


## Grade 8 Mathematics

### Measurement: Lesson 9

Read aloud to the students the material that is printed in **boldface type** inside the boxes. Information in regular type inside the boxes and all information outside the boxes should **not** be read to students. Possible student responses are included in parentheses after the questions.

NOTE: The directions read to students may depend on the available materials. Read only those parts of the lesson that apply to the materials you are using.

Any directions that ask you to do something, such as to turn to a page or to hand out materials to students, will have an arrow symbol (  ) by them.

*Purpose of Lesson 9:*

- In this lesson, the tutor and the students will
  - ✓ solve problems involving elapsed time, and
  - ✓ solve problems involving change across time zone.

*Equipment/Materials Needed:*

- Copies of Student Sheets 100 – 103
- Paper and pencils
- Chalkboard

*Preparations before beginning Lesson 9:*

- Run one copy of Student Sheets 100 – 103 for each student.
- Have paper and pencils available.

## Lesson 9: Measurement


Say:

**Elapsed time** is time that has passed. If I say the party lasted from 10:30 to 12:30, then two hours passed or elapsed. Questions involving elapsed time will be of the following types:

- 1. You know when an event started and when it will end. You have to find the amount of time that has passed. The TV program started at 8:30 p.m. and ended at 9:00 p.m. How many minutes did the program last? (30 minutes)**
- 2. You know when an event started and how long it will last, so you have to find when the event will end. The TV program started at 8:30 p.m. and lasted for 30 minutes. When did the program end? (9:00 p.m.)**
- 3. You know when the event will end and how long it will last, so you have to find when the event will begin. The TV program was 30 minutes long and ended at 9:00 p.m. What time did it start? (8:30 p.m.)**

Say:

**Elapsed time can be measured in seconds, minutes, hours, days, weeks, months, or years. For seconds, minutes, and hours, picturing a clock will help.**


 Give students Student Sheet 100. Discussion is critical. This sheet will focus on elapsed time in minutes, hours, and seconds.

Answers:

1. 15 minutes
2. 1:35 p.m.
3. 1:55 p.m.
4. 3:47 p.m.
5. No, the movie would not be over until 7:20 p.m.
6. 7:55 a.m.
7. 7:25 p.m.
8. 11:25 a.m.
9. 38 seconds

Say:

**When you make a schedule or answer questions about a schedule, you are often finding elapsed time.**

 Give students Student Sheet 101. Discussion is critical. This sheet will focus on elapsed time in minutes and hours in a schedule.

Answers:

1. 1:25 p.m.
2. 13 minutes
3. Bus 2 -- Bus 1 would get her there too early, and Bus 3 would get her there too late.
4. Bus 3
5. 2 hrs. and 2 min.

Say:

**Let's look at elapsed time using days, weeks, months, and years.**

 Ask questions such as these:

**How many days are in a week?** (7)  
**How many days are in two weeks?** (14)  
**How many weeks are in 21 days?** (3)  
**How many weeks are in a month?** (4)  
**How many weeks are in six months?** (24)  
**How many months are in eight weeks?** (2)  
**How many months are in a year?** (12)  
**How many months are in two years?** (24)  
**How many days are in each month?** (31 days in January, March, May, July, August, October, and December. 30 days in April, June, September, and November. 28 days in February.  
You may need to ask more questions of these types.

 Give students Student Sheet 102. Discussion is critical.

Answers:

1. December 18
2. January 12
3. 21 days, 3 weeks
4. October 18
5. August
6. February 15
7. 28 years old
8. Monty's, 1 day


Say:

**If you went to visit a friend in Colorado, the time in Colorado is one hour earlier than the time in Louisiana. If you went to visit a friend in South Carolina, the time there is one hour later than the time in Louisiana. The world is divided into 24 time zones, one for each hour of the day. The United States is divided into six time zones.**

 Give students Student Sheet 103.


Say:

**The chart shows the six United States time zones. If the time is noon or 12:00 p. m., in the Eastern Time Zone, the chart shows the time in other time zones. Colorado is in the Mountain Time Zone, while New York is on Eastern Time. Louisiana is in the Central Time Zone.**

 Have students answer the questions on Student Sheet 103.

Answers:

1. One hour
2. 5 a.m.
3. 2 p.m.
4. 5 p.m.

 Have one student summarize today's lesson. Elapsed time is often a difficult concept for students.

## Student Sheet 100 (Measurement: Lesson 9)

Answer the following questions about time.

