**Progress in Design Technology – Mechanisms**

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|  | **Year 1** | **Year 2** | **Year 3** | **Year 4** | **Year 5** | **Year 6** |
| **Mechanisms** | **Example projects:**  **1. Moving Story Books**  **Content: Explore levers and sliders.**  **2. Wheels and Axels**  **Content: Explore rotating/non-rotating wheels.**  **Design:**  Work within different contexts.  Design and make for themselves or others.  Begin to communicate ideas by talking and drawing.  **Make:**  Assemble accurately.  Create movements up/down/along/around.  Select from a range of tools, materials and components.  Follow safety procedures.  Measure, mark out, shape and cut materials.  **Evaluate:**  Research and test mechanisms.  Test finished products.  Talk about how to improve products.  **Technical knowledge:**  Understand what a mechanism is. Understand how to create different movements.  Know how to operate simple equipment successfully.  Understand the simple characteristics of materials.  Begin to use correct technical vocabulary.  Understand how an axle works.  Use learning from science, maths and other subjects to help design and make products that work. | **Example projects:**  **1. Moving Monsters**  **Content: Levers and linkages.**  **2. Ferris Wheel**  **Content: Explore mechanisms.**  **Design:**  Say how their products will work and how they’re suitable for the users.  Use simple design criteria.  Generate ideas.  Develop and communicate ideas by talking, drawing and ICT where appropriate.  Explore materials, components  Make templates and mock-ups.  **Make:**  Select appropriate tools and materials and explain their choices.  Follow safety procedures.  Measure, mark out, cut, shape, assemble, join and combine a range of materials and components accurately.  Begin to use finishing techniques.  **Evaluate:**  Carry out research and apply to design.  Make simple judgements about their products and ideas against design criteria.  Talk and write about how to make their products better.  **Technical knowledge:**  Identify input and output.  Know about the movement of simple mechanisms and components.  Use correct technical vocabulary for products.  Use learning from science, maths and other subjects to help design and make products that work. | **Example project:**  **Pneumatic Systems**  **Content: Examine pneumatic systems using syringes and balloons.**  **Design:**  Use the views of others to improve designs.  Describe the purpose and  design features of their products.  Model ideas using prototypes.  Communicate ideas using annotated diagrams and some computer-aided design packages where appropriate.  **Make:**  Select appropriate materials and equipment for functional and aesthetic purposes.  Order the main stages of making.  Follow procedures for safety.  Measure, mark out, cut, shape, assemble, join and combine a range of materials and components with some accuracy.  Apply some finishing techniques.  **Evaluate:**  Identify strengths and areas for development referring to design criteria.  Consider the views of others.  Investigate and analyse how well products have been made and whether they achieved their purpose.  Recognise influential inventors, designers and engineers.  **Technical knowledge:**  Understand how pneumatic systems work.  Use correct technical vocabulary for products.  Use learning from science, maths and other subjects to help design and make products that work. | **Example project:**  **Slingshot cars**  **Content: Kinetic energy.**  **Design:**  Use nets and tabs to design and make a car body.  Use the views of others to improve designs.  Use annotated sketches, some cross-sectional drawings and computer-aided design packages to develop and communicate ideas.  Take account of the availability of resources.  **Make:**  Confidently select tools, materials and equipment suitable to the task and explain their choices giving evidence.  Follow procedures for safety.  Measure, mark out, cut, shape, assemble, join and combine a range of materials and components with accuracy.  Accurately apply several finishing techniques.  **Evaluate:**  Identify strengths and areas for development referring to design criteria.  Consider the views of others.  Investigate and analyse how well products have been made and whether they achieved their purpose.  Recognise several influential inventors, designers and engineers.  **Technical knowledge:**  Use correct technical vocabulary – chassis, axle etc.  Recognise how car body shape can Impact on speed (air resistance).  Use learning from science, maths and other subjects to help design and make products that work. | **Example project:**  **Pop-up books for younger children**  **Content: Using a range of mechanisms and construction techniques.**  **Design:**  Plan using storyboards and designs, communicating through words and illustrations.  Carry out research to identify user’s preferences.  Work within a specified design brief.  Share and clarify ideas.  Research existing products.  Model ideas using prototypes.  Use annotated sketches, cross-sectional drawings, exploded diagrams and computer-aided design packages to develop and communicate ideas.  Take account of the availability of resources.  **Make:**  Use layers and spacers to construct pages.  Confidently select suitable tools, materials and equipment and explain their choices giving evidence.  Formulate step-by-step plans as a guide to making.  Measure, mark out, cut, shape, assemble, join and combine materials and components with accuracy.  Accurately apply several finishing techniques.  Use techniques that involve several steps.  Be resourceful when tackling practical problems.  **Evaluate:**  Identify strengths and areas for development referring to design criteria.  Consider the views of others, including intended users to improve their work.  Critically evaluate the quality of the design, manufacture and fitness for purpose of their products against the design criteria.  **Technical knowledge:**  Understand sliders, linkages and levers.  Understand structures and mechanisms.  Use learning from science, maths and other subjects to help design and make products that work. | **Example project:**  **Automata toys**  **Content: Developing woodworking skills and exploring cams.**  **Design:**  Experiment with cams to make suitable design decisions.  Describe in detail the purpose of their products and design features.  Carry out research e.g. surveys, questionnaires and web-based resources to identify user’s preferences.  Develop a detailed design specification to guide their thinking and planning.  Model ideas using prototypes and pattern pieces.  Use annotated sketches, cross-sectional drawings, exploded diagrams and computer-aided design packages to develop and communicate ideas.  Make design decisions based on time, cost and resources constraints.  **Make:**  Measure, mark and cut wood accurately.  Assemble components, including cams, accurately.  Formulate step by-step plans as a guide to making.  Accurately apply several finishing techniques.  Use resourcefulness, resilience and innovation when tackling practical problems.  Explain next steps in learning drawing from prior experience.  **Evaluate:**  Critically evaluate the quality of the design, manufacture and fitness for purpose of their products.  Evaluate their ideas and products against their original design specification.  Investigate and analyse how well products have been made and whether they achieved their purpose.  Investigate and analyse how much products cost; how innovative products are; how sustainable the materials in products are; what impact products have beyond their intended purpose.  **Technical knowledge:**  Name types of cam.  Know how cams impact follower movements. |