



Teacher support materials

Concept focus: Shape

CAMBRIDGE
 $\sqrt{\text{Mathematics}}$

Children's ideas about shape develop from their lived experiences of building, drawing, moving and perceiving. So from their earliest experiences, learners need to be immersed in geometry, to be encouraged to explore concepts for themselves and given the motivation to want to explain or prove them.

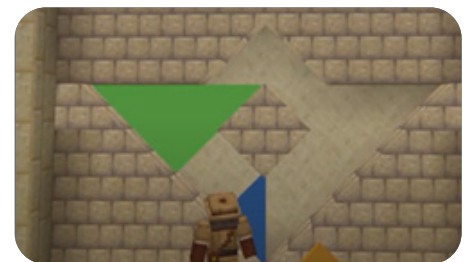
Some of the M.A.T.H. Mummy Mayhem game content which is linked to the concept of shape can be found in parts of the game illustrated below.



Puzzle 1 – 3D block jigsaw



Puzzle 7 – Nets and 3D shapes



Puzzle 9 – Tangram



Puzzle 10 – Quadrilaterals

These parts of the game form the basis for the following ideas and jumping-off points, which you are invited to adopt and/or adapt according to your context.

M.A.T.H. MUMMY MAYHEM

After/before/in between playing M.A.T.H. Mummy Mayhem, you might like to:

- Display the illustrations of the game shown above and ask students to write down as many words describing the mathematical challenge as possible.
- Share examples of these with the class (e.g., using post-it notes or a visualiser, etc.) and invite students to talk about the words with a partner. Pairs can then share their explorations as part of a class discussion. Conversations might arise about specific mathematical vocabulary and other more generic words. These categories should be recorded, and time allowed to consider connections and for consolidation of understanding.
- Encourage students to pick three mathematical words to describe and three more that they are unsure about (either they don't know them or would find it challenging to explain them).
- Set up “musical chairs” (half the class remain seated, and the other half move around to find someone new to talk to) in order to try out their explanations on someone else (e.g., can their partner guess the word if only told what it means?) and to talk about the meanings of the words that they are less sure about. Play for multiple rounds.
- Take feedback about what was learned from their exchanges. Particular words might arise as being challenging to explain, as might feelings about why it is important to try and be as clear as possible, and how helpful the right word is in order to communicate what you notice/think/wonder.

The vocabulary generated by your students will be wide-ranging (particularly given the range of ages who might play the game), but some examples are given in the table below of words that students might talk about having considered these puzzles (this is not an exhaustive list nor intended as a checklist).

Example shape vocabulary

2D shape	cube	net	pentagonal prism	route/path	3D shape	cuboid	
orientation	perimeter	shape	block	folding	outline	plan view	square
circle	kite	parallelogram	quadrilateral	triangle	turning	space/gap	



M.A.T.H. MUMMY MAYHEM

To provide an opportunity to explore students' understanding further and uncover misconceptions within the concept of shape, you could share the following statements and ask students to think about whether the statements are always true, sometimes true or never true.

1. A quadrilateral can be divided into two identical triangles.
2. A 3D shape has more edges than it does faces.
3. A pentagon always has interior angles that are obtuse.
4. There are six different types of quadrilaterals.
5. Putting two rectangles together makes a square.
6. When you double the side lengths of a rectangle, you double its area.

Allow time for:

- developing reasoning
- asking questions to test ideas and to think about different interpretations
- generating examples and non-examples to support/disprove conjectures

When they have thought about where they want to place each statement, and just as importantly why, students could compare, explain and justify their findings to others.

Students might be interested in rewriting the “never true” ones, to make them true and/or creating statements about this topic for other students to think about.

