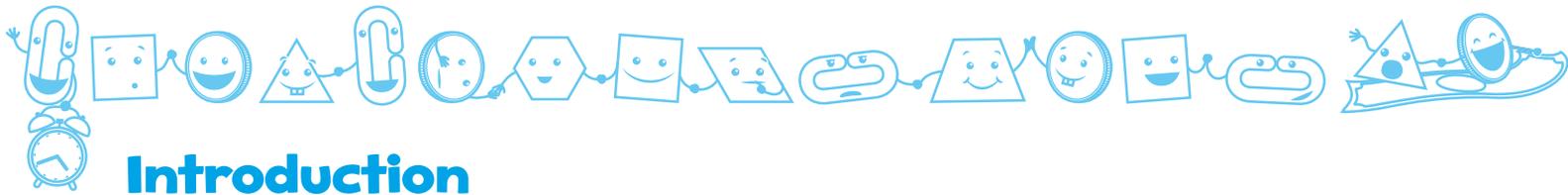


# I **Get** It!

A Research-Based Supplemental Curriculum  
for Using Manipulatives to Conquer Math



A DIVISION OF TEACHER CREATED RESOURCES



## Introduction

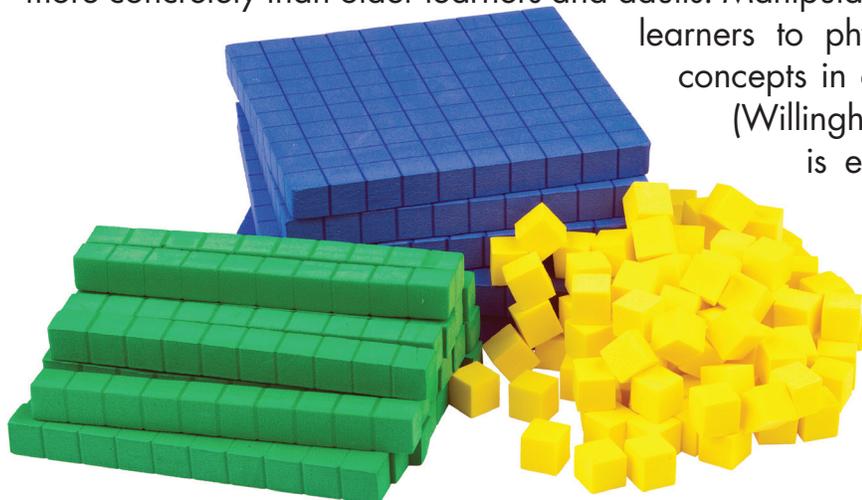
It is no secret that each student is unique. One student may excel with auditory group instruction, while another student may better grasp tough concepts taught visually in a one-on-one setting. Because each student learns and processes information differently, it is important to implement a variety of teaching strategies in the classroom. The *I Get It! Using Manipulatives to Conquer Math* series offers diverse approaches to teaching mathematics with different sets of manipulatives in order to appeal to a greater number of student learning styles.

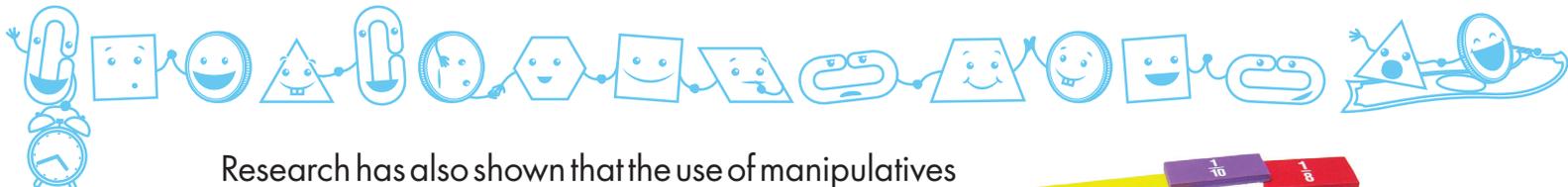
## Why Use Manipulatives?

