# Subject: Design & Technology

# Key assessment criteria

Year 1	Year 2	Year 3
<u>Skills</u>	<u>Skills</u>	<u>Skills</u>
Cooking and Nutrition - Fruit and Vegetables	Cooking and Nutrition - A Balanced Diet	Cooking and Nutrition - Eating Seasonally
Design:  I can design smoothie carton packaging by-hand or on ICT software.  Make:  I can chop fruit and vegetables safely to make a smoothie. I can identify if a food is a fruit or a vegetable. I can say where and how fruits and vegetables grow.  Evaluate:  I can taste and evaluate different food combinations. I can describe appearance, smell and taste. I can suggest information to be included on packaging.	I can design a healthy wrap based on a food combination which works well together.      I can slice food safely using the bridge or claw grip.     I can construct a wrap that meets a design brief.  Evaluate:      I can describe the taste, texture and smell of fruit and vegetables.     I can taste test food combinations and final products.     I can describe the information that should be included on a label.     I can evaluate which grip was most effective.	Design:  I can create a healthy and nutritious recipe for a savoury tart using seasonal ingredients, considering the taste, texture, smell and appearance of the dish.  Make:  I can prepare myself and my work space to cook safely in, after having learnt the basic rules to avoid food contamination.  I can follow the instructions within a recipe.  Evaluate:  I can establish and use a design criteria to help test and review dishes.  I can describe the benefits of seasonal fruits and vegetables and the impact on the environment.  I can suggest points for improvement when making a seasonal tart.
<u>Knowledge</u>	<u>Knowledge</u>	<u>Knowledge</u>
Cooking and Nutrition - Fruit and Vegetables	Cooking and Nutrition - A Balanced Diet	Cooking and Nutrition - Eating Seasonally
<ul> <li>I know the difference between fruits and vegetables.</li> <li>I know that some foods typically known as vegetables are actually fruits (e.g. cucumber).</li> <li>I know that a blender is a machine which mixes ingredients together into a smooth liquid.</li> <li>I know that a fruit has seeds and a vegetable does not.</li> <li>I know that fruits grow on trees or vines.</li> <li>I know that vegetables can grow either above or below ground.</li> <li>I know that vegetables can come from different parts of the plant (e.g. roots: potatoes, leaves: lettuce, fruit: cucumber).</li> </ul>	<ul> <li>I know that 'diet' means the food and drink that a person or animal usually eats.</li> <li>I know what makes a balanced diet.</li> <li>I know where to find the nutritional information on packaging.</li> <li>I know that the five main food groups are: Carbohydrates, fruits and vegetables, protein, dairy and foods high in fat and sugar.</li> <li>I know that I should eat a range of different foods from each food group, and roughly how much of each food group.</li> </ul>	<ul> <li>I know that not all fruits and vegetables can be grown in the UK.</li> <li>I know that climate affects food growth.</li> <li>I know that vegetables and fruit grow in certain seasons.</li> <li>I know that cooking instructions are known as a 'recipe'.</li> <li>I know that imported food is food which has been brought into the country.</li> <li>I know that exported food is food which has been sent to another country.</li> <li>I know that imported foods travel from far away and this can negatively impact the environment.</li> </ul>

