Year 2: Design and Technology

Block 1 – Mechanisms
Fairground Wheels

Overview of unit:	Substantive Knowledge:	Disciplinary Knowledge:
Prior learning – Children will not have experienced axles and wheels in KS1. Use kapow year 1 lesson 1, How do wheels move? , to make prototypes of axles and wheels, establishing how to resolve mistakes.		
• Design and label a wheel. • Consider the designs of others and make comments about their practicality or appeal. • Consider the materials, shape, construction and mechanisms of their wheel. • Label their designs. • Build a stable structure with a rotating wheel. • Test and adapt their designs as necessary. • Follow a design plan to make a completed model of the wheel.	• To know that different materials have different properties and are therefore suitable for different uses. • To know the features of a Ferris wheel include the wheel, frame, pods, a base, an axle and an axle holder. • To know that it is important to test my design as I go along so that I can solve any problems that may occur.	• Selecting a suitable linkage system to produce the desired motions. • Designing a wheel. • Selecting appropriate materials based on their properties. • Selecting materials according to their characteristics. • Following a design brief. • Evaluating different designs. • Testing and adapting a design.

Next steps

This unit will prepare the children for their next mechanisms unit in Year 2 – Making a moving monster, to explore levers, linkages and pivots through existing products and experimentation, use this research to construct and assemble a moving monster.

Important subject vocabulary

Design – a plan or drawing to show how something will work
design criteria – the goals we must achieve to make our plan successful
Ferris wheel - a fairground ride with a giant vertical revolving wheel
Pods - a place for people to sit on the ride
Axle- the part of the mechanism that allows the wheel to turn
axle holder – holds the axle in place but allows it to turn
mechanism - different parts working together in a machine

Block 2 – Structures
Baby Bear's Chair

Overview of unit:	Substantive Knowledge:	Disciplinary Knowledge:
Prior learning – Children will have experienced making windmills in year 1. • They understand that the shape of materials can be changed to improve the strength and stiffness of structures. They understand that cylinders are a strong type of structure (and, therefore, they are the main shape used for windmills and lighthouses). They are beginning to know that different structures are used for different purposes. They know that a structure is something that has been made and put together. • In year 2 they have learned that axles are used in structures and mechanisms to make parts turn in a circle.		
• Identify man-made and natural structures. • Identify stable and unstable structural shapes. • Contribute to discussions. • Identify features that make a chair stable. • Work independently to make a stable structure, following a demonstration. • Explain how their ideas would be suitable for Baby Bear. • Produce a model that supports a teddy, using the appropriate materials and construction techniques. • Explain how they made their model strong, stiff and stable.	• Generating and communicating ideas using sketching and modelling. • Learning about different types of structures, found in the natural world and in everyday objects. • Making a structure according to design criteria. • Creating joints and structures from paper/card and tape. • Building a strong and stiff structure by folding paper. • Exploring the features of structures. • Comparing the stability of different shapes. • Testing the strength of their own structures. • Identifying the weakest part of a structure. • Evaluating the strength, stiffness and stability of their own structure.	• To know that shapes and structures with wide, flat bases or legs are the most stable. • To understand that the shape of a structure affects its strength. • To know that materials can be manipulated to improve strength and stiffness. • To know that a structure is something which has been formed or made from parts. • To know that a 'stable' structure is one which is firmly fixed and unlikely to change or move. • To know that a 'strong' structure is one which does not break easily.To know that a 'stiff' structure or material is one which does not bend easily.

Next steps

The children will move onto making structures in year 3. They will create castles with

- To understand that wide and flat based objects are more stable.
- To understand the importance of strength and stiffness in structures.
- To know the following features of a structure and their purpose.
- To know that a façade is the front of a structure.

Important subject vocabulary

design criteria – the goals we must achieve to make our plan successful
man-made – made by humans, not nature
natural – made by nature, not humans
properties – explaining what the object or material is like, for example, hard, soft, flexible, brittle.
Structure - a building or something that is arranged in a specific/special way
Stable - steady

Block 3 – Food
A balanced diet – special food focus day

Overview of unit:	Substantive Knowledge:	Disciplinary Knowledge:
Prior learning – children experienced selecting, slicing and blending fruit and vegetables to create smoothies in year 1. They understood that fruit and vegetables are a healthy choice and where these foods come from.		
• Name the main food groups and identify foods that belong to each group. • Describe the taste, texture and smell of a given food. • Think of four different wrap ideas, considering flavour combinations. • Construct a wrap that meets the design brief and their plan.	• Designing a healthy wrap based on a food combination which works 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'.

<u>Next steps</u>
In year 3 the children will be

- 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 that has been brought into the country.

Important subject vocabulary

balanced diet – the food and drink eaten that includes all of the different food groups but also in the right amounts.
Carbohydrate - a food group that gives us energy such as rice, bread, pasta.
Dairy – a food group that provides our bodies with energy, protein, vitamins and minerals. In particular, calcium. Found in cheese, butter, milk and yoghurt.
Fruit/vegetables – a food group that provides our bodies with vitamins and fibre. Helps us poo.
Ingredients – food items included in a recipe
Oils – a food group that helps your body to absorb (take on) vitamins.
Protein – a food group that helps our bodies grow and repair such as meat, fish, beans and pulses

Block 4– Mechanisms
Making a moving monster

Overview of unit:	Substantive Knowledge:	Disciplinary Knowledge:
Prior learning – In year 1, children experienced making levers. Earlier in year 2, the children learned how to use axles and wheels.		
• Identify the correct terms for levers, linkages and pivots. • Analyse popular toys with the correct terminology. • Create functional linkages that produce the desired input and output motions. • Design monsters suitable for children, which satisfy most of the design criteria. • Evaluate their two designs against the design criteria, using this information and the feedback of their peers to choose their best design. • Select and assemble materials to create their planned monster features. • Assemble the monster to their linkages without affecting their functionality.	• Creating a design criteria for a moving monster as a class. • 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 an 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.

Next steps

The children will learn in Year 5

- To know that mechanisms control movement.
- To understand that mechanisms can be used to change one kind of motion into another.
- To understand how to use sliders, pivots and folds to create paper-based mechanisms.
- To know that a design brief is a description of what I am going to design and make.
- To know that designers often want to hide mechanisms to make a product more aesthetically pleasing.

Important subject vocabulary

Axle – the part of a mechanism that allows a wheel to move.
design criteria - goals we must achieve to make our design successful
input – energy needed to start something working.
Linkage - a mechanism made up of a series of levers
Mechanical – an object with moving parts working together as a machine to make something move.

Output – the movement that happens after a machine is given input
Pivot – a pin on which something turns