

## Math: Money & Time: Teacher's Guide

**Grade Level:** 2-3

**Curriculum Focus:** Mathematics

**Lesson Duration:** Two class periods

### Program Description

"When are we going to use math anyway?" If you've heard that before, here is a video with irrefutable evidence that we use math every day—whether counting change, changing an appointment, or balancing our checkbooks. **Money**—Use the practical application of money to explain the basics of addition, subtraction, and multiplication of whole numbers and how to convert fractions into decimals. **Time**—Learn how and why our complicated system of timekeeping came into being. Show your students why knowing their fractions makes it easy to tell time.

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### Onscreen Activities

#### Segment 1, Money

- Activity: Suppose your class decides to bake cookies to raise money for your school. Think about all of the materials you'll need. How much money will the materials cost? Then decide how much you should charge for each cookie to make a profit.

#### Segment 2, Time

- Activity: There are 24 hours in a day. How much of this time are you busy? Use addition to calculate how many hours a day you spend doing schoolwork, playing, and eating. Then calculate how much time you have left over for rest and sleep. Now figure out how much time you spend resting and sleeping each week.
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### Lesson Plan

#### Student Objectives

- Discuss how to solve word problems involving time and money.
- Work as a class to solve word problems focusing on addition, subtraction, multiplication, and simple fractions.
- Work with a partner to make up their own word problems.

## Materials

- *Math: Money & Time* video and VCR, or DVD and DVD player
- Overhead projector with transparencies and pens

## Procedures

1. Begin the lesson by asking students to think about how time and money are used in their daily lives. Students may suggest the following:
  - Amount of time it takes to get to soccer practice
  - Amount of time they are supposed to practice their musical instrument
  - The times school starts and ends
  - How much money they earn for allowance or receive as gifts
  - How much money they need to save to buy a new toy
2. Explain to students that they use math every time they figure out how much time or money they have, spend, or need. During this lesson, students will be working together to apply the math skills they already know (addition, subtraction, multiplication, and fractions) to solve real-life problems about money and time. They will begin by working as a class to solve word problems about money and time. After practicing, students will work with partners to apply the same writing and math skills as they prepare their own word problems involving either time or money.
3. Write the following problem on the board or on an overhead transparency:

*Your teacher told you to buy a notebook, a ruler, a pencil, and an eraser for math class. The notebook costs \$3.00, the ruler \$1.50, the pencil \$.20, and the eraser \$.40. What is the total amount of money you need to buy these items?*

Ask students how they would solve this problem. First, discuss which operation they should use. Point out that the words "the total amount" usually indicate that addition is called for. Go through the following steps with your students to solve this problem:

- To find out how much money you need, add up the following:

$$\begin{array}{r}
 \$3.00 \\
 \$1.50 \\
 \$0.20 \\
 + \$0.40 \\
 \hline
 \$5.10
 \end{array}$$

- You would need to take \$5.10 to the store to have enough money to buy the supplies.



- Ask students how they would solve the problem if the teacher asked them to get three pencils and three erasers. Explain that when they hear the word each, they know that they will likely have to multiply.
- To find out how much money you would need now, begin by multiplying:

$$\$ .20 \times 3 = \$ .60$$

$$\$ .40 \times 3 = \$ 1.20$$

- Then add those totals to the other expenses for single items:

$$\$ 3.00$$

$$\$ 1.50$$

$$\$ 0.60$$

$$+ \$ 1.20$$

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$$\$ 6.30$$

4. Now work on this problem with the class:

*Sophie has soccer practice at 3:45 p.m. If it takes one hour to drive there, plus an additional 15 minutes during rush hour, what time do she and her mother leave to get there on time?*

Discuss the way to solve the problem with the class. What operation must they use? Have them identify the need to use subtraction to determine that one hour earlier than 3:45 would be 2:45. Subtracting another 15 minutes would bring the time to 2:30. To get to practice on time, Sophie and her mom must leave at 2:30.

Ask students how they would figure out how much total time Sophie would be gone from home, including travel time to and from practice and actual practice time (which is 1 hour and 30 minutes). Tell them to try to use fractions in solving this problem.