	<ul> <li>I know that nutrients are substances in food that all living things need to make energy, grow and develop.</li> <li>I know that 'ingredients' means the items in a mixture or recipe.</li> <li>I know that I should only have a maximum of five teaspoons of sugar a day to stay healthy.</li> <li>I know that many foods and drinks we do not expect to contain sugar do; we call these 'hidden sugars'.</li> </ul>	<ul> <li>I know that each fruit and vegetable gives us nutritional benefits because they contain vitamins, minerals and fibre.</li> <li>I know that vitamins, minerals and fibre are important for energy, growth and maintaining health.</li> <li>I know safety rules for using, storing and cleaning a knife safely.</li> <li>I know that similar coloured fruits and vegetables often have similar nutritional benefits.</li> </ul>
<u>Skills</u>	<u>Skills</u>	<u>Skills</u>
Mechanisms - Wheels and axels	Mechanisms - Making a moving monster	Mechanisms - Pneumatic Toy
Design:  I can design a vehicle that includes wheels, axles and axle holders, that when combined, will allow the wheels to move.  I can create clearly labelled drawings that illustrate movement.  Make:  I can adapt mechanisms, when:  * they do not work as they should.  * to fit their vehicle design.  * to improve how they work after testing their vehicle.  Evaluate:  I can test wheel and axle mechanisms, identifying what stops the wheels from turning, and recognising that a wheel needs an axle in order to move.	<ul> <li>Design:         <ul> <li>I can create a class design criteria for a moving monster.</li> <li>I can design a moving monster for a specific audience in accordance with a design criteria.</li> </ul> </li> <li>Make:         <ul> <li>I can make linkages using card for levers and split pins for pivots.</li> <li>I can experiment with linkages adjusting the widths, lengths and thicknesses of card used.</li> <li>I can cut and assemble components neatly.</li> </ul> </li> <li>Evaluate:         <ul> <li>I can evaluate my own designs against design criteria.</li> <li>I can use peer feedback to modify a final design.</li> </ul> </li> </ul>	<ul> <li>I can design a toy which uses a pneumatic system.</li> <li>I can design a criteria from a design brief.</li> <li>I can generate ideas using thumbnail sketches and exploded diagrams.</li> <li>I can talk about the different types of drawings that are used in design to explain ideas clearly.</li> <li>Make: <ul> <li>I can create a pneumatic system to create a desired motion.</li> <li>I can build secure housing for a pneumatic system.</li> <li>I can use syringes and balloons to create different types of pneumatic systems to make a functional and appealing pneumatic toy.</li> <li>I can select materials due to their functional and aesthetic characteristics.</li> <li>I can manipulate materials to create different effects by cutting, creasing, folding and weaving.</li> </ul> </li> <li>Evaluate: <ul> <li>I can use the views of others to improve designs.</li> <li>I can test and modify the outcome, suggesting improvements.</li> <li>I can understand the purpose of exploded-diagrams through the eyes of a designer and their client.</li> </ul> </li> </ul>

#### **Mechanisms - Wheels and axels**

#### **Technical:**

- I know that wheels need to be round to rotate and move.
- I know that for a wheel to move it must be attached to a rotating axle.
- I know that an axle moves within an axle holder which is fixed to the vehicle or toy.
- I know that the frame of a vehicle (chassis) needs to be balanced.

#### Additional:

 I know some real-life items that use wheels such as wheelbarrows, hamster wheels and vehicles.

# Knowledge

#### Mechanisms - Making a moving monster

#### Technical:

- I know that mechanisms are a collection of moving parts that work together as a machine to produce movement.
- I know that there is always an input and output in a mechanism.
- I know that an input is the energy that is used to start something working.
- I know that an output is the movement that happens as a result of the input.
- I know that a lever is something that turns on a pivot.
- I know that a linkage mechanism is made up of a series of levers.

#### **Additional:**

• I know some real-life objects that contain mechanisms.

# Knowledge

#### **Mechanisms - Pneumatic Tov**

#### Technical:

- I know how pneumatic systems work.
- I know that pneumatic systems can be used as part of a mechanism.
- I know that pneumatic systems operate by drawing in, releasing and compressing air.

#### Additional:

- I know how sketches, drawings and diagrams can be used to communicate design ideas.
- I know that exploded-diagrams are used to show how different parts of a product fit together.
- I know that thumbnail sketches are small drawings to get ideas down on paper quickly.

# Skills

#### **Textiles - Puppets**

#### Design:

• I can use a template to create a design for a puppet.

#### Make:

- I can cut fabric neatly with scissors.
- I can use joining methods to decorate a puppet.
- I can sequence the steps taken during construction.

#### Evaluate:

 I can reflect on a finished product, explaining likes and dislikes.

# **Skills**

# Structures - Baby Bear's Chair

#### Design:

 I can generate and communicate ideas using sketching and modelling.

#### Make:

- I can make a structure according to design criteria.
- I can create joints and structures from paper/card and tape.
- I can build a strong and stiff structure by folding paper.

#### **Evaluate:**

- I can test the strength of my own structure.
- I can identify the weakest part of a structure.
- I can evaluate the strength, stiffness and stability of my own structure.

# Skills

# Textiles - an Egyptian Collar

#### Design:

- I can design and make a template for an Egyptian collar and apply individual design criteria.
- I can follow my design criteria to create an Egyptian collar.

#### Make:

- I can select and cut fabrics with ease using fabric scissors.
- I can thread needles with greater independence.
- I can tie knots with greater independence.
- I can sew cross stitch to decorate or join fabric.
- I can decorate fabric using appliqué, beads (or other embellishments), ribbon and pinking scissors.

