

Solve It! Intervention Manual for Math Reasoning

Goal: Solve It! Provides the extra instructional assistance for teaching students how to decide what to do.

Target Audience: For intermediate and older students problem solving math reasoning problems.

Instructional Recommendations: Solve It! Can be an individual or group intervention. It can also be used for a Tier I, II or III intervention. The Tier of the intervention will affect its intensity. For example, for Tier I interventions, this would be given to an entire class once or twice. For a Tier II intervention, it should be given to a smaller group more often, like weekly. For a Tier III intervention, the intervention could be given to small group or individuals bi-weekly or more. Or, it could be broken down into smaller steps and each step explained more.

Script:

1. First, the teacher presents a problem on an overhead projector and says, "Now watch me say everything I am thinking and doing as I solve this problem: (Teacher reads the problem.)"
2. Next, the teacher says, "First I am going to read the problem for understanding.

"SAY to yourself: Read the problem. Okay, I will do that. (The teacher reads the problem.) If I don't understand it, I will read it again. Hm, I think I need to read it again (The teacher reads the problem again)."

"ASK yourself, Have I read and understood the problem? I think so."

"CHECK for understanding as I solve the problem."

3. Next, the teacher says, "I am going to paraphrase the problem by putting it into my own words.

"SAY: put the problem into my own words (teacher reads the first part of the problem) Underline the important information. I will underline (insert important information and continue this step until all important information is underlined)"

"ASK: Have I underlined the important information? Let's see, yes I did. What is the question? The question is (insert question from the problem) What am I looking for? I am looking for (insert information that is asked for from the problem)."

“CHECK: That the information goes with the question. I have (insert the question you came up with from the problem here). I need to find (insert information that is asked for from the problem).”

4. Next, the teacher says, “Then I will Visualize by making a drawing or diagram.

“SAY : Make a drawing or diagram. Hmm, I will draw (talk about what you are going to draw that goes with the problem. For example, if the problem talks about 3 buckets of paint, the teacher could draw a bucket of paint putting the number of buckets needed underneath it.)”

“ASK: does the picture fit the problem? Yes, I believe it does tell the story.”

“CHECK: The picture against the problem information. (Teacher checks the numbers and makes sure they make sense).”

5. Next, the teacher says, “Now I will hypothesize by making a plan to solve the problem.

“SAY: Decide how many steps and operations are needed. Let me see. First I need, (teacher goes through the problem, talking about what he/she needs to do to solve each step of it.)

“ASK: If I (state a step in the problem), I will get (state the number of items one will get as an answer to this step). How many steps are needed? (Teacher states the number of steps needed to solve the problem.)”

“CHECK: That the plan makes sense. Ask for help if it does not make sense. My plan makes sense.”

6. Next, the teacher says, “Next, I need to estimate by predicting the answer.”

“SAY: Round the numbers, do the problem in my head and write an estimate (teacher does this while thinking aloud).”

“ASK: Did I round up or down? Yes I did. Did I write the estimate? Yes I did.”

“CHECK: That I used all the important information. Two steps. Okay.”

7. “Next, the teacher says, “Now I will compute by doing the arithmetic.”

“SAY: Do The operations in the right order. First, (teacher does the steps of the problem. For example, first add $2+3$, then subtract.....).”

“ASK: How does my answer compare with my estimate? Hmm, (compare answer to the estimate) Very close. Does my answer make sense. Yes, (talk

about why the answer makes sense.) Are the decimals or the money signs in the right place? (Discuss this—if none are needed, state this.)”

“CHECK: That all operation were done in the right order. (state the order of the operations that the teacher did.). Yes, they were.”

8. Next, the teacher says, “Okay, now I really get to check to see if the answer if correct.”

“SAY: Check the computation. Let’s see (teacher thinks aloud while she checks her/his work.”

“ASK: Have I checked every step? Yes, the operations chosen were correct and the computation was correct. Is my answer right? Yes.”

“CHECK: That everything is right. I have checked everything. If not, go back. Then ask for help if I need it. I do not need help. The answer is right.”

9. The teacher should then ask the students if they have any questions, making sure to answer them.
10. The teacher can also give students SAY, ASK, CHECK signs (see attached) to place on their desks and assist them in future problem-solving.

Progress Monitoring: Students should be given weekly probes of the math reasoning concepts that the teacher is working on. For example, if the teacher is working on story problems using addition and subtraction, a different one should be given to the student weekly or more often. These probes can be timed or untimed and the main goal would be checking for accuracy in both answers and process.

Based on: Montague, M, Warger, C., & Morgan, T.H. (2000). Solve It! Strategy instruction to improve mathematical problem solving. Learning Disabilities, 15, 110-116.

Supported by: Montague, M. & Jitendra A.K. (2006). Teaching mathematics to middle school students. New York: The Guildford Press.

Montague, M. (1993). Middle school students’ mathematical problem solving: An analysis of think-aloud protocols. Learning Disability Quarterly, 16, 19-32.

Treatment Integrity checklist:
Mark yes/no to each question.

1. I took baseline data before implementing the intervention. _____
2. I followed the scrip, explaining each step as I completed the problem. _____
3. I broke the problem down into the eight steps, labeling them for the students.

4. I broke each step down into say, ask, check components. _____
5. I asked the students if they had questions and checked for understanding before having them attempt a problem on their own. _____
6. I broke step down into the smallest possible steps to ensure student understanding.

SAY



ASK



CHECK