According to the National Association for the Education of Young Children (NAEYC) and the National Council of Teachers of Mathematics (NCTM), manipulatives are necessary “to support effective teaching and learning” (2010). The councils go even further to state that “mathematics-rich classrooms require a wide array of materials for young children to explore and manipulate.” The Learning Pyramid created by the National Training Laboratories (2003) suggests that learners retain an average of 75% of material that they learn through “practice by doing.” Manipulatives provide learners with a way to practice concepts and retain information.

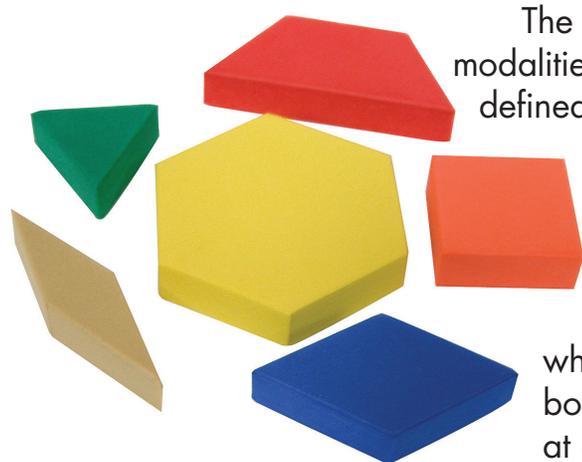
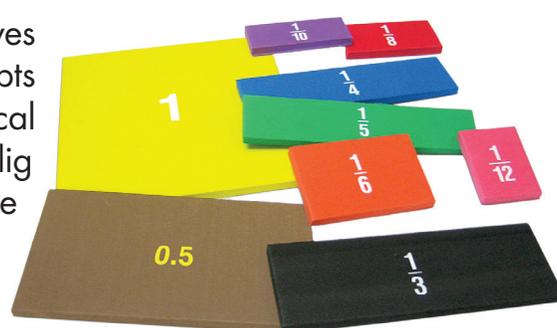


The use of manipulatives is truly a part of good teaching practices for all ages of learners, but has a greater effect on young learners. Manipulatives are powerful tools for teaching students complex and abstract mathematical concepts, especially when used to present initial numerical ideas to young children (Morin & Samelson 2015). These young learners think more concretely than older learners and adults. Manipulatives provide opportunities for young learners to physically interact with mathematical concepts in order to make sense of the concept (Willingham 2017). A strong conceptual base is essential to meet the high demands of Common Core State Standards and “engage with the subject matter...grow in mathematical maturity and expertise throughout the elementary, middle, and high school years” (CCSS).





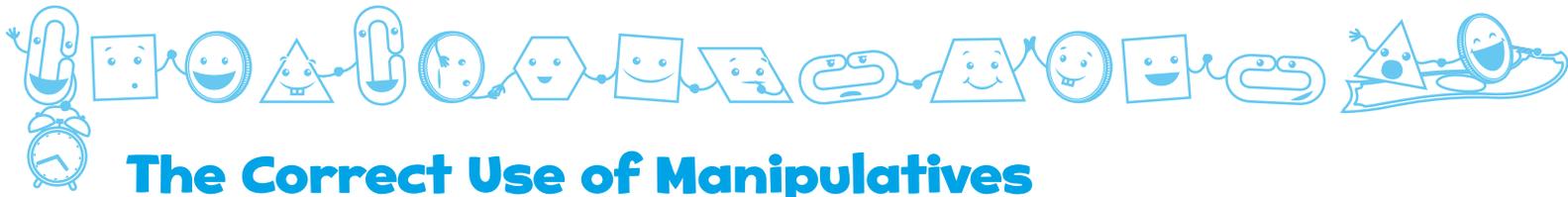
Research has also shown that the use of manipulatives has positive outcomes on the retention of math concepts versus teaching that uses only abstract mathematical symbols and concepts (Carbonneau, Marley, & Selig 2013). Using tools has also been linked to more positive thoughts about the subject of math, especially when students receive instruction with concrete materials delivered by teachers who know how to expertly use the materials (Sowell 1989, Leinenbach & Raymond 1996). The use of manipulatives benefits English Language Learners (ELLs) by providing visuals to support the introduction of new concepts and new vocabulary.



