**ATME5b Fall 2013**

**Solve – Concepts & Procedure Instruction Condition**

List to Bring to Session

Digital Voice Recorder

Scripts

Schedule

Student Response Packet (Problem Solving Block, Midtest)

Midtest and Instruction Prompts

Blank paper to use for session notes if needed and to give to student for scratch work

File folder for putting collected data in

Consent Log/Master subject list

Purple Pens

Dry erase markers for prompts

It is important that you are not reading the script – memorize what you can – and make lots of eye contact

***\*\*Turn on the digital voice recorder!\*\****

**WELCOME**

**Today we’re going to try to solve some math problems and talk about some math ideas. Please write your first name.**

**Solve Block**

**First, you’re going to work on some math problems on your own. If you’d like help adding on the problems, you may use anything that helps like your fingers, a number line or a hundreds chart.**

**For each problem, you need to figure out the number that goes in the box to make the number sentence true.**

**I want you to explore and think about some new math problems on your own. It’s okay if you’re not sure about the right answer. It will still help to just look at the problems very carefully and think about them – it will help you learn more about them later.**

**And, are you ready for a hint?** (pause, wait for response) **When working on these problems**, **it’s helpful to think about what the equal sign means and if there might be a better way to think about what it means. OK? The equal sign is important.** **Are you ready for another hint? The problems on a page go together. So you can use the answer to one problem to help you with the next one. So think about how the problems on a page go together.**

**You’ll find other hints on some of the problems too.**

**You may go ahead and get started and work until you get to the stop sign.**

<record start and stop times for each child on data collection sheet>

1. 3 + \_\_ = 10 10. 4 + 7 = 3 + \_\_

2. 10 = 3 + \_\_ 11. 6 + 2 + 3 = \_\_ + 8

3. 3 + 7 = \_\_ + 5 12. 4 + 2 + 5 = 5 + \_\_

4. 3 + 7 = \_\_ + 6 13. 9 + 6 = \_\_ + 5

5. 3 + \_\_ = 8 14. 5 + 5 + 5 = \_\_ + 6

6. 8 = \_\_ + 5 15. 5 + 6 + 4 = 4 + \_\_

7. 3 + 5 = 4 + \_\_ 16. 8 + 2 + 5 = \_\_ + 5

8. 3 + 5 = 6 + \_\_ 17. 6 + 4 + 3 = 3 + \_\_

9. 11 = 4 + \_\_ 18. What does the equal sign mean?

*If students finish early*:

Have students go back and check their work and try *to think about how the problems on a page go together*.

\*\*When all students are finished: **Let’s look at #17 together. I want you to check your answer – but don’t erase it. 10 is the right answer to this problem.**

HELP GUIDELINES FOR SOLVE BLOCK:

*If students are stuck/moving slowly or struggling:*

“Remember, it’s okay if you aren’t sure about the correct answer. It’s still helpful to look at the problems carefully and think about them.” OR “If you really aren’t sure about a problem, it’s okay to write a question mark and move on.”

“What can you do to get started?” OR “What numbers do you want to add first?”

*How to respond if student makes discouraging statements like “This is too hard”*

“I think you are doing a great job thinking about these problems.”

*If taking too long:*

In extreme circumstance, stop after 30 minutes in the solve block, even if all students in a group have not finished. This is rare.

**MIDTEST**

**You all did a great job working hard and thinking hard about those problems. Next, we’re going to answer some different questions. Turn to the next page.**

**Memory Items:**

**First, I’d like you to remember a problem for me. I’m going to show you it for just a few seconds. I don’t want you to solve the problem. Just look at it, and try to remember it. After I put the problem down, I want you to write the problem exactly as you saw it.**

**So please put your pencils down now. Remember, after I take the problem away write down exactly what you saw. Are you ready?**

Show problem for 5 seconds. After 20 seconds, ask them to finish up.

Problem a: 5 + 4 + 8 = 5 + \_\_

**Okay, now we’re going to do one more. Please put your pencil down. Try to remember this problem, and write it down after I take it away.**

Show problem for 5 seconds. After 20 seconds, ask them to finish up.

