Action-Packed Subtraction Patterns

Math Concepts

- whole numbers
- subtraction
- patterns

Materials

- TI-10
- manipulatives or counters
- **Action-Packed Subtraction Patterns** recording sheets
- pencils

Overview

Students will use manipulatives and calculators to explore what happens when they change one number at a time in a subtraction number sentence. They will also record and describe the pattern that develops.

Introduction

The **Action-Packed Stories** activity on page 3 should be completed before beginning this activity.

1. Have each student choose one of his or her **Action-Packed Stories** that uses subtraction and write the number sentence that goes with it on the recording sheet: 6 - 1 = 5, for example.

   Or, have students read *There Were Ten in a Bed* by Pam Adams or *Five Little Ducks* by Raffi and write number sentences for one of the stories. Then ask them to choose one of those number sentences and write it on their recording sheets. Next, ask them to model the story they chose with manipulatives.

2. Ask students to choose one number in the story to change, and circle the number in the number sentence on their recording sheets.

   Examples:
   In the number sentence 6 - 1 = 5, change 1 to 2; the new number sentence is 6 - 2 = 4.

   In *There Were Ten in a Bed*, 10 - 1 = 9, 9 - 1 = 8, etc.
   In *Five Little Ducks*, 5 - 1 = 4, 4 - 1 = 3, etc.

3. Now, have students model the new number sentence with manipulatives and discuss how the story should change to go with the new number sentence.

4. Have students continue to change the same number, tell the new story it represents, and model it with manipulatives.

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Action-Packed Subtraction Patterns *(continued)*

Introduction (continued)

5. Record all of the changes in the number sentences on their recording sheets and discuss the patterns that develop.

   Example:
   6 - 1 = 5
   6 - 2 = 4
   6 - 3 = 3
   6 - 4 = 2
   6 - 5 = 1

6. Have students choose a similar situation using larger numbers. Then have them use their calculators to find number sentence patterns and write them on their recording sheets.

Use the scroll feature, ◀ ▶, to explore the number sentence patterns on the TI-10.

Collecting and Organizing Data

While students are exploring their patterns, ask questions such as:

- What happened to your third number when you changed your second number each time? Did it get smaller or larger? Why?
- What would happen if you changed the first number, but kept the second number the same each time? Could you show me with your manipulatives? Would your story stay the same? How might it change?
- Can you make up a different story using the same pattern of number sentences?

How can the pattern you recorded be represented on the calculator?

What do the numbers you are pressing on your calculator represent in your story?

How can you use the scroll feature, ◀ ▶, to analyze the data and look for patterns?

What patterns did you notice in the display?

Did you stop using the calculator? When?

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Action-Packed Subtraction Patterns *(continued)*

Analyzing Data and Drawing Conclusions

After students have explored several patterns, have them work as a whole group to analyze their results. Ask questions such as:

- How could you describe the pattern you recorded?
- How did your story have to change as your sentences changed?
- What do you think the patterns might be for addition stories? Why?

How did you use the calculator to help you show the action in your story?

Does the order in which you entered the numbers in your calculator matter to your story? Why or why not?

How did you use the scroll feature, ◀ ▶, to explore the patterns on the calculator?

Continuing the Investigation

Have students:

- Select other stories and number sentences and repeat the sequence.
- Continue their patterns past $n - n = 0$ and make conjectures about the negative numbers that begin to appear.

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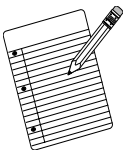
Name:



Action-Packed Subtraction Patterns

Recording Sheet

Collecting and Organizing Data

The number sentence with which I started is:

_____ - _____ =

My new number sentence is:

_____ - _____ =

I have circled the number I want to change.
My number sentence pattern is:

_____ - _____ =

_____ - _____ =

_____ - _____ =

_____ - _____ =

_____ - _____ =

_____ - _____ =

_____ - _____ =

_____ - _____ =

The pattern I see is:

I have circled the number I want to change.
My new number sentence pattern is:

_____ - _____ =

_____ - _____ =

_____ - _____ =

_____ - _____ =

_____ - _____ =

_____ - _____ =

_____ - _____ =

_____ - _____ =

The pattern I see is:

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