

Unit 8

Busy Hands




**Concepts**

- Part-whole relationships
- Addition
- Subtraction
- Problem solving

Materials

- TI-10
- Book: *Count on Your Fingers African Style*
- Markers or crayons
- Paper hand mat (from Unit 7)
- Number name cards (from Unit 7)
- Connecting cubes or color tiles
- Grid paper
- Fact Family Activity Sheet
- Construction paper (12" or 18")

Calculator Connections

- Scrolling  
- 2-Line display
- Problem solving 

Suggested Age/Grade Level

- Ages 5-7
- Kindergarten through first grade

Overview

After reading *Count on Your Fingers African Style* written by Claudia Zaslavsky (Writers and Readers Publishing, Inc., 1999), students will make their own finger signs for the numbers from zero to ten. Students will relate each finger sign to its numeral and then explore number sentences and fact families with the problem solving feature of the TI-10.

Assessment

Questions for formative assessment are included throughout the unit. Teacher observations and student work samples are also important things to consider. The scrolling feature of the TI-10 and student activity sheets can be used to check for understanding.

New Vocabulary:

Addend
Addition
Difference
Fact family
Plus
Subtraction
Subtrahend
Sum

Prerequisite:

Unit 7:
Helping Hands

Activity A: Connecting Literature and Mathematics

Read *Count on Your Fingers African Style*.

Activity B: Making Addition Number Sentences

Tell students that they will be putting two numbers together to make a different number.

Questions to ask:



- Using one hand, how might you show the number three?
- How might you explain what happens if you raise two more fingers on that same hand?

Explain to students that one way of making the number five is to put three and two together.

Provide opportunities for students to explore other ways of making the number five using their fingers on one hand.

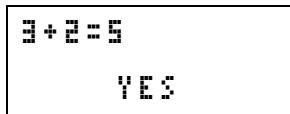
1. Instruct students to place their paper hand mat (created during Unit 7) and the TI-10 on the desk.
2. Demonstrate how folding and unfolding the paper fingers on the paper hand mat might represent two numbers that make five.
3. Show the number three on your paper hand mat.
4. Raise two more fingers on the paper hand.

Questions to ask:

- How might you describe this action?
 - How might the TI-10 show this action?
5. Press  to begin.
 6. Press  to clear anything previously stored in memory.

7. Press Clear . The screen is blank (except for the cursor), the memory is clear, and you are ready to get started.
8. Press On/Off .
9. Press Auto to let the TI-10 know that you will be making your own number sentence.
10. Press $3 + 2 = 5 \text{ Enter}$.

The TI-10 displays:



Ask students to use their TI-10 and paper hand mat to make other addition combinations of two numbers with sums of zero through five.

Questions to ask:

- How would you show zero?
- How could you show the sum of zero with your paper hand mat and TI-10.

Activity C: Number Sentences with Missing Addends

1. Ask students to again show the number three with their fingers on one hand.

Questions to ask:

- What number might you add to the number three to make five?
- How might you explain your answer?

Ask students to work in pairs while each partner takes turns at guessing the missing number (addend). For example, if a partner holds up three fingers and asks what number is missing to make five, the other partner may say, two.

Instruct students to continue this activity by using their paper hand mats.


Questions to ask:


- How might you describe this action?


Teaching Tip:









The sum will always be the unfolded paper fingers.

Resetting the TI-10:

Press  to wake it up if it has turned off.

Press  if you need to clear the memory.



Press  to clear the display.

- How might the TI-10 show this action?
2. Reset the TI-10.
 3. Press .
 4. Press  to take the shortcut to the working area.
 5. Press      .

The TI-10 displays:




3+?=5
SOL

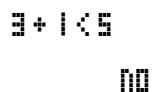
6. Press the number that you think is missing. For example, .
7. Press .

The TI-10 displays:



3+2=5
YES

If you press a number that is not the missing number, for example , the TI-10 displays:



3+1<5
NO

Students will work in pairs with their paper hand mats and TI-10 to make other addition combinations with a missing addend.

For example, one partner may show the number two by unfolding two paper fingers and ask how many are missing to make four. The other partner will enter that missing number sentence on the TI-10 as above.

Instruct students to alternate roles and continue.

