Scheme of Learning: User Centred – Mechanical Toy: Timbers and Mechanical Devices

Topic Sequence: Year 7 Design & Technology Rotation

1	2	3
User Centred Tiny House	Mechanical Toy	Food Technology

Topic Overview:

This project serves as an introduction to working with timber and builds students' knowledge of mechanical devices. Students are introduced to the concepts of using mechanical devices to gain "mechanical advantage" – building awareness of levers, cams, gears, and pulleys. Students apply this knowledge through manufacturing a timber framed mechanical toy.

This is students' first introduction to working with "resistant materials" and requires them to handle workshop tools with skill and accuracy. They also have the opportunity to use the powered workshop tools and develop their knowledge of workshop health and safety practices.

Through manufacturing a functioning product, students are encouraged to develop a "problem solving" approach in the workshop to adapt their methods, reflect on what is going well and how they might improve further. Students develop their knowledge of "stock forms" of materials, the sources and life cycle of common materials.

Lesson Sequence:

The lessons have been sequenced to purposely build pupils' understanding and knowledge of Design & Technology that should have been delivered during Key Stage 2. There needs to be a balance between delivering core knowledge, all of which must be related to the intended practical outcome and also developing students confidence in using effectively and accurately the equipment and tools in the workshop.

The topic starts with a lesson for exploring some standard mechanical devices, to make the link to KS2 study. This sets the scene for the practical project that will follow. It is good practice for students to become practised in research, completed in a range of methods, from handling existing products, web based research and accessing specific relevant software. There is a subsequent lesson that draws this knowledge together further and introduces the concepts of mechanical levers.

The main material group used through this project is timber based materials, students are introduced to the categories and stock forms, which will be used throughout. This encourages the use of subject specific vocabulary throughout the project and beyond, from their first experience in the workshop.

The following sequence of lessons takes the students through a basic project manufacture, including accuracy and skill in measuring and marking out, using hand and powered tools, the use of glasspaper and adhesives. These lessons also require students to accurately and logically assemble a working product, diagnosing and solving faults throughout.

The final sequence of lessons explores the use of CAD and CAM, using 2D design and the laser cutter to create decorative follower toppers. Introducing an awareness of this technology and encouraging independent use is a useful foundation on which to build in subsequent years/projects.

Sequence of Lessons:

1	Analysis of existing products
2	Levers
3	Timber based materials
4	Marking out
5	Sawing and drilling
6	Sanding and adhesives
7	Continuation of all practical skills
8	Assembly – using adhesives
9	Computer aided design
10	Forms Assessment
11	Computer aided manufacture - Laser cutting
12	Assembly of mechanism
13	Final finishing of toy

Topic Resources:

Knowledge Map:	Mechanical Toy	**Prescribed Sources:**	None

Assessment:

Knowledge:	Microsoft Forms Assessment
Application of Knowledge:	Production of a working mechanical toy, incorporating CAD/CAM toppers

Supportive Reading:

Technology Student	technologystudent.com
Focus Education - Focus on Mechanisms	Via the Design & Technology Curriculum Zone on the school website.