Year 5 – Mechanical Systems: Pop-up Book

Rationale: Pupils who are **secure** will be able to:

- Produce a suitable plan for each page of their book.
- Produce the structure of the book. Assemble the components necessary for all their structures/mechanisms.
- Hide the mechanical elements with more layers using spacers where needed.
- Use a range of mechanisms and structures to illustrate their story and make it interactive for the users.
- Use appropriate materials and captions to illustrate the story.

Learning Objectives:

- 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
- Investigate and analyse a range of existing products
- Apply their understanding of how to strengthen, stiffen and reinforce more complex structures
- Generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer-aided design
- Select from and use a wider range of materials and components, including construction materials, textiles and ingredients, according to their functional properties and aesthetic qualities

Overview:	Cross Curricular Links
Lesson 1: Pop-up book page design - To design a pop-up book Lesson 2: Making my pop-up book – To follow my design brief to make my pop-up book Lesson 3: Using layers and spacers – To use layers and spacers to cover the working of mechanisms Lesson 4: Writing and illustrating – To create a high-quality product suitable for target user.	**Resources** • A selection of pop-up/interactive books and greetings cards • A disassembled mechanism from a greetings card • Link to videos: • Drawing and colouring pencils • Pop-up example • Children's completed Activity: Pop-up book design template from 'Lesson 1: Pop up book page design' • A3 Card (three sheets per pupil) • Scrap card/smaller for the mechanisms and structures • Scissors • Glue sticks • Paper fasteners/split pins, the number needed depends on how many children have used this mechanism and how many times they have used it • Hole-punch (four per class) • Rulers (one per pair of pupils) • Pop-up examples • Children's completed Activity: Pop-up book design template from 'Lesson 1: Pop up book page design' • Pupils' book structures so far • Scrap/smaller pieces of card for the mechanisms and structures • Thick or corrugated card, to make spacers • Scissors (one each) • Glue sticks (enough to share per table) • Paper fasteners/split pins, the number needed depends on how many children have used this mechanism and how many times they have used it • Hole-punch (four for the class) • Rulers (one per pair) • Pupils' book structures so far • Scrap, coloured card/paper • Scissors • Glue sticks • Any other finishing materials you want to supply: foil, crepe paper, wobbly-eyes, pipe cleaners, felt, etc

Impact/Assessment

Most Children will: • Producing a suitable plan for each page, naming each type of mechanism, input and output accurately. • Producing the structure of the book and beginning to draw and assemble the components necessary for their first structures/mechanisms. • Assembling the components necessary for all their structures/mechanisms and hiding the relevant parts of the mechanisms with more layers using spacers where needed. • Using a range of mechanisms and structures to illustrate their story and make it interactive for the users.

More Able Children will: • Producing the above but to a higher level of sophistication, particularly with the use of more complex linkage systems. • Using more demanding mechanisms/structures. Producing a product of exceptionally high quality – neatly and accurately cut and assembled. • Assembling the components necessary for all their structures/mechanisms and hiding the relevant parts of the mechanisms with more layers using spacers where needed. • :Including a wider range of more sophisticated mechanisms and structures.