

## **Title: Elapsed Time**

### **Brief Overview:**

This Concept Development Unit will introduce students to the concept of measuring time with clocks. Students will explore minutes, seconds, and hours to examine elapsed time. Students develop time sense by recording the ways they spend their time and solving simple problems involving time and elapsed time in several contexts.

### **NCTM Content Standard/National Science Education Standard:**

- Problem Solving
- Communication
- Reasoning
- Whole Number Computation
- Measurement

### **Grade/Level:**

Grade 4

### **Duration/Length:**

Three days (60 minutes each day)

### **Student Outcomes:**

Students will:

- Be able to estimate time; use time; determine elapsed time.
- Develop the concept of elapsed time in seconds, minutes, and hours.
- Increase time sense and solve simple problems involving time and elapsed time.

### **Materials and Resources:**

- Books: *What Time Is It? A Book of Math Riddles* by Sheila Keenan and *It's About Time* by Marilyn Burns
- Demonstration clock
- Clock models for students
- Math Journals
- Overhead projector
- Transparencies
- Homework Chart

- Index Cards (multi-colored)
- Markers or pencils
- Brads
- Hole puncher
- Student Resource Sheets 1-8
- Teacher Resource Sheets # 1-7

## **Lesson 1: Exploring Time**

### **Preassessment:**

Begin with a review of time. Distribute Student Resource Sheet 1. Students will work individually on these questions and check answers with a partner. Answers may be found on Teacher Resource Sheet 1.

- How many seconds are in a minute?
- How many seconds are in a half of a minute?
- How many minutes are in an hour?
- How many minutes are in a half hour?
- How many hours and minutes are in 82 minutes?

### **Launch:**

Begin the lesson by asking students to think about how time is used in their daily lives. Students may suggest the following:

- Amount of time it takes to get to football, dance or soccer practice.
- Amount of time they are supposed to do their homework
- The times school starts and ends.

Explain to students that they use math every time they figure out how much time they have, spend, or need to do activities. Discuss the importance of knowing how to tell time and elapsed time. Give each student or team of two students a clock model with adjustable hands. The teacher will review the parts of the analog clock face with the students. State a time orally and have the students demonstrate the time on the clock model. (Example: 3:15, 2:05, and 12:43).

Have the students demonstrate what time it will be if it is three hours later than 3:15, 2:05, and 12:43. Have students share the strategies they used to solve this problem.

Explain to the students that what they have just demonstrated is elapsed time. Discuss the definition of elapsed time: the amount of time taken to go from start to finish.

### Teacher Facilitation/ Student Application:

State the objective for the day. Students will define and compute units of elapsed time using an analog clock and learn to apply the use of elapsed time in their daily schedule.

Write on chalkboard or overhead: This morning you arrived at school at 8:00 AM and Math begins at 1:00 PM. How much time has passed? Allow time for student responses and ask students how they solved the problem? With large demonstration clock have a student move the hands to show how much time has passed. Review concept of start time, end time, and time passed. Draw chart on board.

Start Time	End Time	Time Passed

Ask which one of these categories could be erased and renamed “elapsed time.” Change “*Time Passed*” to **Elapsed Time** on chart. Then, fill in 9:00 AM under Start Time; 1:00 PM under End Time; then fill in the **Elapsed time. (5 hours)**

Ask students what time math class started? Record time under “Start Time.” Have a student set the clock to that time. What time is it now? How much time has elapsed since this math lesson began? A student can come to the board and fill in the amount of time under **Elapsed Time** and move hands on large clock.

Skip count by 5’s around clock to locate 30 minutes before or after a given time. Show students a way to find the time 30 minutes before of after any given time. Have the students look at the tick mark directly opposite the given time, (Example: to find 30 minutes after 12:38, follow the line of the minute hand to the opposite side of the clock.

