

The Importance of the Concrete-Pictorial-Abstract Progression (CPA)

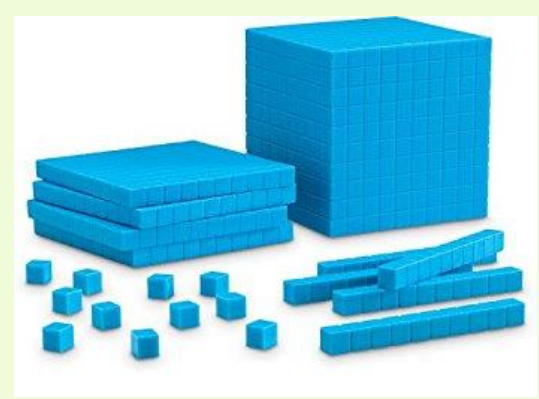


C-P-A Progression

- Students can find math difficult because it is abstract
- The CPA approach builds on a student's existing knowledge by introducing abstract concepts in a concrete and tangible way
- It involves moving from concrete materials, to pictorial representations, to abstract symbols and problems



Concrete

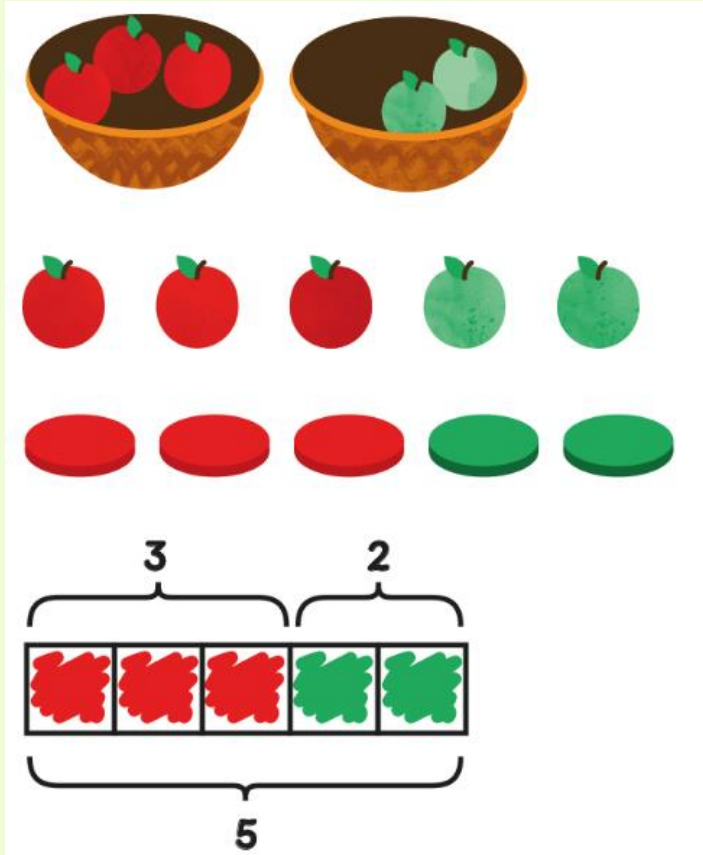


- Concrete is the “doing” stage
- Students use concrete objects to model problems
- Abstract concepts are first introduced using physical, interactive, concrete materials.

Manipulatives: counters or cubes



Pictorial



- Pictorial is the “seeing” stage
- Visual representations of concrete objects
- Building or drawing a model makes it easier for students to grasp difficult abstract concepts
- This stage bridges the concrete to making mental visualizations (abstract)



Abstract

- Abstract is the “symbolic” stage
- Students use abstract symbols to model problems
- Students progress to abstract after demonstrating understanding of the concrete and pictorial stages
- Symbolic level, using only numbers, notation, and mathematical symbols:



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Building Number Sense

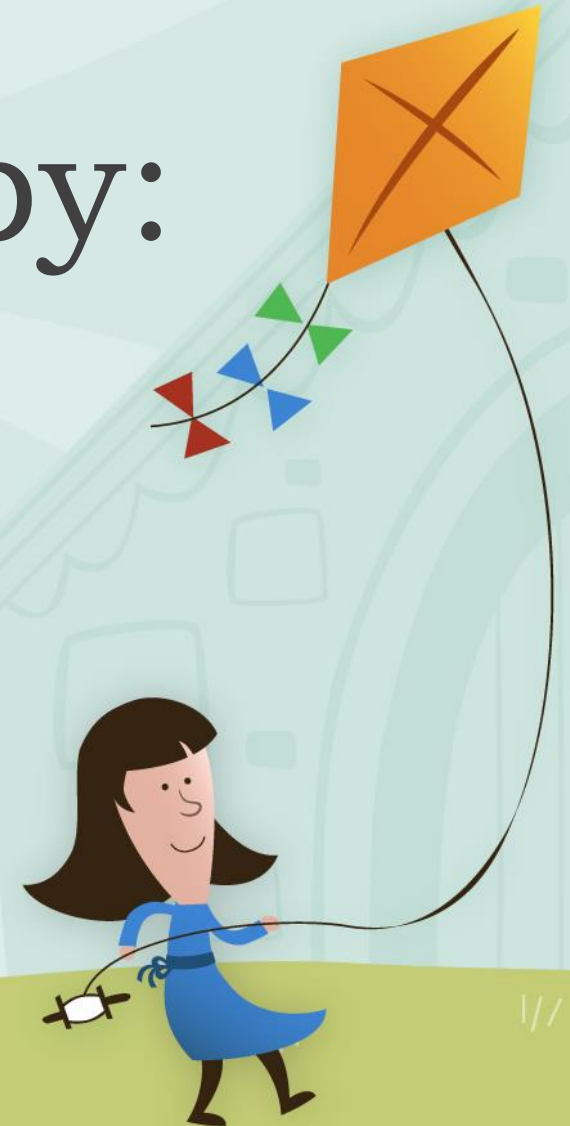
- Allowing students time to progress with concrete materials will develop a strong number sense and **conceptual understanding**
- Number sense is the foundation for all higher level mathematics

“Students understand more complex functions when they have number sense and deep understanding of numerical principals, not blind memorization or fast recall.”

(Boaler, 2016)



What do we mean by: Conceptual Understanding



Conceptual Understanding

Students must learn mathematics with understanding, actively building new knowledge from experience and prior knowledge



Students will be able to apply and possibly adapt some acquired mathematical ideas to new situations

Final Thoughts

“The more we emphasize memorization to students, the less willing they become to think about numbers and their relations and to use and develop number sense.”

(Jo Boaler)

Integrating hands-on activities develops a motivation and engagement in math, especially for basic fact fluencies. Through repeated exposure, this will lead to memorization and efficiency with recall.



Final Thoughts

We are adapting our K-5 math curriculum to develop lessons and activities that are developmentally appropriate.

- ✓ Strong number sense
- ✓ Flexible thinkers
- ✓ Conceptual understanding
- ✓ Mathematical thinkers and problem solvers
- ✓ Love of learning and confidence in mathematics!

