	1. Year Groups Year 4	2. Aspect of D&T Structures	<b>4. What could children design,</b> <b>make and evaluate?</b> A smuggler's box with a hidden compartment	<b>5. Intended users</b> themselves siblings parents relatives	6. Purpose of products storage protection
		Focus Shell structures: A smuggler's box	<b>7. Links to topics and themes</b> Shape and Space Smugglers	8. Possible contexts home school culture	<b>9. Project title</b> Design, make and evaluate a smuggler's box fo yourself or someone in your family to keep secret treasures in. To make a smuggler's box with a hidden compartment.
<ul> <li>3. Key learning in design and technology</li> <li>Prior learning <ul> <li>Experience of using different joining, cutting and finishing techniques with paper and card.</li> <li>A basic understanding of 2-D and 3-D shapes in mathematics and the physical properties and everyday uses of materials in science.</li> </ul> </li> <li>Designing <ul> <li>Generate realistic ideas and design criteria collaboratively through discussion, focusing on the</li> </ul> </li> </ul>		ferent joining, cutting and th paper and card. of 2-D and 3-D shapes in hysical properties and rials in science. s and design criteria	<ul> <li>10. Investigative and Evaluative Activities (IEAs)</li> <li>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? Are the materials recyclable or reusable? 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?</li> <li>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?</li> <li>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 in our product to meet users' preferences and its intended purpose?</li> </ul>		<ul> <li>11. Related learning in other subjects</li> <li>Science – discuss the properties and suitabilit of materials for particular purposes.</li> <li>Mathematics – compare and sort common 2-1 and 3-D shapes in everyday objects. Recognise 3-D shapes in different orientations and describe them.</li> <li>Spoken language – ask relevant questions to extend knowledge and understanding. Build their technical vocabulary.</li> </ul>
	<ul> <li>needs of the user and p</li> <li>Develop ideas through products and use anno prototypes to model an</li> <li>Making</li> <li>Order the main stages</li> </ul>	purpose of the product. the analysis of existing stated sketches and ad communicate ideas.	• • •	xperiment with assembling in nets in numerous ways. tting out and assembling using pre-drawn nets. Then	<ul> <li>13. Related learning in other subject</li> <li>Mathematics – use a ruler to measure to the nearest cm, half cm or mm. Draw 2-D shapes and make 3-D shapes using modelling materials.</li> </ul>

- Select and use appropriate tools 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 finishing techniques suitable for the product they are creating.

#### Evaluating

- Investigate and evaluate a range of existing shell structures including the materials, components and techniques that have been used.
- Test and evaluate their own products against design criteria and the intended user and purpose

#### Technical knowledge and understanding

- Develop and use knowledge of how to construct strong, stiff shell structures.
- Develop and use knowledge of nets of cubes and cuboids and, where appropriate, more complex 3D shapes.
- Know and use technical vocabulary relevant to the project.

# 14. Design, Make and Evaluate Assignment (DMEA)

acetate sheet added.

desired appearance of their products.

- Develop a design brief with the children within a context which is authentic and meaningful.
- Discuss with the children the uses and purposes of their shell structures e.g. What does the product need to do? Who is it aimed at? How will the purpose and user affect your design decisions? Agree on design criteria that can be used to guide the development and evaluation of children's products e.g. How will we know that we have designed and made successful products?

Demonstrate how to use different ways of stiffening and strengthening their shell structures e.g. folding

and shaping, corrugating, ribbing, laminating. Provide opportunities for the children to practise these

and to carry out tests to find out where their structures might need to be strengthened or stiffened.

Children discuss and explore the graphics techniques and media that could be used to achieve the

- Ask the children to use annotated sketches and prototypes to develop, model and communicate their ideas for the product 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.
- Evaluate throughout and the final products against the intended purpose and with the intended user, drawing on the design criteria previously agreed.

#### 15. Related learning in other subjects

- Spoken language ask relevant questions to extend knowledge and understanding. Build technical vocabulary.
- Art and design use and develop drawing skills.
- Writing write for real purposes and audiences.

### 16. Possible resources

collection of shell structures for different purposes and users

card, squared paper, coloured paper, adhesive tape, masking tape, PVA glue, glue spreaders, acetate sheet, pencils, felt-tip pens, rulers, right/left handed scissors

### 17. Key vocabularv

shell structure. three-dimensional (3-D) shape, net, cube, cuboid, vertex, edge, face, length, width, breadth, capacity marking out, scoring, shaping, tabs, adhesives, joining, assemble, accuracy, material, stiff, strong, reduce, reuse, recycle, corrugating, ribbing, laminating font, lettering, text, graphics, decision, evaluating, design brief design criteria, innovative, prototype

## 18. Key competencies

problem-solving teamwork negotiation organisation motivation consumer awareness persuasion leadership perseverance other - specify

## **19. Health and safety**

Pupils should be taught to work safely, using tools, equipment, materials, components and techniques appropriate to the task. Risk assessments should be carried out prior to undertaking this project.

### **20. Useful websites:**

1) From a chocolate box (up to 5mins 11secs) https://www.youtube.com/watch?v=xH28JUO6b6c 2) Making a false bottom layer

https://www.youtube.com/watch?v=CqBP3XZgkRo

3) A pull out trap door - starts at 16:04

https://www.youtube.com/watch?v=1I0Yj6F78HA

4) a net template for a cuboid - twinkl

https://www.twinkl.co.uk/resource/t-n-2243-3d-netfor-cuboid



ox for

iects tability on 2-D ations

jects the apes