In this case, they would need to determine that 1 hour and 15 minutes is the same as  $1 \frac{1}{4}$  hours and that 1 hour and 30 minutes is the same as  $1 \frac{1}{2}$  hours. Then they would add the travel time to the practice time and the travel time home:

$$1 \frac{1}{4} \text{ hours}$$

$$1 \frac{1}{2} \text{ hours}$$

$$+ 1 \frac{1}{4} \text{ hours}$$

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$$4 \text{ hours}$$

You may want to use a circle graph to illustrate this information. The quarter of the pie missing represents 15 minutes, or one-quarter of an hour.

5. Give students one final problem to work on as a class:



*Jimmy's neighbors asked him to rake their leaves. They offered to pay him \$5 an hour. How many hours must he work to earn \$20?*

To solve the problem, suggest that students set up the following equation:  $\$5 \times \text{number of hours} = \$20$ .

You may choose to set up a table such as this one to illustrate how Jimmy earns money for each hour worked.

No. of hours	Money earned
1	\$5
2	\$10
3	\$15
4	\$20

If they know their multiplication tables, they will see that  $\$5 \times 4 \text{ hours} = \$20$ . If students have learned how to divide, they can divide \$20 by 5 to get 4 hours.

- Ask students if they understand how they use math all the time. Have them pick partners and have each pair make up one word problem focusing on time or money. The problems should give students practice working on addition, subtraction, multiplication, or fractions. Have students write their problems on a piece of paper or on a transparency so they can present to the class. After they have written the problems, have them prepare their own solution in the form of an equation or equations, as well as a written explanation of the steps they used to solve the problem.
- Have each pair present its problem to the class. Have the presenting pair lead a discussion about the steps needed to solve the problem. Then they can reveal their own solutions.

### Discussion Questions

- Which words in a word problem usually mean that addition is the correct operation to use? Which words usually indicate that subtraction should be used?
- Give two examples of problems about money or time that came up in your everyday life. Were you able to solve them?
- Take one of the problems presented by your classmates and add a sentence to it that requires using another mathematical operation to find the solution. (They might ask them to figure out how much time is needed each week, if the activity was only for one day. Or, they might ask how much change they would get back for their purchase, if they gave the cashier a \$20 bill for a smaller amount.)

### Assessment

Use the following three-point rubric to evaluate students' work during this lesson.

- 3 points: Students were very attentive during class; actively participated in class discussions; and applied what they learned to write accurate, interesting word problems.



- 2 points: Students were somewhat attentive during class; showed some involvement during class discussions; and applied what they learned to write satisfactory word problems.
- 1 point: Students were not attentive during class; showed little involvement during class discussions; and had difficulty applying what they learned to write their own word problems.

## Vocabulary

### decimal

*Definition:* A fraction (as  $.25 = 25/100$  or  $.025 = 25/1000$ ) or mixed number (as  $3.025 = 3-25/1000$ ) in which the denominator is a power of 10 usually expressed by use of the decimal point.

*Context:* We use decimals when we count money.

### elapsed time

*Definition:* The actual time taken to complete a task.

*Context:* The amount of time it takes to complete a project is known as elapsed time.

### equation

*Definition:* A mathematical statement of equality.

*Context:* Addition, subtraction, multiplication and division can be used in solving equations.

### fraction

*Definition:* A numerical representation of a portion of a whole.

*Context:* One-fourth ( $1/4$ ) and one-half ( $1/2$ ) are fractions.

### operation

*Definition:* The practical application of principles or processes; in mathematics, this refers to addition, subtraction, multiplication, or division.

*Context:* When solving word problems, the first step in finding the answer is determining which operation to use.

## Academic Standards

### Mid-continent Research for Education and Learning (McREL)

McREL's Content Knowledge: A Compendium of Standards and Benchmarks for K-12 Education addresses 14 content areas. To view the standards and benchmarks, visit <http://www.mcrel.org/>.

This lesson plan addresses the following national standards:

- Understands and applies basic and advanced properties of the concepts of numbers
- Uses basic and advanced procedures while performing the processes of computation



### **The National Council of Teachers of Mathematics (NCTM)**

NCTM has developed national guidelines for teaching mathematics. To view the standards online, go to <http://standards.nctm.org/>.

This lesson plan addresses the following math standards:

- Numbers and Operations
  - Problem Solving
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