

Can I describe and predict transformations of shapes?

Teaching guidance

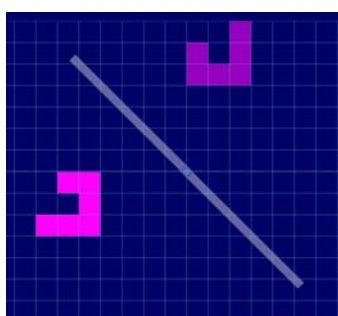
Key vocabulary

reflect, reflection, mirror line, line of symmetry, image, rotate, rotation, centre of rotation, angle, translate, translation, transformation, coordinate, orientation

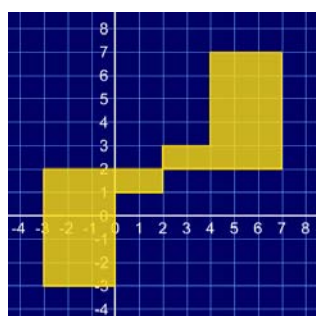
Models, images and resources

Interactive teaching programs

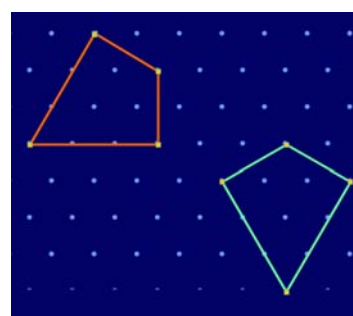
Symmetry ITP



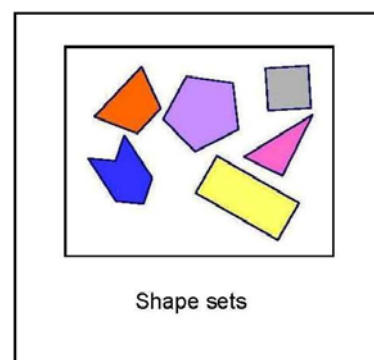
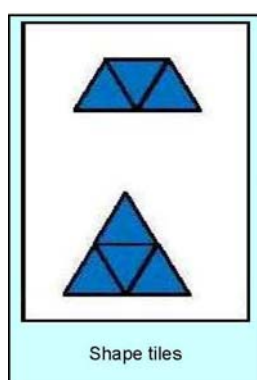
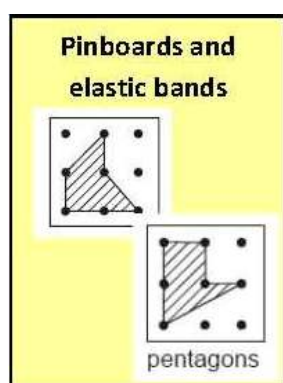
Coordinates ITP



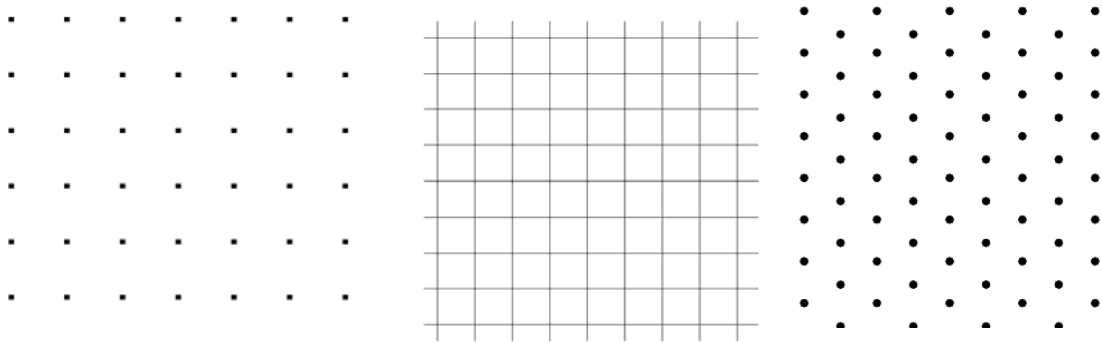
Isometric grid ITP



Equipment for making shapes



Squared, isometric and tracing paper



Teaching tips

- Ensure that children appreciate and can explain what stays the same and what is different when shapes are reflected, rotated and translated:
 - Reflection: length of sides and size of angles are unchanged; orientation and position of shape can be changed; shape is 'flipped over'.
 - Rotation: length of sides and size of angles are unchanged; orientation and position of shape can be changed.
 - Translation: length of sides and size of angles are unchanged; orientation of shape is unchanged; position is changed.
- Children should use different types of grid and isometric paper to help them predict where the image of a shape will be after a transformation.
- If children struggle to visualise the image of a shape after a transformation, encourage them to find the position of the image for one vertex at a time.
- Give children opportunities to reflect shapes in a variety of mirror lines including some that: are not parallel or perpendicular to sides of the shape; are sides of the shape; pass through the shape.
- Ensure that children have opportunities to explain their strategies for predicting the image of a shape when reflected. For example, children might describe that each vertex of the shape is the same distance from the mirror line (measured perpendicularly to the mirror line) but on the other side.
- Provide problems for the children to explore that help them to gain greater understanding of the effect of reflection. For example:
 - *Reflect the same shape in a series of parallel mirror lines. What is the same about the image each time? What is different?*
 - *If you reflect a line in a parallel mirror line, the image will always be parallel: true or false? Explain your reasoning.*
- Ensure that children appreciate the need to identify the centre, angle and direction for a rotation. Explore the effect of rotations of the same shape using different centres, angles

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and directions. Help them to appreciate that the centre of rotation does not move under rotation and that all other points move in a circular path as the shape is rotated.

- Ensure that children have opportunities to explain their strategies for predicting the image of a point when rotated. For example, they might describe the route from the centre of rotation to the point and then rotate this route.
- Provide problems for the children to explore that help them to gain greater understanding of the effect of rotation, for example:
 - *How many degrees will the hour hand of a clock rotate through between 2:00 pm and 5:30 pm? What point on the hour hand remains stationary?*
 - *A square is rotated through 180° . The image of the shape together with the original forms a rectangle. Find a possible position for the centre of rotation.*