

Grade 4 Mathematics

Number and Number Relations: Lesson 14

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 14:

- In this lesson, the tutor and the students will
 - ✓ analyze multi-step word problems.

Equipment/Materials Needed:

- Copies of Student Sheet 89
- Paper and pencils
- Chalkboard

Preparations before beginning Lesson 14:

- Run one copy of Student Sheet 89 for each student.
- Have paper and pencils available.

Lesson 14: Number and Number Relations

This lesson, as did Lessons 11 – 13 in Number Relations, will focus on analyzing word problems. In this lesson, the emphasis will be on multi-step word problems. A *multi-step word problem* is one that requires more than one operation or process to solve the problem.

Say:

Today, we are going to focus on multi-step word problems. *Multi-step* problems are problems that require more than one step or operation to solve them. Sometimes when solving multi-step problems, you have to answer questions that are not written down. Writing the missing questions can help you understand how to solve these multi-step problems.

 Give students Student Sheet 89. You may want to cut the problems apart so that students focus on one problem at a time.

Say:

I am going to give you a problem and either one or two students' solutions to the problems. You need to decide what unwritten questions the students were answering.

Answers:

1. a. How many days are in one week?
b. How much does it cost to board her cat for one week?
c. How much is Ms. Warren's total bill?

2. a. How much does one pencil cost normally?
b. What is the difference between the cost of one pencil at the normal price and the sale price?
c. How much will Christine save on eight pencils if she buys them on sale?
d. How much do eight pencils cost at the sale price?
e. If four pencils cost 88¢, then how much is twice that amount?
f. How much does Christine save on eight pencils if she buys them on sale?
g. Their final answers are the same. Often, you can work word problems in different ways and still get the right answer.

3. a. At what time did Jessica finish her homework? or at what time did she start playing with her friends?
b. How long did Jessica play with her friends?
c. How long was it from the time Jessica came home from school until her mother called her to dinner?
d. How long did Jessica play with her friends?
e. Their final answers are the same.

Answers will vary:

4. $2 \text{ hrs} \times 5 \text{ days} = 10 \text{ hours}$ -- How many hours does Virginia baby-sit in one week?
 $10 \text{ hrs} \times 4 \text{ weeks} = 40 \text{ hours}$ -- How many hours does Virginia baby-sit in 4 weeks?
5. $1 \text{ hour} + 2 \text{ hours} = 3 \text{ hours}$ -- How many hours was the flight delayed?
 $9:00 \text{ p.m.} + 3 \text{ hours}$ would be $12:00 \text{ a.m.}$ -- What time did the flight leave?
6. $\$6.50 + \$6.50 = \$13.00$ -- How much do 2 adult tickets cost?
 $\$2 \times 3 = \6 -- How much do 3 children's tickets cost?
 $\$13.00 + \$6.00 = \$19.00$ -- How much will it cost for the family to go to the movie?

 Have one student summarize today's lesson. Multi-step word problems are often difficult for students because they do not *see* the unwritten questions.

Student Sheet 89 (Number Relations: Lesson 14)

Here are problems and solutions to the problems. What questions (either written or unwritten) are being answered in the steps of the solutions?

- Ms. Warren boards her cat, Keko, at the kennel when she is out of town. It costs her \$3.00 a day. On the last day, she has the staff give Keko a flea bath that costs \$8.95. What is Ms. Warren's total bill for boarding and the bath if she boards Keko for one week?

Mark's solution:

$$\begin{array}{r} \$3 \times 7 \text{ days} = \$21 \\ \$21.00 \\ + 8.95 \\ \hline \$29.95 \end{array}$$

- What question does using "7" answer?
 - What question does "\$3 × 7 days = \$21" answer?
 - What question does "\$21.00 + 8.95 = \$29.95" answer?
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- Pencils are on sale for 18¢ each. They normally sell for a price of four pencils for 88¢. If Christine buys eight pencils, how much will she save if she buys them on sale?

Rosalind's solution:

$$88¢ \div 4 \text{ pencils} = 22¢ \quad 22¢ - 18¢ = 4¢ \quad 4¢ \times 8 \text{ pencils} = 32¢$$

- What question does "88¢ ÷ 4 pencils = 22¢" answer?
- What question does "22¢ - 18¢ = 4¢" answer?
- What question does "4¢ × 8 pencils = 32¢" answer?

Jay's solution:

$$8 \text{ pencils} \times 18¢ = 144¢ \quad 2 \times 88¢ = 176¢ \quad 176¢ - 144¢ = 32¢$$

- What question does "8 pencils × 18¢ = 144¢" answer?
- What question does "2 × 88¢ = 176¢" answer?
- What question does "176¢ - 144¢ = 32¢" answer?
- What do you notice about Rosalind and Jay's answers? What does that tell you about solving word problems?

Student Sheet 89 (Number Relations: Lesson 14) continued

3. Jessica got home from school at 3:30 p.m. She worked on her homework for one hour and then played with her friends until her mother called her to eat dinner at 6:00 p.m. How long did she play with her friends?

Scott's solution:

3:30 p.m. and 1 hour will be 4:30 p.m.

6:00 p.m. – 4:30 p.m. is 1 hour and 30 minutes

- What question does “3:30 p.m. and 1 hour is 4:30 p.m.” answer?
- What question does “6:00 p.m. – 4:30 p.m. is 1 hour and 30 minutes” answer?

Nicole's solution:

6:00 p.m. – 3:30 p.m. is 2 hours and 30 minutes

hours 30 minutes – 1 hour is 1 hour and 30 minutes

- What question does “6:00 p.m. – 3:30 p.m. equals 2 hours and 30 minutes” answer?
- What question does “2 hours 30 minutes – 1 hour equals 1 hour and 30 minutes” answer?
- What do you notice about Scott and Nicole's final solutions?

Solve the following multi-step questions. As you work the problems, write down any questions that are answered.

- Virginia baby-sits for her little brother, Chris, for two hours each afternoon, five days a week. How many hours will she baby-sit over four weeks?
- Marilyn's flight was scheduled to leave at 9:00 p.m. It was delayed for one hour because of bad weather and then for two more hours because of mechanical problems. What time did the flight leave?
- Adult tickets for the movie are \$6.50 each; the children's tickets are \$2 each. How much would it cost Mr. and Ms. Ross and their three children to go to the movie?