**Design Make Evaluate**

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|  | **Autumn**  **Food – The best pumpkin soup** | | **Spring**  **Textiles – flower threading** | | **Summer**  **Structures – make a boat for the Gingerbread man** | |
|  | **Disciplinary Knowledge** | **Substantive Knowledge** | **Disciplinary Knowledge** | **Substantive Knowledge** | **Disciplinary Knowledge** | **Substantive Knowledge** |
| **EYFS**  **Reception** | • Designing a soup recipe as a class.  • Designing soup packaging.  • Chopping plasticine safely.  • Chopping vegetables with support.  • Tasting the soup and giving opinions.  • Describing some of the following when tasting food: look, feel, smell and taste.  • Choosing their favourite packaging design and explaining why. | • To know that soup is ingredients (usually vegetables and liquid) blended together.  • To know that vegetables are grown.  • To recognise and name some common vegetables.  • To know that different vegetables taste different.  • To know that eating vegetables is good for us.  • To discuss why different packages might be used for different foods | * Designing treaded flower with a repeating pattern. * Draw the shape of a chosen flower. * Cut out the flower. * Thread wool through punched holes in the flower. * Return to build on their previous learning, refining ideas and developing their ability to reoresent them. * Share their creations, explaining the process they have used. | * Discussing what a good design looks like * Develop fine motor skills so the children can use a range of tools competently, safely and confidently. * To name some simple shapes and colours. * To listen and respond to suggestions. | • Designing a junk model boat.  • Using knowledge from exploration to inform design.  • Making a boat that floats and is waterproof, considering material choices.  • Making predictions about, and evaluating different materials to see if they are waterproof.  • Making predictions about, and evaluating existing boats to see which floats best.  • Testing their design and reflecting on what could have been done differently.  • Investigating the how the shapes and structure of a boat affect the way it moves. | • To know that some objects float and others sink.  • To know the different parts of a boat. |
| **Vocabulary** |  |  |  |  |  |  |
| **Year 1** | **Autumn**  **Structures - Constructing a windmill** | | **Spring**  **Food – Fruit and Vegetables** | | **Summer**  **Mechanisms - Wheels and axels** | |
| **Disciplinary Knowledge** | **Substantive Knowledge** | **Disciplinary Knowledge** | **Substantive Knowledge** | **Disciplinary Knowledge** | **Substantive Knowledge** |
|  | • Learning the importance of a clear design criteria.  • Including individual preferences and requirements in a design.  • Making stable structures from card, tape and glue .  • Learning how to turn 2D nets into 3D structures.  • Following instructions to cut and assemble the supporting structure of a windmill.  • Making functioning turbines and axles which are assembled into a main supporting structure.  • Evaluating a windmill according to the design criteria, testing whether the structure is strong and stable and altering it if it isn’t.  • Suggest points for improvements. | • To understand that the shape of materials can be changed to improve the strength and stiffness of structures.  • To understand that cylinders are a strong type of structure (e.g. the main shape used for windmills and lighthouses).  • To understand that axles are used in structures and mechanisms to make parts turn in a circle.  • To begin to understand that different structures are used for different purposes.  • To know that a structure is something that has been made and put together. | • Designing smoothie carton packaging by-hand or on ICT software.  • Chopping fruit and vegetables safely to make a smoothie.  • Tasting and evaluating different food combinations.  • Describing appearance, smell and taste.  • Suggesting information to be included on packaging. | • Understanding the difference between fruits and vegetables.  • To understand that some foods typically known as vegetables are actually fruits (e.g. cucumber).  • To know that a blender is a machine which mixes ingredients together into a smooth liquid.  • To know that a fruit has seeds and a vegetable does not.  • To know that fruits grow on trees or vines.  • To know that vegetables can grow either above or below ground.  • To know that vegetables can come from different parts of the plant (e.g. roots: potatoes, leaves: lettuce, fruit: cucumber). | • Designing a vehicle that includes wheels, axles and axle holders, that when combined, will allow the wheels to move.  • Creating clearly labelled drawings that illustrate movement.  Adapting mechanisms, when:  ● They do not work as they should.  ● To fit their vehicle design.  ● To improve how they work after testing their vehicle.  • Testing wheel and axle mechanisms, identifying what stops the wheels from turning, and recognising that a wheel needs an axle in order to move. | • To know that wheels need to be round to rotate and move.  • To understand that for a wheel to move it must be attached to a rotating axle.  • To know that an axle moves within an axle holder which is fixed to the vehicle or toy.  • To know that the frame of a vehicle (chassis) needs to be balanced. |
