Southbourne Junior School - Design and Technology Progression Map

Design

Year Group	Knowledge Children will know…	Skills Children will be able to…
3	- Know that **design criteria** are specific goals that a project must achieve in order to be **fit for purpose**. - Know that all products have a **purpose**. - Know that a **prototype** is a sample/ model of a product that is used to test and **develop** a concept. - Know that **annotated sketches** are a method of **generating** a design.	- Develop their own **design criteria** and use these to inform their ideas. - Describe the **purpose** of their products - **Model** their ideas using **prototypes** and **pattern pieces**
4	- Know what makes an effective **design criteria**. - Know that **products** are designed to **appeal** to **particular individuals or groups**. - Know that **annotated sketches** can be used to **communicate their ideas**. - Know that **prototypes** are used to **model and communicate ideas**. - Know the features of **cross-sectional and exploded diagrams**.	- Create shared **design criteria**. - Identify features of an effective **design criteria**. **-** Use **research** to inform the **design criteria**.
5	- Know appropriate **research** sources. - Know the features of **pattern pieces and computer-aided design.** - Know that **cross-sectional and exploded diagrams** can be used to **communicate ideas.**	- Use their research to develop their own design criterias. - Use **cross-sectional and exploded diagrams.** **- Discuss** how their products can be **fit for purpose and appealing.**
6	- Know how **pattern pieces and computer-aided design** can communicate ideas. - Know how **research** can ensure products are **innovative and functional**.	- Discuss how their products can be innovative and functional. - Create design criteria that ensure their products are **fit for purpose and appealing.** - Choose a design method to communicate their ideas (**annotated sketches, prototypes, cross-sectional and exploded diagrams).** - Use **computer-aided design** to model and communicate their ideas. - Use research to ensure that their designs are **innovative and functional**.

Year 3/4 Vocabulary				
Design Criteria	Purpose	Product	Prototype	Annotated Sketch
Pattern Pieces	User	Design	Function	Cross-sectional and exploded diagrams

Year 5/6 Vocabulary				
Research	Computer-aided design	Innovative	Functional	Fit for Purpose
				Appealing

Make

Year Group	Knowledge	Skills
3	- Know how to **join** materials with tape (sellotape, masking tape, double sided) accurately. - Know that different types of scissors will **cut** different materials. - Know how to measure **accurately** (cm) to create a **functional** product. - Know the properties of loose-weave fabric (aida, binka), paper (including art straws), cards of different thicknesses, pneumatic components (e.g. syringes or balloons). - Know that food contamination is where food has been infected with potentially harmful bacteria or viruses. - Know that different coloured chopping boards can be used to avoid food contamination.	- Use a ruler to measure accurately to cms. - Select **joining** methods (sellotape, masking tape, double sided). - Select different types of scissors to **cut** different materials. - Select materials for their product by their **properties**- loose-weave fabric (aida, binka), paper (including art straws), cards of different thicknesses, pneumatic components (e.g. syringes or balloons). - Choose appropriate coloured chopping boards for different ingredients.
4	- Know how to **join** materials with glue and elastic bands (in addition to joining techniques learnt in year 3). - Know **cutting** methods to ensure accuracy when cutting different materials. - Know how to measure **accurately** (cm and mm) to create a functional product. - Know the **functional qualities** of felt, wooden battens, electronic systems (light bulb, switch, wires and batteries, conductive materials) and rubber elasticity. - Know that food contamination is where food has been infected with potentially harmful bacteria or viruses. - Know that different coloured chopping boards can be used to avoid food contamination. - Know some foods can be eaten raw whereas others can't.	- Use a ruler to measure **accurately** to mms. - Select **joining** materials (glue and elastic bands, sellotape, masking tape, double sided). - Select **cutting** methods to ensure accuracy for different materials. - Select materials for their product by their functional properties- felt, wooden battens, electronic system (light bulb, switch, wires and batteries, conductive materials and rubber (e.g.elastic bands)). -Identify whether ingredients can be eaten raw or not. .
5	- Know how to use glue guns safely (see specific risk assessment). - Know how hot glue can be used to **join** materials securely. - Know how to use a saw safely (see specific risk assessment). - Know how to use a saw to **cut** straight lines in wood. - Know when to use cm or mm to measure **accurately**. - Know the **functional and aesthetic qualities** of cotton, electronic systems (light bulb, switch, wires and batteries, conductive materials), dowels and card. - Know that **shaping** in textiles helps to create a 3D shape.	- Use glue guns safely (see specific risk assessment) to **join** materials securely. - Use a saw safely(see specific risk assessment) cut straight lines in wood. - Measure to the nearest cm or mm **accurately**.

