

CRITICAL THINKING

6 Tips for Teaching Math Problem-Solving Skills

Solving word problems is tougher than computing with numbers, but elementary teachers can guide students to do the deep thinking involved.

By **Dani Fry Jackson**

February 6, 2023



JulPo / iStock

A growing concern with students is the ability to problem-solve, especially with complex, multistep problems. Data shows that students **struggle more when solving word problems than they do with computation**, and so problem-solving should be considered separately from computation. Why?

Consider this. When we're on the way to a new destination and we plug in our location to a map on our phone, it tells us what lane to be in and takes us around any detours or collisions, sometimes even buzzing our watch to remind us to turn. When I experience this as a driver, I don't have to do the thinking. I can think about what I'm going to cook for dinner, not paying much attention to my surroundings other than to follow those directions. If I were to be asked to go there again, I wouldn't be able to remember, and I would again seek help.

If we can switch to giving students strategies that require them to think instead of giving them too much support throughout the journey to the answer, we may be able to give them the ability to learn the skills to read a map and have several ways to get there.

Here are six ways we can start letting students do this thinking so that they can go through rigorous problem-solving again and again, paving their own way to the solution.

1. LINK PROBLEM-SOLVING TO READING

When we can remind students that they already have many comprehension skills and

strategies they can easily use in math problem-solving, it can ease the anxiety surrounding the math problem. For example, providing them with strategies to practice, such as visualizing, acting out the problem with math tools like counters or base 10 blocks, drawing a quick sketch of the problem, retelling the story in their own words, etc., can really help them to utilize the skills they already have to make the task less daunting.

We can break these skills into specific short lessons so students have a bank of strategies to try on their own. Here's an example of an [anchor chart that they can use for visualizing](#). Breaking up comprehension into specific skills can increase student independence and help teachers to be much more targeted in their problem-solving instruction. This allows students to build confidence and break down the barriers between reading and math to see they already have so many strengths that are transferable to all problems.

2. AVOID BOXING STUDENTS INTO CHOOSING A SPECIFIC OPERATION

It can be so tempting to tell students to look for certain words that might mean a certain operation. This might even be thoroughly successful in kindergarten and first grade, but just like when our map tells us where to go, that limits students from becoming deep thinkers. It also expires once they get into the upper grades, where those words could be in a problem multiple times, creating more confusion when students are trying to follow a rule that may not exist in every problem.

We can encourage a variety of ways to solve problems instead of choosing the operation first. In first grade, a problem might say, "Joceline has 13 stuffed animals and Jordan has 17. How many more does Jordan have?" Some students might choose to subtract, but a lot of students might just count to find the amount in between. If we tell them that "how many more" means to subtract, we're taking the thinking out of the problem altogether, allowing them to go on autopilot without truly solving the problem or using their comprehension skills to visualize it.

3. REVISIT 'REPRESENTATION'

The word "representation" can be misleading. It seems like something to do after the process of solving. When students think they have to go straight to solving, they may not realize that they need a step in between to be able to support their understanding of what's actually happening in the problem first.

Using an anchor chart like one of these ([lower grade](#), [upper grade](#)) can help students to choose a representation that most closely matches what they're visualizing in their mind. Once they sketch it out, it can give them a clearer picture of different ways they could solve the problem.

Think about this problem: "Varush went on a trip with his family to his grandmother's house. It was 710 miles away. On the way there, three people took turns driving. His mom drove 214 miles. His dad drove 358 miles. His older sister drove the rest. How many miles did his sister drive?"

If we were to show this student the anchor chart, they would probably choose a number line or a strip diagram to help them understand what's happening.

If we tell students they must always draw base 10 blocks in a place value chart, that doesn't necessarily match the concept of this problem. When we ask students to match our way of thinking, we rob them of critical thinking practice and sometimes confuse them in the process.

4. GIVE TIME TO PROCESS

Sometimes as educators, we can feel rushed to get to everyone and everything that's required. When solving a complex problem, students need time to just sit with a problem and wrestle with it, maybe even leaving it and coming back to it after a period of time.

This might mean we need to give them fewer problems but go deeper with those problems we give them. We can also speed up processing time when we allow for collaboration and talk time with peers on problem-solving tasks.

5. ASK QUESTIONS THAT LET STUDENTS DO THE THINKING

Questions or prompts during problem-solving should be very open-ended to promote thinking. Telling a student to reread the problem or to think about what tools or resources would help them solve it is a way to get them to try something new but not take over their thinking.

These skills are also transferable across content, and students will be reminded, "Good readers and mathematicians reread."

6. SPIRAL CONCEPTS SO STUDENTS FREQUENTLY USE PROBLEM-SOLVING SKILLS

When students don't have to switch gears in between concepts, they're not truly using deep problem-solving skills. They already kind of know what operation it might be or that it's something they have at the forefront of their mind from recent learning. Being intentional within their learning stations and assessments about having a variety of rigorous problem-solving skills will refine their critical thinking abilities while building more and more resilience throughout the school year as they retain content learning in the process.

Problem-solving skills are so abstract, and it can be tough to pinpoint exactly what students need. Sometimes we have to go slow to go fast. Slowing down and helping students have tools when they get stuck and enabling them to be critical thinkers will prepare them for life and allow them multiple ways to get to their own destination.