

ST MATH AND THE COMMON CORE

COMMON CORE
BY DESIGN



This MIND Research Institute created the visually-based Spatial-Temporal Math (ST Math[®]) program to engage all students in the strategic and creative thinking that guides the new Common Core State Standards for Mathematics (CCSSM). Through visual and kinesthetic online manipulative games organized into mastery-based objectives, ST Math provides multiple rich, interactive representations for teachers and students to experience all of the conceptual areas covered by CCSSM. ST Math also fully integrates the Standards for Mathematical Practice into the grade-level content, enabling students to develop long-term problem-solving skills and a deep conceptual understanding of mathematics with strong connections between concepts and across grades.

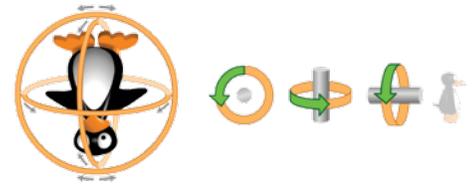
MATHEMATICAL PRACTICE STANDARD

HOW ST MATH HELPS STUDENTS DEMONSTRATE UNDERSTANDING AND MASTER THE STANDARD

1 Make sense of problems and persevere in solving them

Unlike any other instructional software, ST Math engages students in learning through problem solving. Students are challenged with 50 or more complex problems during a single session, building mastery through the development of strategic thinking, conceptual understanding, perseverance and practice.

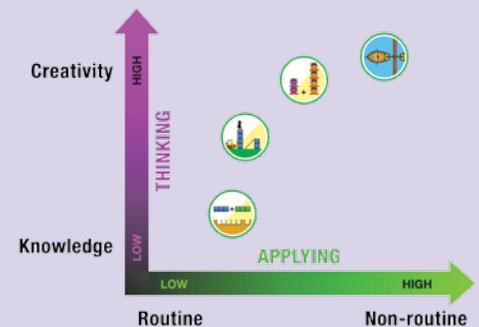
Example: *In the Upright JiJi game, students must manipulate the sphere to get JiJi the penguin into the indicated position.*



2 Reason abstractly and quantitatively

ST Math content objectives are designed around learning paths that begin with basic concepts but end in rigorous applications where students use abstract, quantitative, and creative reasoning to solve non-routine problems.

ST Math takes students to the highest level of thinking and applying math: the ability to creatively problem-solve in non-routine ways.



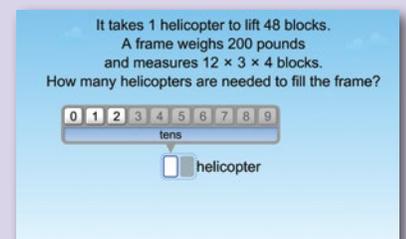
3 Construct viable arguments and critique the reasoning of others

With **Teacher Mode**, the ST Math software provides teachers the opportunity to bring the games into the classroom and use them as a vehicle for classroom discussion, asking students to make conjectures, discuss problem solving strategies in groups, and clearly explain and justify their reasoning.

4 Model with mathematics

Learning paths guide students' progress from visual to symbolic to contextual problem solving, using mathematics to model and describe complex situations.

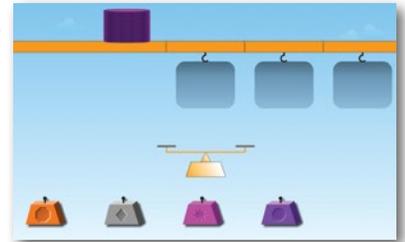
Example: *This screenshot represents the highest level of the game where students demonstrate their knowledge through language.*



Through new touch technology integration, ST Math bridges the gap between visual and physical manipulatives, enabling students to choose real world tools and strategically use them to solve problems.

5 Use appropriate tools strategically

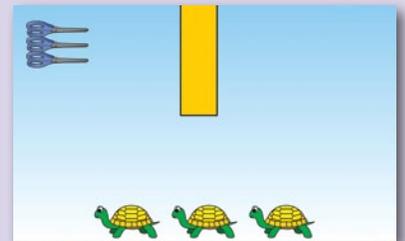
Example: *By using the scale in this measurement game students interact with a real-world tool in order to form a strategy for problem-solving. Students can compare the weights using the balance scale to determine how to place the weights in order of increasing magnitude.*



Students directly experience precision in mathematics, connecting the precision inherent in symbolic representations to precision in measuring and using tools.

6 Attend to precision

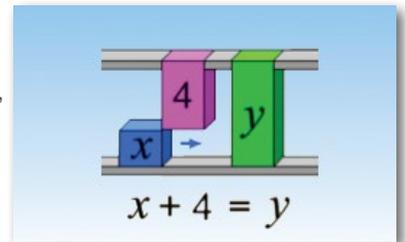
Example: *In this beginning fractions game, students must cut the bar precisely into three equal parts each representing one-third.*



Each game in ST Math is based on a visual schema. Students internalize these interactive representations, connecting the structure of the models with the symbols, and using this structure to solve problems.

7 Look for and make use of structure

Example: *When solving equation-based problems, students connect visual representations to the symbolic.*



Each key concept is presented in multiple games with different representations, allowing students to identify ideas and reasoning strategies that enable them to solve problems in different forms.

8 Look for and express regularity in repeated reasoning

Example: *Games found in the Addition and Subtraction objectives engage students in solving puzzles with a variety of models, including blocks, ten-frames, and number lines.*

