Maths - Year 6

Measurement 3: 3D shapes - nets and surface area

Key Vocabulary

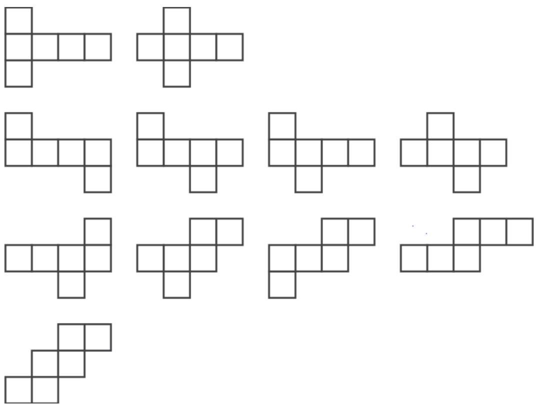
Reflection	Transformation of a shape or point about a line of symmetry (mirror line).
Rotation	Rotating/turning about an axis or centre point.
Face	A flat surface on a solid shape.
Edge	Where two faces of a 3D shape meet.
Vertex/vertices	A point where two sides meet in a flat shape, or a point where three or more edges meet in a 3D shape.
Congruent	Identical in form.
Dimensions	A measurable extent of a particular kind, such as length, breadth, depth, or height.
Polygon	A flat, geometric shape with straight sides.
Regular polygon	A 2D shape formed of straight lines, which has angles all the same size and all sides the same length.
Polyhedron	A 3D shape with flat faces.
Regular polyhedron	A polyhedron whose faces are identical regular polygons.
Surface area	The area of an outer part or uppermost layer of something.
Tetrahedron	A triangular pyramid - a polyhedron composed of four triangular faces, six straight edges, and four vertex corners.
Octahedron	A polyhedron with eight flat faces.
Dodecahedron	A polyhedron with twelve flat faces.
Icosahedron	A polyhedron with twenty flat faces.
Prism	A solid shape with two identical and parallel faces.

Mathematical Skills

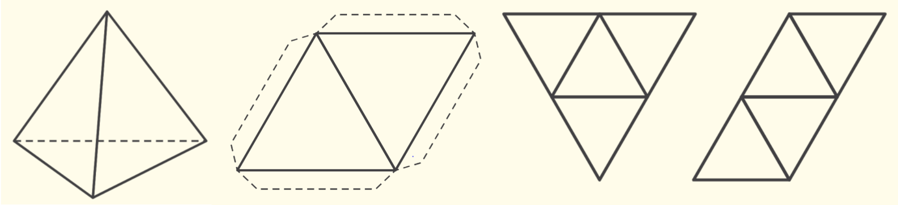
- Explain and illustrate how a 2D net and 3D shape relate.
- Systematically explore all options for creating nets.
- Convert between standard units of 1, 2 or 3 dimensions, e.g. length, area and volume.

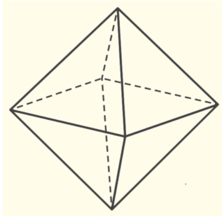
Mathematical Methods

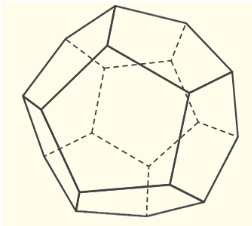
- Introducing nets—finding nets of a cube.

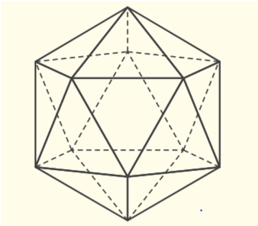


Investigating nets and regular and irregular polyhedra.

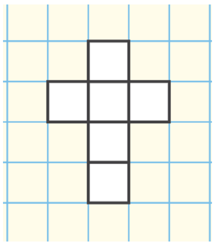








- Solving problems involving surface area and nets e.g. A baker has been commissioned to make a batch of 100 cakes for a special celebration. She has decided to decorate the batch by covering them completely with edible foil. Since it is quite an expensive ingredient, she wants to use only just as much foil as is needed to cover each cake. She has decided to cut the cakes into cube shapes with edges 8cm long. How much foil will she need to order?

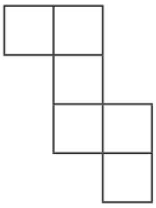


8 cm × 8 cm = 64 cm^2, so the surface area of the cube is 64 cm × 6 = 384 cm^2.

the baker needs: 384 cm^2 for each cake, so (since there are 100 cakes in the batch) 384 × 100 = 38 400 cm^2 altogether.

Can you..?

- Will this net form a cube?



- Create a net for an hexagonal prism.

- Rosie is covering the outside of this cuboid with golden foil. Can you work out the total surface area of foil she uses?