DESIGN TECHNOLOGY KNOWLEDGE AND SKILLS PROGRESSION

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| Types of knowledge in Design Technology | | |
| **Declarative:**  ‘I know that…’. Refers to facts and information linked to specific projects (eg hygiene is an important part of cooking, structures can be strengthened to improve them, different types of mechanical systems). Can need detailed explanations and can be prone to cognitive overload. | **Procedural:**  ‘I know how…’. Being able to apply knowledge of the procedures involved in the design process (eg research, planning, making, evaluating) into practice. Following a series of steps for a specific goal. Can be generic (design and making) or more specific (how to cut vegetables in a certain way). | **Disciplinary:**  What pupils learn about how that knowledge came to be and the understanding that it wasn’t just by chance. Eg humans worked for years to find easier way to do things and trialled various things before finding the best way to do something like pulleys and gears, how to cook certain foods to make them edible etc. |

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|  | KS1 | | LKS2 | | UKS2 | |
| Generating ideas- Design | | | | | | |
| Core knowledge | Know that we need to look at existing products to help develop ideas.  Know that we need to plan how we are going to make something. | Know that we need to consider criteria when designing.  Know how to create a plan for our design.  Know that explaining designs can help us develop our ideas. | Know that research helps to inform design ideas.  Know that a design needs to meet requirements.  Know that plans need to be realistic to be successful. | Know what a prototype is and why we use them.  Know how to create a criteria based on purpose.  Know that computers can aid in the design process. | Know what market research is and why it is done.  Know how to create design criteria.  Know that reviewing and refining helps improve design. | Know how to conduct market research.  Know how to effectively review and refine designs.  Know how to use computers to aid design. |
| Core skills | Design a product meant to appeal and be functional following criteria given.  Use existing products to develop own ideas.  Explain what they will do next.  Develop, model and communicate their ideas through talk, mock-ups and drawings. | | Use research for design ideas.  Show that their design meets a range of requirements and it fit for purpose.  Begin to create own design criteria.  Begin to suggest improvements for a design.  Produce a plan and explain it to others.  Say how realistic a plan is.  Annotate sketches.  Make and explain design decisions considering tools and materials available.  Make a prototype.  Begin to use computers to show design. | | Use internet and questionnaires for research and design ideas.  Draw on market research to inform design.  Use research of user’s needs, wants and requirements for design.  Create own design criteria and specification.  Follow and refine a logical plan.  Use annotated sketches, cross-sectional planning and exploded diagrams.  Make design decisions considering resources and cost.  Clearly explain how parts of a design will work and how they are fit for purpose.  Independently refine design ideas by making prototypes and using pattern pieces.  Use computer-aided designs. | |
| Threads of learning | Pupils can use existing products to inform and adapt a design which will be used for a specific purpose. | | | | | |
| Make | | | | | | |
| Core knowledge | Know that tools help us to create our designs.  Know that some materials are better for certain purposes.  Know how to work safely. | Know how to join materials and components together.  Know how to measure and cut materials.  Know that working safely and hygienically is important.  Know what ‘finishing’ a product is. | Know that some tools are more suitable for jobs than others.  Know how to measure, mark, cut and shape materials and components.  Know ways to assemble materials. | Know how to recognise if a product isn’t going to be good quality whilst making.  Know how to finish products accurately.  Know why we need to be accurate when measuring, marking and cutting. | Know which tools and materials would be best for the task.  Know how constraints may affect choices.  Know that products need to appeal to the audience. | Know that choosing materials is based on functionality and aesthetics.  Know how to apply skills accurately to make a product.  Know how to approach a practical problem. |
