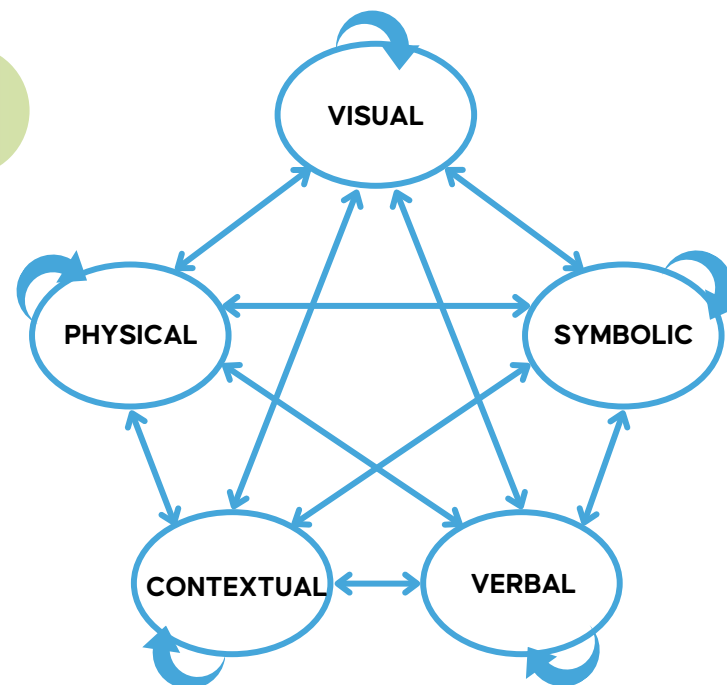# EMTP 3 — Use & Connect Mathematical Representations

Effective teaching of mathematics engages students in making connections among mathematical representations to deepen understanding of mathematics concepts and procedures and as tools for problem solving.

NCTM (2014, p. 24)

Huinker & Bill (2017, p. 137)

As a teacher I…

- use tasks that encourage or require multiple representations.
- introduce representations that align to lesson goals and enhance learning.
- consider concrete, semi-concrete, and abstract representations to support student thinking.
- encourage students to show and explain their thinking using different representations.
- support students in comparing and connecting representations within a category (e.g., two physical representations) and across categories (e.g., contextual to a symbolic), bringing attention to the shared underlying structure or mathematical idea.

so that my students…

- choose and use manipulatives to help make sense of problems.
- draw visuals that help them make sense of and solve problems.
- adjust their choice of representations as needed as they solve problems.
- explain and justify their thinking with physical materials, drawings, and symbols.
- use representations to explain concepts or procedures.
- describe connections among representations.
- evaluate the usefulness of a particular representation for a specific type of problem.

Adapted from NCTM (2014, p. 29)