

# Fundamental Knowledge Map: Design & Technology



**EDALE RISE**  
Primary & Nursery School

# Fundamental Knowledge Map: Design & Technology

This document captures the fundamental knowledge, both substantive and disciplinary, taught in Design & Technology at Edale Rise. The units taught at Edale Rise explore more material than this document demonstrates; however, this document states the most fundamental knowledge a child will be able to demonstrate if they are secure in the unit taught.

The purpose of this document is to ensure that:

- A. Teachers know exactly what children should be know or be able to do by the end of the unit
- B. Teachers know what knowledge should be prioritised for retrieval within and between units and years
- C. Teachers know what prior-knowledge should be assessed for before proceeding with subsequent units
- D. Leaders know exactly what knowledge children should be able to articulate during monitoring exercises

For more information regarding the content covered in each unit, please see the [long-term plan](#) available on the school website or request a meeting with a member of the curriculum team.

# F2: Expressive Art & Design – Creating with Materials

## Junk Modelling

Pupils who are **secure** will be able to:

- Plan what they are going to make
- Make informed choices about which junk materials they need to make their model describing shape, size and any other relevant properties
- Make choices about what to use to join their pieces together for the desired effect e.g is it a moving part, does it need to be very secure.
- Able to use tools effectively for cutting, shaping and manipulating materials e.g scissors, hole punches

# DT: Y1

Structures: Windmills	Textiles: Puppets	Cooking and Nutrition: Smoothies
<p>Pupils who are <b>secure</b> will be able to:</p> <ul style="list-style-type: none"> <li>• Follow design criteria to meet the needs of a user.</li> <li>• Make a stable structure.</li> <li>• Make functioning sails/blades that attach to the supporting structure.</li> <li>• Improve their windmill.</li> </ul> <p><i>Outcome: Design and make a windmill structure with functioning sails/blades.</i></p>	<p>Pupils who are <b>secure</b> will be able to:</p> <ul style="list-style-type: none"> <li>• Join fabrics together using pins, staples or glue.</li> <li>• Design a puppet and use a template.</li> <li>• Join their two puppets' faces together as one.</li> <li>• Decorate a puppet to match their design.</li> </ul> <p><i>Outcome: Design and make a fabric puppet using a joining technique.</i></p>	<p>Pupils who are <b>secure</b> will be able to:</p> <ul style="list-style-type: none"> <li>• Describe fruits and vegetables and explain how to identify fruits.</li> <li>• Name a range of places that fruits and vegetables grow.</li> <li>• Describe basic characteristics of fruit and vegetables.</li> <li>• Prepare fruits and vegetables to make a smoothie.</li> </ul> <p><i>Outcome: Design and follow a recipe to make a smoothie, applying food preparation skills.</i></p>

Structures: Baby Bear's Chair	Mechanisms: Fairground Wheel	Mechanisms: Making a Moving Monster
<p>Pupils who are <b>secure</b> will be able to:</p> <ul style="list-style-type: none"> <li>• Identify man-made and natural structures.</li> <li>• Identify stable and unstable structural shapes.</li> <li>• Identify features that make a chair stable.</li> <li>• Work independently to make a stable structure, following a demonstration.</li> <li>• Contribute to discussions, including explaining how their ideas would be suitable for baby bear</li> <li>• Produce a model that supports a teddy, using the appropriate materials and construction techniques.</li> <li>• Explain how they made their model strong, stiff and stable.</li> </ul> <p><i>Outcome: Design and make a stable chair structure for Baby Bear.</i></p>	<p>Pupils who are <b>secure</b> will be able to:</p> <ul style="list-style-type: none"> <li>• Describe how axles help wheels move a vehicle and design and label a working fairground wheel.</li> <li>• Evaluate different designs.</li> <li>• Describe the properties of different materials and select appropriate materials for the wheel.</li> <li>• Build a stable structure, test elements of the design and adapt the design as necessary.</li> <li>• Make the wheel rotate, evaluate a wheel mechanism and adapt it as necessary.</li> <li>• Recall that a survey is used to find out what people like, tally results and use the results to inform the design.</li> <li>• Add pods for the correct number of people and ensure that the pods stay upright when rotating around a fixed point.</li> <li>• Explain the decisions for the pod design.</li> </ul> <p><i>Outcome: Design and make a fairground wheel that rotates.</i></p>	<p>Pupils who are <b>secure</b> will be able to:</p> <ul style="list-style-type: none"> <li>• Identify the correct terms for levers, linkages and pivots and analyse popular toys with the correct terminology.</li> <li>• Create functional linkages that produce the desired input and output motions.</li> <li>• Design monsters suitable for children, which satisfy most of the design criteria.</li> <li>• Evaluate their two designs against the design criteria, using this information and the feedback of their peers to choose their best design.</li> <li>• Select materials to create their planned monster features and assemble the monster to their linkages without affecting their functionality.</li> </ul> <p><i>Outcome: Design and make a moving monster with functional linkages.</i></p>