6	- Know a range of **joining** techniques and which would be most appropriate to use. - Know how to measure angles. - Know how to measure 3D shapes using a measuring tape, string, flexible rulers etc. - Know how to **cut** angles with a saw. - Know that **shaping and finishing** helps products to be aesthetically pleasing. - Know the **functional and aesthetic qualities** of a range of fabrics, electronic systems (light bulb, switch, wires and batteries, conductive materials), dowels, card, wooden battens and wooden **cams**. - Know that cross contamination can occur between meal preparation if not cleaned effectively.	- Use a range of **joining** techniques accurately and appropriately. - Use protractors and set squares to measure angles. - Measure 3D shapes (e.g. their bodies) measuring tape, string, flexible rulers etc. - Use a saw to accurately **cut** the angles they've measured. - Use sandpaper to **shape and finish** wooden products. - Use wooden **cams** to create a product with moving parts. -Independently prepare food in a safe cooking environment. - Clear a cooking environment to reduce cross contamination

Year 3/4 Vocabulary			
Measure	Accuracy	Template	Make
Materials	Join	Secure	Contamination
Cut	Functional	Conduct	

Year 5/6 Vocabulary			
Aesthetic	Shaping	Finishing	Cams

Evaluate

Year Group	Knowledge	Skills
3	- Know that **evaluating** means to determine the success of their product. - Know that **investigating** existing products can inform future design. - Know different designers, engineers, architects and scientists and understand their influence on products.	- **Evaluate** their product against a given success criteria.
4	- Know the features of effective feedback. - Know different designers, engineers, architects and scientists and understand their influence on products.	- **Investigate existing products** and identify weaknesses and strengths that can be transferred to their own designs. - Offer constructive advice to their peers. - Consider the impact specific designers, engineers, architects and scientists have had on other designers, engineers, architects and scientists.

5	- Know that effective **analysing** involves looking critically at each component. - Know different designers, engineers, architects and scientists and understand how they have shaped the world through their designs.	- **Analyse** different existing products to identify key areas of improvement. - **Evaluate** their ideas and products against their own **design criteria** and consider the views of others to improve their work
6	- Know how key events and individuals in design and technology have helped shape the world.	- **Evaluate** their ideas and products against their own **design criteria** and consider the views of others to improve their work - **Investigate and analyse** a range of **existing products**.

Year 3/4 Vocabulary				Year 5/6 Vocabulary
Evaluate	Purpose	Investigate	Improve	Analyse
User	Success			

Technical Knowledge

Year Group	Knowledge	Skills
3	**Textiles**: - Know the parts of a needle (eye, point). - Know how to secure the thread to the fabric. - Know how to use cross stitch to add embellishment. **Structures** **-** Know which structures are strong and which are not. - Know that a shell structure is a hollow structure made from a thin outer layer.	**Textiles**: - Thread a needle with little support when a needle is the appropriate size for the thread being used. - Attach the thread to the fabric so that their stitching is secure. - Use cross stitch to add detail to their designs. **Structures** - Use their understanding of shell structures to create their own. **Mechanisms**

	Mechanisms **-** Know that mechanisms are a system of parts working together. - Know that pneumatic systems use pressurised air to create movement. **Electricity** **-** To understand that an energy source can give energy that can be converted into other energy types e.g. solar into thermal. **Cooking** **-** Know that **seasonal foods** refers to the time of year where a food is at its peak. - Know that food miles refers to the distance food has travelled from farm to plate. **-** Know the nutritional values of foods from different food groups.	**-** Use a pneumatic mechanical system to create moving parts. **Electricity** **-** Children are able to use an energy source and consider how they can amplify this energy for their desired product outcome. **Cooking** **-** Children can design and make a seasonal dish. - Children can explain the nutritional value of their dish.
4	**Textiles**: - Know that applique is when a patch of fabric is applied to the main piece. - Know the different fastenings that can be used (e.g. buttons, zips, poppers). **Structures:** - Know that triangles are stronger shapes and are used to **reinforce** structures. - Know the terms 'strong' and 'stable' in relation to structures. **Mechanisms:** - Know what a **lever** is. (Definition - levers have a long arm and a fulcrum, which is where the arm pivots (a turning point). The object you are lifting is called the load, and the force you apply to that load through the arm to make the object move is called the effort.) - Know that a mechanical **linkage** is a collection of parts joined together to change or help movement. **Electricity:** - Know that an electrical circuit combines conductors with components such as **bulbs, switches and batteries**.	**Textiles**: - Use applique to add a design to their work. - Use a fastening of their choice in their work. **Structures:** - Use their understanding of strong shapes to ensure that their structures are strong and stable. **Mechanisms:** - Use **levers and linkages** within their own **products**. **Electricity:** - Use an electrical circuit with a working **switch** and **light bulb** within their products.