The use of manipulatives allows teachers to reach all modalities of learning, including kinesthetic learning. As defined by the Institute for Learning Styles, kinesthetic learners are those who want to “try things out and like to manipulate objects.” While using manipulatives, students are also able to move their bodies rather than simply listening to new information. Studies have shown that conceptual retention is improved when learning is connected to body movements. These body movements provide cues for retrieving information at a later time (Carbonneau et al. 2013, Lindren 2015).

Additionally, inclusive education classrooms aim to provide the necessary resources and support for all students, regardless of background, abilities, or deficiencies to learn together. For students with special needs, manipulatives can play an important role in helping these students understand mathematical concepts and engage with the subject. Evidence shows that manipulatives can increase student’s attention and involvement in math lessons. (Tjandra, 2023).





# The Correct Use of Manipulatives

The use of manipulatives is a proven pedagogical strategy. Piaget (1952) was one of the first experts to theorize that students need models and instruments to understand abstract mathematical concepts. Today many experts, including NCTM, cite mathematic manipulatives as powerful tools that foster conceptual understanding when used correctly. Manipulatives have the power to help students improve their mathematical reasoning skills while deepening their comprehension of mathematical concepts (Laski et al. 2015). However, this can only happen if the manipulatives are introduced and used in intentional ways to foster learning.

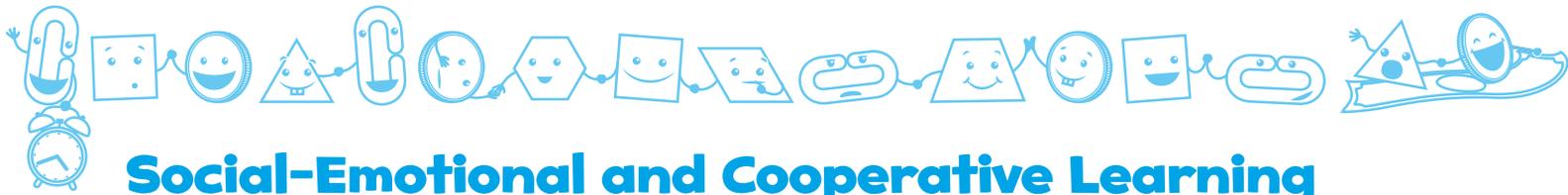


Manipulatives can be ineffectual or even deter from learning if students are not given proper instruction and guidance on how to use them. Research has proven that manipulatives are most effective at helping students learn when the tools are combined with a teacher's guidance (Bruner 1974). Effective teaching and guidance combined with the use of manipulatives yields the greatest benefits to students.

The *I Get It! Using Manipulatives to Conquer Math* series provides solid instruction to help teachers guide students' use of manipulatives. The All Together Now! section of the lesson plans includes detailed, step-by-step instructions, often with suggested dialogue for the teacher. Multiple diagrams demonstrate how the teacher can foster conceptual understanding with concrete objects. Teachers can reproduce the diagrams on the board using the magnetic manipulatives. Students listen and follow along as the teacher introduces and explains the mathematical concepts. The lessons come with activity boards that serve as learning tools to aid with instruction. Once students have a firm grasp of the concept, the teacher transitions the students to working in small groups and then later, working independently. The *I Get It!*

*Using Manipulatives to Conquer Math* series allows for multiple opportunities to practice mathematical skills and to develop greater conceptual understanding of mathematical concepts.

