

## Transformation

Children should be given opportunities to demonstrate how the knowledge and skills gained in this strand can be used to link, reinforce and progress learning across the other four interconnected strands.

	a The learner	b The learner	c The learner	d The learner	e The learner	f The learner	g The learner	h The learner	i The learner	j The learner	k The learner
<b>Elements</b>	<b>Transformation</b>										
<b>Understanding and Connecting</b>	Explores and engages with the movement of shapes.	Recognises that a shape may appear different when moved in some way.	Identifies shapes in a variety of different orientations.	Recognises and identifies the component parts of composite [combination of] shapes.  Identifies line symmetry of simple shapes and images.	Recognises and identifies known shapes when repeated, rotated or reflected.  Identifies shapes and combinations of shapes which tessellate in the environment.	Discusses, models and visualises reflection, rotation and translation of shapes.  Examines tessellations and identifies if shapes have been reflected, rotated and/or translated.  Explores and creates simple tessellations.	Identifies shapes which have rotational symmetry.  Creates tessellations using more than one shape.	Uses a grid to explore reflection where the line of reflection is external to the shape and may not be horizontal or vertical.  Explores rotational symmetry, identifying the order and angle of rotation.	Plots shapes and their reflections and translations using squared paper/grids.  Plots shapes on the coordinate plane (first quadrant).	Translates shapes on the coordinate plane noting the new co-ordinates.  Reflect shapes through the x-axis or y-axis, noting its new co-ordinates.  Recognise that tessellations involve shapes fitting together around a point.	Investigates how scale [ratios] is used to enlarge and reduce shapes.  Devises a range of steps to transform shapes.

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<b>Elements</b>	<b>Transformation</b>										
<b>Communicating</b>	Attends to the language of movement and manipulation of shapes.	Follows instructions relating to the movement of shapes.	Uses appropriate language (For example: turn, flip, slide, match, and fit) to describe movement and comparison of shapes.  Selects appropriate materials/digital tools to explore and represent shape movements.	Makes and describes composite shapes.  Gives and follows instructions relating to the movement of shapes.	Understands and uses the terms reflect, rotate and translate to describe relevant shape movements.  Selects appropriate materials/digital tools to draw and label shape movements.	Completes missing reflections, of shapes or images.  Use appropriate language and simple measures where appropriate to describe shape movement (For example: rotated through a quarter turn).	Describes features of line and rotational symmetry.  Describes regular tessellations [tessellations of regular polygons].	Interprets and follows simple instructions to transform shapes.  Specifies angle of rotation in degrees.  Selects appropriate materials/digital tools, or creates labelled drawings to investigate, record or explain geometrical ideas [may include detail of angle or other measures].	Records and describes steps involved in transformation in using appropriate mathematical terms.	Selects appropriate materials/digital tools, or creates precise labelled drawings, to investigate and/or justify conjectures.	Instructs technology to perform a range of transformations.  Devises creative ways to combine and present new transformations.
<b>Reasoning</b>	Observes the effects of shapes moving.	Visualises how a shape will look when moved.  Recognises that changes in a shape's orientation do not change the shape itself.	Makes predictions about shape movements and shape matching (For example: Will it fit if I turn it this way? Will it match if I turn it over?).	Makes predictions and justifies why some shapes have/do not have line symmetry with reference to shape properties.  Visualises how shapes can be combined or dissected to make new shapes.	Makes predictions and explains in simple terms why some shapes tessellate (For example: referring to right angles or other familiar properties).	Visualises and predicts how an object will look when rotated through a half or quarter turn.  Reasons about alternative ways to perform the same transformation (For example: noting that rotating three-quarters of a turn clockwise is equivalent to a quarter turn anti-clockwise).	Selects shapes/combinations of shapes to create tessellating patterns and justifies choice.  Visualises and makes predictions about whether properties of shapes will change under transformations.	Makes and tests hypotheses about how shapes might appear under given transformations.  Explains the effects of flipping and rotating a shape [and any implications for tessellation].	Identifies and explains patterns in reflected and original co-ordinates of shapes.  Examines reflection and rotational symmetry of regular and irregular polygons, and makes conjectures about connections between shape properties.	Compares various transformations of a shape  Visualises and makes predictions about whether properties of shapes will change under a combination of transformations.  Uses angles to explain tessellation.	Make deductions about shape properties and/or transformations based on the analysis and comparison of co-ordinates.  Predicts missing coordinates of transformed shapes using the properties of shapes and/or transformations.

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<b>Applying and Problem-Solving</b>	Moves shapes for a purpose.	Solves and discusses simple spatial puzzles such as jigsaws or shape sorters.	Selects and manipulates shapes to copy a model or structure.	Engages in spatial puzzles or construction activities (For example – tangrams puzzles, block play) which involve moving, comparing, dissecting or combining shapes.	Transforms shapes in various ways in meaningful contexts, including art (For example – printing and paper folding).  Identifies lines of symmetry and reflected lines or shapes in images or illustrations.  Explores position and space with a range of polyominoes (Definition of polyominoes: shapes formed by joining one or more equal squares edge to edge).	Manipulates models or materials (For example – tangrams, pattern blocks, polyominoes) to make or create a structure or model.  Explores tessellations where a single shape is repeated (how many different patterns can be created for a single repeating rectangle?)	Explores tessellations which occur in Art, and designs and creates tessellating patterns through shape rotation/ reflection and translation.  Solves simple problems involving shape or line transformations.	Uses transformations or manipulations of shapes to solve a problem (e. g., identifying how many unique nets of cube are possible).	Uses software /technology to solve transformation-based problems in meaningful contexts.	Plans for and solves complex problem involving shape or line transformations.  Investigates creative expressive of tessellations for various purposes.	Applies transformation such as reflection, translation and rotation to 2-D shapes on the coordinate plane and identifies and predicts effects of transformation on coordinates of shape corners.  Applies transformation to 2-D shapes on the coordinate plane and identifies and predicts effects of transformation on coordinates of shape corners.