The teacher presents students with a clock face (Student Resource Sheet 2) worksheet to use for determining elapsed time. Instruct students to record the time that is 30 minutes after the time shown. Ask students for answers and write the correct answer on the chalkboard. Answers may be found on Teacher Resource Sheet 2.

Explain to the students that the 12 hours from midnight to noon are called AM. The 12 hours from noon to midnight are called PM. Draw two clocks on the board, one labeled AM and the other PM. Explain to the

students that the pizza store is open (10:00 AM to 11:00 PM.). Have a student shade the hours when the pizza shop is open. Discuss answer with students. Distribute Student Resource Sheet 3 and have students complete it independently. Review answers with students (Teacher Resource Sheet 3).

**Embedded Assessment:**

Distribute BCR (Student Resource Sheet 4) for students to complete independently and have students discuss answers. Answers may be found on Teacher Resource Sheet 4.

**Reteaching/Extension:**

*At various times throughout the day, ask the class to tell what time is shown on the classroom clock.*

*Use a center activity that involves the students matching cards with times on clock faces to cards with the correct numeral times and words.*

**Math Journal Entry Questions:**

- How much time will elapse between breakfast and lunch?
- How many hours are you in school each day?
- Estimate how long you think that you are on the bus each day or it takes to walk to school.

*Homework:*

Give students a blank activity chart (Student Resource Sheet 5). Have each student fill in what they do from the time they get home to the time they go to bed. These can include sports, dinner, homework, television watching, etc. Starting and finishing times cannot overlap. Students will fill in start, end, and elapsed times. Students must include at least 5 activities.

Activity	Start Time	End Time	Elapsed Time
1.			
2.			
3.			
4.			
5.			

## Lesson 2: From Time to Time

### Preassessment:

Review prior material and begin with an assessment of previous night's homework. Ask two students to copy their homework chart onto a chart on the board. Teacher circulates to check homework and students are sharing with their partners.

Using their homework charts ask students to calculate how much time elapsed from the time you got home until you completed your activities. Record the total amount of time you took to complete the activities last night in hours and minutes.

### Launch:

Challenge students to guess how long 1 minute is. Tell students you will look at a clock hidden from them to see when a minute has passed. During that period students raise their hands when they think the minute is up. Give a signal at the end of the minute. Engage students in a discussion about the amount of time in a minute and list other activities that could be completed in a minute. Ask the students if they know what a riddle is. Teacher tells students that she is going to read a book, *What Time Is It? A Book of Math Riddles* by Sheila Keenan.

### Teacher Facilitation:

Ask students to state the difference between end time and elapsed time. Review the definition of elapsed time. Guide the students through the following chart on an overhead. Ask students to calculate missing information. Fill in the chart.

Activity	Start Time	End Time	Elapsed Time
1. Music Lesson	9:30 AM	(10:15)	45 minutes
2. Football practice	(4:45)	6:00 PM	1 hour, 15 minutes
3. Homework	3:45 PM	(4:35)	50 minutes
4. Watch television	(7:00)	8:30 PM	1 hour, 30 minutes

After activity is completed, model answering word problems.

- Sarah's dance class begins at 6:30 PM. It takes her 30 minutes to walk to class from home. What is the latest time she can leave home to arrive at class on time? (6:00)
- Steven's mom picks him up from football practice at 5:30 PM. He starts at 3:30 PM. How long is his football practice? (2 hours)
- Steven's mom can drive home from the football field in 20 minutes. What time do they arrive home? (5:50)

### **Student Application:**

Students work independently on Student Resource Sheet 6 that assesses various word problems on start time, end time, and elapsed time. Teacher will circulate through the room answering and asking questions, and offering individual support as needed. Share strategies that students are using. Review answers from Teacher Resource Sheet 5.

### **Embedded Assessment:**

Distribute BCR (Student Resource Sheet 7) for students to complete independently and have students discuss answers and procedures to solve the BCR. For the answers refer to Teacher Resource Sheet 6.

