

Mathematics in the New Zealand Curriculum Second Tier

Strand: Geometry and Measurement Strand

Thread: Shape

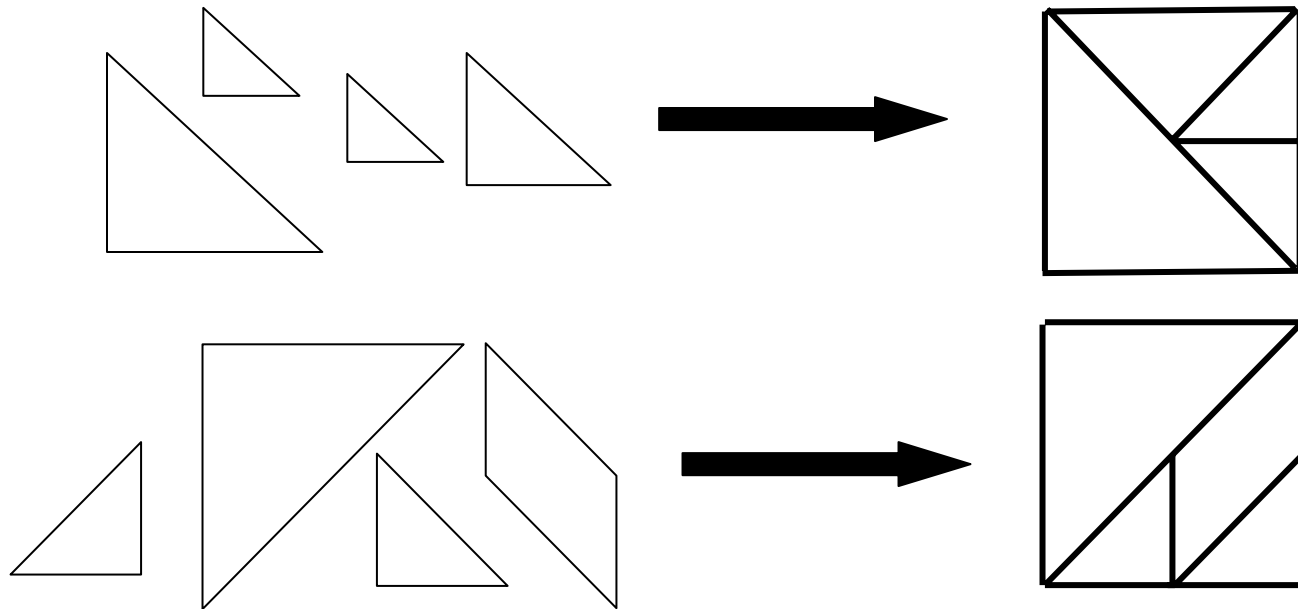
Level: One

Achievement Objectives: Sort objects by their appearance.

Exemplars of student performance:

Exemplar One: Given a set of attribute blocks the student sorts them by shape and describes their classification. He/She uses shape names triangles, squares, circles, oblongs and hexagons to label each set. The student justifies the similarity of shapes/objects in a set by matching characteristics, e.g. This side (of one shape) matches this side (of another shape).

Exemplar Two: Given four pieces that form a square the student assembles the square. He/She does so by focusing on the attributes of the square such as "square corners" and sides of equal length.



This response shows achievement at Level One because the student is able to look at global characteristics of objects and identify similarities and differences.

Important teaching ideas (working at):

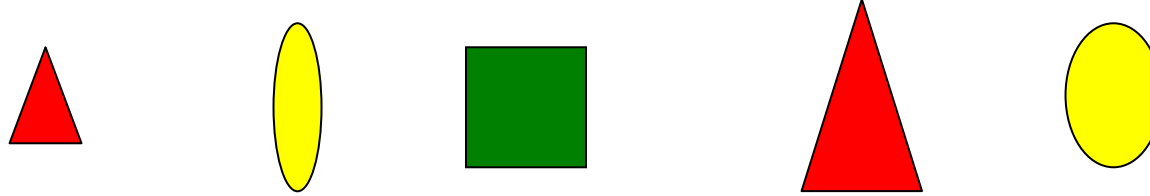
Students exist in a 3-dimensional world. The focus at this level is getting students to attend to the objects in their environment and to recognize shapes within these objects. Challenge students to identify shapes within objects and relate the shape properties of objects to their purpose, e.g. stacking, rolling, packing. Students should be able to sort everyday objects by their attributes and describe the basis for the classification, for example sorting groceries into boxes, cans, bottles and soft packets. They should also be able to sort objects using classifications devised by others, for example, sharp versus curved and some shapes that are both.

