Developmental Levels for Recognizing Geometric Shapes

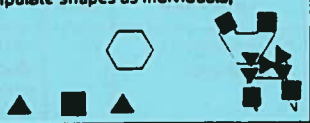
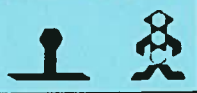
Geometric shapes can be used to represent and understand objects. Analyzing, comparing, and classifying shapes helps create new knowledge of shapes and their relationships. Shapes can be decomposed or composed into other shapes. Through their everyday activities, children build both intuitive and explicit knowledge of geometric figures. Most children can recognize and name basic two-dimensional shapes at four years of age. However, young children can learn richer concepts about shape if they have varied examples and nonexamples of shape, discussions about shapes and their characteristics, a wide variety of shape classes, and interesting tasks. Children typically follow an observable developmental progression in learning about shapes with recognizable stages or levels. This developmental path can be described as part of a learning trajectory.

Age Range	Level Name	Level	Description
2	Shape Matcher—Identical	1	The earliest sign of understanding shape is when a child can match basic shapes (circle, square, typical triangle) with the same size and orientation.
2	Shape Matcher—Sizes	2	A sign of development is when a child can match basic shapes with different sizes.
2	Shape Matcher—Orientations	3	This level of development is when a child can match basic shapes with different orientations.
3	Shape Recognizer—Typical	4	A sign of development is when a child can recognize and name a prototypical circle, square, and, less often, a typical triangle. For example, the child names this a square. ☐ Some children may name different sizes, shapes, and orientations of rectangles, but also accept some shapes that look rectangular but are not rectangles. Children name these shapes "rectangles" (including the nonrectangular parallelogram).
3	Shape Matcher—More Shapes	5	As children develop understanding of shape, they can match a wider variety of shapes with the same size and orientation.
3	Shape Matcher—Sizes and Orientations	6	The child matches a wider variety of shapes with different sizes and orientations.
3	Shape Matcher—Combinations	7	The child matches combinations of shapes to each other.
4	Shape Recognizer—Circles, Squares, and Triangles	8	This sign of development is when a child can recognize some nonprototypical squares and triangles and may recognize some rectangles, but usually not rhombi (diamonds). Often, the child does not differentiate sides/corners. The child at this level may name these as triangles.
4	Constructor of Shapes from Parts—Sticks *Like Representing*	9	A significant sign of development is when a child represents a shape by making a shape "look like" a goal shape. For example, when asked to make a triangle with sticks, the child may create the following:

Age Range	Level Name	Level	Description
5	Shape Recognizer—All Rectangles	10	As children develop understanding of shape, they recognize more rectangle sizes, shapes, and orientations of rectangles. For example, a child at this level may correctly name these shapes "rectangles."
5	Side Recognizer *Parts*	11	A sign of development is when a child recognizes parts of shapes and identifies sides as distinct geometric objects. For example, when asked what this shape is, the child may say it is a quadrilateral (or has 4 sides) after counting and running a finger along the length of each side.
5	Angle Recognizer *Parts*	12	At this level, a child can recognize angles as separate geometric objects. For example, when asked, "Why is this a triangle," the child may say, "It has three angles" and count them, pointing clearly to each vertex (point at the corner).
5	Shape Recognizer—More Shapes	13	As children develop, they are able to recognize most basic shapes and prototypical examples of other shapes, such as hexagon, rhombus (diamond), and trapezoid. For example, a child can correctly identify and name all the following shapes:
6	Shape Identifier	14	At this level, the child can name most common shapes, including rhombi, without making mistakes such as calling ovals circles. A child at this level implicitly recognizes right angles, so distinguishes between a rectangle and a parallelogram without right angles. A child may correctly name all the following shapes:
6	Angle Matcher *Parts*	15	A sign of development is when the child can match angles concretely. For example, given several triangles, the child may find two with the same angles by laying the angles on top of one another.

Developmental Levels for Composing Geometric Shapes

Children move through levels in the composition and decomposition of two-dimensional figures. Very young children cannot compose shapes but then gain ability to combine shapes into pictures, synthesize combinations of shapes into new shapes, and eventually substitute and build different kinds of shapes. Children typically follow an observable developmental progression in learning to compose shapes with recognizable stages or levels. This developmental path can be described as part of a learning trajectory.

Age Range	Level Name	Level	Description
2	Pre-Composer	1	The earliest sign of development is when a child can manipulate shapes as individuals, but is unable to combine them to compose a larger shape. 
3	Pre-Decomposer	2	At this level, a child can decompose shapes, but only by trial and error.
4	Piece Assembler	3	Around age 4, a child can begin to make pictures in which each shape represents a unique role (for example, one shape for each body part) and shapes touch. A child at this level can fill simple outline puzzles using trial and error.
5	Picture Maker	4	As children develop, they are able to put several shapes together to make one part of a picture (for example, 2 shapes for 1 arm). A child at this level uses trial and error and does not anticipate creation of the new geometric shape. The children can choose shapes using "general shape" or side length, and fill "easy" outline puzzles that suggest the placement of each shape (but note that the child is trying to put a square in the puzzle where its right angles will not fit).
5	Simple Decomposer	5	A significant step occurs when the child is able to decompose ("take apart" into smaller shapes) simple shapes that have obvious clues as to their decomposition.
5	Shape Composer	6	A sign of development is when a child composes shapes with anticipation ("I know what will fit!"). A child at this level chooses shapes using angles as well as side lengths. Rotation and flipping are used intentionally to select and place shapes. 

Age Range	Level Name	Level	Description
6	Substitution Composer	7	A sign of development is when a child is able to make new shapes out of smaller shapes and uses trial and error to substitute groups of shapes for other shapes in order to create new shapes in different ways. For example, the child can substitute shapes to fill outline puzzles in different ways.
6	Shape Decomposer (with Help)	8	As children develop, they can decompose shapes by using imagery that is suggested and supported by the task or environment.
7	Shape Composite Repeater	9	This level is demonstrated when the child can construct and duplicate units of units (shapes made from other shapes) intentionally, and understands each as being both multiple, small shapes and one larger shape. For example, the child may continue a pattern of shapes that leads to tiling.
7	Shape Decomposer with Imagery	10	A significant sign of development is when a child is able to decompose shapes flexibly by using independently generated imagery.
8	Shape Composer—Units of Units	11	Children demonstrate further understanding when they are able to build and apply units of units (shapes made from other shapes). For example, in constructing spatial patterns, the child can extend patterning activity to create a tiling with a new unit shape—a unit of unit shapes that he or she recognizes and consciously constructs. For example, the child may build *T*s out of 4 squares, use 4 *T*s to build squares, and use squares to tile a rectangle.
8	Shape Decomposer — Units of Units	12	As children develop understanding of shape, they can decompose shapes flexibly by using independently generated imagery and planned decompositions of shapes that themselves are decompositions.