| **Vocabulary** | axle  bridge  design  design criteria  model  net | template  unstable  strong  weak  packaging  structure | fruit  vegetable  seed  leaf  root  stem | peel  slice  smoothie  healthy  carton  design  flavour | axle  axle holder  chassis  diagram | dowel  equipment  mechanism  wheel |
| **Year 2** | **Autumn**  **A Balanced Diet** | | **Spring**  **Mechanisms – Mechanical animals** | | **Summer**  **Textiles - pouches** | |
| **Disciplinary Knowledge** | **Substantive Knowledge** | **Disciplinary Knowledge** | **Substantive Knowledge** | **Disciplinary Knowledge** | **Substantive Knowledge** |
|  | • Designing a healthy wrap based on a food combination which work well together.  • Slicing food safely using the bridge or claw grip.  • Constructing a wrap that meets a design brief.  • Describing the taste, texture and smell of fruit and vegetables.  • Taste testing food combinations and final products.  • Describing the information that should be included on a label.  • Evaluating which grip was most effective | • To know that ‘diet’ means the food and drink that a person or animal usually eats.  • To understand what makes a balanced diet.  • To know where to find the nutritional information on packaging.  • To know that the five main food groups are: Carbohydrates, fruits and vegetables, protein, dairy and foods high in fat and sugar.  • To understand that I should eat a range of different foods from each food group, and roughly how much of each food group.  • To know that nutrients are substances in food that all living things need to make energy, grow and develop.  • To know that ‘ingredients’ means the items in a mixture or recipe.  • To know that I should only have a maximum of five teaspoons of sugar a day to stay healthy.  • To know that many food and drinks we do not expect to contain sugar do; we call these ‘hidden sugars’. | • Creating a class design criteria for a moving monster.  • Designing a moving monster for a specific audience in accordance with a design criteria  • Making linkages using card for levers and split pins for pivots.  • Experimenting with linkages adjusting the widths, lengths and thicknesses of card used.  • Cutting and assembling components neatly  • Evaluating own designs against design criteria  • Using peer feedback to modify a final design | • To know that mechanisms are a collection of moving parts that work together as a machine to produce movement. • To know that there is always an input and output in a mechanism.  • To know that an input is the energy that is used to start something working.  • To know that an output is the movement that happens as a result of the input.  • To know that a lever is something that turns on a pivot. • To know that a linkage mechanism is made up of a series of levers | • Designing a pouch.  • Selecting and cutting fabrics for sewing.  • Decorating a pouch using fabric glue or running stitch.  • Threading a needle.  • Sewing running stitch, with evenly spaced, neat, even stitches to join fabric.  • Neatly pinning and cutting fabric using a template  • Troubleshooting scenarios posed by teacher. • Evaluating the quality of the stitching on others’ work. • Discussing as a class, the success of their stitching against the success criteria. • Identifying aspects of their peers’ work that they particularly like and why | • To know that sewing is a method of joining fabric.  • To know that different stitches can be used when sewing.  • To understand the importance of tying a knot after sewing the final stitch.  • To know that a thimble can be used to protect my fingers when sewing |
| **Vocabulary** | balanced diet  balance  carbohydrate  dairy  fruit | ingredients  oils  sugar  protein  vegetable  design criteria | decorate  fabric  fabric glue  knot  needle | needle threader  running stitch  sew  template  thread | axle  design criteria  input  linkage | mechanical  output  pivot  wheel |
| **Year 3** | **Autumn**  **Food – Eating seasonally** | | **Spring**  **Structures – constructing a castle** | | **Summer**  **Textiles – Egyptian collars** | |
| **Disciplinary Knowledge** | **Substantive Knowledge** | **Disciplinary Knowledge** | **Substantive Knowledge** | **Disciplinary Knowledge** | **Substantive Knowledge** |
|  | • Creating a healthy and nutritious recipe for a savoury tart using seasonal ingredients, considering the taste, texture, smell and appearance of the dish  • Knowing how to prepare themselves and a work space to cook safely in, learning the basic rules to avoid food contamination.  • Following the instructions within a recipe.  • Establishing and using design criteria to help test and review dishes.  • Describing the benefits of seasonal fruits and vegetables and the impact on the environment.  • Suggesting points for improvement when making a seasonal tart | • To know that not all fruits and vegetables can be grown in the UK.  • To know that climate affects food growth.  • To know that vegetables and fruit grow in certain seasons.  • To know that cooking instructions are known as a ‘recipe’.  • To know that imported food is food which has been brought into the country.  • To know that exported food is food which has been sent to another country..  • To understand that imported foods travel from far away and this can negatively impact the environment.  • To know that each fruit and vegetable gives us nutritional benefits because they contain vitamins, minerals and fibre.  • To understand that vitamins, minerals and fibre are important for energy, growth and maintaining health.  • To know safety rules for using, storing and cleaning a knife safely.  • To know that similar coloured fruits and vegetables often have similar nutritional benefits. | • Designing a castle with key features to appeal to a specific person/purpose.  • Drawing and labelling a castle design using 2D shapes, labelling: -the 3D shapes that will create the features - materials needed and colours.  • Designing and/or decorating a castle tower on CAD software.  • Constructing a range of 3D geometric shapes using nets.  • Creating special features for individual designs.  • Making facades from a range of recycled materials  • Evaluating own work and the work of others based on the aesthetic of the finished product and in comparison to the original design.  • Suggesting points for modification of the individual designs. | • To understand that wide and flat based objects are more stable.  • To understand the importance of strength and stiffness in structures | • Designing and making a template from an existing cushion and applying individual design criteria  • Following design criteria to create a cushion or Egyptian collar.  • Selecting and cutting fabrics with ease using fabric scissors.  • Threading needles with greater independence.  • Tying knots with greater independence.  • Sewing cross stitch to join fabric.  • Decorating fabric using appliqué.  • Completing design ideas with stuffing and sewing the edges (Cushions) or embellishing the collars based on design ideas (Egyptian collars)  • Evaluating an end product and thinking of other ways in which to create similar items. | •To know that applique is a way of mending or decorating a textile by applying smaller pieces of fabric to larger pieces. •To know that when two edges of fabric have been joined together it is called a seam.  •To know that it is important to leave space on the fabric for the seam.  •To understand that some products are turned inside out after sewing so the stitching is hidden. |
| **Vocabulary** | 2D  castle  key features  scoring  stable  strong | 3D  design  net  shape  stiff  structure | Climate  import  natural  reared  seasonal  diet | ingredients  processed  recipe  seasons  sugar | appliqué  cross-stitch  fabric  running stitch  patch  thread  embellish  template  cotton  silk | polyester  wrinkle  tear  water-resistant  breathable  matt  shiny  biodegrade  pinking |
| **Year 4** | **Autumn**  **Mechanical systems – making a slingshot car** | | **Spring**  **Food – adapting a recipe** | | **Summer**  **Electrical systems - torches** | |
| **Disciplinary Knowledge** | **Substantive Knowledge** | **Disciplinary Knowledge** | **Substantive Knowledge** | **Disciplinary Knowledge** | **Substantive Knowledge** |
|  | • Designing a shape that reduces air resistance.  • Drawing a net to create a structure from.  • Choosing shapes that increase or decrease speed as a result of air resistance.  • Personalising a design.  • Measuring, marking, cutting and assembling with increasing accuracy.  • Making a model based on a chosen design.  • Evaluating the speed of a final product based on: the effect of shape on speed and the accuracy of workmanship on performance. | • To understand that all moving things have kinetic energy.  • To understand that kinetic energy is the energy that something (object/person) has by being in motion.  • To know that air resistance is the level of drag on an object as it is forced through the air.  • To understand that the shape of a moving object will affect how it moves due to air resistance. | • Designing a biscuit within a given budget, drawing upon previous taste testing judgements  • Following a baking recipe, from start to finish, including the preparation of ingredients. • Cooking safely, following basic hygiene rules. • Adapting a recipe to improve it or change it to meet new criteria (e.g. from savoury to sweet)  • Evaluating a recipe, considering: taste, smell, texture and appearance.  • Describing the impact of the budget on the selection of ingredients.  • Evaluating and comparing a range of food products.  • Suggesting modifications to a recipe (e.g. This biscuit has too many raisins, and it is falling apart, so next time I will use less raisins) | • To know that the amount of an ingredient in a recipe is known as the ‘quantity.’  • To know that it is important to use oven gloves when removing hot food from an oven.  • To know the following cooking techniques: sieving, creaming, rubbing method, cooling.  •To understand the importance of budgeting while planning ingredients for biscuits. | • Designing a torch, giving consideration to the target audience and creating both design and success criteria focusing on features of individual design ideas.  • Making a torch with a working electrical circuit and switch. • Using appropriate equipment to cut and attach materials. • Assembling a torch according to the design and success criteria.  • Evaluating electrical products. • Testing and evaluating the success of a final product | • To understand that electrical conductors are materials which electricity can pass through.  • To understand that electrical insulators are materials which electricity cannot pass through.  • To know that a battery contains stored electricity that can be used to power products.  • To know that an electrical circuit must be complete for electricity to flow.  • To know that a switch can be used to complete and break an electrical circuit |
