How *Kinderlogo* Connects to State Mathematics Standards

Kinderlogo can be used to explore many different mathematical concepts. Some of the key areas are geometry, measurement, and patterns. A creative teacher can design challenges for the students that incorporate many other concepts using the *Kinderlogo* activities.

Using the free exploration activities (KL1–KL5), students draw, compare, and measure two-dimensional shapes (geometry). They create patterns using the command sequences and shapes they draw. They count turtle steps to ensure that regular shapes have equal length sides (measurement). Activities such as Beads (patterns), Mirror (symmetry), and Color Grid (area and fractions) focus on other concepts.

Kinderlogo addresses the following sampling of math standards from several states. The grade level, state, and standard number are listed for each. For many skills, it is interesting to see how different wording often describes the same concept. You can correlate these skills to the guidelines of other states, which will have similar standards.

Resources:
California Math Standards: http://www.cde.ca.gov/be/st/ss/documents/mathstandard.pdf
Florida Math Standards: http://www.floridastandards.org/Standards/FLStandardSearch.aspx
New York Math Standards: http://www.p12.nysed.gov/ciai/mst/math/standards/core.html
Texas Math Standards: http://ritter.tea.state.tx.us/rules/tac/chapter111/ch111a.html

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Number Sense

Counting

- Count, recognize, represent, name, and order a number of objects (up to 30). (K, CA-1.2)
- Represent quantities with numbers up to 20, verbally, in writing, and with manipulatives. (K, FL-1.1)
- Draw pictures or other informal symbols to represent a spoken number up to 10 (K, NY-N.7)
- Count by 2s, 5s, and 10s to 100. (1, CA-2.4)
- Use patterns to skip count by twos, fives, and tens. (1, TX-5A)
- Extend number patterns to build a foundation for understanding multiples and factors – for example, skip counting by 2's, 5's, 10's. (2, FL- 4.1)

Fractions

- Separate a whole into two, three, or four equal parts and use appropriate language to describe the parts such as three out of four equal parts. (1, TX-2A)
- Recognize, name, and compare unit fractions from 1/12 to 1/2. (2, CA-4.1)
- Use concrete models to represent and name fractional parts of a whole object (with denominators of 12 or less). (2, TX-2A)

- Use geometric models to demonstrate the relationships between wholes and their parts as a foundation to fractions. (2, FL-5.1)
- Construct concrete models of fractions. (3, TX-2A)
- Use fraction names and symbols to describe fractional parts of whole objects or sets of objects (3, TX-2C)
- Represent fractions, including fractions greater than one, using area, set, and linear models. (3, FL-2.1)
- Use manipulatives, visual models, and illustrations to name and represent unit fractions (1/2, 1/3, 1/4, 1/5, 1/6, and 1/10) as part of a whole or a set of objects. (3, NY-N.11)

Measurement and Geometry

Identifying and Describing Shapes

- Identify and describe common geometric objects (e.g., circle, triangle, square, rectangle…). (K, CA-2.1)
- Describe, identify, and compare circles, triangles, rectangles, and squares (a special type of rectangle). (K, TX-9C)
- Describe characteristics and relationships of geometric objects. (K, NY-G.1)
- Identify, name, describe and sort basic two-dimensional shapes such as squares, triangles, circles, rectangles, hexagons, and trapezoids. (K, FL-2.2)
- Recognize, name, describe, create, sort, and compare two-dimensional and three-dimensional shapes. (1, NY-G.2)
- Identify, describe, and compare triangles, rectangles, squares, and circles. (1, CA-2.1)
- Describe and identify two-dimensional geometric figures, including circles, triangles, rectangles, and squares (a special type of rectangle) (1, TX-6A)
- Describe attributes (the number of vertices, faces, edges, sides) of two- and three-dimensional geometric figures such as circles, polygons, spheres, cones, cylinders, prisms, and pyramids, etc. (2, TX-7A)
- Define and use correct terminology when referring to shapes (circle, triangle, square, rectangle, rhombus, trapezoid, and hexagon). (3, NY-G.1)
- Describe, analyze, compare, and classify two-dimensional shapes using sides and angles—including acute, obtuse, and right angles—and connect these ideas to the definition of shapes. (3, FL-3.1)
- Identify, describe, and classify polygons (including pentagons, hexagons, and octagons). (3, CA-2.1)

Measurement

- Compare and order two or three concrete objects according to length (longer/shorter than, or the same) (K, TX-10A)
- Compare and order objects indirectly or directly using measurable attributes such as length, height, and weight. (K, FL-3.1)
- Name, discuss, and compare attributes of length (longer than, shorter than). (K, NY-M.1)

