Mathematical Representations

Students will represent and describe mathematical ideas, generalizations, and relationships with a variety of methods. Students will understand that representations of mathematical ideas are an essential part of learning, doing, and communicating mathematics. Students should move easily among different representations — graphical, numerical, algebraic, verbal, and physical — and recognize that representation is both a process and a product. (From the Introduction to the 2009 Virginia Mathematics Standards of Learning.)

“Representations are useful in all areas of mathematics because they help us develop, share, and preserve our mathematical thoughts. They help to portray, clarify, or extend a mathematical idea by focusing on its essential features.”

“Representations do not “show” the mathematics to the students. Rather the students need to work with representations extensively in many contexts as well as move between representations in order to understand how they can use a representation to model mathematical ideas and relationships.”

“Students must be actively engaged in developing, interpreting, and critiquing a variety of representations. This type of work will lead to better understanding and effective, appropriate use of representation as a mathematical tool.”

NCTM Principles and Standards, 2000

Mathematical Connections

Students will relate concepts and procedures from different topics in mathematics to one another and see mathematics as an integrated field of study. Through the application of content and process skills, students will make connections between different areas of mathematics and between mathematics and other disciplines, especially science. Science and mathematics teachers and curriculum writers are encouraged to develop mathematics and science curricula that reinforce each other. (From the Introduction to the 2009 Virginia Mathematics Standards of Learning.)

“An emphasis on mathematical connections helps students build a disposition to use connections in solving mathematical problems, rather than see mathematics as a set of disconnected, isolated concepts and skills.”

NCTM Principles and Standards, 2000