#### Evaluate:

I can evaluate an end product

# **Textiles - Puppets**

- I know that 'joining technique' means connecting two pieces of material together.
- I know that there are various temporary methods of joining fabric by using staples, glue or pins.
- I know that different techniques for joining materials can be used for different purposes.
- I know that a template (or fabric pattern) is used to cut out the same shape multiple times.
- I know that drawing a design idea is useful to see how an idea will look.

# Knowledge

#### Structures - Baby Bear's Chair

- I know that materials can be manipulated to improve strength and stiffness.
- I know that a structure is something which has been formed or made from parts.
- I know that a 'stable' structure is one which is firmly fixed and unlikely to change or move.
- I know that a 'strong' structure is one which does not break easily.
- I know that a 'stiff' structure or material is one which does not bend easily.

# Knowledge

#### Textiles - an Egyptian Collar

#### Technical:

- I know that appliqué is a way of mending or decorating a textile by applying smaller pieces of fabric.
- I understand that a product's function relies on material choices.

#### Additional:

 I can identify and explain some materials and explain their aesthetic and/or functional properties.

Year 4	Year 5	Year 6
<u>Skills</u>	<u>Skills</u>	<u>Skills</u>
Textiles:	Cooking and Nutrition - What could be healthier?	Electric Systems - Steady hand game
<ul> <li>Design:         <ul> <li>I can write a design criteria for a product, articulating decisions made.</li> <li>I can design a personalised book sleeve (changed to t-shirt to fit with the topic.)</li> </ul> </li> <li>Make:         <ul> <li>I can make and test a paper template with accuracy and in keeping with the design criteria.</li> <li>I can measure, mark and cut fabric using a paper template.</li> <li>I can select a stitch style to join fabric, working neatly by sewing small, straight stitches.</li> <li>I can incorporate fastenings into a design.</li> </ul> </li> <li>Evaluate:         <ul> <li>I can test and evaluate an end product against the original design criteria.</li> <li>I can decide how many of the criteria should be met for the product to be considered successful.</li> <li>I can suggest modifications for improvement.</li> <li>I can articulate the advantages and disadvantages of different fastening types.</li> </ul> </li> </ul>	<ul> <li>I can adapt a traditional recipe, understanding that the nutritional value of a recipe alters if you remove, substitute or add additional ingredients.</li> <li>I can write an amended method for a recipe to incorporate the relevant changes to ingredients.</li> <li>I can design appealing packaging to reflect a recipe.</li> <li>Make:         <ul> <li>I can cut and prepare vegetables safely.</li> <li>I can use equipment safely, including knives, hot pans and hobs.</li> <li>I can avoid cross-contamination and talk about how I have avoided cross-contamination.</li> <li>I can follow a step by step method carefully to make a recipe.</li> </ul> </li> </ul>	Design:  I can design a steady hand game - identifying and naming the components required.  I can draw a design from three different perspectives.  I can generate ideas through sketching and discussion.  I can model ideas through prototypes.  Make:  I can construct a stable base for a game.  I can accurately cut, fold and assemble a net.  I can decorate the base of the game to a high quality finish.  I can make and test circuits.  I can incorporate a circuit into a base.  Evaluate:  I can test my own and others finished games, identifying what went well and making suggestions for improvement.

