Amblecote Primary School—Knowledge Organisers

Phase: 3/4

Subject: Design and Technology Focus: Shell structures using CAD Term:



What I should already know?

Experience of using different joining, cutting and finishing techniques with paper and card.
A basic understanding of 2-D and 3-D shapes in mathematics and the physical properties and everyday uses of materials in science.
Familiarity with general purpose software that can be used to draw accurate shapes, such as Microsoft Word, or simple computer-aided design (CAD), such as Purple Mash design tools.



By the end of the unit you will have

Spring

Designing

• Generated realistic ideas and design criteria collaboratively through discussion, focusing on the needs of the user and the functional and aesthetic purposes of the product.

• Developed ideas through the analysis of existing shell structures and use computer-aided design to model and communicate ideas.

Making

· Planned the order of the main stages of making.

• Selected and used appropriate tools and software to measure, mark out, cut, score, shape and assemble with some accuracy.

- Explained your choice of materials according to functional properties and aesthetic qualities.
- Used computer-generated finishing techniques suitable for the product you are creating.

Evaluating

• Investigated and evaluate a range of shell structures including the materials, components and techniques that have been used.

 $\boldsymbol{\cdot}$ Tested and evaluated their own products against design criteria and the intended user and purpose.

Technical knowledge and understanding

• Developed and used knowledge of nets of cubes and cuboids and, where appropriate, more complex 3D shapes.

• Developed and used knowledge of how to construct strong, stiff shell structures.

Know and used technical vocabulary relevant to the project.

Manufacturing process

THOUGHT

What product am I designing and making the packaging for? How will it safely protect the product? How will my product appeal to my intended user?

How can CAD help me make a package that is accurate, strong and appealing? Which materials will I use?

Which shape(s) will be the best to keep the food safe? How will I strengthen my structure?

How can I use CAD to get the graphic effects that I want?

Will I work with someone else? How long will it take? What order will I work in? What tools, techniques and skills will I use?

Do I need to adjust or change anything?

> Will my product meet the needs of the user?

ACTION

Discussing and researching ideas, generating design criteria, drawing annotated sketches

Investigating and evaluating possible tools and materials

Discussing, constructing and comparing different nets Exploring strengthening techniques Evaluating prototypes against success criteria

 Discussing, exploring, trialling and evaluating graphic effects

Negotiating, developing and agreeing a plan of action, evaluating actions

 Discussing, trying out and modifying the design

Evaluating the product with the intended user and against the success criteria

	Vocabulary
CAD	computer-aided design.
Shell structure	a hollow structure with a thin outer covering.
Edge	where two surfaces meet at an angle.
Face	a surface of a geometric shape.
Vertex	the corners of a geometric shape where edges meet.
Font	printer's term meaning the style of lettering be- ing used.
Net	the flat or opened-out shape of an object such as a box.
Cuboid	solid body with rectangular sides.
Prism	a solid shape.