Activity D: Making Subtraction Number Sentences

1. Hold up five fingers to the class by using one hand. Ask students to count the number of fingers that are showing.

- Hide three fingers by touching them to the palm. Ask students how many fingers are left.

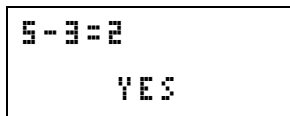
Explain that you are taking away three fingers by hiding them. Provide opportunities for students to explore other ways of making two by hiding fingers.

Instruct students to use their paper hand mats to show five fingers and take away three by folding.

Questions to ask:

- How would you describe this action?
 - How could you use the TI-10 to show this action?
- Reset the TI-10.
 - Press \diamond .
 - Press Auto to take the shortcut to the working area.
 - Press 5 $-$ 3 $=$ 2 Enter .

The TI-10 displays:



5-3=2
YES

Ask students to use their TI-10 and paper hand mat to make other subtraction number sentences.

Activity E: Number Sentences with Missing Subtrahends

- Hold up five fingers to the class by using one hand. Ask students to count the number of fingers that are showing.
- Hide three fingers by touching them to the palm.

Questions to ask:

- What number was taken away?
- How might you explain your answer?


Resetting the TI-10:


Press ON to wake it up if it has turned off.


Press AC if you need to clear the memory.

Press Clear to clear the display.

Resetting the TI-10:

Press  to wake it up if it has turned off.









Press  if you need to clear the memory.

Press  to clear the display.

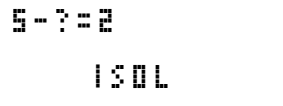
Instruct students to work in pairs while each partner takes turns at guessing the missing number (subtrahend).

Ask students to continue this activity with their paper hand mats.



Questions to ask:

- How might you describe this action?
 - How might the TI-10 show this action?
3. Reset the TI-10.
 4. Press .
 5. Press  to take the shortcut to the working area.
 6. Press      .

The TI-10 displays:



5 - ? = 2
1 SOL

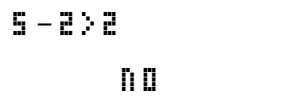
7. Press the number that you think is missing. For example, .
8. Press .

The TI-10 displays:



5 - 3 = 2
YES

If you press a number that is not the missing number, the TI-10 displays:



5 - 2 > 2
NO

Encourage students to work in pairs with their paper hand mats to make other subtraction combinations with a missing subtrahend.

Instruct students to continue to explore with the problem solving feature (manual mode) of the TI-10 to show these number sentences.

Activity F: Making Addition and Subtraction Number Sentences to 10

Tell students that they will work in pairs and put two numbers together to make a number greater than five.

Question to ask:

- Using one hand, how might you show the number three?
- How might you explain what happens if you show three more fingers on the other hand?

Explain to students that one way of making the number six is to put three and three together.

Question to ask:

- How might you show the number six another way?

Provide opportunities for students to explore other ways of making numbers greater than five using their fingers.

1. Place your paper hand mat on your desk and show the number three.

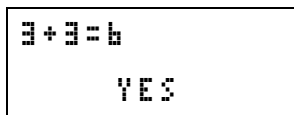
Questions to ask:

- What number did you and your partner make together?
- How might you describe this action?

How might the TI-10 show this action?

2. Reset the TI-10.
3. Press \diamond .
4. Press Auto to take the shortcut to the working area.
5. Press $3 + 3 = 6$ Enter .

The TI-10 displays:



3 + 3 = 6
YES

Resetting the TI-10:

Press On to wake it up if it has turned off.

Press AC if you need to clear the memory.

Press Clear to clear the display.

Teaching Tip:

Addition and subtraction mats can be made from large construction paper to accommodate three number name cards.

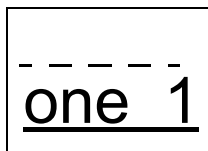
Encourage students to work in pairs with their TI-10 and paper hand mats to make other addition combinations of two numbers that make six through ten.

When students demonstrate understanding of working in pairs with larger numbers and the paper hand mats, ask them to explore other number sentences using the TI-10. Have students explore addition with a missing addend, subtraction, and subtraction with a missing subtrahend.