Students need experience of taking apart objects and reassembling them, for example cardboard cartons, as well as opportunities to design and make containers to hold given objects. The difficulty at this level though would be how to connect the faces, which is developed at Level 2 where a net would be made.

Students should be able to identify shapes including triangle, square, oblong (rectangle), circle, oval, pentagon, hexagon, diamond and box (rectangular prism or cuboid), soccer ball (sphere) and tincan (cylinder). Through observation and discussion students should describe shapes using appropriate mathematical language such as straight and curved, smooth, bumpy and rough, thick and thin, flat and solid, sides and corners, face and edges. It is necessary to use such vocabulary when a situation is created requiring the appropriate words to be used. The following activities provide examples of creating such situations.

- Students could take turns to describe a chosen shape using these attributes, from a collection of shapes that both students can see, for their partner to correctly identify. For example, "This shape has 3 sides and is flat".
- Students could draw, cut or use concrete material such as play-dough, pipe-cleaners, iceblock sticks or geoboards to create shapes according to instructions given orally or on an activity card. For example, "Make a thin oblong", "Make a flat circle", "How many different triangles can you make?"
- A "feely" bag could be used for students to describe the attributes of an object for another student to guess, as well as to find specified objects and talk about their similarities and differences by attending to the attributes. For example, when asked to find all the triangles in the feely bag a student might say, "This shape is a triangle as it has three pointy corners, but this shape is not a triangle because it has four sides".

- An attribute train could be developed by following a set of instructions or copying someone else's. For example,

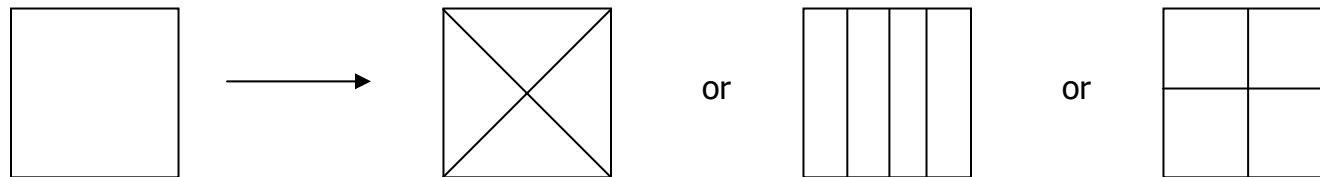


"small red triangle" "thin yellow oval" "green square" "large red triangle" "thick yellow oval"

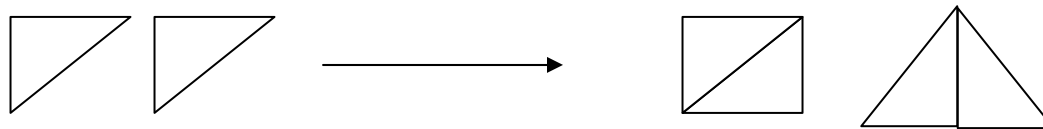
- Posting boxes could be used whereby the child names the shape as he/she posts it into the appropriate hole.

Students at this level are beginning to develop images of shapes. Students could use movement to create images of shapes, for example "Make a triangle with your body". "Walk along an imaginary outline of a square". "Draw a hexagon in the air with your finger".

Connections should also be made to other strands. For example, explore what new shapes are made when you cut a square into quarters (going from whole to part). For example,



Conversely go from part to whole, begin with a shape piece labeled a "half" and create the whole i.e. two triangular pieces can create a rectangle or a large triangle



Useful resources

nzmaths Website:

- <http://www.nzmaths.co.nz/node/188> (Shape: Shape makers)
- <http://www.nzmaths.co.nz/node/189> (Shape: Shape explorers)
- <http://www.nzmaths.co.nz/node/191> (Shape: New kids on the block)
- <http://www.nzmaths.co.nz/node/192> (Shape: Arty shapes)

Learning Objects:

<http://www.nzmaths.co.nz/learningobjects/314/1>

Virtual Library Website manipulatives:

- http://nlvm.usu.edu/en/nav/frames_asid_277_g_1_t_3.html (Attribute Blocks)
- http://nlvm.usu.edu/en/nav/frames_asid_277_g_1_t_3.html (Geoboards)

Illuminations Website manipulatives:

- <http://illuminations.nctm.org/ActivityDetail.aspx?ID=72> (Shape Cutter)
- <http://illuminations.nctm.org/ActivityDetail.aspx?ID=27> (Patch Tool)