

# Math Notes

Southern Nevada  
Regional Professional  
Development  
Program

CCSS MINI-SERIES  
ES #1.1



A Newsletter from the Elementary Mathematics Team

## Make Sense of Problems and Persevere in Solving Them

Mathematical Practice # 1



The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students. These practices rest on important “processes and proficiencies” with longstanding importance in mathematics education. They are sometimes referred to as the *8 Standards for Mathematical Practice*. In this and subsequent issues you will find excerpts from these practices as well as brief sketches from the **Conference Board of Mathematical Science** of the Common Core State Standards for Mathematical Practice as they apply to teaching in elementary school.

Math Resources

[www.rpd.net](http://www.rpd.net)

### 1. Make sense of problems and persevere in solving them.

Mathematically proficient students start by explaining to themselves the meaning of a problem and looking for entry points to its solution. They analyze givens, constraints, relationships, and goals. They make conjectures about the form and meaning of the solution and plan a solution pathway rather than simply jumping into a solution attempt. They consider analogous problems, and try special cases and simpler forms of the original problem in order to gain insight into its solution. They monitor and evaluate their progress and change course if necessary. Older students might, depending on the context of the problem, transform algebraic expressions or change the viewing window on their graphing calculator to get the information they need. Mathematically proficient students can explain correspondences between equations, verbal descriptions, tables, and graphs or draw diagrams of important features and relationships, graph data, and search for regularity or trends. Younger students might rely on using concrete objects or pictures to help conceptualize and solve a problem. Mathematically proficient students check their answers to problems using a different method, and they continually ask themselves, “Does this make sense?” They can understand the approaches of others to solving complex problems and identify correspondences between different approaches.

#### Standards for Mathematical Practice

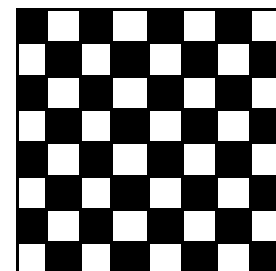
1. **Make sense of problems and persevere in solving them.**
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

Young children are eager for challenges and are problem solvers by nature. A challenge for elementary teachers is to help children maintain their enjoyment for engaging with problems. Teachers can help their students explore, investigate, and persevere in solving problems by creating a nurturing classroom environment. It is important for teachers to convey that everyone can learn math and that it takes active effort and thinking to do so. It is also important for teachers to convey that by thinking hard, we can actually increase our intelligence. Research on motivation indicates that supporting autonomy, competence, and relatedness supports internal motivation and leads to better outcomes than environments that are experienced as highly controlling. Elementary school teachers often want to make mathematics “fun” for students and shelter them from the difficulty of learning mathematics, which frequently leads to activities that have little mathematical substance.



**Try this!**

**How many squares are there on a 8 x 8 checkerboard? How do you know? Are you sure you have them all?**



Adapted from the *Common Core State Standards for Mathematics: Standards for Mathematical Practice*, © Copyright 2010. National Governors Association Center for Best Practices and Council of Chief State School Officers. All rights reserved.

\* **COMMON CORE STATE STANDARDS** for Mathematics