Grade 4 Mathematics
Algebra: Lesson 1

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 1:

- In this lesson, the tutor and the students will
  - ✓ understand the concept of "unknown" using empty boxes or letters for the unknown,
  - ✓ choose the correct number sentence or write a number sentence for a word problem,
  - ✓ write a word problem given a number sentence, and
  - ✓ use numbers to replace unknowns.

Equipment/Materials Needed:

- 1 copy of Student Sheet 35 for each student
- Paper and pencils
- 20 Counters (Optional)

Preparations before beginning Lesson 1:

- Run off 1 copy of Student Sheet 35 for each student.
- Have paper and pencils available.
- Have counters available, if you are going to use them.

Lesson 1: Algebra

Say:

What do you think a number sentence is? (It is just a sentence with numbers in it.) **4 + 6 = 10 is an example of a number sentence. So is 10 > 9. We can use number sentences to show what is happening in a story problem.**

⇨ Give this problem to the students. You may want to write it on the board.

Say:

Marilyn has 4 PlayStation games. Rosalind gives her 2 more. Marilyn now has 6 games. What number sentence could we use to show this problem? (4 + 2 = 6 or 2 + 4 = 6 or 6 = 2 + 4 or 6 = 4 + 2) Note: I will just give one sample response from now on.
Sometimes, we have information that is missing.

⇨ Give this problem to the students. You may want to write it on the board.

Say:

On Monday, the animal shelter had 3 pets that needed to be adopted. Some pets went into the shelter on Tuesday, and now the shelter has 11 pets waiting for adoption. How many went in on Tuesday? What information do we know in this problem? (There were 3 pets on Monday and now there are 11 pets.) **What information is missing?** (How many went in on Tuesday.) **There are different ways we could write this sentence.**

⇨ Write the following on the board or on a sheet of paper.

3 + ? = 11	3 + ___ = 11
3 + ☐ = 11	3 + p = 11

Say:

All of the sentences above are number sentences. You may see any of the forms in mathematics. We read all of these number sentences as "3 plus what number equals 11?" or "What number do I have to add to 3 to get to 11?" We are asking the question: With what number should I replace the "?", the box, the blank, or the "p"? Why do you think we put a *p* in the 4th sentence? What does the *p* stand for? (the number of pets) **We used a *p* for pets. We could have used an *n* for number of pets**

or any letter for that matter. We are asking: How many pets + 3 will equal 11? (8.)

⇨ You may want to write 3 + ☐ = 11 and use counters to show what is happening. ooo + ☐ = ooooooooo o.

Say:

What number goes in the box to make the number sentence true? We are looking for the missing number or the "unknown."

⇨ Give the following problems to the students. Work the problems one at a time.

Say:

I am going to read you a problem. I want you to write a number sentence.
A. John had 12 marbles. He lost 3 marbles at recess. How many marbles does he have now? Allow them time to write the sentence. You may have to go back and ask what do they know in the problem and what is missing in the problem. (12 – 3 = ☐)

Say:

I am going to read you another problem. I want you to write a number sentence for it.
B. It takes 9 beads to make a power bracelet. Ginny has 45 beads. How many power bracelets can she make? (45 ÷ 9 = ☐ or 9 × ☐ = 45.)

Say:

I am going to read you another story problem. I want you to write a number sentence.
C. Jan sold 25 raffle tickets this morning. Her goal is to sell 75 tickets by the end of the day. How many raffle tickets does she need to sell this afternoon? (25 + ☐ = 75 or 75 – 25 = ☐)

Say:

This time, I am going to give you a number sentence and I want you to write (or tell) a story problem that goes with it.

⇨ Write 16 + ☐ = 30 on the board or a sheet of paper.

Say:

Write a story problem for 16 + ☐ = 30. (Sample response: I need $30 to buy a present. I only have $16. How much more do I need?)

⇨ Write 57 – 21 = ☐ on the board or a sheet of paper.

Say:

Write a story problem for 57 – 21 = ☐ (Sample response: There are 57 students in the 4th grade. 21 went on a field trip. How many did not go on the field trip?)

⇨ Write 1.25 × 3 = ☐ on the board or a sheet of paper.

Say:

Write a story problem for 1.25 ´ 3 = ☐ (Sample response: Hamburgers are $1.25 each. Mark ate 3. How much did he spend on hamburgers?

⇨ Students need to be able to find the missing number or unknown number. Write the following problems on the board or on a sheet of paper.

A. 88 ÷ 2 = ☐

B. 28 + ☐ =56

C. 144 – 52 = ☐

D. 24.10 × ☐ = 48.20

Say:

For each problem, we need to find what number is missing or what number should go in the box. In problem A, what number is missing? (44) **How did you figure out the answer?** (I divided 88 by 2.) **In Problem B, what number is missing?** (28) **How did you find this number?** (Possible responses: I thought of what number should be added to 28 to get 56, or I subtracted 28 from 56.) **In problem C, what number is missing?** (92) **How did you find this answer?** (I subtracted 52 from 144.) **In problem D, what is the missing number?** (2) **How did you find the answer?** (I thought of what number should I multiply 24.10 by to get 48.20.)

⇨ Give Student Sheet 35 to the students. It is important that the students explain their thinking on each problem. You may not need to do the whole sheet if the students did well in the lesson.

Answers:

1) 155 + __ = 325; or 325 – ___ = 155; or 325 – 155 = ___ ; or ___ + 155 = 325

2) 12.99 + 12.99 + 12.99 = ___ ; or 12.99×3 = ___

3) C 4) B

(For 5 – 8, the answers will vary; these are just samples.)

5) I need $120 for a bike. I have $95. How much more do I need?

6) I had 18 marbles. I lost 12 of them. How many do I have left?

7) There are 12 cookies in a pack. I have 48 cookies. How many packs do I have?

8) I will be gone for 56 days. How many weeks will I be gone?

⇨ Have one student summarize today's lesson.

Student Sheet 35 (Algebra: Lesson 1)

Write a number sentence for the problems below. You do not have to work the problem.

1. Buddy needs $325 to go on the class trip. He has $155 now. How much more does he need for the trip? _____

2. Georgie bought 3 CDs. Each cost $12.99. How much did she spend on the CDs? _____

Choose the correct number sentence for each of the problems below.

3. Beau had 6 RBI's in Friday's game. He had twice as many in Monday's game. Which number sentence shows the number of RBI's he had in Monday's game?
   A. $6 + 2 = \square$ B. $6 - 2 = \square$
   C. $6 \times 2 = \square$ D. $6 \div 2 = \square$

4. Abby and Laura have 17 videotapes together. Nine of them belong to Abby. Which number sentence could you use to find the number of tapes that belong to Laura?
   A. $17 + 9 = \square$ B. $9 + \square = 17$
   C. $17 \times 9 = \square$ D. $17 \div 9 = \square$

Write a word problem for each of the number sentences below.

5. $95 + \square = 120$ _____

   _____

6. $18 - 12 = \square$ _____

   _____

7. $12 \times \square = 48$ _____

   _____

8. $56 \div 7 = \square$ _____

   _____