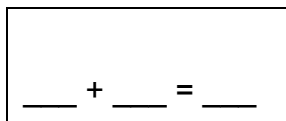
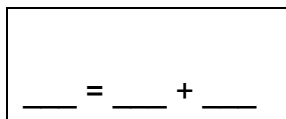
Activity G: *Guess My Number Game*

To play the game, students will need a TI-10, number name cards, addition mats, and subtraction mats.

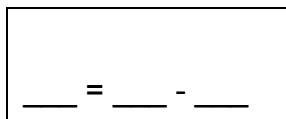
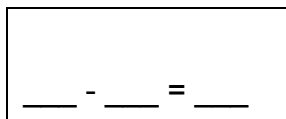
- Sample Number Name Card:



- Sample Addition Mats:



- Sample Subtraction Mats:

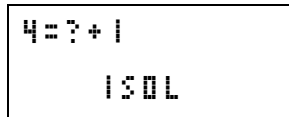


Explain the rules of the game.

1. You will work in pairs.
2. Each of you will draw a question mark (?) on the back of your number name cards.

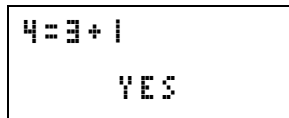
3. Partner one will select three number name cards to create an addition or subtraction number sentence and lay the cards on the mat with only one card face down (question mark will be face up).
4. Partner two will use the problem solving feature (manual mode) of the TI-10 to guess the missing (?) number.
5. Reset the TI-10.
6. Press \diamond .
7. Press Auto to take the shortcut to the working area.
8. Press $4 = ? + 1 \text{ Enter}$.

The TI-10 displays:



9. Press the number that you think is missing. For example, 3 .
10. Press Enter .

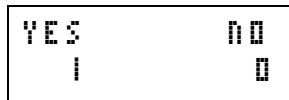
The TI-10 displays:



Partner one flips over the number name card to show the answer. The game can then be repeated beginning with partner number two.

Each partner can see their score on the TI-10 by pressing Mode .

The TI-10 displays:



Example:


A diagram showing three rectangular boxes representing number name cards. The first box contains the number "4", the second contains a question mark "?", and the third contains the number "1". Below the boxes are mathematical symbols: an equals sign "=" is positioned between the first and second boxes, and a plus sign "+" is positioned between the second and third boxes. The boxes and symbols are arranged horizontally.


Resetting the TI-10:
 Press On/Off to wake it up if it has turned off.
 Press AC if you need to clear the memory.
 Press Clear to clear the display.


Teaching Tip:

Addition and subtraction are related - like families. For two addends and their sums, there are two addition facts and two subtraction facts. These are called Fact Families.

Resetting the TI-10:

Press  to wake it up if it has turned off.

Press  if you need to clear the memory.

Press  to clear the display.

Teaching Tip:

It is important for students to build a foundation of smaller number sentences, in order to generalize to larger number sentences.

Teaching Tip:









The game may continue for any appropriate amount of time.

Activity H: Fact Family Game

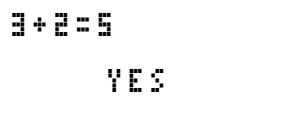
Students will need a TI-10, connecting cubes, and a Fact Family workmat.

To play the Fact Family Game, students will work in pairs as a team. The first team will lay a train of connecting cubes with 2 colors on the table.

The second team will use the problem solving feature of the TI-10 to make two addition facts and two subtraction facts for the train.

1. Reset the TI-10.
2. Press .
3. Press  to take the shortcut to the working area.
4. Press      .

The TI-10 displays:



5. Press      .

The TI-10 displays:



6. Press      .

The TI-10 displays:



7. Press      .

The TI-10 displays:



Repeat the game beginning with the second team. Students should press  to see their score.

Fact Family Activity Sheet

Family of _____	
$\underline{\quad} + \underline{\quad} = \underline{\quad}$	$\underline{\quad} - \underline{\quad} = \underline{\quad}$
$\underline{\quad} + \underline{\quad} = \underline{\quad}$	$\underline{\quad} - \underline{\quad} = \underline{\quad}$

Family of _____	
$\underline{\quad} + \underline{\quad} = \underline{\quad}$	$\underline{\quad} - \underline{\quad} = \underline{\quad}$
$\underline{\quad} + \underline{\quad} = \underline{\quad}$	$\underline{\quad} - \underline{\quad} = \underline{\quad}$