Problem b: 7+ 5 + 2 = \_\_ + 3

True/False:

**Okay, please do the problems on the next page. I just want you to decide whether each of these number sentences is true. In other words, does it make sense? Circle True, False or Don’t Know.**

a) 8 = 8 d) 7 + 6 = 6 + 6 + 1

b) 7 + 6 = 0 e) 8 = 5 + 10

c) 31 + 16 = 16 + 31 f) 8 = 5 + 3

**Great! Please put down your pencils, close your packets, and flip them over to the front where your name is. We’re ready for the next part.**

**CONCEPTUAL INSTRUCTION BLOCK**

**Now, we’re going to think about what the equal sign means and look at a few examples. Think about what you noticed when trying to solve the problems earlier.**

**First, we’re going to think about what the equal sign means and look at a few examples.**

**1) If we look at a problem like this:** (hold up prompt)

**3 + 4 = 3 + 4**

**There are two sides to this problem,** (sweep gesture under side) **one on the first side of the equal sign and** (sweep gesture under side) **one on the second side of the equal sign.**

**The first side is 3 + 4** (sweep side).

**The second side is 3 + 4** (sweep side).

**The *equal sign*** (point) **means that the things on both sides of the equal sign are equal or the same amount** (sweeping hand back and forth). **So the first side of the equal sign always has the same amount as the second side of the equal sign.**

**You can answer all together. What is 3 + 4?** (Point to the left side. Wait for responses.)

**The first side of the equal sign is equal to 7.**

**And what is 3 + 4 on the second side?** (Wait for student responses)

**The second side of the equal sign is equal to 7, too.**

**We have 7 on this side** (gesture around left) **and 7 on this side** (gesture around right). **Because we get the same amount on both sides, we can say that they are equal. If both sides are not the *same amount*, then they aren’t equal.**

**2) Let’s look at another example. Take a look at this:** (hold up prompt).

**4 + 4 = 3 + 5**

**What is on the first side of the problem?** (Remind students can say it all together if needed. If a student doesn’t respond, be sure to ask them what they think.)

**Right, the first side is 4 + 4.** *(*sweep gesture – your gestures are very important!)

**What is on the second side of the problem?** (Wait for students to respond)

**The second side of the equal sign is 3 + 5.**(sweep gesture)

**Remember now, the *equal sign always* says that *both sides* have to equal the *same amount*.**

**So if we have 4 + 4 on the first side, how much is on the first side?** (Wait for response.)

**The first side has 8.**

**So how much has to be on the second side?** (Wait for response)

**The second side has to be 8!**

**What is 3 + 5? (**Wait for response)

**Right, 8.**

**Both sides have 8 so there should be an equal sign here. If they don’t have the same amount, then the two sides aren’t *equal, and there shouldn’t be an equal sign here*** (point).

**3) So if we look at a problem like this** (hold up prompt)**:**

**7 = 3 + 4**

**The equal sign still means that both sides are worth the same amount. The *equal sign* always means that the first side has the same amount as the second side. And it means that here, too.**

**What is on the first side? (**Wait for response. Switch to calling on non-participating students.)

**Right, 7.**

**We have 3 + 4 on the second side. How much is on the second side?** (wait for response.)

**The second side has 7.**

**So, both sides are 7, and the equal sign tells us both sides have the same amount.**

**4) Now let’s look at something else. For example, if you saw something like this, would it make sense to write an equal sign here?** (Wait for response. Be sure that all students are participating and attending)

**2 + 3 3 + 6**

**Good** (if say no) / **hmm, what do other people think?** (if say yes):

**How much is on the first side?** (wait for student response)

**Correct, the first side has 5.**

**How much is on the second side?** (wait for student response)

**Correct, the second side has 9.**

**Are they the same amount?** (Wait for student response)

**No, they aren’t. The equal sign means that the first side is the same amount as the second side. Since these are not the same amount, then they are not *equal*, so it would not make sense to write an equal sign here.**

**5) Let’s look at another problem,** (hold up prompt)**.**

**5 + 4 + 3 = 5 + 🞎**

**What is on the first side of the problem?** (Wait for student response)

**The first side is 5+4+3.** (*gesture*)

**Now, what is on the second side.** (Wait for student response)

**The second side is *5 +* 🞎** (gesture)

**Again, the *equal* sign means that the first side (gesture) needs to be *the same amount as* the second side (**gesture**).**

If answer 7, be noncommittal, say “OK” and move on.

