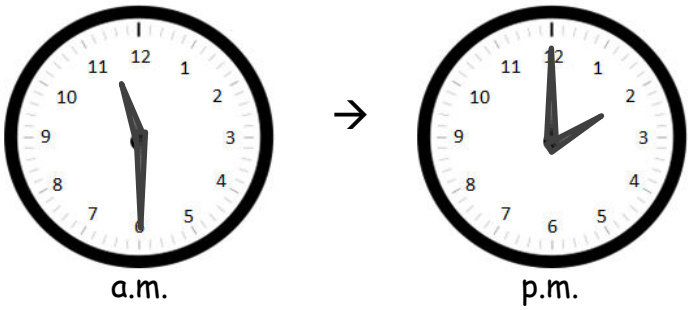
h. 

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2. Solve.

   a. Kylie started basketball practice at 2:30 p.m. and finished at 6:00 p.m. How long was Kylie at basketball practice?

   b. Jamal spent 4 and a half hours at his family picnic. It started at 1:30 p.m. What time did Jamal leave?

   c. Christopher spent 2 hours doing his homework. He finished at 5:30 p.m. What time did he start his homework?

   d. Henry slept from 8 p.m. to 6:30 a.m. How many hours did Henry sleep?