	- Know materials that conduct and insulate. **Cooking:** **-** Know how to accurately measure both dry and wet ingredients using weighing scales and jugs. - Know that baking is the action of cooking food by dry heat without direct exposure to a flame, typically in an oven.	 **Cooking:** - Use measuring jugs and weighing scales to accurately measure dry ingredients. - Observe whether a product is too wet or too dry and make amendments before baking.
5	**Textiles**: - Know that blanket stitch is used to join and reinforce the edge of materials. **Structures:** - To know what shapes and additions can be used within structures to **strengthen, stiffen and reinforce** them. **Mechanisms:** - To know that **gears** are a toothed wheel that works with others. - To know that **pulleys** are a wheel with a grooved rim around which a cord passes, which acts to change the direction of a force applied to the cord and is used to raise heavy weights. **Electricity:** - Know that a break in a circuit will stop it from working. - Know the difference between a series and a parallel circuit. **Cooking:** - Know the principles of a **healthy, varied diet**. - Know that frying is when we cook (food) in hot fat or oil, typically in a shallow pan. - Know how some of the ingredients they use have been **reared/ caught and processed.**	**Textiles**: - Use blanket stitch to join and reinforce the edges of material. **Structures:** - Use their knowledge of strong shapes and reinforcements to create strong, sturdy structures. **Mechanisms:** - Use **gears and pulleys** to create a mechanism that can move an object within their product. **Electricity:** - Use either a **series or parallel circuit** within their products. - Use a circuit with more than one electrical component in their products e.g. **bulb, buzzer**. **Cooking:** - Use their knowledge of a **healthy, varied diet** to adapt a recipe. - Use the cooking method of frying to create their meal.
6	**Textiles**: - Know the properties of running stitch, cross-stitch and blanket stitch. - Know the properties of a range of fabrics.	**Textiles**: - Make appropriate choices of the stitches being used to create their product. - Consider the best fabric for their product and how they might combine different fabrics.

	Structures: - Know how different materials and shapes can be used to **strengthen, reinforce and stiffen more complex structures.** **Mechanisms:** - Know that a **cam** is a device which can convert rotary motion into linear motion (movement in a straight line) or activate a linkage. **Electricity:** - Know that a **motor** is a machine, especially one powered by electricity or internal combustion, that supplies motive power for a vehicle or for another device with moving parts. **Cooking:** - Know that foods have different nutrients. - Know how to use a sharp knife to cut safely.	**Structures:** - Use their knowledge of materials, shapes and joining to create strong, sturdy products. - Effectively reinforce products with appropriate materials if they are not sturdy. **Mechanisms:** - Use a **cam** mechanism to create linear movement within their product. **Electricity:** - Use their knowledge of motors to create a product with a motorised moving component. **Cooking:** - Use their knowledge of seasonality, balanced diet and flavour combinations from previous years to make a healthy meal.

Year 3/4 Vocabulary	Year 5/6 Vocabulary
Textiles: Needle, thread, pin, secure, applique, cross stitch, running stitch, embellishment. **Structures:** Strong, stable, sturdy, secure, join, shell structure, hollow, frame, layer. **Mechanism:** Mechanism, pneumatic, system, lever. **Electricity:** Energy, source, wire, conduct, insulate, light bulb, battery, convert. **Cooking:** Food contamination, seasonal, prepare, nutrition, carbohydrates, vitamins, minerals, food miles, baking.	**Textiles:** Blanket stitch **Structures:** Strengthen, stiffen, reinforce **Mechanism:** Gear, pulley, cam **Electricity:** Parallel circuit, series circuit, buzzer, motor **Cooking:** Varied diet, adapt, frying