LEARNER GUIDE

Analysing 2D and 3D Properties

2D and 3D Shapes. A short guide to walk beside you — read as much or as little as helps. *Connection before curriculum. Always.*

What this lesson is about

Every 3D solid can be described by three simple things you can count: its faces, its edges and its vertices. This lesson helps you describe 2D shapes and 3D solids by their properties, and to notice a lovely pattern — that a prism's whole structure is decided by its base. The question you are exploring is: what stays true about a shape, however we turn or draw it?

What you are learning to notice

- What faces, edges and vertices are, and how to count them — including the ones you cannot see from the front.
- How to describe a solid precisely by its properties.
- That a prism with an n-sided base always has $n + 2$ faces, $3n$ edges and $2n$ vertices.
- That these properties stay the same however you turn the shape.

Moving through it, one step at a time

Use the Prism Family Pattern Explorer: choose a base, predict the faces, edges and vertices, then reveal them and look for the rule. Sweep a flat shape into a solid to see how a prism is built. Then become a Shape Detective — read the property clues and reason out which solid it is. There is no rush: try a prediction before you check.

> **A gentle reminder**
> You can pause. You can return. You do not need to complete everything in one sitting.

If you get stuck

Getting stuck is part of doing mathematics, not a sign that something is wrong. There is support built into the lesson, and using it is a strong move:

- **Reconnection Routes** — if an earlier idea feels shaky (naming 2D shapes, right angles, and the faces of a solid), open a short recap and return whenever you are ready.
- **Socratic prompt** — a question to nudge your thinking.
- **Hint** — a little more help with the step in front of you.
- **Check** — try an answer and see how you are doing; a wrong try is useful information.
- **Worked solution** — a full model to compare your thinking against.

How the worked solution unlocks

The worked solution unlocks after you use the Socratic prompt, use the hint, and check two answers. Those steps are the learning — the worked solution is there to confirm your thinking, not to replace it.

Using support is part of learning. It is not cheating.

Recording your thinking

You can show your working in whatever way suits you today — the on-screen Scratchpad, paper, a spoken explanation, or a photo of a sketch. There is no single right format. If you do not finish everything in one sitting, that is completely fine: what you have done is information for your next step, never a failure.

Before you begin

Settle into a comfortable pace and take the steps one at a time. If your attention drifts, pause and come back — the lesson will keep your place. When you are ready, begin.

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