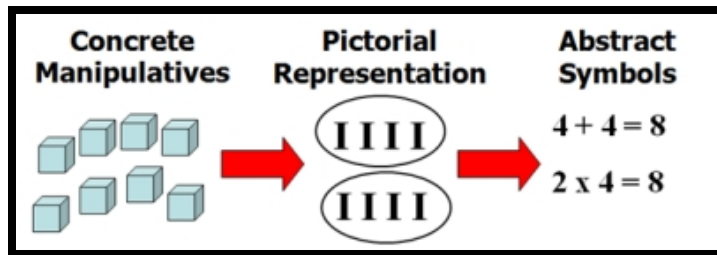


Engaging in Math Concepts

Concrete –Representational (Pictorial) - Abstract



Purpose

The purpose of teaching through a concrete-to-representational-to-abstract sequence of instruction is to ensure students truly have a thorough understanding of the math concepts/skills they are learning. When students first develop a concrete understanding of the math concept/skill, then they are much more likely to perform that math skill and truly understand math concepts at the abstract level.

What is it?

- Each math concept/skill is first modeled with concrete materials (e.g. chips, unifix cubes, base ten blocks, beans and bean sticks, pattern blocks).
- Students are provided many opportunities to practice and demonstrate mastery using concrete materials.
- The math concept/skill is next modeled at the representational (semi-concrete) level which involves drawing pictures that represent the concrete objects previously used (e.g. tallies, dots, circles, stamps that imprint pictures for counting).
- Students are provided many opportunities to practice and demonstrate mastery by drawing solutions.
- The math concept/skill is finally modeled at the abstract level (using only numbers and mathematical symbols).
- Students are provided many opportunities to practice and demonstrate mastery at the abstract level before moving to a new math concept/skill.
- As a teacher moves through a concrete-to-representational-to-abstract sequence of instruction, the abstract numbers and/or symbols should be used in conjunction with the concrete materials and representational drawings (promotes association of abstract symbols with concrete & representational understanding).

What are the critical elements of this strategy?

- Use appropriate concrete objects to teach particular math concept/skill. Teach concrete understanding first.
- Use appropriate drawing techniques or appropriate picture representations of concrete objects.
- Use appropriate strategies for assisting students to move to the abstract level of understanding for a particular math concept/skill.
- When teaching at each level of understanding, use explicit teaching methods.

How do I implement the strategy?

1. When initially teaching a math concept/skill, describe & model it using concrete objects (concrete level of understanding).
2. Provide students many practice opportunities using concrete objects.
3. When students demonstrate mastery of skill by using concrete objects, describe & model how to perform the skill by drawing or with pictures that represent concrete objects (representational level of understanding).
4. Provide many practice opportunities where students draw their solutions or use pictures to problem-solve.
5. When students demonstrate mastery drawing solutions, describe and model how to perform the skill using only numbers and math symbols (abstract level of understanding).
6. Provide many opportunities for students to practice performing the skill using only numbers and symbols.
7. After students master performing the skill at the abstract level of understanding, ensure students maintain their skill level by providing periodic practice opportunities for the math skills.
8. Be sure to make connections between the 3 representations.

How does this instructional strategy positively impact students?

- Helps passive learners to make meaningful connections.
- Teaches conceptual understanding by connecting concrete understanding to abstract math processes.
- By linking learning experiences from concrete-to-representational-to-abstract levels of understanding, the teacher provides a graduated framework for students to make meaningful connections.
- Blends conceptual and procedural understanding in a structured way.

It is important for students to understand the WHY rather than just knowing how to “get through the procedures of math”.