| **Vocabulary** | chassis  energy  kinetic  mechanism  air resistance  design | structure  graphics  research  model  template | design criteria  research  texture  innovative  aesthetic  measure | cross-contamination  diet  processed  packaging | battery  buzzer  circuit  electricity  series circuit  component  design criteria  evaluation  model  target audience  recyclable | bulb  conductor  circuit diagram  insulator  switch  diagram  LED  shape  input  theme |
| **Year 5** | **Autumn**  **Structures - bridges** | | **Spring**  **Textiles – stuffed toys** | | **Summer**  **Food – what could be healthier?** | |
| **Disciplinary Knowledge** | **Substantive Knowledge** | **Disciplinary Knowledge** | **Substantive Knowledge** | **Disciplinary Knowledge** | **Substantive Knowledge** |
|  | • Designing a stable structure that is able to support weight.  • Creating a frame structure with a focus on triangulation  • Making a range of different shaped beam bridges.  • Using triangles to create truss bridges that span a given distance and support a load.  • Building a wooden bridge structure.  • Independently measuring and marking wood accurately.  • Selecting appropriate tools and equipment for particular tasks.  • Using the correct techniques to saws safely.  • Identifying where a structure needs reinforcement and using card corners for support.  • Explaining why selecting appropriating materials is an important part of the design process.  • Understanding basic wood functional properties.  • Adapting and improving own bridge structure by identifying points of weakness and reinforcing them as necessary.  • Suggesting points for improvements for own bridges and those designed by others | • To understand some different ways to reinforce structures.  • To understand how triangles can be used to reinforce bridges.  • To know that properties are words that describe the form and function of materials.  • To understand why material selection is important based on properties.  • To understand the material (functional and aesthetic) properties of wood | • Designing a stuffed toy, considering the main component shapes required and creating an appropriate template.  • Considering the proportions of individual components.  • Creating a 3D stuffed toy from a 2D design.  • Measuring, marking and cutting fabric accurately and independently .  • Creating strong and secure blanket stitches when joining fabric.  • Threading needles independently.  • Using appliqué to attach pieces of fabric decoration.  • Sewing blanket stitch to join fabric.  • Applying blanket stitch so the spaces between the stitches are even and regular.  • Testing and evaluating an end product and giving point for further improvements. | • To know that blanket stitch is useful to reinforce the edges of a fabric material or join two pieces of fabric.  • To understand that it is easier to finish simpler designs to a high standard.  • To know that soft toys are often made by creating appendages separately and then attaching them to the main body.  • To know that small, neat stitches which are pulled taut are important to ensure that the soft toy is strong and holds the stuffing securely. | • Adapting a traditional recipe, understanding that the nutritional value of a recipe alters if you remove, substitute or add additional ingredients.  • Writing an amended method for a recipe to incorporate the relevant changes to ingredients. • Designing appealing packaging to reflect a recipe.  • Cutting and preparing vegetables safely.  • Using equipment safely, including knives, hot pans and hobs.  • Knowing how to avoid cross-contamination.  • Following a step by step method carefully to make a recipe  • Identifying the nutritional differences between different products and recipes.  • Identifying and describing healthy benefits of food groups | • To understand where meat comes from - learning that beef is from cattle and how beef is reared and processed, including key welfare issues.  • To know that I can adapt a recipe to make it healthier by substituting ingredients.  • To know that I can use a nutritional calculator to see how healthy a food option is.  • To understand that ‘cross-contamination’ means bacteria and germs have been passed onto ready-to-eat foods and it happens when these foods mix with raw meat or unclean objects. |
| **Vocabulary** | beam bridge  arch bridge  truss bridge  strength  technique  corrugation  lamination  stiffness  rigid  factors  stability  visual appeal  aesthetics  joints | mark out  hardwood  softwood  wood file/rasp  sandpaper/glasspaper  bench hook/vice  tenon saw/coping saw  assemble  material properties  reinforce  wood sourcing  evaluate  quality of finish  accuracy | accurate  annotate  appendage  blanket-stitch  design criteria  detail  evaluation | fabric  sew  shape  stuffed toy  stuffing  template | beef  reared  processed  ethical  diet | ingredients  supermarket  farm  balanced |