- Use basic shapes, spatial reasoning, and manipulatives to model objects in the environment and to construct more complex shapes. (K, FL-2.5)

Spatial Awareness

- Give and follow directions about location. (1, CA-2.3)
- Place an object in a specified position. (1, TX-7B)
- Arrange and describe objects in space by proximity, position, and direction (e.g., near, far, below, above, up, down, behind, in front of, next to, left or right of). (1, CA-2.4)

Attributes of Shapes

- Compare familiar plane and solid objects by common attributes. (K, CA-2.2)
- Use appropriate vocabulary to compare shapes according to attributes and properties such as number and lengths of sides and number of vertices. (1, FL-3.1)
- Describe attributes (the number of vertices, faces, edges, sides) of two- and three-dimensional geometric figures such as circles, polygons, spheres, cones, cylinders, prisms, and pyramids, etc. (2, TX-7A)
- Identify attributes of quadrilaterals (e.g., parallel sides for the parallelogram, right angles for the rectangle, equal sides and right angles for the square). (3, CA-2.3)

Symmetry

- Manipulate two- and three-dimensional shapes to explore symmetry. (K, NY-G.4)
- Explore line symmetry. (2, NY-G.6)
- Create two-dimensional figures with lines of symmetry using concrete models and technology (3, TX-9B)

Area and Perimeter

- Select a non-standard unit of measure such as square tiles to determine the area of a two-dimensional surface. (2, TX-9B)
- Use concrete and pictorial models of square units to determine the area of two-dimensional surfaces (3, TX-11C)
- Use standard units to find the perimeter of a shape. (3, TX-11B)
- Select appropriate units, strategies, and tools to solve problems involving perimeter. (3, FL-5.1)

Statistics, Data Analysis and Probability

Patterns

- Identify, describe, and extend simple patterns (such as circles or triangles) by referring to their shapes, sizes, or colors. (K, CA-1.2)
- The student identifies, extends, and creates patterns. The student is expected to identify, extend, and create patterns of sounds, physical movement, and concrete objects. (K, TX-5)
- Use a variety of manipulatives to create patterns using attributes of color, size, or shape. (K, NY-A.1)

- Recognize, describe, extend, and create patterns that repeat (e.g., ABABAB or ABAABAAAB). (K, NY-A.2)
- Extend repeating and growing patterns, fill in missing terms, and justify reasoning. (1, FL-4.1)
- Determine and discuss patterns in arithmetic (what comes next in a repeating pattern, using numbers or objects) (1, NY-A.1)
- Describe, extend, and explain ways to get to a next element in simple repeating patterns (e.g., rhythmic, numeric, color, and shape). (1, CA-2.1)
- The student is expected to identify, describe, and extend concrete and pictorial patterns in order to make predictions and solve problems. (1, TX-4)

Graphing

- Students organize, represent, and compare data by category on simple graphs and charts. (1, CA-1.0)
- Construct picture graphs and bar-type graphs. (2, TX-11A)
- Identify, describe, and extend repeating and additive patterns to make predictions and solve problems. (2, TX-6C)
- Identify and extend whole-number and geometric patterns to make predictions and solve problems (3, TX-6A)
- Construct and analyze frequency tables, bar graphs, pictographs, and line plots from data, including data collected through observations, surveys, and experiments. (3, FL-7.1)
- Display data in pictographs and bar graphs. (3, NY-S.5)

Probability

- Record the possible outcomes for a simple event (e.g., tossing a coin) and systematically keep track of the outcomes when the event is repeated many times. (3, CA-1.2)

Mathematical Reasoning

- Explain the reasoning used with concrete objects and/or pictorial representations. (K, CA-2.1)
- Communicate mathematical ideas using objects, words, pictures, numbers, and technology (K, TX-14A)
- Share mathematical ideas through the manipulation of objects, drawings, pictures, and verbal explanations (K, NY-CM.2)
- Use tools, such as manipulatives or sketches, to model problems. (1-2, CA-1.2)
- Select or develop an appropriate problem, solving strategy including drawing a picture, looking for a pattern, systematic guessing and checking, or acting it out in order to solve a problem (K-3, TX-13C)
- Use tools such as real objects, manipulatives, and technology to solve problems. (K-3, TX-13D)
- Determine when and how to break a problem into simpler parts. (3, CA-1.2)
- Apply strategies and results from simpler problems to more complex problems. (3, CA-2.2)
- Relate informal language to mathematical language and symbols. (3, TX-15B)