## RESEARCH AND STANDARDS

The methodology of using coupons to teach mathematics and problem-solving skills in *Coupon Math* is firmly based in the research regarding teaching mathematics to students with special needs. Research shows that students with learning disabilities need relevant and meaningful practice to acquire mathematical skills. Sousa states that "Students are more comfortable with mathematics when they perceive it as a practical tool and not as an end unto itself" (2001). Therefore, life skills and concepts are best learned through the use of hands-on manipulatives and realistic scenarios. Research further suggests that students with learning disabilities work best with concrete models that enable them to link abstract mathematical skills to real-world applications. According to Bellonio, "a review of activity-based mathematics learning indicates that mathematics achievement increased when manipulatives were used" (2001). In particular, the research on teaching mathematics to students with special needs reinforces the importance of using methodological steps to solving problems. Providing steps for students to follow makes abstract concepts more concrete. *Coupon Math* provides a two- and three-step strategy to solve addition and subtraction problems. Students are then asked to further analyze or compare outcomes of those multi-step problems.

The Principles and Standards for School Mathematics by the NCTM state that "students need to learn a new set of mathematics basics that enable them to compute fluently and to solve problems creatively and resourcefully" (2003). The problems in *Coupon Math* focus on real-world situations in which students must work within a budget, compare prices of items, determine if using a coupon is beneficial, and compare which item is the better value. Most mathematical concepts can be best introduced through problems based on familiar experiences. The activities in *Coupon Math* provide problems that follow the NCTM suggestion to "give students the chance to solidify and extend their knowledge and to stimulate new learning" (2003).

*Coupon Math* meets both state and national standards (including the National Council of Teachers of Mathematics Standards 2000 Project) regarding numbers, operations, problem solving, connections, and representations. As students use the coupons and the steps to solve the problems presented in this program, they will:

- identify and analyze information needed to solve mathematical problems.
- use manipulatives to build new mathematical knowledge.
- apply and adapt a multi-step strategy to solve real-world problems and scenarios.
- recognize and understand how mathematical ideas interconnect and build on one another to solve problems.
- reflect upon and verbalize the process of mathematical problem solving.

Bellonio, J. L. (2001). "Multi-Sensory Manipulatives in Mathematics: Linking the Abstract to the Concrete." *Human Intelligence: Theories and Developmental Origins,* VI. Retrieved June 23, 2004, from http://www.yale.edu/ynhti/curriculum/units/2001/6/01.06.12.x.html

National Council of Teachers of Mathematics. (2003). Principles and Standards for School Mathematics. [Electronic version] Retrieved on June 23, 2004, from http://standards.nctm.org/document/chapter8/index.htm

Sousa, D.A. (2001). *How the Special Needs Brain Learns.* Thousand Oaks, CA: Corwin Press, Inc.