<u>Knowledge</u>	<u>Knowledge</u>	<u>Knowledge</u>
<ul> <li>I know that a fastening is something which holds two pieces of material together, for example a zipper, toggle, button, press stud and velcro.</li> <li>I know that different fastening types are useful for different purposes.</li> <li>I know that creating a mock up (prototype) of their design is useful for checking ideas and proportions.</li> <li>I know how to make a pattern accurately for a design.</li> </ul>	I know where meat comes from - learning that beef is from cattle and how beef is reared and processed, including key welfare issues.     I know that I can adapt a recipe to make it healthier by substituting ingredients.     I know that I can use a nutritional calculator to see how healthy a food option is.     I know 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.	Electric Systems - Steady hand game  Technical:  I know that batteries contain acid, which can be dangerous if they leak.  I know the names of the components in a basic series circuit, including a buzzer.  Additional:  I know the diagram perspectives 'top view', 'side view' and 'back'
Skills Structures - Pavilions	Skills  Mechanical systems - Pop up Book	Skills  Mechanical systems - Automata Toys
<ul> <li>Design:         <ul> <li>I can design a stable pavilion structure that is aesthetically pleasing and select materials to create a desired effect.</li> <li>I can create a design in accordance with a plan.</li> </ul> </li> </ul>	I can design a pop-up book which uses a mixture of structures and mechanisms.     I can name each mechanism, input and output accurately.     I can Storyboard ideas for a book.	I can experiment with a range of cams, creating a design for an automata toy based on a choice of cam to create a desired movement.      I can understand how linkages change the direction of a force.
<ul> <li>I can create a range of different shaped frame structures.</li> <li>I can make a variety of free standing frame structures of different shapes and sizes.</li> <li>I can select appropriate materials to build a strong structure and cladding.</li> <li>I can reinforce corners to strengthen a structure.</li> <li>I can build a frame structure designed to support weight.</li> <li>I can create different textural effects with materials.</li> </ul> Evaluate: <ul> <li>I can evaluate structures made by the class.</li> <li>I can describe what characteristics of a design and construction made it the most effective.</li> <li>I can consider effective and ineffective designs.</li> </ul>	I can follow a design brief to make a pop up book, neatly and with focus on accuracy.     I can make mechanisms and/or structures using sliders, pivots and folds to produce movement.     I can use layers and spacers to hide the workings of mechanical parts for an aesthetically pleasing result.  Evaluate:  N/A	<ul> <li>I can make things move at the same time.</li> <li>I can understand and draw cross-sectional diagrams to show the inner-workings of my design.</li> <li>Make:         <ul> <li>I can measure, mark and check the accuracy of the jelutong and dowel pieces required.</li> <li>I can measure, mark and cut components accurately using a ruler and scissors.</li> <li>I can assemble components accurately to make a stable frame.</li> <li>I can understand that for the frame to function effectively the components must be cut accurately and the joints of the frame secured at right angles.</li> <li>I can select appropriate materials based on the materials</li> </ul> </li> </ul>

being joined and the speed at which the glue needs to

dry/set.

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#### Structures - Pavilions

#### Technical:

- I know what a frame structure is.
- I know that a 'free-standing' structure is one which can stand on its own.

#### Additional:

- I know that a pavilion is a decorative building or structure for leisure activities.
- I know that cladding can be applied to structures for different effects.
- I know that aesthetics are how a product looks.
- I know that a product's function means its purpose.
- I know that the target audience means the person or group of people a product is designed for.
- I know that architects consider light, shadow and patterns when designing.

# Knowledge

#### Mechanical systems - Pop up Book

#### Technical:

- I know that mechanisms control movement.
- I know that mechanisms can be used to change one kind of motion into another.
- I know how to use sliders, pivots and folds to create paperbased mechanisms.

#### Additional:

- I know that a design brief is a description of what I am going to design and make.
- I know that designers often want to hide mechanisms to make a product more aesthetically pleasing.

# Knowledge

#### **Mechanical systems - Automata Toys**

#### Technical:

- I know that the mechanism in an automata uses a system of cams, axles and followers.
- I know that different shaped cams produce different outputs.

#### Additional:

- I know that an automata is a hand powered mechanical toy.
- I know that a cross-sectional diagram shows the inner workings of a product.
- I know how to use a bench hook and saw safely.
- I know that a set square can be used to help mark 90° angles.

# Skills

#### **Electric Systems - Torches**

#### Design:

 I can design a torch, giving consideration to the target audience and creating both design and success criteria focusing on features of individual design ideas.

#### Make:

- I can make a torch with a working electrical circuit and switch
- I can use appropriate equipment to cut and attach materials.
- I can assemble a torch according to the design and success criteria.

#### **Evaluate:**

 I can evaluate electrical products, testing and evaluating the success of a final product.

# **Skills**

#### Structures - Bridges

#### Design:

- I can design a stable structure that is able to support weight.
- I can create a frame structure with a focus on triangulation.

#### Make:

- I can make a range of different shaped beam bridges.
- I can use triangles to create truss bridges that span a given distance and support a load.
- I can build a wooden bridge structure.
- I can independently measure and mark wood accurately.
- I can select appropriate tools and equipment for particular tasks.
- I can use the correct techniques to saw safely.
- I can identify where a structure needs reinforcement and use card corners for support.
- I can explain why selecting appropriate materials is an important part of the design process.
- I can understand basic wood functional properties.