### **Reteaching/Extension:**

- Students can create multi-step word problems using chart information.
- Students can chart their parents' activities, including start time, end time, and elapsed time.
- Students can create a weekly schedule of their activities and determine the elapsed times of activities and the start, end and elapsed time from the beginning of their week to the end.

## **Lesson 3: Beyond Time**

### **Preassessment:**

Discuss and review the concepts of measuring time and elapsed time. Ask students how many minutes are in an hour? How many seconds are in a minute? How many hours are in a day? Draw a clock on the board or use

a clock manipulative that has movable hands. Ask a student to come up and manipulate the clock (either by drawing hands on the clock you have drawn on the board or moving the hands on the clock) to show 12:30, 1:00, 5:00, and various times.

**Launch:**

Make a clock using 2 different colored index cards and brads (that will allow mobility). Connect 12 index cards using brads; be sure to alternate the color of the cards. Hence you have one green card, one blue card, one green card, one blue card, and so on. The twelve cards will form a number line (a straight line) 1 through 12.

**Teacher Facilitation:**

Teacher states objective for the day. Students will understand that time has a beginning and an end point. This activity will enable students to read and tell time on a traditional clock. Essentially, this lesson demonstrates time in a visual manner using a number line. Place the number line on the board using an adhesive in order to hold the number line in place. Point to the space midway between two and four, 3:00. Ask the students is it one yet? Slide your finger closer to one but not quite on one. Ask the students again if it is one yet? Ask what time is it? Students will likely reply 12:55 or a time close to this estimation. Continue this process using different numbers on the number line. This will assist students to view time as a number line in a straight format. Now, fold the number line into a circle/clock. The number line now becomes a clock. This will visually assist students with the concept of time.

**Student Application:**

Give each student 12 index cards (6 of one color and six of a different color) so that each student has twelve cards consisting of two different colors. Next, pass out 12 brads so that each student can make their own clock. Students will also need a hole puncher or index cards which you have placed holes in so that they can connect the cards to form a number clock of their own. Circulate around the classroom and assist students with the creation of their number line/clock.

**Embedded Assessment:**

Once students have all completed their number line/clocks instruct them to extend the clock into a number line on their desk and put their finger on

the point that shows it is almost 3:00. Continue this assessment with various times. Distribute Student Resource Sheet 8 and have students complete it independently. Refer to Teacher Resource Sheet 7 for answers.

**.Reteaching/Extension:**

Students can plan a vacation, determining how long it will take to get to their destination. They can describe activities they will do and how long each will take.

- Some students might be interested in learning how clocks work and others might investigate the ways people have measured time at different periods in history. The book, *It's About Time* by Marilyn Burns provides examples of interesting ideas about time.

**Summative Assessment:**

Students will explore and develop the concept of time by communicating through writing and solving problems in their daily activities. A variety of tools and instruction will be used to assist students to describe elapsed time and procedural steps to find the amount of elapsed time.

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Name \_\_\_\_\_

## Introduction to Time

1. How many seconds are in a minute? \_\_\_\_\_
2. How many seconds are in half of a minute? \_\_\_\_\_
3. How many minutes are in an hour? \_\_\_\_\_
4. How many minutes are in half of an hour? \_\_\_\_\_
5. How many hours and minutes are in 82 minutes? \_\_\_\_\_

Name \_\_\_\_\_

### **Introduction to Time**

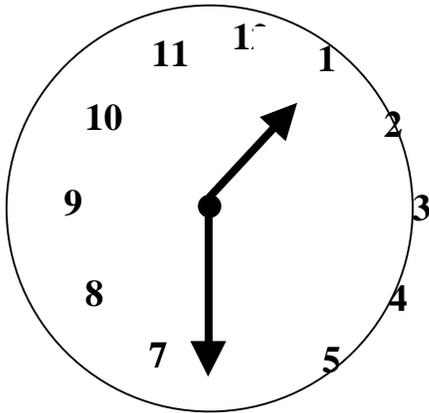
1. How many seconds are in a minute? **60**
2. How many seconds are in half of a minute? **30**
3. How many minutes are in an hour? **60**
4. How many minutes are in half of an hour? **30**
5. How many hours and minutes are in 82 minutes? **1 hour and 22 minutes**

