

# Avoid Hard Work!

...AND OTHER ENCOURAGING MATHEMATICAL PROBLEM-SOLVING TIPS  
FOR THE YOUNG, THE VERY YOUNG, AND THE YOUNG AT HEART



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# My Dream

We asked hundreds of parents and teachers: “When it comes to children and mathematics, what are your dreams?” Here is what they told us.

For our children, we dream that mathematics...

- ... makes sense
- ... is more than just arithmetic
- ... is joyous
- ... makes them strong
- ... is meaningful
- ... is creative
- ... is full of fascinating questions
- ... opens up many paths to solutions
- ... is friendly
- ... solves big problems and makes the world better
- ... is a powerful tool they can master
- ... is beautiful
- ... lets them learn in their own ways
- ... is connected to their lives
- ... asks “why” and not just “how”
- ... opens the world

## Teaching Techniques

These teaching techniques are companions to the problem-solving techniques. They will help you to support mathematical play, inquiry, and exploration. Do try this at home!

- 1 Write down clever, kind, silly, wise, funny, curious, inspiring, exciting things kids say as they try to solve problems. Create memories!
- 2 Present a problem you like, but you are sure is too advanced for the child. Do not hope for an answer, but give the child a chance to probe, ask questions, and explore. Demonstrate that it's perfectly okay if a problem is not solved for months or even years.
- 3 Collect and exhibit pictures, quotes, and other tidbits your child liked on a bulletin board. Kids will be reminded to review math through their favorite pieces, building up understanding and joy.
- 4 Revisit problems that were interesting to the child. You can solve the same problem again a few months later, remix it yourself, or find a similar problem.
- 5 Capture your work toward the solution in simple cartoons or photos of your setups, and display on a bulletin board.

- 6 Keep baskets of puzzles and manipulatives, or individual math toys and books, where the child can see and reach them.
- 7 Invite your child to explain how to solve a problem to a friend or a younger kid. Explaining to an adult might feel like being tested.
- 8 Always leave room for exploration: extra space and time. Think of mathematics as a road trip. You have the directions, but might want to try a scenic route, visit a roadside attraction, take an unexpected detour, or stay for a picnic.
- 9 If you are tempted to judge the child's answer wrong and want to start correcting, first ask the simple "why?" question. Most of the time kids have meaningful reasons behind their strange answers. Discussing children's "whys" will teach them more math than explaining your "hows."
- 10 Go beyond the original problem or even leave it behind. Working toward a solution you might discover other related problems that pique your curiosity. Go for them!



**Q: I DON'T FEEL CONFIDENT WITH THE MATH YOU SUGGEST INTRODUCING TO MY CHILDREN. HOW CAN I INTRODUCE SOMETHING TO MY CHILD IF I DON'T REALLY KNOW THE SUBJECT OR UNDERSTAND HOW TO SOLVE A PROBLEM?**

A: If you feel like you are learning a lot about this level of mathematics, your role with your children changes. As the teacher saying goes, you go from sage on the stage to **guide on the side**. Fortunately, this is a job promotion. The saying comes from the title of a popular article about good teaching practices. When you solve problems, imagine you and your children collaborating on a little research project:

	Adults	Children
<b>Ideas</b>	Write ideas down, sort and organize sets of examples, articulate knowledge	Generate diverse, creative, novel, unexpected ideas
<b>Mathematics</b>	Maintain consistency of patterns, systematically extend patterns with new examples	Open up and maintain free play, break patterns to create new patterns
<b>Process</b>	Organize activities, manage time and tasks, maintain group well-being, nurture	Sense poor management practices, quickly show when well-being is in danger (“the canary”), invoke empathy and joy
<b>Applications</b>	Connect ideas to many life experiences and examples	Connect ideas to unexpected examples, look at familiar things from new angles
<b>Aesthetics</b>	Appreciate order and systems	Appreciate storytelling, links to nature, and adventure