



# The CSA Framework: Connecting Concrete, Semi-concrete, and Abstract Representations

Dr. Bethany Noblitt, Northern Kentucky University

- 1 The Concrete Semi-Concrete Abstract - or CSA - approach provides students with different
- 2 representations of mathematical ideas, making learning more meaningful and accessible for students.
- 3 The CSA framework is comprised of three types of representations: concrete, semi-concrete, and
- 4 abstract.
- 5 Concrete representations let students physically interact with mathematical concepts using hands-on
- 6 materials such as base-ten blocks or fraction tiles.
- 7 Semi-concrete representations, such as area models or number lines, help bridge the gap between
- 8 physical objects and abstract thinking.
- 9 Finally, abstract representations, such as symbols, numerals, and equations, allow students to work
- 10 with mathematical concepts in a more generalized way.
- 11 A key element of the CSA framework is its flexibility. It is not about following a strict, chronological
- 12 sequence from concrete to abstract. Instead, teachers guide students' movement between these
- 13 representations as needed, reinforcing their conceptual understanding and making connections
- 14 between the representations along the way. Even when students are working at a more abstract level,
- 15 they may return to hands-on materials or visual representations to clarify their thinking or explore new
- 16 ideas.
- 17 Because mathematical understanding depends on making connections, it is essential that students see
- 18 how different representations relate to one another. The CSA framework emphasizes these
- 19 connections, which directly supports Effective Mathematics Teaching Practice 3: Use and Connect



20 Mathematical Representations. This practice encourages teachers to engage students in using and  
21 connecting concrete representations, visual representations, symbolic notation, verbal explanations,  
22 and contextual math situations to build a deeper understanding of mathematical concepts.

23 Using multiple representations makes math more accessible for students. When students can engage  
24 with concepts in different ways, they develop stronger reasoning skills and deeper understanding. The  
25 ability to move between representations not only supports understanding but also gives students  
26 access to different ways to represent and solve problems and express their thinking. CSA provides  
27 meaningful entry points for all learners, ensuring they have the tools they need to make sense of  
28 mathematics and communicate their ideas effectively.