# DT: Y3

Cooking and Nutrition: Eating Seasonally	Digital World: Wearable Technology	Structures: Constructing a Castle
<p>Pupils who are <b>secure</b> will be able to:</p> <ul style="list-style-type: none"> <li>• Explain that fruits and vegetables grow in different countries based on their climates.</li> <li>• Understand that seasonal fruits and vegetables grow in a given season.</li> <li>• Understand that eating seasonal fruit and vegetables positively affects the environment.</li> <li>• Design a tart recipe using seasonal ingredients.</li> </ul> <p><i>Outcome: Design and follow a recipe to make a seasonal fruit tart.</i></p>	<p>Pupils who are <b>secure</b> will be able to:</p> <ul style="list-style-type: none"> <li>• Give a brief explanation of the digital revolution and/or remember key examples.</li> <li>• Write a program that initiates a flashing LED panel, or another pattern, on the virtual micro:bit when a button is pressed.</li> <li>• Identify errors, if testing is unsuccessful, by comparing their code to a correct example.</li> <li>• Explain the basic functionality of their finished program.</li> <li>• Create annotated diagrams to help illustrate how their product is worn, considering the overall theme and the user.</li> <li>• Follow basic design requirements using computer-aided design, drawing at least one shape with a text box and bright colours, following a demonstration.</li> <li>• Evaluate their design using a focus group.</li> </ul> <p><i>Outcome: Write a program that initiates a flashing LED panel when a button is pressed and design a way to wear this technology.</i></p>	<p>Pupils who are <b>secure</b> will be able to:</p> <ul style="list-style-type: none"> <li>• Draw and label a simple castle that includes the most common features.</li> <li>• Recognise that a castle is made up of multiple 3D shapes.</li> <li>• Design a castle with key features which satisfy a given purpose.</li> <li>• Score or cut along lines on the net of a 2D shape.</li> <li>• Utilise skills to build a complex structure from simple geometric shapes, including using glue to securely assemble</li> <li>• Evaluate their work by answering simple questions.</li> </ul> <p><i>Outcome: Design and construct a castle.</i></p>

# DT: Y4

Structure: Pavilions	Mechanical Systems: Mechanical Cars	Electrical Systems: Torches
<p>Pupils who are <b>secure</b> will be able to:</p> <ul style="list-style-type: none"> <li>• Produce a range of free-standing frame structures of different shapes and sizes.</li> <li>• Design a pavilion that is strong, stable and aesthetically pleasing.</li> <li>• Select appropriate materials and construction techniques to create a stable, free-standing frame structure.</li> <li>• Select appropriate materials and techniques to add cladding to their pavilion.</li> </ul> <p>Outcome: Build a free standing frame structure complete with cladding.</p>	<p>Pupils who are <b>secure</b> will be able to:</p> <ul style="list-style-type: none"> <li>• Describe key design improvements in the history of the automobile.</li> <li>• Measure and compare the distance travelled by different mechanical cars.</li> <li>• Choose and use appropriate tools and materials to make mechanical cars.</li> <li>• Draw exploded diagrams and annotated sketches of my different mechanical cars.</li> <li>• Use a problem statement to identify the design criteria.</li> <li>• Assess the product against the design criteria.</li> <li>• Conduct market research into existing products.</li> <li>• Provide specific feedback and adjust my design to incorporate customer feedback.</li> </ul> <p>Outcome: Design and create a mechanical car.</p>	<p>Pupils who are <b>secure</b> will be able to:</p> <ul style="list-style-type: none"> <li>• Identify electrical products and explain why they are useful.</li> <li>• Help to make a working switch.</li> <li>• Identify the features of a torch and how it works.</li> <li>• Describe what makes a torch successful.</li> <li>• Create suitable designs that fit the success criteria and their own design criteria.</li> <li>• Create a functioning torch with a switch according to their design criteria.</li> </ul> <p>Outcome: Make a torch including an operational electrical circuit.</p>

