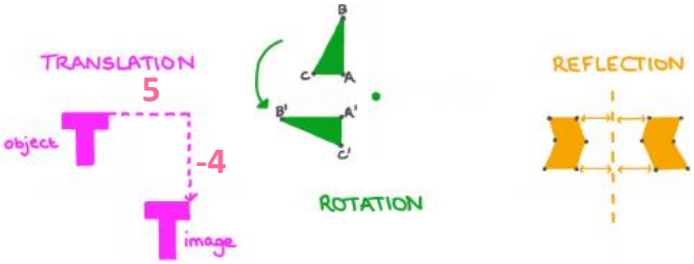
Unit 8 – Transformations – Knowledge Organiser

Objective
Describe a variety of transformations
Use transformations to move shapes
Understand and identify reflection and rotational symmetry
Understand and identify congruence



Key Facts:

Transformations are identified as follows (see diagram top right for examples):

Translation – **vector** $\binom{a}{b}$ where movement is given by **a** right and left and **b** up and down e.g. translation vector $\binom{5}{-4}$

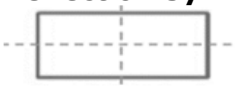
Reflection – **mirror line** across which reflections may be vertical, horizontal or diagonal e.g. reflection about dotted line

Rotation – **Angle, clockwise/anti-clockwise, centre of rotation** e.g. A,B,C to A',B',C' is rotation of 90^0 anticlockwise around the point

Congruence and transformations

The image of an object after a translation, reflection or rotation is congruent to the object.

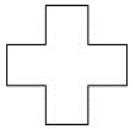
Reflection Symmetry



e.g. 2 lines of symmetry

The shape divides into identical reflected halves across a line of symmetry

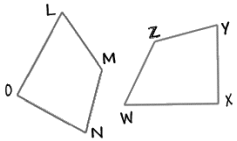
Rotation Symmetry



e.g. rotation symmetry of order 4

The shape repeats itself as rotated a full turn around its centre

Congruence



Exactly the same size and shape given by all corresponding sides and angles being equal

Key Concept Check:

Is the centre of rotation in the centre of a shape? Always/Sometimes/Never?
Can an object and its image after a reflection be congruent?
Does an object with no rotational symmetry have rotation symmetry of order 1 or 0?
Does the order in which a combined transformation takes place change the final position of its image? Is it in the same position whichever way round you do it?

Key words used in this unit:

Transformation – A way of changing the size and/or position of a shape

Object – The shape before a transformation

Image – The shape after a transformation

Translation – The movement of a shape a certain distance by a **vector** (quantity with size and direction)

Reflection – A shape that is flipped across a **mirror line** (the line about which a reflection takes place)

Rotation – A shape that is turned about a **centre of rotation** (fixed point) and **angle of rotation**

Reflection symmetry – each half of and object is the reflected image of the other across the **line of symmetry / mirror line**

Rotation symmetry – a shape repeats itself more than once in a full turn about its centre

Congruent – Exactly the same size and shape