



Math Reasoning: Problem Solving Strategies

The development of math reasoning appears as your child begins to recognize that math makes sense and can be understood. Math reasoning is the skill that equips a student to make use of all math processes, tools and models and explain the reasons behind his/her answer.

Teaching Strategies for Problem Solving Success

- Have students say steps, for solving the problem, out-loud.
- Use visual representations and manipulatives.
- [DRAW/FAST DRAW](#)
- Provide “scripted” word problems: underline what’s known, circle what’s unknown, write operations next to the problem, and write problem and answer.
- Introduce abstract math concepts one at a time and with concrete, real life examples.
- Use scale, ruler, measuring cups to teach measurement.
- Create a **math journal** to reflect and interact with math on a daily basis through written expression too! This is also a good place to write steps to solve a problem, draw a picture and have your student make up his/her own problems to refer back to if needed.
- **Object, Drawing and Symbols-** First model and let your child practice with manipulatives (**O**bjects), then have your child **D**raw a picture representing the problem, then transfer learning to more abstract by adding the mathematic **S**ymbols to represent problem.
- **Think aloud-** Modeling the thought process as the teacher/parent thinks aloud to show student the process. It is usually introduced in four steps, gradually transferring responsibility to student:
 - The teacher/parent reads a problem and stops as needed to explain her thoughts. Students listen. They all solve the problem together.
 - The teacher/parent reads the problem and stops often. Students express their thoughts at each point (and often write them). The whole class, led by the teacher, solves the problem together.
 - The teacher/parent reads the problem, allowing students to signal stopping points as thoughts occur to them. Students solve the problem individually, and then discuss their interpretations of it and solution strategies.
 - Work together to solve the problem. Your child can work with a friend, you, or a sibling to solve problems together.
- **No Number Strategy-** Sometimes it is easier to begin teaching a new concept by talking about the problem without specific numbers to get the idea of the problem solving steps, then add the numbers.
- **KWC-** What do we **K**now about the problem? What do we **W**ant to know in order to solve the problem? What are **C**hallenges preventing us to solve the problem?
- **CUBES-** **C**ircle key numbers, **U**nderline the question, **B**ox any math action words, **E**valuate what steps do I need to take, **S**olve and check your answer.
- **Projects-** Problem solving places the focus of the students’ attention on ideas and sense making.
 - Meaningful math projects develop the belief in students that they are capable of doing mathematics and that mathematics makes sense.
 - Projects, with real life application, allow an entry point for a wide range of students. Good problem-based tasks have multiple paths to the solution. Observing how your child attempts the project will

provide ongoing assessment data that can be used to make instructional decisions, help students succeed.

- Projects use problem solving and develop “mathematical power.”
- It is a lot of fun!
- **Building Confidence with Success**-Let your child track his success. Use graphs to chart progress and encourage your child to color in a box for each fact that is mastered. With success comes motivation to persevere, even when it is not easy. Avoid the frustration point. Play a math game or use other strategies (above) to introduce and review concepts that are too difficult. Ensure your child can work a problem successfully before she is left to do her work independently. It is not always easy to see little successes along the way, unless you are looking for them. Take time to celebrate math success!

Questions to ask to prompt the problem solving process:

- How does this connect to my everyday life?
- What do I know about this already that might be helpful?
- Can I simplify this in some way to see a pattern?
- What are the big ideas in this passage or problem?
- Can I visualize what’s going on here? Can I draw a picture of this situation that might help me see the connections among quantities?
- What are the assumptions or the givens?
- What am I trying to find out (a problem), or what are they trying to teach me (text)?
- What words don’t I know – who can I ask?