# DT: Y5

Electrical Systems: Doodlers	Mechanical Systems: Pop-up Books	Cooking and Nutrition: Developing a Recipe
<p>Pupils who are <b>secure</b> will be able to:</p> <ul style="list-style-type: none"> <li>Identify simple circuit components (battery, bulb and switch)</li> <li>Explain that a series circuit is assembled in a loop to allow the electricity to flow</li> <li>Describe a motor as a circuit component that changes electrical energy into movement.</li> <li>Provide examples of motorised products that use movement to rotate or spin different parts.</li> <li>Suggest ways to improve the Doodler.</li> <li>Explain some of the changes they made and the effect this had</li> <li>Develop design criteria with consideration for the target user</li> <li>Explain simply the steps to assemble a Doodler as part of a set of instructions (or storyboard).</li> <li>Provide suggestions to improve a peer's set of instructions</li> </ul> <p>Outcome: Develop a DIY kit for another individual to assemble their product.</p>	<p>Pupils who are <b>secure</b> will be able to:</p> <ul style="list-style-type: none"> <li>Produce a suitable plan for each page of their book.</li> <li>Produce the structure of the book.</li> <li>Assemble the components necessary for all their structures/mechanisms.</li> <li>Hide the mechanical elements with more layers using spacers where needed.</li> </ul> <p>Outcome: Use a range of mechanisms and structures to illustrate their story and make it interactive for the users, using appropriate materials and captions to illustrate the story.</p>	<p>Pupils who are <b>secure</b> will be able to:</p> <ul style="list-style-type: none"> <li>Describe the process of beef production.</li> <li>Research a traditional recipe and make changes to it.</li> <li>Add nutritional value to a recipe by selecting ingredients.</li> </ul> <p>Outcome: Prepare and cook a version of bolognese sauce.</p>

# DT: Y6

Textiles: Waistcoats	Structure: Playgrounds	Digital World: Navigating the World
<p>Pupils who are <b>secure</b> will be able to:</p> <ul style="list-style-type: none"> <li>• Consider a range of factors in their design criteria and use this to create a waistcoat design.</li> <li>• Use a template to mark and cut out a design.</li> <li>• Use a running stitch to join fabric to make a functional waistcoat.</li> <li>• Attach a secure fastening, as well as decorative objects.</li> <li>• Evaluate their final product.</li> </ul> <p>Outcome: Create a functional waistcoat fitting the design brief.</p>	<p>Pupils who are <b>secure</b> will be able to:</p> <ul style="list-style-type: none"> <li>• Create five apparatus designs, applying the design criteria to their work.</li> <li>• Make suitable changes to their work after peer evaluation.</li> <li>• Make roughly three different structures from their plans using the materials available.</li> <li>• Complete their structures, improving the quality of their rough versions and applying some cladding to a few areas.</li> <li>• Secure their apparatus to a base.</li> <li>• Make a range of landscape features using a variety of materials which will enhance their apparatus.</li> </ul> <p>Outcome: Create a model playground complete with structures and surrounding landscape.</p>	<p>Pupils who are <b>secure</b> will be able to:</p> <ul style="list-style-type: none"> <li>• Incorporate key information from a client's design request such as 'multifunctional' and 'compact' in their design brief.</li> <li>• Write a program that displays an arrow to indicate cardinal compass directions with an 'On start' loading screen.</li> <li>• Identify errors (bugs) in the code and suggest ways to fix (debug) them.</li> <li>• Self and peer evaluate a product concept against a list of design criteria with basic statements.</li> <li>• Identify key industries that use 3D CAD modelling and why.</li> <li>• Recall and describe the name and use of key tools used in Tinkercad (CAD) software.</li> <li>• Combine more than one object to develop a finished 3D CAD model in Tinkercad.</li> <li>• Complete a product pitch plan that includes key information.</li> </ul> <p>Outcome: Develop a 3D CAD model complete with written code for a navigation device and product pitch.</p>