

## Include Writing Activities

The Common Core State Standards in Mathematics (National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010) include numerous opportunities for writing at all grade levels. Writing is an important component of communication in the classroom, and research studies have highlighted the benefits to students of writing to learn mathematics (Pugalee, 2005; Stonewater, 2002). As the brain's frontal cortex develops during the school years, writing enhances the learner's ability to organize, understand, analyze, and reflect on the new learning. In addition to requiring focus, writing provides another modality for processing information and skills, thereby helping the student find sense and meaning, and increasing the likelihood that the new learning will be remembered.

### *Benefits of Writing in Mathematics*

Through writing activities, teachers help students

- learn a mathematics concept more effectively and develop critical-thinking and problem-solving skills;
- create a permanent record of their thoughts where they can return to reflect on them;
- organize ideas, develop new applications for knowledge, and solve problems involving mathematical operations;
- become active participants in their own learning by engaging in an interaction with the subject or content area;
- maintain a silent dialogue with the content area, in which they internalize knowledge and articulate it in the learning process;
- establish a personal connection to new mathematics concepts;
- get involved in an active intellectual process in which they decide what is important and what is meaningful or relevant to them;
- gain self-understanding and confidence in dealing with their concerns; and
- personalize the subject matter, because it gives them choices for applying their knowledge in areas that interest them.

Besides helping students understand mathematical concepts, writing also enhances their confidence in their writing skills for other curriculum areas. In Chapter 8, you will find specific suggestions for how to incorporate writing into mathematics lessons.

## Fixed and Growth Mind-Sets in Mathematics

Psychologists have known for years that our preconceptions about how the world works shape our beliefs and our actions. One psychologist, Carol Dweck (2006), has been looking specifically at preconceptions, called *mind-sets*, about what it means to be smart and successful. Her research has revealed that each of us develops at a young age either of two different mind-sets about our ability and what actions will lead to our success. She called these fixed and growth mind-sets. Below is a comparison of the two types of mind-sets as they apply to learning mathematics.