**PROCEDURAL INSTRUCTION BLOCK**

**Thanks for thinking about what the equal sign means. Now, we’re going to go through a short lesson about how to solve problems like these.**

**1) The problems will look something like this** (hold up prompt) **:**

**4 + 2 = 3 + 🞎**

**Just like this problem, all of the problems we’ll work on now will have an empty box and we need to figure out what number goes in the box. There is more than one way to solve this type of problem, but I‘m going to show you one way to solve them today.**

**First, you can combine the numbers on one side of the equal sign. Next, you subtract the number that’s on the other side of the equal sign.**

**On this problem, first, you add up all the numbers on this side of the equal sign** (sweep).

**What is 4 + 2?** (wait for response)

**Right, 6.** (draw a carrot below 4+2 and write 6)

**Then, subtract 3 on the second side of the equal sign** (point to 3). **What is 6 – 3?**

**Great, so 3 is the number that goes in the box.** (write 3 in box)

**2) Let’s look at another example.** (hold up prompt)

**6 + 4 + 5 = 6 + 🞎**

**First, you combine the numbers on the one side of the equal sign. Then, you subtract the amount on the other side from what you got on the first side.**

**So for this problem, first, you add up all the numbers on this side of the equal sign** (sweep side). **What is 6 + 4 + 5?** (Wait for response.)

**Right, 15.** (draw carrot under 3 numbers and write 15)

**Then, subtract 6 on the second side** (point to 6). **15 minus 6 is what?** (Wait for response).

**Great, so 9 is the number that goes in the box.** (write 9 in box)

**3) Okay, let’s try another example** (hold up prompt)**.** **You can use the same strategy to solve problems like this.**

**5 + 4 = 🞎 + 3**

**Can you tell me what to do first?** (Wait for response.)

**We add up the numbers on this side** (sweep side).

**If we add up the numbers on this side, what do we get?** (Wait for response.)

**We get 9.** (draw carrot under 5 + 4 and write 9)

**Now we need to figure out what to subtract from this. What do we need to subtract?**

**On the other side we have a 3** (pointing)**. That means we need to subtract 3 from 9. What is 9 minus 3?**

**So we know 6 goes in the box.** (write 6 in box)

**4) Now I want you to think about everything we have talked about so far, and let’s look at one more problem together, okay?** (hold up prompt)

**2 + 1 + 4 = 🞎 + 4**

**What do we do first?** (Wait for student to point)

**We start on the first side with 2 + 1 + 4** (sweep side)**.**

**What do the numbers on the first side add up to?** (Wait for response.)

**Right, so we know 2 + 1 + 4 = 7.** (draw carrot under numbers and write 7)

**What do we do next?** (Wait for response.)

**To finish, we subtract the amount on the second side from what we got on the first side. What is 7 minus 4?** (Wait for response.)

**7 minus 4 equals 3, so we know 3 goes in the box.** (write 3 in box)

**MANIPULATION CHECK**

**Okay. Thanks for listening so carefully. Turn your packet over to the last page. Now, use the strategy I just taught you to solve some problems on your own.** (Direct them towards problem in packet. Note that you avoid giving or confirming the correct answer since this does not occur in the other condition.)

**1) Only do the first problem on this page. On this problem, I want you to use this strategy. Find the number that goes in the box to make this number sentence true.**

**3 + 6 + 2 = 3 + 🞎**  (Hold up prompt when children have finished solving)

**Remember, to solve #1 using our strategy, you add up the numbers on the first side of the equal sign (**sweep gesture under first side**). What is 3 + 6 + 2?**

**Right, 11.**

**Then, you subtract the number on the other side of the equal sign, the 3** (point). **You subtract 3 from 11. (**avoid stating or confirming the correct answer if possible)

**Try again to use this correct strategy to solve the next problem on your own.**

**2) Find the number that goes in the box to make this number sentence true.**

**2 + 8 + 3 = 🞎 + 3** (Hold up prompt when children have finished solving.)

**To solve this problem using our strategy, you add up the 2, the 8, and the 3 on the first side** (sweep). **What is 2 + 8 + 3?**

**Right, 13.**

**Then, you subtract the number on the other side of the equal sign, the 3** (point). **You subtract 3 from 13** (avoid giving or confirming answer)**.**

**There are other correct strategies that will also get the same correct answer, but this is one good strategy.**

**\*\*\*\*\*Turn back to the first page. Before we finish today, I want you to go back and check the problems that you solved earlier. Think about what we talked about the equal sign means. And think about the strategy we talked about for how to solve them. Use a purple pen to make any changes and write a check mark if you don’t want to make any changes.** <Make sure all students check all problems AND DO NOT ERASE THEIR ORIGINAL ANSWERS>

**I hope these problems makes a little more sense to you. Thanks for all your hard work!**

**End of Session**