| Core skills | Join materials/ components together in different ways.  Measure, mark out, cut and shapes materials and components, with support.  Choose tools and explain choices.  Choose suitable materials and explain choices depending on characteristics.  Use finishing techniques to make the product look good.  Work safely and hygienically. | | Select suitable tools and equipment, explain choices in relation to required techniques and use increasingly accurately.  Select appropriate materials, fit for purpose, and explain choices.  Work through plan in order.  Realise if the product is going to be good quality.  Measure, mark out, cut and shape materials/ components with some accuracy.  Assemble, join and combine materials and components with some accuracy.  Apply a range of finishing techniques with some accuracy. | | Use selected tools and equipment precisely.  Produce suitable list of tools, equipment, materials needed, considering constraints.  Select appropriate materials, fit for purpose, explain choice considering functionality and aesthetics.  Create, follow and adapt detailed step-by-step plans.  Explain how product will appeal to audience; make changes to improve quality.  Accurately measure, mark out, cut and shape materials/ components.  Accurately assemble, join and combine materials/ components.  Accurately apply a range of finishing techniques.  Use techniques that involve a number of steps.  Be resourceful with practical problems. | |
| Threads of learning | Pupils can choose specific tools to make and finish a product to a desired standard.  Pupils can make decisions about working safely and solve problems. | | | | | |
| Evaluate | | | | | | |
| Core knowledge | Know that when we finish a product, we need to consider whether it was successful.  Know how to express a preference and opinion. | Know what evaluation is.  Know how to make meaningful suggestions of what we would improve. | Know that design criteria needs to be used to evaluate.  Know that research helps us learn about product types and needs. | Know that products are designed because of a need for something.  Know at least three ground-breaking products that have been designed.  Know the importance of creating products that can be recycled. | Know that evaluations have to be detailed and effective.  Know that we can use evaluations of existing products to improve our own. | Know at least three key events that led to a ground-breaking product.  Know that to make a product the best it can be, it needs to be tested and improved. |
| Core skills | Describe what went well, thinking about design criteria.  Talk about existing products considering: use, materials, how they work, audience, where they might be used; express personal opinion.  Evaluate how good existing products are.  Talk about what I would do differently if I were to do it again and why. | | Refer to design criteria while designing and making.  Use criteria to evaluate product.  Begin to explain how I could improve original design.  Evaluate existing products, considering: how well they’ve been made, materials, whether they work, how they have been made, fit for purpose.  Discuss by whom, when and where products were designed.  Research whether products can be recycled or reused.  Know about some inventors/designers/ engineers/chefs/manufacturers of ground-breaking products | | Evaluate quality of design of existing products while designing and making; is it fit for purpose?  Keep checking design is best it can be.  Evaluate ideas and finished product against specification, stating if it’s fit for purpose.  Test and evaluate final product; explain what would improve it and the effect different resources may have had.  Do thorough evaluations of existing products considering: how well they’ve been made, materials, whether they work, how they’ve been made, fit for purpose.  Evaluate how much products cost to make and how innovative they are.  Research and discuss how sustainable materials are.  Consider the impact of products beyond their intended purpose.  Discuss how key events and individuals in design and technology have helped shape the world. | |
| Threads of learning | Pupils can effectively evaluate their product and the process they went through to make it.  Pupils can make sensible and viable suggestions for how to improve their products based on a chosen criteria (eg cost, durability, fit-for-purpose). | | | | | |
| Design, Make and Evaluate Vocabulary | | | | | | |
| *Consolidate in new learning* | Planning; investigating; design; evaluate; make; user; purpose; ideas. | Design criteria; function; product | Annotated sketch; label; appealing | Design brief; prototypes | Innovative; design specification; mock-up | Functionality; cross-sectional planning; exploded diagrams. |
| Cooking and Nutrition | | | | | | |
