Investigations in Number, Data, and Space®

The *Shapes* Software (K-2)[1]

Shapes is designed to help students develop their ability to visualize shapes and motions, the effects of those motions, and to begin to think about the attributes of 2-D shapes.
The software includes three different shape sets: Pattern Blocks (the default), Power Polygons, and Tangrams. Unlike work with actual blocks, students have access to an unlimited supply of shapes, and can save their work in order to develop ideas and projects over time. *Shapes* extends what students can do with these familiar manipulatives and requires students to be more intentional and precise in their actions, for example, instead of intuitively turning their hand to make a block fit into place, students must select a tool to turn it or flip it, and decide how much of a turn is needed. These additional ways of working with the manipulatives helps deepen the mathematical ideas emphasized in the curriculum unit they are studying.

When using the *Shapes* Software, students can:

- Rotate shapes left and right (and specify the angle)
- Reflect shapes vertically and horizontally
- Duplicate shapes
- Create and apply a pattern (a procedure involving duplicating a shape, translating and/or rotating it to a new position relative to the original, and then applying those rules to other shapes)
- Group and ungroup shapes by gluing them together or hammering them apart
- Work in a mirror environment where every shape is reflected in a vertical or horizontal mirror (or both at the same time, making three reflections)
- Turn a grid on and off; turn a "snap together" feature on or off; change colors of shapes; save drawings; and print drawings

The *Shapes* software includes the following activities, which are integrated into Math Workshops throughout the geometry units. Except for *Quilt Squares*, all of them allow students to solve pre-made puzzles or make their own, and can be done using any of the three shape sets. All of the activities except for *Free Explore* include a range of levels of difficulty that can be chosen by the user.

- *Free Explore.* A blank template that allows students to work with any of the three shape sets and to manipulate the shapes freely.
- *Quick Images.* Students look briefly at an image made up of one to several shapes. They then work to build a copy of the image in the workspace.

- *Puzzles*. Students are presented with a puzzle outline and figure out how to use shapes to fill it in completely.
- *Quilt Squares*. Students design a template square, which gets replicated nine times to create a quilt. (Grade 1 only.)
- *Reflection Puzzles*. Students are given a glued set of shapes in a mirror environment and need to rotate the set of shapes until a line of symmetry matches the mirror. They can then use the mirror to check that it perfectly overlaps its reflection. (Grade 2 only.)

Kindergarten, Unit 5	**Grade 1, Unit 2**	**Grade 2, Unit 2**
Free Explore	Free Explore	Free Explore
Puzzles	Puzzles	Puzzles
Quick Images	Quick Images	Quick Images
	Quilt Squares	Reflection Puzzles
		Line of Symmetry

After being introduced to the software in the above units, *Investigations* suggests that students continue using *Shapes* throughout the year. Continued experience allows students to become increasingly fluent in the mechanics of the software itself and able to better focus on the mathematical ideas of the game and activities. *Shapes* activities can be incorporated into Math Workshop, and in other times outside of math class, such as computer time, before and after school, choice time, and/or during recess.

[1] This document applies to the 2nd edition of *Investigations* (2008, 2012). *Investigations and the Common Core Standards* omits the Quilt Squares and Reflection Puzzle activities.