#### **Evaluate:**

- I can adapt and improve my own bridge structure by identifying points of weakness and reinforcing them as necessary.
- I can suggest points for improvements for own bridges and those designed by others.

#### Skills

#### Digital World - Navigating the World

#### Design:

- I can write a design brief from information submitted by a client.
- I can develop design criteria to fulfil the client's request.
- I can consider and suggest additional functions for my navigation tool.
- I can develop a product idea through annotated sketches.
- I can place and manoeuvre 3D objects, using CAD.
- I can change the properties of, or combine one or more 3D objects, using CAD.

#### Make:

- I can consider materials and their functional properties, especially those that are sustainable and recyclable (for example, cork and bamboo).
- I can explain material choices and why they were chosen as part of a product concept.
- I can program an N,E, S, W cardinal compass.

#### Evaluate:

- I can explain how my program fits the design criteria and how it would be useful as part of a navigation tool.
- I can develop an awareness of sustainable design.
- I can identify key industries that utilise 3D CAD modelling and explain why.
- I can describe how the product concept fits the client's request and how it will benefit the customers.
- I can explain the key functions in my program, including any additions.
- I can explain the key functions and features of my navigation tool to the client as part of a product concept pitch.
- I can demonstrate a functional program as part of a product concept pitch.

# **Electric Systems - Torches**

#### Technical:

- I know that an electrical circuit must be complete for electricity to flow.
- I know that a switch can be used to complete and break an electrical circuit.

#### Additional:

- I know the features of a torch: case, contacts, batteries, switch, reflector, lamp, lens.
- I know facts from the history and invention of the electric light bulb(s) by Sir Joseph Swan and Thomas Edison.

# Knowledge

#### Structures - Bridges

#### Technical:

- I know some different ways to reinforce structures.
- I know how triangles can be used to reinforce bridges.
- I know that properties are words that describe the form and function of materials.
- I know why material selection is important based on properties.
- I know the material (functional and aesthetic) properties of wood.

#### Additional:

- I know the difference between arch, beam, truss and suspension bridges.
- I know how to carry and use a saw safely.

# Knowledge

# Digital World - Electronic Charm Technical:

- I know that accelerometers can detect movement.
- I know that sensors can be useful in products as they mean the product can function without human input.

#### Additional:

- I know that designers write design briefs and develop design criteria to enable them to fulfil a client's request.
- I know that 'multifunctional' means an object or product has more than one function.
- I know that magnetometers are devices that measure the Earth's magnetic field to determine which direction you are facing.

# Design and Technology (DT): Bedrock - Bookmark

# Nursery

# Reception

#### Personal, Social, Emotional Development

#### 3 / 4 year olds:

• Select and use activities and resources, with help when needed. This helps them to achieve a goal they have chosen or one which is suggested to them.

#### **Physical Development**

#### 3 / 4 year olds:

- Use large-muscle movements to wave flags and streamers, paint and make marks.
- Choose the right resources to carry out their own plan.
- Use one-handed tools and equipment, for example, making snips in paper with scissors.

#### Understanding the World

#### 3 / 4 year olds:

Explore how things work.

#### **Expressive Arts and Design**

#### 3 / 4 year olds:

- Make imaginative and complex 'small worlds' with blocks and construction kits, such as a city with different buildings and a park.
- Explore different materials freely, in order to develop their ideas about how to use them and what to make.
- Develop their own ideas and then decide which materials to use to express them.
- Create closed shapes with continuous lines, and begin to use these shapes to represent objects.

# **Physical Development**

#### Reception:

- Progress towards a more fluent style of moving, with developing control and grace.
- Develop their small motor skills so that they can use a range of tools competently, safely and confidently.
- Use their core muscle strength to achieve a good posture when sitting at a table or sitting on the floor.

#### **ELG: PD: Fine motor skills:**

• Use a range of small tools, including scissors, paintbrushes and cutlery.

#### **Expressive Arts and Design**

#### Reception:

- Explore, use and refine a variety of artistic effects to express their ideas and feelings.
- Return to and build on their previous learning, refining ideas and developing their ability to represent them.
- Create collaboratively, sharing ideas, resources and skills.

#### **ELG: EAD: Creating with materials:**

- Safely use and explore a variety of materials, tools and techniques, experimenting with colour, design, texture, form and function.
- Share their creations, explaining the process they have used.