Name \_\_\_\_\_

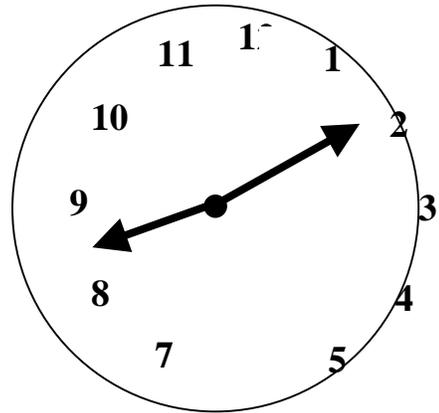
Date \_\_\_\_\_

### A Half Hour Later

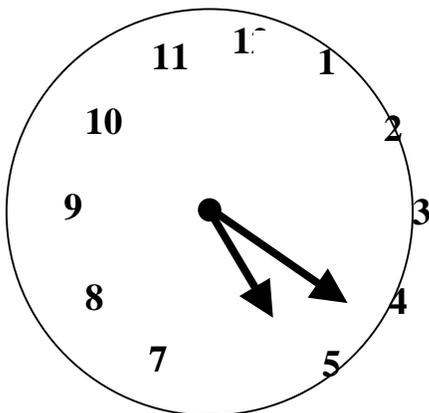
Look at each clock and decide what time it is showing.  
 Then write what time it would be a half hour later.  
 Write that time on the line below the clock.



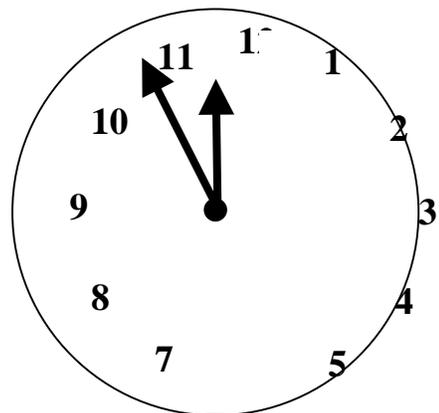
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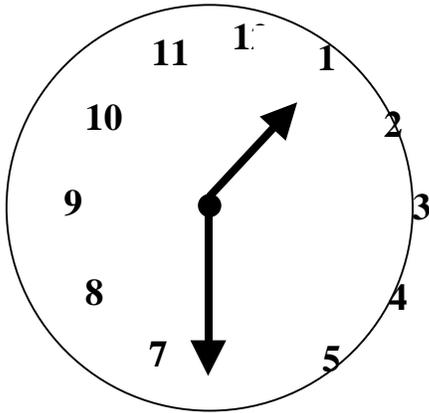
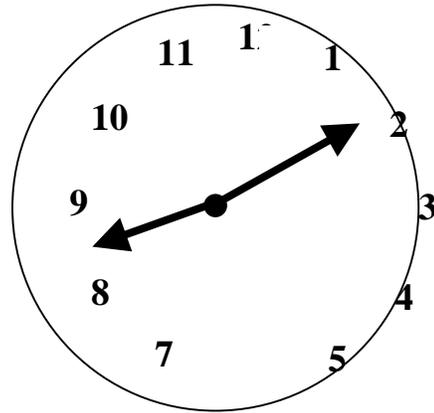
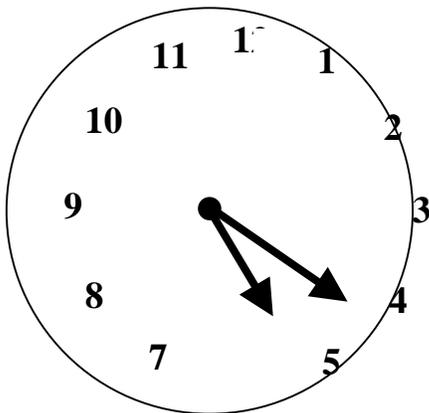
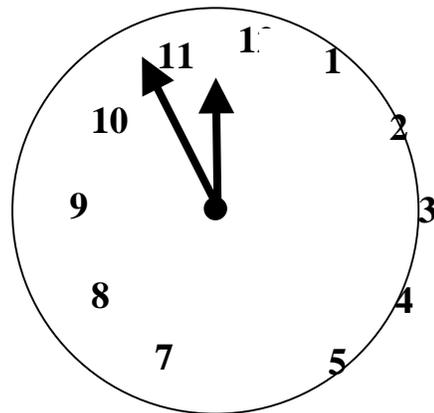
\_\_\_\_\_