| Core knowledge | Know that we need to wash our hands before cooking.  Know foods that grow in the ground or from animals.  Know that fruit and vegetables help us to be healthy.  Know some fruit and veg names. | Know how to cook hygienically.  Know more names of more fruit and veg.  Know that there are different groups of food.  Know that food is ‘created’ in different ways (grown, farmed etc). | Know how to be hygienic when preparing food.  Know how to be safe with some utensils.  Know that food we eat is grown and reared around the world.  Know what a ‘healthy diet’ means. | Know that we use different techniques for a reason (eg why peel and not slice).  Know how to cook safely and hygienically.  Know what the different between processed, pre-cooked and fresh is.  Know how exercise and diet affect our bodies. | Know that recipes can change by adding similar substitutes.  Know what seasonality is.  Know some food that is grown and reared in the UK and abroad.  Know that different ingredients are used for different reasons (eg add texture, flavour). | Know what climate zones different food are grown or reared in and why.  Know that recipes need to change due to allergy/ intolerances.  Know how to adapt recipes for various reasons.  Know how food is processed. |
| Core skills | Explain hygiene and keep a hygienic kitchen.  Describe properties of ingredients and importance of varied diet.  Say where food comes from (animal, underground etc.).  Describe how food is farmed, home-grown, caught.  Draw eat well plate; explain there are groups of food.  Describe “five a day”.  Cut, peel and grate with increasing confidence. | | Explain how to be safe/hygienic.  Think about presenting product in interesting/ attractive ways.  Understand ingredients can be fresh, pre-cooked or processed.  Begin to understand about food being grown, reared or caught in the UK or wider world.  Describe eat well plate and how a healthy diet=variety / balance of food and drinks.  Explain importance of food and drink for active, healthy bodies.  Prepare and cook some dishes safely and hygienically.  Use some of the following techniques: peeling, chopping, slicing, grating, mixing, spreading, kneading and baking. | | Understand a recipe can be adapted by adding / substituting ingredients.  Explain seasonality of foods.  Learn about food processing methods.  Name some types of food that are grown, reared or caught in the UK or wider world.  Adapt recipes to change appearance, taste, texture or aroma.  Describe some of the different substances in food and drink, and how they can affect health.  Prepare and cook a variety of savoury dishes safely and hygienically including, where appropriate, the use of heat source.  Use a range of techniques confidently such as peeling, chopping, slicing, grating, mixing, spreading, kneading and baking. | |
| Vocab | Common fruit and vegetable names; common equipment; sensory vocab eg soft, crunchy, sweet; parts of fruit and veg eg pip, skin, core. | Further sensory vocab eg sharp, sour, crisp; cut; slice; squeeze; healthy diet; ingredients. | Names of common products; equipment; utensils; appearance; preference; savoury/sweet; grown; varied diet. | Techniques; texture; greasy/moist; hygenic; edible; reared; processes eg tinned, caught, processed, seasonal. | Detailed ingredients of common products eg yeast, bran, wholemeal, baking soda, spices; Diet eg fats, carbohydrate etc; food miles; food source; seasonality; utensils. | Allergy; intolerance; gluten; dairy; fold; knead; whisk; beat |
| Threads of learning | Revisit and consolidate previous vocabulary in new learning.  Pupils can choose appropriate equipment to prepare food for cooking, using them safely.  Pupils can plan and make meals based on a desired criteria (eg cost, healthy, seasonality). | | | | | |
| Technical Knowledge | | | | | | |
|  | Structure  Levers and sliders.  Textiles. | Structures  Wheels and axles.  Textiles. | Structures  Mechanical systems- levers and linkages.  Textiles. | Structures  Electrical system- series circuits, bulbs.  Textiles. | Structures  Mechanical systems- gears, pulleys and cams.  Textiles. | Structures  Electrical system- incorporating switches, buzzers and motors.  Textiles |