| **Year 6** | **Autumn**  **Food – come dine with me** | | **Spring**  **Mechanical systems – automata toys** | | **Summer**  **Digital world – navigating the world** | |
| **Disciplinary Knowledge** | **Substantive Knowledge** | **Disciplinary Knowledge** | **Substantive Knowledge** | **Disciplinary Knowledge** | **Substantive Knowledge** |
|  | • Writing a recipe, explaining the key steps, method and ingredients.  • Including facts and drawings from research undertaken.  • Following a recipe, including using the correct quantities of each ingredient.  • Adapting a recipe based on research.  • Working to a given timescale. • Working safely and hygienically with independence.  • Evaluating a recipe, considering: taste, smell, texture and origin of the food group.  • Taste testing and scoring final products.  • Suggesting and writing up points of improvements when scoring others’ dishes, and when evaluating their own throughout the planning, preparation and cooking process.  • Evaluating health and safety in production to minimise cross contamination. | • To know that ‘flavour’ is how a food or drink tastes.  • To know that many countries have ‘national dishes’ which are recipes associated with that country.  • To know that ‘processed food’ means food that has been put through multiple changes in a factory.  • To understand that it is important to wash fruit and vegetables before eating to remove any dirt and insecticides.  • To understand what happens to a certain food before it appears on the supermarket shelf (Farm to Fork). | •Experimenting with a range of cams, creating a design for an automata toy based on a choice of cam to create a desired movement.  • Understanding how linkages change the direction of a force. • Making things move at the same time.  • Understanding and drawing cross-sectional diagrams to show the inner-workings of my design.  • Measuring, marking and checking the accuracy of the jelutong and dowel pieces required.  • Measuring, marking and cutting components accurately using a ruler and scissors.  • Assembling components accurately to make a stable frame.  • Understanding that for the frame to function effectively the components must be cut accurately and the joints of the frame secured at right angles.  • Selecting appropriate materials based on the materials being joined and the speed at which the glue needs to dry/set  • Evaluating the work of others and receiving feedback on own work.  • Applying points of improvement to their toys.  • Describing changes they would make/do if they were to do the project again. | • To understand that the mechanism in an automata uses a system of cams, axles and followers.  • To understand that different shaped cams produce different outputs. | • Writing a design brief from information submitted by a client.  • Developing design criteria to fulfil the client’s request.  • Considering and suggesting additional functions for my navigation tool.  • Developing a product idea through annotated sketches.  • Placing and manoeuvring 3D objects, using CAD.  • Changing the properties of, or combining one or more 3D objects, using CAD.  • Considering materials and their functional properties, especially those that are sustainable and recyclable (for example, cork and bamboo).  • Explaining material choices and why they were chosen as part of a product concept.  • Programming an N,E, S, W cardinal compass.  • Explaining how my program fits the design criteria and how it would be useful as part of a navigation tool.  • Developing an awareness of sustainable design.  • Identifying key industries that utilise 3D CAD modelling and explaining why.  • Describing how the product concept fits the client’s request and how it will benefit the customers.  • Explaining the key functions in my program, including any additions.  • Explaining how my program fits the design criteria and how it would be useful as part of a navigation tool.  • Explaining the key functions and features of my navigation tool to the client as part of a product concept pitch.  • Demonstrating a functional program as part of a product concept pitch. | • To know that accelerometers can detect movement.  • To understand that sensors can be useful in products as they mean the product can function without human input. |
| **Vocabulary** | equipment  flavours  ingredients  method  research  ripe | bridge method  cookbook  cross-contamination  farm to fork  preparation  storyboard | accurate  assembly-diagram  automata  axle  bench hook  cam  clamp  component  cutting list  diagram  dowel  drill bits  exploded-diagram  finish  follower | frame  function  hand drill  jelutong  linkage  mark out  measure  mechanism  model  research  right-angle  set square  tenon saw | smart  smartphone  equipment  navigation  cardinal compass  application (apps)  pedometer  GPS tracker  design brief  design criteria  client  function  program  duplicate  replica | loop  variable  value  if statement  boolean  corrode  moudable  lightweight  sustainable design  environmentally friendly  biodegradable  recyclable  product lifecycle |