



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.

## 2. Reason abstractly and quantitatively.

Mathematically proficient students make sense of quantities and their relationships in problem situations. They bring two complementary abilities to bear on problems involving quantitative relationships: the ability to *decontextualize*—to abstract a given situation and represent it symbolically and manipulate the representing symbols as if they have a life of their own, without necessarily attending to their referents— and the ability to *contextualize*, to pause as needed during the manipulation process in order to probe into the referents for the symbols involved. Quantitative reasoning entails habits of creating a coherent representation of the problem at hand; considering the units involved; attending to the meaning of quantities, not just how to compute them; and knowing and flexibly using different properties of operations and objects.

Much of elementary teachers’ work is helping young students connect their observations about quantities in the world with the abstract mathematical symbols we use to describe, record, and reason about relationships among quantities. Objects or simple math drawings (e.g., drawings that show tens and ones) can be especially helpful in making such connections, so elementary teachers need to be well prepared to use and discuss such drawings or objects in their instruction.

### 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.



**Try this!** Show different ways to make the number 24. Use objects, numbers, drawings.

Examples might include:

$$\begin{aligned} &20 + 4 \\ &10 + 10 + 4 \\ &2 \times 12 \\ &4 \times 6 \\ &6 + 6 + 6 + 6 \\ &25 - 1 \end{aligned}$$



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\* COMMON CORE STATE STANDARDS FOR Mathematics <http://www.corestandards.org/the-standards/mathematics/introduction/standards-for-mathematical-practice/>