

Ashtree Primary School and Nursery Medium Term Plan for DT

Year 5 – Mechanisms – Pulleys or Gears

Key Vocabulary

design decisions, functionality, authentic, user, purpose, design specification, design brief, innovative, research, evaluate, design criteria, annotate, evaluate, mock-up, prototype

Mechanical systems: Mechanism, lever, linkage, design brief, generate, loose/fixed pivot, guide/bridge, system, input, output, components,

Prior Knowledge

- Experience of axles, axle holders and wheels that are fixed or free moving.
- Basic understanding of electrical circuits, simple switches and components.
- Experience of cutting and joining techniques with a range of materials including card, plastic and wood.
- An understanding of how to strengthen and stiffen structures.

Key Knowledge

Describe the way in which a cam changes rotary motion into linear motion. Discuss the relationship between a cam and follower, an off-centre cam, a peg cam, a pearshaped cam and a snail cam. Use a range of technical vocabulary to describe the properties and functions of mechanisms.

Key Skills

- Generate innovative ideas by carrying out research using surveys, interviews, questionnaires and web-based resources.
- Develop a simple design specification to guide their thinking.
- Develop and communicate ideas through discussion, annotated drawings, exploded drawings and drawings from different views.
Produce detailed lists of tools, equipment and materials. Formulate step-by-step plans and, if appropriate, allocate tasks within a team.
- Select from and use a range of tools and equipment to make products that that are accurately assembled and well finished.

KS2 Design and Technology National Curriculum

Design and Evaluate: Generate questions to investigate and compare the efficiency of pneumatic systems.

Analyse and evaluate the efficiency of pneumatic systems.

Design and Evaluate

Children can be taught key knowledge by learning the skills below:

- Develop an authentic and meaningful design brief with the children.
- Children generate innovative ideas by carrying out research including surveys, interviews and questionnaires and develop a design specification for their product, carefully considering the purpose and intended user for their product.
- Communicate ideas through detailed, annotated drawings from different views and/or exploded diagrams. The drawings should indicate the design decisions made, including the location of the mechanical and electrical components, how they work as a system with an input, process and output, and the appearance and finishing techniques for the product.
- Produce detailed step-by-step plans and lists of tools, equipment and materials needed. If appropriate allocate tasks within a team.
- Make high quality products, applying knowledge, understanding and skills from IEAs and FTs. Children should use a range of decorative finishing techniques to ensure a well finished final product that matches the intended user and purpose.
- Evaluate throughout and the final product in use, comparing it to the original design specification. Critically evaluate the quality of the design, the manufacture, functionality, innovation shown and fitness for the intended user and purpose.

Curriculum Enhancements and Designers

- ❖ Explore some famous inventions/mechanical engineers in history (inventions using levers and linkages) e.g George Stephenson and locomotives, Karl Benz and first practical automobile [link to Year 5 history topic of Victorians – equipment that may have been used in the mines etc]

Misconceptions

- ❖ Order of design sequence – eg must a design *always* come before you make anything?
- ❖ Evaluation of product – if final product does not match the initial design is that a bad thing? Can it be good? What can we learn from adapting our design?

Suggested Activities

- ❖ Exploring existing products – toys with pulleys and gears, toys. Explore and discuss how these work and what is needed to make them work.
- ❖ Make prototypes of mechanisms and moving parts
- ❖ Design a toy with moving pieces (gears and pulleys, cams etc)

Curriculum links

- ❖ Science: materials and their properties, how things work/developing knowledge of engineering
- ❖ History: inventions
- ❖ Maths: measurement

This will lead children..

- ❖ Develop an understanding of how machines and mechanisms use moving parts to work
- ❖ Explain the parts needed to make a working mechanisms (lever, linkages, pulley, gear etc)
- ❖ Make appropriate material choices to make moving parts for an interactive product (toy, proposed invention to make a Victorian job easier)