Name \_\_\_\_\_

Date \_\_\_\_\_

**A Half Hour Later**

**Look at each clock and decide what time it is showing.  
Then write what time it would be a half hour later.  
Write that time on the line below the clock.**

2:00  
\_\_\_\_\_8:40  
\_\_\_\_\_5:50  
\_\_\_\_\_12:25  
\_\_\_\_\_

Name \_\_\_\_\_

**Directions:** Write **AM** or **PM** for each question.



1. Sara is eating breakfast. It is 8:00\_\_\_\_\_.



2. Chris is sleeping. It is 10:00\_\_\_\_\_.



3. Amy is going to school. It is 9:00\_\_\_\_\_.



4. It is the fourth of July. It is 9:30\_\_\_\_\_.

Name \_\_\_\_\_

**Answer Key:** **AM** or **PM** is indicated in bold and italics.



1. Sara is eating breakfast. It is 8:00 ***AM***.



2. Chris is sleeping. It is 10:00 ***PM***.



3. Amy is going to school. It is 9:00***AM***.



4. It is the fourth of July. It is 9:30 ***PM***.

Brief Constructed Response

Sue spent 1 hour at the mall. Sue spent 30 minutes of her time in the shoe store and 20 minutes of her time in the video game store. The remainder of the time at the mall Sue spent at the ice cream shop.

**Step A**

How long did Sue spend at the ice cream shop?

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**Step B**

Use what you know about time to explain why your answer is correct. Use words, pictures, and/or numbers in your explanation.

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### Brief Constructed Response

Sue spent 1 hour at the mall. Sue spent 30 minutes of her time in the shoe store and 20 minutes of her time in the video game store. The remainder of the time Sue spent at the ice cream shop.

#### **Step A**

How long did Sue spend at the ice cream shop?

10 minutes

#### **Step B**

Use what you know about time to explain why your answer is correct. Use words and/or numbers in your explanation.

You will get 50 minutes by adding the time spent in the shoe store (30 minutes) to the time spent in the video game store (20 minutes). Students then can subtract 50 minutes from 60 minutes to formulate the answer of 10 minutes.

Name: \_\_\_\_\_

Date: \_\_\_\_\_

# Homework Sheet



Activity	Start Time	End Time	Elapsed Time
1.			
2.			
3.			
4.			
5.			

Name: \_\_\_\_\_

Date: \_\_\_\_\_

**Directions:** Read each question and circle the best answer.

1. John played for **1 hour** at the playground. John spent **20 minutes** on the slide and **10 minutes** on the swings. John spent the rest of the time on the monkey bars. **How much time did John spend on the monkey bars?**

- A. 10 minutes
- B. 30 minutes
- C. 60 minutes
- D. 20 minutes

2. Sharon has **2 hours** to clean the house before her mom gets home. Sharon must dust, sweep, wash the dishes, and vacuum. Sharon spent **30 minutes** dusting, **20 minutes** sweeping, and **40 minutes** washing the dishes. **How much time does she have left to vacuum?**

