NCCA

Primary Mathematics Toolkit – Support material

Shape and space: Transformation – Suggestions for children's learning

The child has opportunities to...

Understand and connect

- engage in play with 2-D and 3-D shapes, exploring how they fit together, how they look the same or different when flipped, rotated, etc.
- sort shapes or objects according to different criteria, e.g., *with/without rotational symmetry, will/won't tessellate.*
- explore symmetry in the classroom, the school environment and in nature.
- engage with art activities involving symmetry, e.g., *paper folding, symmetrical painting, completing half of a symmetrical picture.*
- examine 'real-life' instances of translation, reflection and rotation, e.g., *'sliding' objects across a table, rotation of a washing machine, reflection in mirrors.*

Communicate

- use appropriate language of transformation when discussing the movement of shapes, e.g., *I will flip over the tangram piece, I rotated the piece 90 degrees clockwise, I translated the shape to a new position by...*
- describe and compare the features of various transformations, e.g., *when translating a shape the size of the shape does not change, when enlarging a triangle the angles stay the same.*
- represent transformations using a variety of means, e.g., *through body movement and gestures, drawings/diagrams, on co-ordinate grids, digital tools, or oral descriptions.*
- devise, give and relay step-by-step instructions to translate, reflect and rotate shapes, including using the co-ordinate plane.
- use digital tools such as coding and online manipulatives to investigate tessellation and to perform transformations.

Reason

- investigate the impact of movement of shapes as they are reflected, rotated or translated; and predict what will happen to other shapes under the same transformation.
- use knowledge of transformations to deduce properties of shapes, e.g., *this shape does not have rotational symmetry because it only looks the same after one full rotation.*
- justify reasons for choice when choosing shapes to create tessellations.
- explore multiple ways of describing transformations, and discuss the efficiency of these, e.g., *Jane rotated the puzzle piece in a three-quarter turn clockwise, John rotated it in a quarter turn anti-clockwise, which is more efficient?*
- explore connections between transformations and everyday activities and in the environment, e.g., *the use of mirrors in cars, the movement of pieces in board games, using magnifying glasses or binoculars to enlarge objects.*

Apply and problem-solve

- apply knowledge of transformations to games and activities involving moving and manipulating shapes, e.g., *tangram, jigsaw puzzles and online games.*
- design tessellations with one or more shapes for a particular purpose, e.g., *creating a tile pattern, designing a Tetris-style game or jigsaw puzzle for friends.*
- explore a range of possibilities for solving problems, e.g., *finding multiple ways of creating composite shapes, completing translations using physical manipulatives on a grid or algebraically on the co-ordinate plane.*
- use digital software and tools to experiment with shapes and create structures, e.g., *Minecraft.*
- apply understanding of transformations in real-life contexts, e.g., *designing tiles using tessellation, manipulating and rotating objects to pack into a box.*

Developed in collaboration with **Mary Kearney, Primary School Teacher, Co. Galway**