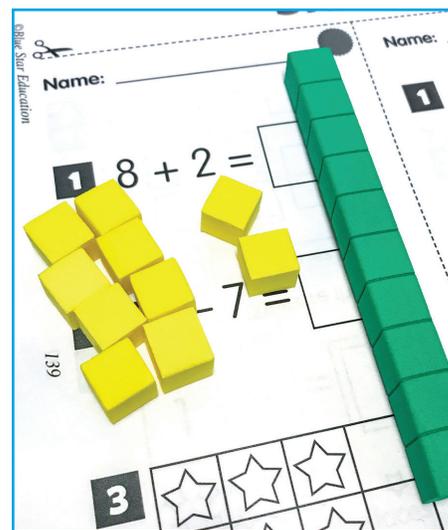




## Social-Emotional and Cooperative Learning

Countless studies have proven that people learn through interactions with others. Concepts become more solidified when students have opportunities to discuss learning and work together to practice their learning. Ultimately, students are more actively engaged in learning (NEA). When working together, students typically have higher achievement rates and greater productivity (Johnson & Johnson 1989). Cooperative learning situations also benefit ELL students. These students become actively engaged in cooperative groups, and have authentic opportunities to discuss key concepts and use academic vocabulary (Haynes 2014).

While social-emotional learning has been a buzzword in education for years, the COVID-19 pandemic brought about a resurgence of the importance of SEL in the classroom. The Collaborative for Academic, Social, and Emotional Learning (CASEL) identifies social-emotional learning as the process that enables children to learn how to understand themselves and those around them, manage their emotions, display empathy and respect, build solid relationships, and make smart choices (CASEL 2018). Studies show that when promoting SEL for students during math instruction, centers (rotating educator and peer-led small groups) provide opportunities for students to practice SEL skills, particularly exercising voice and agency (Ackerman, 2020).

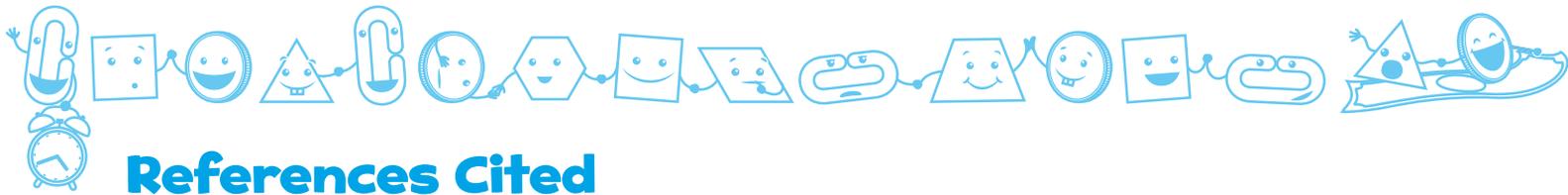


The lessons in the *I Get It! Using Manipulatives to Conquer Math* series incorporate time for social-emotional and cooperative learning. In the Teamwork Time! sections, the teacher provides mathematical problems that are to be solved by students working in small groups. The groups use their manipulatives and rely on each other to work through and discuss the problems. Working in small groups allows teachers time to walk around the room and assess student understanding. Teachers can listen to group conversations and see how students work together to use the manipulatives and mathematical reasoning to work through the problems.

Once the groups have solved the problems, it is important to go over the answers as a class and have individual groups explain the steps it took to find the answers. Studies show the importance of allowing time to explicitly improve mathematical reasoning in students (Baxter et al. 2005). One way to do this is by building time into instruction for students to explain their thinking and reasoning to the class.

Working in small groups also offers students the opportunity to grow their social-emotional learning skills as they discern how other students use the manipulatives and their mathematical reasoning skills. There is often more than one way to solve a problem, and it helps students to see and understand this concept. Furthermore, cooperative learning can increase student achievement and develop social skills (Siegel 2005).





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