CONSTRUCTING TASK: TIME TO GET CLEAN

Adapted from Inside Mathematics (Noyce Foundation)
APPROXIMATE TIME: 2 Days

STANDARDS FOR MATHEMATICAL CONTENT

MCC. 3.MD.1 Tell and write time to the nearest minute and measure time intervals in minutes. Solve word problems involving addition and subtraction of time intervals in minutes, e.g., by representing the problem on a number line diagram.

STANDARDS FOR MATHEMATICAL PRACTICE

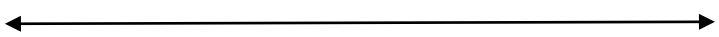
1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
8. Look for and express regularity in repeated reasoning.

BACKGROUND KNOWLEDGE

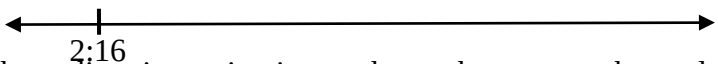
In this task, students will record and draw time to the nearest minute and calculate elapsed time in 15, 30, and 60 minute intervals.

Teachers may want to begin with a discussion of daily activities in students' lives and the amount of time those activities typically take. For example, getting ready for school may begin at 7:06 AM and end at 7:36 AM, a 30 minute duration. Then engage students in a discussion of activities that typically happen during the school day and their estimates of the duration of these activities. One book that explores elapsed time, *The Long Wait* by Annie Cobb, discusses wait-time at an amusement park. As the calculations are made, you should encourage students to explore a linear model of time as well as a traditional analog clock. The linear model can be created using an open number line. Jumps are made from the beginning time to the ending time much like movement on a number line and increments of time may be recorded above the jumps. An example is shown below:

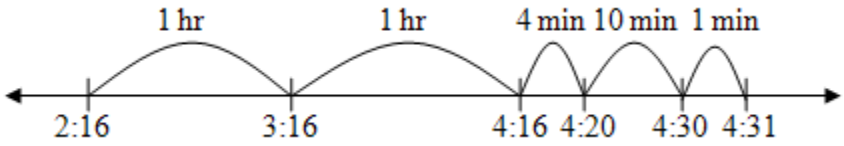
To find the elapsed time from 2:16 pm to 4:31 pm, start with an open number line:



Add the starting time:



Then count up to the ending time using jumps that make sense to the students:



If telling time is built into daily routines, students should have had classroom experiences with telling time to the nearest minute. Daily routines can be extended to elapsed time by asking students the stopping time if they start work now and work for 15 minutes or 30 minutes. Additionally, students could be asked what time they will return to the classroom if they will be returning in one hour.

ESSENTIAL QUESTIONS

- What strategies can I use to help me tell and write time to the nearest minute and measure time intervals in minutes?
- How can we determine the amount of time that passes between two events?
- What part does elapsed time play in our daily living?
- How can I demonstrate my understanding of the measurement of time?

MATERIALS

- book, *The Long Wait* by Annie Cobb, or similar text
- "Time to Get Clean" student recording sheet
- clock (Classroom clock or individual clocks for each student)
- empty number line, or any material students may need to assist them with measuring elapsed time

GROUPING

Small Group/Partner Task

TASK DESCRIPTION, DEVELOPMENT, AND DISCUSSION

Students will examine a family's morning bathroom routine. In this task, they will discuss and explore telling time to the minute as well as elapsed time. Students will follow the directions below from the "Time to Get Clean" student recording sheet.

- Closely examine the *Time to Get Clean* chart below.
- With a partner or small group, fill in the missing parts of this schedule.
- Answer the questions below about the bathroom schedule.
  - Who spends the most time in the bathroom?
  - Who spends the shortest time in the bathroom?
  - How long to Dad and Grandpa spend in the bathroom in all?
  - How much longer does Meagan spend in the bathroom than Carl?
  - The first person goes into the bathroom at 6AM. It is in use until everyone is finished getting clean. At what time will the bathroom be free each day?
  - Choose one person's bathroom slot. Tell how you figured out their missing information.

FORMATIVE ASSESSMENT QUESTIONS

- What strategies did you use to figure out the missing times on the chart?
- What connections can you make to parts of the hour (half hour, quarter hour, etc?)
- What is the hardest part about telling time to the nearest minute and elapsed time?
- What part of this task did you find was easiest to complete?
- How did you determine the elapsed time?
- Is there more than one way to figure out elapsed time?

DIFFERENTIATION

Extension

- Have students make a list of other values and their equivalents (i.e. ½ hour = 30 minutes).
- Have students create their own schedule with missing values for a classmate to complete.
- Have students prepare a "Telling Time Toolkit" for a visitor from prehistory (or at least before clocks were invented!) explaining everything they need to know about telling time to the nearest minute and explaining how to figure out elapsed time.

Intervention

- Provide beginning and ending times for activities that do not cross the hour mark. For example, show a beginning time of 11:15 and an ending time of 11:45 for a given activity. Be sure students understand the elapsed time of 30 minutes before moving to activities of a longer duration that begin and end in different hours.
- Only provide the elapsed time in minute form.
- Allow students to use clock, calculators, and number lines for help.
- Facilitate a teacher-guided group.

TECHNOLOGY CONNECTION

- http://nlvm.usu.edu/en/nav/frames_asid_318_g_2_t_4.html Elapsed time problems using two clocks, both analog and digital
- http://www.shodor.org/interactivate/activities/ElapsedTime/?version=disabled&browser=MSIE&vendor=na&flash=10.0.32 Several activities surrounding elapsed time using analog or digital clocks.
- http://donnayoung.org/math/clock.htm Printable blank clock faces.

Time to Get Clean!

The Freeman Family Bathroom is a busy place in the mornings! So, the Freeman kids decided to create a chart for everyone to follow so things wouldn't get too crowded. There's one problem. Baby Freeman (Georgie) erased some important parts of the schedule. The Freeman kids are very nervous about this because they will have to show their new schedule to the family tonight and be ready to explain it. Can you help them?

- Closely examine the Freeman Family Morning Bathroom Schedule below.
- Fill in the missing parts of the schedule. Use clocks or other tools to help you.
- Answer the questions about the schedule on the space provided.

Part I: The Freeman Family Morning Bathroom Schedule

Person	Activities	Start Time	End Time	Time Taken
Megan	Shower, wash hair, dry hair, brush teeth		6:30	½ hour
Carl	Shower, brush teeth	6:30	6:56	
Baby Georgie	Take a bath	6:56		24 minutes
Mom	Shower, brush teeth		8:05	¾ hour
Dad	Shower, shave, brush teeth	8:05	8:47	
Grandpa	Take a bath, shave	8:47		35 minutes

Part II: Explanations for the Family Meeting

1. Who spends the most time in the bathroom? _____
2. Who spends the shortest time in the bathroom? _____
3. How long to Dad and Grandpa spend in the bathroom in all? _____
4. How much longer does Meagan spend in the bathroom than Carl? _____
5. The first person goes into the bathroom at 6AM. It is in use until everyone is finished getting clean. At what time will the bathroom be free each day? _____
6. Choose one person's bathroom slot. Tell how you figured out their missing information below.

   _____

   _____