| Core knowledge | Know that structures need to be strong.  Know how we could make materials stronger.  Know what levers and sliders are and how they make things move.  Know what ‘textiles’ means.  Know why we need products to be made of textile and the benefits of this. | Know how to make materials stronger for a purpose.  Know that wheels and axles make things move, and how this happens.  Know that different textiles are chosen for different purposes and why this may be.  Know how to make a 3D textile structure. | Know that being accurate avoids mistakes.  Know that using certain materials will make structures stronger.  Know what linkages are and how they create movement.  Know that a user chooses specific textiles for a purpose.  Know what a template is and why we use them in textiles. | Know various techniques we can use to make a structure stronger.  Know that circuits are used in products (such as games).  Know that a computer can be used to control a product.  Know how textiles are joined.  Know that textiles can be strengthened and how. | Know that shapes can improve the shape of structures (eg triangles in bridges).  Know the reasons why a product needs to be strong.  Know what gears, pulleys and cams are and how they work.  Know that products need to be functional and aesthetic.  Know that various aspects are considered when choosing textiles for a purpose.  Know how manufacturers reproduce items. | Know techniques that will strengthen a 3D frame.  Know that structures need to be strong and aesthetically pleasing (eg buildings).  Know that different circuits can be used for different purposes.  Know how computers control products.  Know that textiles can be adapted to be more suitable (eg hemming).  Know that products can be made by many template shapes. |
| Core skills | Describe some different characteristics of materials; Join materials in different ways; Use joining, rolling or folding to make it stronger; Use own ideas to try to make product stronger.  Use levers or slides; Begin to understand how to use wheels and axles. Measure textiles; Join textiles together to make a product, and explain how I did it; Carefully cut textiles to produce accurate pieces; Explain choices of textile; Understand that a 3D textile structure can be made from two identical fabric shapes. | | Use appropriate materials; Measure carefully to avoid mistakes; Attempt to make product strong; Continue working on product even if original didn’t work; Make a strong, stiff structure; Develop and use knowledge of how to construct strong, stiff shell structures.  Select most appropriate tools / techniques; Explain alterations to product after checking it; Grow in confidence about trying new / different ideas; Use levers and linkages to create movement.  Use number of components in circuit; Learn about how to program a computer to control product.  Think about user when choosing textiles; Think about how to make product strong; Begin to devise a template; Explain how to join things in a different way; Understand that a simple fabric shape can be used to make a 3D textiles project. | | Select materials carefully, considering intended use of the product, the aesthetics and functionality; Measure accurately enough to ensure precision; Explain how product meets design criteria; Reinforce and strengthen a 3D frame; Ensure product is strong and fit for purpose.  Refine product after testing, considering aesthetics, functionality and purpose; Incorporate hydraulics and pneumatics; Be confident to try new / different ideas; Use cams, pulleys and gears to create movement.  Use different types of circuit in products; Think of ways in which adding a circuit would improve product; Incorporate switch into product; Program a computer to monitor changes in environment and control product.  Think about user’s wants/needs and aesthetics when choosing textiles; Make product attractive and strong; Make a prototype; Use a range of joining techniques; Think about how product might be sold; Think carefully about what would improve product; Understand that a single 3D textiles project can be made from a combination of fabric shapes. | |
| Vocab | Cut; fold; join; fix.  Slider; lever; slot; pivot; slot; pull; push.  Fabrics; pattern; decorate. | Tower; weak; strong; base.  Vehicle; wheel; axle; axle holder; chassis; body; cab; moving.  Template; joining and finishing technique. | Three dimensional; 3D shape names; net; scoring; tabs; lettering.  Lever; linkage; pivot; bridge; process.  Fastening; zip; button; stiffening; strength. | Shell structure; capacity; assemble; reduce, reuse, recycle; graphics.  Series circuit; battery; bulb; wire; control; program; fault; connection.  Names of fabrics; stitch; compartment. | Strengthen; reinforce; stability.  Pulley; drive belt; gear; rotate; spindle; driver; input; output  Seam; seam allowance; names of textiles; pins; needles; thread. | Frame structure; triangulation; temporary; permanent.  Switch; buzzer; motor; light dependent resistor (LDR); light emitting diode (LED); conductor; parallel circuit; input device; output device.  Hem; wadding. |
| Threads of learning | Revisit and consolidate previous vocabulary in new learning.  Pupils can use their technical knowledge to design and evaluate systems or products. | | | | | |