- A. 30 minutes
- B. 20 minutes
- C. 60 minutes
- D. 10 minutes

Activity	Start Time	End Time	Elapsed Time
1. Playing Cards	9:00AM	10:00AM	
2. Shopping	12:15 PM		1 hour, 15 minutes
3. Eating Lunch		1:30AM	45 minutes
4. Swimming		5:00PM	2 hours, 20 minutes

Name: \_\_\_\_\_

**Answer Key - The correct answer is in bold and italics.**

1. John played for **1 hour** at the playground. John spent **20 minutes** on the slide and **10 minutes** on the swings. John spent the rest of the time on the monkey bars. **How much time did John spend on the monkey bars?**

- A. 10 minutes
- B. 30 minutes**
- C. 60 minutes
- D. 20 minutes

2. Sharon has **2 hours** to clean the house before her mom gets home. Sharon must dust, sweep, wash the dishes, and vacuum. Sharon spent **30 minutes** dusting, **20 minutes** sweeping, and **40 minutes** washing the dishes. **How much time does she have left to vacuum?**

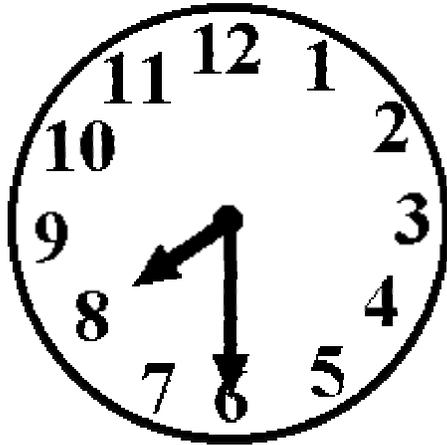
- A. 30 minutes**
- B. 20 minutes
- C. 60 minutes
- D. 10 minutes

Activity	Start Time	End Time	Elapsed Time
1. Playing Cards	9:00AM	10:00AM	<b>1 hour</b>
2. Shopping	12:15 PM	<b>1:30PM</b>	1 hour, 15 minutes
3. Eating Lunch	<b>12:45PM</b>	1:30AM	45 minutes
4. Swimming	<b>2:40PM</b>	5:00PM	2 hours, 20 minutes

Brief Constructed Response

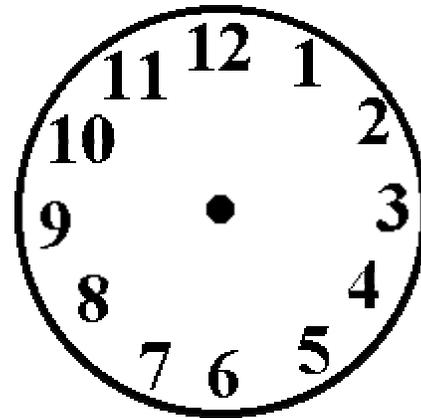
**Step A**

Draw the minute and hour hand on the clock to show what time it will be in three hours.



In 3 hours  
the time  
will be

\_\_\_\_\_



**Step B**

Use what you know about clocks and elapsed time to explain why your answer is correct. Use words and/or numbers in your explanation.

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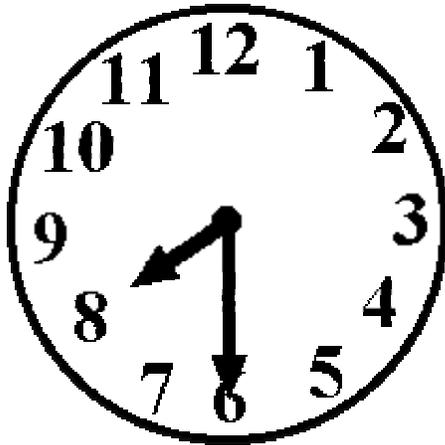
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### Brief Constructed Response

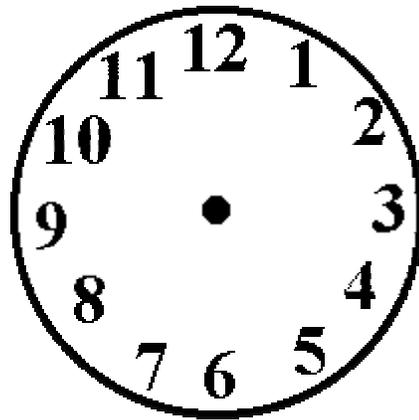
#### Step A

Draw the minute and hour hand on the clock to show what time it will be in three hours.



