Supporting Year 6 Teachers and Pupils

KS2 Mathematics Tests

Geometry

Norfolk
County Council

Geometry

One of the topics identified through our analysis, to contribute to several marks in the KS2 tests is 'Geometry'. This topic encompasses a wide range of objectives, so for the purposes of supporting your targeted teaching and revision we have narrowed these down to a small number of crucial objectives.

- Complete the reflection of a shape given a mirror line on a grid
- Draw the position of a shape following a translation on a four quadrant grid.
- Identify and draw different types of angles
- Use the properties of quadrilaterals to solve problems of missing angles and sides

To support your focused teaching on revisiting, reshaping, and challenging your pupils learning on this already taught content. We have provided a range of misconceptions which may need to be addressed in order for your pupils to progress their learning in this topic.

One

Misconception: The angle measured by the protractor is read as 60 degrees.
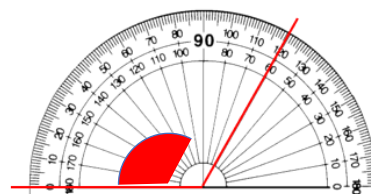
Problem: Often when first introduced to measuring angles, **pupils** only measure angles less than 90 degrees or angles in the same orientation.

Solution: When measuring angles, ensure there is a variety of different size angles and in different orientations, so pupils become familiar with using both the inner and outer scale of the protractor for measuring. Encourage pupils to examine the angle before measuring to estimate its size, by doing so, pupils already have an indication of the size of the angle they are measuring.

Two

**Misconception:** Angle 'A' is a right angle, but angle 'B' is not.

Problem: Over exposure to the classic examples of a right angle where one side is vertical and the other side ishorizontal and to the right of the vertial line; consequently do not recognise other orientations of the angle.

Solution: Pupils should be able to check using a sticky note or the corner of a piece of paper, if an angle is a right angle and ensure the angles used in the activity are in different orientations. Try to avoid using hand gestures to represent a right angle, such as making a 'L' shape with your forefinger and thumb, as this reinforces the idea that right angles are only right angles when they look like the letter 'L'.

Three

Misconception: There are only 2 nets of a cube.
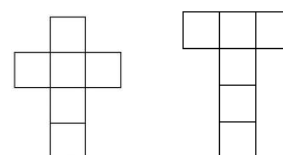
Problem: Pupils have only experienced or been overly exposed to the common cross shape net of a cube (pictured).

Solution: Display all the different nets and model how each one creates a cube, to ensure pupils have the understanding, before they construct nets of a cube. Digital visualisations can support pupil's understanding of which nets do and do not form a cube. An example can be found on NCTM www.nctm.org/Classroom-Resources/Illuminations/Interactives/Cube-Nets/. Polydron and magnetic squares can also be used to support the visualisation and understanding of nets of a cube.

Four

Misconception: Draw a translation instead of a reflection (pictured)
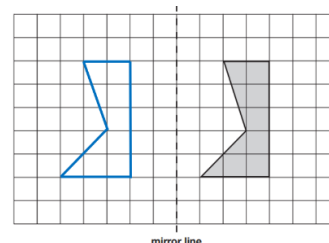
Problem: Reflection and Translation given as verbal explanations for pupils to remember, with little practice and often taught in the same lesson or at the same time.

Solution: Best to avoid teaching reflection and translation together when first introducing or if re-teaching this topic. Often, we rush to have pupils drawing reflections of shapes in mirror line before they fully understand the concept, instead provide pupils with a range of completed reflections some correct and some incorrect and ask them to explain if they are a reflection. Include in the exercise diagonal mirror lines, shapes with an edge along the mirror line, shapes with a vertex on the mirror line and shapes which overlap the mirror line. Geoboards, Numicon with Baseboards and small mirrors can also be used to support the visualisation of reflections in a mirror line.

Five

Misconception: A is a hexagon and B is not.

Problem: Pupil have been exposed only or mainly to classic examples e.g., regular hexagons with a horizontal base line, consequently, do not recognise any other visual image. This is also often the case with other polygons.

Solution: Provide pupils with a range of regular and irregular, as well as concave and convex hexagons either on a worksheet in different orientations or cut out. Ask pupils to compare 'What's the same? What's different?' using the properties of the hexagons. Ask pupils to sort the hexagons in different ways, based on their properties. Discuss examples in everyday life of the different types of hexagons e.g., Lightning bolt safety sign, Chevron Road signs, Honeycomb cells, sections of a football etc.

I've got some questions... No problem, we're here to help.

Rose Keating and Sarah Penfold, Mathematics Advisers, and our experienced team are here to help you provide the best Mathematics education possible. We will be happy to answer your questions and/or discuss your bespoke needs.

Please contact us:

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