Design and Technology – Year 3

Content- Mechanism- Levers and Linkages

Big Question: Why is functionality important when making a product?

NC objectives - **areas of study**	End point of area of study	Vocabulary		
		Basic	Adventurous	Technical
Through a variety of creative and practical activities, pupils should be taught the knowledge, understanding and skills needed to engage in an iterative process of designing and making. They should work in a range of relevant contexts. -Children should understand and use mechanical systems in their products. -They use research and develop design criteria to inform the design of innovative, functional, appealing products that are fit for purpose, aimed at particular individuals or groups. -They generate, develop, model and communicate their ideas through discussion, annotated sketches, cross sectional and exploded diagrams, prototypes, pattern pieces and computer aided design. -They can select from and use a wider range of tools, equipment to perform practical tasks accurately. -They can select from and use wider range of materials and components, including construction materials and textiles according to their functional properties and aesthetic qualities.	**<u>Mechanisms</u>** Children will create a product using levers and linkages, thinking about their intended user and design criteria. Children will be able to accurately measure, mark out, cut and complete finishing techniques. Children can distinguish between fixed and loose pivots. Children understand what the input and output levers are and annotate these in their design. Children understand and use the correct technical vocabulary linked to their product. Children will be able to use a range of tools to help accurately measure, mark out and cut pieces of card or paper. With supervision, children will begin to use a glue gun.	User, design, measure, mark out, cut, complete, finishing, glue,	System, linear, process, appealing, function, input, output, guide, bridge, purpose	Lever, linkage, rotary, oscillating, reciprocating, prototype, innovative, appealing, loose pivot, fixed pivot.

-They can investigate and analyse a range of existing products. -Children evaluate their ideas and products against their own design criteria and consider the views of others to improve their work. -They can understand how key events and individuals in design and technology have helped shape the world. -They can apply understanding of computing to programme, monitor and control their products.				

Knowledge

Substantive Knowledge

Mechanism- Concept- Functionality

Lesson 1:

LO: To know levers and linkages mechanisms.

(Retrieval years 1- Children to identify levers and sliders-Can they identify them in existing products)

Children know and investigate, analyse and evaluate books and, where available, other products which have a range of lever and linkage mechanisms e.g. bike brakes,

Questions to consider:

Who *might it be for?*

What is its purpose?

What do you think will move?

How will you make it move?

What part moved and how did it move?

How do you think the mechanism works?

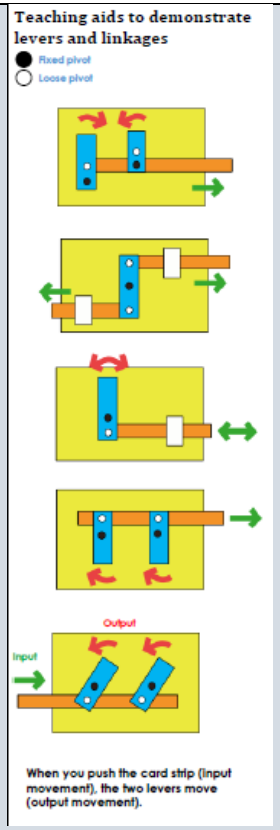
Disciplinary Knowledge

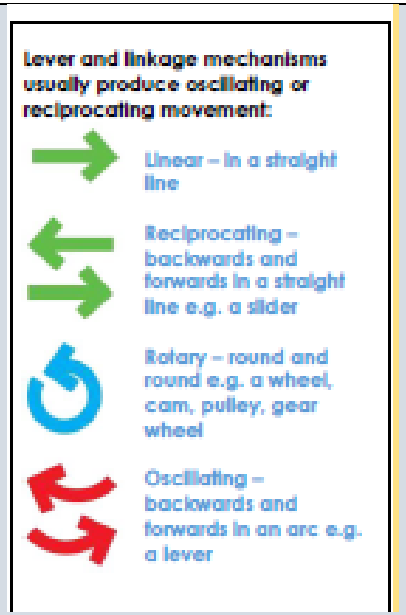
Each lesson: Tell chn- Today we are going to be designer/illustrator and create a moving book or poster using levers and linkages. Explain the role of a designer/illustrator and how it is important we create a functional product that works to a high standard using the correct materials. Children should understand what their working product will look like and work like.

Children to draw upon other subject disciplines and knowledge such as Mathematics and Art and Design. E.g. use of positional and directional vocabulary. Children to measure out accurately using cm/mm. Children to draw upon their knowledge in Art and use line, colour and pattern to create finishing techniques appropriate for their user.

Children to follow the four aspects of Design and Technology- research, design, make and evaluate whilst building upon technical knowledge to make their finished product.

What materials have been used? *How effective do you think it is and why? What else could move?* Introduce concept `functionality` - Do children know the function of each of these products and who they have been created for? **Lesson 2:** **LO: To understand levers and linkages mechanisms.** **LO: To know the difference between loose and fixed pivots.** Children to know how levers and linkage mechanisms work. Use prepared teaching aids to show children the movements of the mechanisms. Children to be given the opportunity to create levers and linkages using paper and cards. Children to know the movements of each lever and linkage and use the correct vocabulary to describe them. Children will understand the moments from their year 1 learning but the technical vocabulary will need to be introduced in this lesson and used throughout the unit.	





Questions to consider:

Which card strip is the lever? Which card strip is acting as the linkage? Which part of the system is the input and which part the output? What does the type of movement remind you of? Which are the fixed pivots and which are the loose pivots?

Lesson 3:

LO: To understand the design criteria and make realistic poster design ideas.

Children to generate realistic ideas and their own design criteria through discussion, focusing on the needs of the user.

They will then draw annotated sketches and prototypes to develop, model and communicate ideas.

As a class create a design brief with a specific purpose and function.

Plan the types of materials that they will use and list the making process stages. (Retrieval from year 1-Children can include sliders and levers or pops up to demonstrate knowledge and understanding, however ensure levers and linkages are a main focus.) **Lesson 4:** **LO: To know how to use appropriate tools accurately to cut, shape and join paper and card.** Children to articulate the main stages of making. They will be able to select from the appropriate tools and know how to accurately cut, shape and join paper and card, drawing upon the basic skills taught in the earlier sessions. E.g. creating levers and linkages. Set goals for my work. **Lesson 5:** **LO: To know how to make functional product and use finishing techniques for user.** Children to have the opportunity to finish their product and use any finishing techniques to meet the needs of the user. E.g. colouring crayons, paint etc. **Lesson 6:** **LO: To understand how to evaluate own product and ideas against design criteria.** Children to evaluate their own product and ideas against the criteria and users needs. Ask user to share their opinions about the product and test the functionality of their product. Encourage children reflect on the making process and finished product. Reviewing and evaluating created things.	

Concepts			
Functionality Pupils should design and make products that work/function effectively in order to fulfil users' needs, wants and purposes. • Know that their products should work in some way. • Know how a range of existing products work. • Develop specific technical knowledge and understanding in order to ensure that their products work well. • Understand the meaning of 'functionality' and its importance to design and technology. • Know how functionality is relevant to the product they are designing. • Know how the materials and components they use assist the functionality of the product. • Contrast the functional properties of materials and components with their aesthetic qualities. • Understand that how products work affects how they are used.	**Authenticity**	**Innovation**	**Significance**

ASSESSMENT

KNOW MORE, REMEMBER MORE, DO MORE...

In this unit of learning, progress has been made when a learner knows more. This 'distance travelled' from the starting point is evidenced through them remembering more and doing more: in books, low stakes quizzes, retrieval, use of mind maps, answering the big question and being able to feel more confident about this unit.