In 3 hours the time will be

11:30



#### Step B

Use what you know about clocks and elapsed time to explain why your answer is correct. Use words and/or numbers in your explanation.

**Students will add three hours to 8:30 to show the time of 11:30.**

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Name \_\_\_\_\_

**Directions:** Choose the best answer for each question.

**What time is it?**



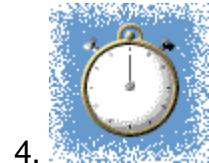
- A. 12:00
- B. 10:10
- C. 3:00
- D. 6:00



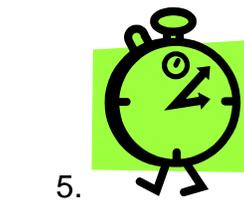
- A. 10:00
- B. 11:55
- C. 12:20
- D. 3:00



- A. 9:24
- B. 10:30
- C. 12:00
- D. 2:30



- A. 3:00
- B. 1:00
- C. 5:30
- D. 12:00



- A. 3:05
- B. 12:00
- C. 6:00
- D. 1:30



- A. 12:30
- B. 10:10
- C. 9:05
- D. 5:30

Name \_\_\_\_\_

Answer Key – The answer is indicated in bold and italics.

What time is it?



- A. 12:00
- B. **10:10**
- C. 3:00
- D. 6:00



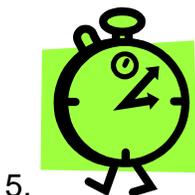
- A. 10:00
- B. **11:55**
- C. 12:20
- D. 3:00



- A. **9:24**
- B. 10:30
- C. 12:00
- D. 2:30



- A. 3:00
- B. 1:00
- C. 5:30
- D. **12:00**



- A. **3:05**
- B. 12:00
- C. 6:00
- D. 1:30



- A. 12:30
- B. 10:10
- C. **9:05**
- D. 5:30

**Elapsed Time**  
**(To be used with Student Resource Sheets 4 & 7)**  
 Brief Constructed Response  
 Mathematics Rubric - Grades 1-8

Score	
<b>2</b>	<p>My answer shows I completely understood the problem and how to solve it:</p> <ul style="list-style-type: none"> <li>• I used very good, complete strategy to correctly solve the problem.</li> <li>• I used my best math vocabulary to clearly explain what I did to solve the problem. My explanation was complete, well organized and logical.</li> <li>• I applied what I know about math to correctly solve the problem.</li> <li>• I used numbers, words, symbols or pictures to show how I solved the problem.</li> </ul>
<b>1</b>	<p>My answer shows I understood most of the problem and how to solve it:</p> <ul style="list-style-type: none"> <li>• I used a strategy to find a solution that was partly correct.</li> <li>• I used some math vocabulary and most of my reasons were correct to explain how I solved the problem. My explanation needed to be more complete, well organized or logical.</li> <li>• I partly applied what I know about math to solve the problem.</li> <li>• I tried to use numbers, words, symbols or pictures to show how I got my answer, but these may not have been completely correct.</li> </ul>
<b>0</b>	<p>My answer shows I did not understand the problem and how to solve it:</p> <ul style="list-style-type: none"> <li>• I was not able to use a good strategy to solve the problem.</li> <li>• My strategy was not related to what was asked.</li> <li>• I did not apply what I know about math to solve the problem.</li> </ul>

