Curriculum Intent:

To use creativity and imagination to design and make products that solve real and relevant problems within a variety of contexts, considering their own and others' needs, wants and values and to be able to evaluate past and present design technology, its uses and

Subject	Term	Unit
DT	Autumn	Shell structures: CAD – Broken biscuits

Prior knowledge Building on knowledge and skills	National Curriculum Focus
• 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 2D Primary by Techsoft.	• use research and develop design criteria to inform the design of innovative, functional, appealing products that are fit for purpose, aimed at particular individuals or groups • generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer-aided design • select from and use a wider range of tools and equipment to perform practical tasks • select from and use a wider range of materials and components, including construction materials, textiles and ingredients, according to their functional properties and aesthetic qualities • investigate and analyse a range of existing products • evaluate their ideas and products against their own design criteria and consider the views of others to improve their work • understand how key events and individuals in design and technology have helped shape the world • apply their understanding of computing to program, monitor and control their products

What?	Designing, making, and evaluating a shell structure for a packet of biscuits.
Why?	To understand how to use computer aided design.

Key vocabulary			
CAD	Computer-aided-design	Face	A surface of a geometric shape

Shell structure	A hollow structure with a thin outer covering.	Vertex	The corners of a geometric shape where edges meet
Edge	Where two surfaces meet at an angle	Font	A printer's term meaning the style of lettering being used
Net	The flat or opened-out shape of an object such as a box	Cuboid	A solid body with rectangular sides

Key learning: (Specific link to the NC here)

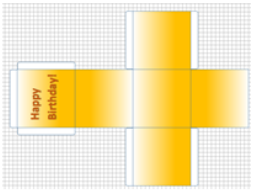
Objective	Learning
To explore and evaluate a range of existing products	• Children investigate a collection of different shell structures including packaging. Use questions to develop children's understanding e.g. *What is the purpose of the shell structure – protecting, containing, presenting? What material is it made from? How has it been constructed? How has it been stiffened i.e. folded, corrugated, ribbed, laminated? What size/shape/colour is it? What information does it show and why? How attractive is the design?* • Children take a small package apart identifying and discussing parts of a net including the tabs e.g. *How are different faces of the package arranged? How are the tabs used to join the 'free' edges of the net?* • Evaluate existing products to determine which designs children think are the most effective. Provide opportunities for the children to judge the suitability of the shell structures for their intended users and purposes. Discuss graphics including colours/impact of style/logo/size of font e.g. *What do you prefer and why? What style of graphics and lettering might we want to include*

Using Microsoft Word

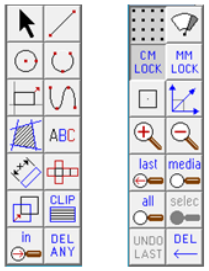
Turn on gridlines and use the pre-set shapes to draw simple nets. Shapes can be edited if you choose.

Text boxes and colouring using the format tab will allow children to come up with a range of designs.

Microsoft Word has many features that allow children to draw and manipulate accurate shapes, import or paste in graphics and print the final designs without having to use dedicated CAD software.

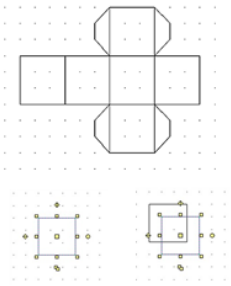


Using TechSoft 2D Primary



Explore and use the different drawing tools and zoom, grid and locking tools to help ensure accurate drawings.

Demonstrate how to draw a simple net and ask children to practise using the copy and move 'handles'.



	in our product to meet users' preferences and its intended purpose? Which packaging might be the best for…?	
To explore computer-aided-design	• Demonstrate simple drawing software such as Techsoft 2D Primary or Microsoft Word. Ask children to explore the interface and drawing tools to practise drawing and manipulating shapes such as rectangles, squares, ellipses, trapezoids and triangles. • Ask children to use the software to open existing drawings including nets and to draw nets of their own, using gridlines and pre-shaped tools. • Let the children explore and be guided to try out different fill and font tools to become familiar with the graphic design aspects of the available software to achieve the desired appearance of their products. • Practise making nets out of card, joining flat faces with masking tape to create 3-D shapes. Experiment with assembling pre-drawn nets in numerous ways using scoring, cutting and assembling techniques. Allow children to construct a simple box and show how a window can be cut out and acetate sheet added.	
To use research and develop design criteria to inform the design of innovative, functional, appealing	• Develop a design brief with the children within a context which is authentic and meaningful. • Ask the children to develop a design using computer-aided design (CAD) software to create nets, addressing the needs of the user and the purpose. • Using computer-aided design (CAD) software ask the children to print out their nets to develop prototypes in	

products that are fit for purpose, aimed at particular individuals or groups	order to evaluate and refine their ideas e.g. *What will you need to include in your design? How can you improve it? What materials will you use? How will you make sure your product works well and has the right appearance?* • Ask children to identify the main stages of making and the appropriate tools and skills they learnt through focused tasks. Encourage the children to work with accuracy, using their computer-aided design (CAD) skills as appropriate.	
To select from and use a wider range of tools and equipment to perform practical tasks following a design or plan	• Plan the order of the main stages of making. • Select and use appropriate tools and software to measure, mark out, cut, score, shape and assemble with some accuracy. • Explain their choice of materials according to functional properties and aesthetic qualities. • Use computer-generated finishing techniques suitable for the product they are creating.	
To evaluate their ideas and products against their own design criteria and consider the views of others to improve their work	• Evaluate throughout and the final products against the intended purpose and with the intended user, where safe and practical, drawing on the design criteria previously agreed. Test and evaluate their own products against design criteria and the intended user and purpose	

Websites

- Packaging – Banish broken biscuits! Box them brilliantly! - D&T Association (designtechnology.org.uk)

- Packaging – with links to Maths - D&T Association (designtechnology.org.uk)