

Phase: 5/6

Subject: Design and Technology

Focus: Pulleys or gears

Term: Spring

Prior Learning

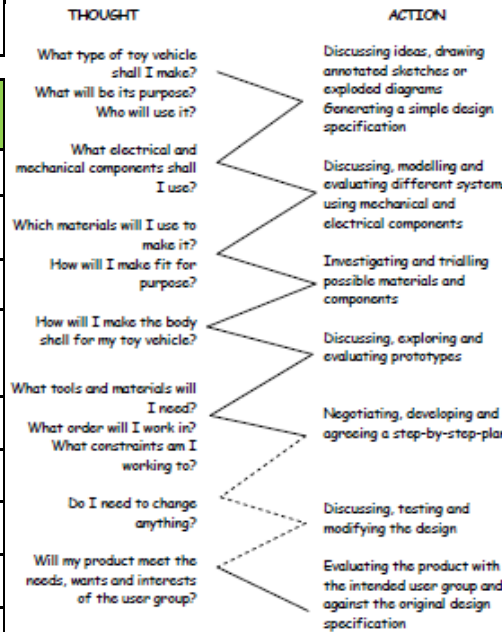
- Experience of axles, axle holders and wheels that are fixed or free moving.
- Basic understanding of electrical circuits, simple switches and components.
- Experience of cutting and joining techniques with a range of materials including card, plastic and wood.
- An understanding of how to strengthen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

Vocabulary

Pulley	A grooved wheel over which a drive belt can run
Gear	A wheel with teeth around its circumference
Drive Belt	The belt which connects and transfers movement between pulleys
Gearing up or down	Changing the rotational speed of a product by the use of pulleys or gears. When a small pulley or gear is used to drive a larger one the rotational speed is reduced and the product has been geared down.
Mechanical system	A set of related parts or components used to create movement
Driver	The gear or pulley that provides the input movement to the system
Follower	The gear or pulley that provides the output movement to the system
Mesh	The point where two gears join together and transfer movement
Motor Spindle	The rod on the end of the motor onto which a gear or pulley is attached.

Knowledge

- Understand that mechanical and electrical systems have an input, process and an output.
- Understand how gears and pulleys can be used to speed up, slow down or change the direction of movement.



By the end of the unit I should...

Designing

- Generate innovative ideas by carrying out research using surveys, interviews, questionnaires and web-based resources.
- Develop a simple design specification to guide my thinking.
- Develop and communicate ideas through discussion, annotated drawings, exploded drawings and drawings from different views.

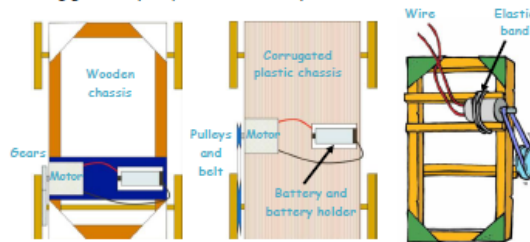
Making

- 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 are accurately assembled and well finished. Work within the constraints of time, resources and cost.

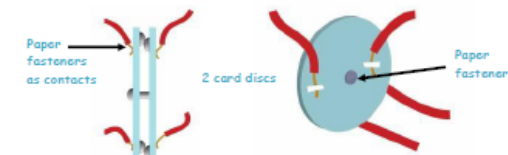
Evaluating

- Compare the final product to the original design specification.
- Test products with intended user and critically evaluate the quality of the design, manufacture, functionality and fitness for purpose.
- Consider the views of others to improve my work.
- Investigate famous manufacturing and engineering companies relevant to the project.

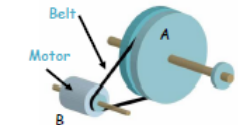
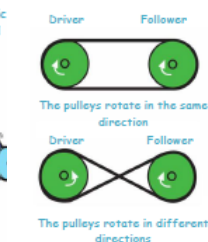
Building gears or pulleys into children's products



An example of a handmade reversing switch



Developing understanding of gears and pulleys



The small pulley (B) rotates much more quickly than the large pulley (A)

Using construction kits, ask children to explore gear ratio using combinations of two gears e.g.

No. teeth	Ratio
8, 16	2:1
8, 40	5:1
8, 24	3:1
40, 40	1:1