1. Judy arrived at the movie theater at 1:15 p.m. The movie she wanted to see started at 1:30 p.m. How long did she have to wait?
2. Jimmy arrived at the movie theater 20 minutes after Judy. What time did he arrive?
3. Tina wanted to get to the movie theater 20 minutes before the 2:15 p.m. show. What time should she have arrived?
4. Ray knew that the movie lasted 1 hour and 32 minutes. What time would the 2:15 show end?
5. Mark wants to watch a movie that is  $2\frac{1}{2}$  hours long. His father said dinner would be ready at 7:00 p.m. It is now 4:50 p.m. Does he have time to watch the movie? Explain.
6. Bernice got to school at 8:15 a.m. She was 20 minutes late. What time did her school start?
7. Suppose you put a cake in the oven at 6:45 p.m. It takes 40 minutes to bake. What time will the cake be done?
8. David flew to Dallas. His plane was supposed to leave at 9:35 a.m. It was delayed for a 1 hour and 50 minutes. What time did the plane leave?
9. Tony finished a race in 3 minutes and 23 seconds. Mary finished the race in 4 minutes and 1 second. How much faster was Tony?

## Student Sheet 101 (Measurement: Lesson 9)

<b>Bus Schedule</b>
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<b>Bus</b>	<b>Arrives at Aster Ave.</b>	<b>Arrives at Rose Road</b>	<b>Arrives at Petunia Park</b>	<b>Arrives at Daisy Drive</b>
<b>Bus 1</b>	<b>12:32 p.m.</b>	<b>12:48 p.m.</b>	<b>1:01 p.m.</b>	<b>1:25 p.m.</b>
<b>Bus 2</b>	<b>2:32 p.m.</b>	<b>2:52 p.m.</b>	<b>3:07 p.m.</b>	<b>3:37 p.m.</b>
<b>Bus 3</b>	<b>5:05 p.m.</b>	<b>5:35 p.m.</b>	<b>6:01 p.m.</b>	<b>6:47 p.m.</b>

Tara often rides the city bus to get to the shopping center on Rose Road, to the Petunia Park, and to the skating rink on Daisy Drive. She lives on Aster Ave.

**Use the bus schedule to answer the following questions.**

1. What time does the earliest bus arrive at the skating rink?
2. How long does it take the first bus to get from Rose Road to the park?
3. Tara wants to be at the skating rink for 4:00 p.m. Which is the latest bus she can take? Why?
4. Which bus takes 46 minutes to get from Petunia Park to Daisy Drive?
5. Tara arrived at the bus stop at 12:30, but the bus had come early so she missed Bus 1. How long does she have to wait until Bus 2 arrives at her stop?

## Student Sheet 102 (Measurement: Lesson 9)

**Answer the following questions about time.**

1. The Hoffman's left on a two-week vacation on December 4<sup>th</sup>. When did they return?
2. The Smith's left for a two-week vacation on December 29<sup>th</sup>. When did they return?
3. Michael was 15 years old on July 2<sup>nd</sup>. Raquel was 15 years old on July 23<sup>rd</sup>. How many days older is Michael? How many weeks older is Michael?
4. Cindy will arrive at the hotel on October 10<sup>th</sup>. She will stay 8 nights. What date will she check out of the hotel?
5. Hannah's appointment with the dentist was on February 10<sup>th</sup>. The dentist wants to see Hannah in six months. In what month should Hannah make an appointment?
6. Many airlines make you purchase a ticket 14 days before your flight. If Natalie is leaving on March 1<sup>st</sup>, on what day should she purchase her ticket?
7. Todd was born on August 8, 1973. How old will he be on his birthday in 2001?
8. Yvette's vacation is from June 27<sup>th</sup> to July 9<sup>th</sup>. Monty's vacation starts on June 27<sup>th</sup> and lasts 2 weeks. Whose vacation is longer? How much longer?

## Student Sheet 103 (Measurement: Lesson 9)

Name of Time Zone	Time
Eastern	12:00 p.m.
Central	11:00 a.m.
Mountain	10:00 a.m.
Pacific	9:00 a.m.
Alaska	8:00 a.m.
Hawaii	7:00 a.m.

**Answer the following questions using the chart. Remember Louisiana is in the Central Time Zone.**

1. How many hours difference are there between Mountain Time and Pacific Time?
2. It is 9:00 a.m. in the Central Time Zone. You decided to call a friend in Hawaii. What time would it be in Hawaii?
3. Beth was in Utah, which is in the Mountain Time Zone. She wanted to watch the Saints' game. She knew that the game started at 3:00 p.m. in New Orleans. What time should she turn on the TV?
4. Your favorite TV show is on at 8:00 p.m. Eastern Time. What time would it be on in California, which is in the Pacific Time Zone?