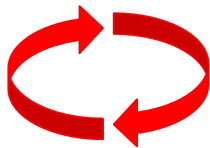


Knowledge

There are different types of mechanisms. A cam is a rotating or sliding piece in a mechanical linkage used especially in transforming rotary motion to linear motion.



Rotary

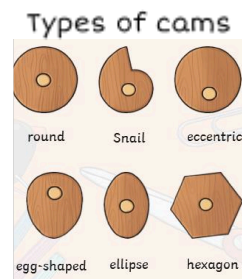
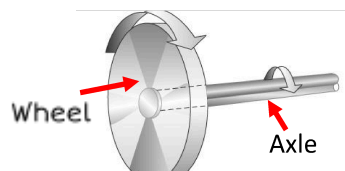
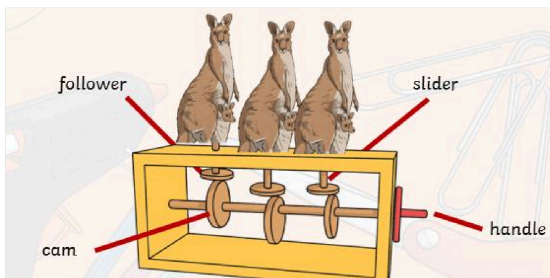


Linear

The eccentric cam rotates as it is fixed to the axle which is turned by the handle. The eccentric cam causes the follower cam to move up and down (linear) and rotate.

Cams are used in: moving toys, engines, sewing machines, dishwashers, washing machines, hole punchers and clocks.

Cams can be used to make a toy move by turning the handle to make the axle turn. The cam rotates on the axle. The cam and follower work together to create the movement - as the cam turns, it moves the follower. The cam changes rotary motion into linear motion. Different shaped cams produce different movements.



Vocabulary

- Cam - a specifically shaped wheel, or one with a hole off-centre. When it rotates, anything resting on its edge will bob up and down, as in a pull-along toy.
- Follower - a level which is moved by the rotary motion of a cam.
- Linear motion - when something moves in a straight line.
- Rotary motion - when something turns in a circle.
- Shaft - a long, thin piece of wood or metal that forms the axle, connecting a pair of wheels on a vehicle.

Design, make, evaluate

1. Research and generate ideas from previous knowledge and moving toys.
2. Design and construct a moving toy with a cam mechanism. The toy needs to be able to move in a linear motion. The movement should be noticeable and smooth. The toy should have an intended user in mind.
3. While making, the children should select tools, materials and equipment components to help them make a moving toy. Include: wheels, rods, axle and CAMS.
4. Children need to understand properties of materials, and be able to use the most sensible one for their toy. Assemble, join and combine materials - axle/shaft, follower and cam.
5. Evaluate against the design criteria, considering the intended user.

Skills

- Develop designing skills by using information sources to generate ideas, and formulate an understanding of how cam mechanisms can be used to produce movement.
- Develop techniques in cutting, shaping and joining to combine components and by selecting tools and equipment to measure, mark out and cut accurately.
- Understand the working characteristics of the materials and components, and how they can be combined to create more useful properties.
- Consider functional and decorative attributes in a finished product.

Skills	
Design	<p>Use research of the user's individual needs, wants, requirements for design.</p> <p>Identify features of design that will appeal to the intended user.</p> <p>Create their own design criteria and specification.</p> <p>Come up with innovative design ideas.</p> <p>Follow and refine a logical plan.</p> <p>Use annotated sketches, cross-sectional planning and exploded diagrams.</p> <p>Make design decisions, considering resources.</p> <p>Clearly explain how parts of design will work, and how they are fit for purpose.</p> <p>Independently model and refine design ideas.</p>
Make	<p>Use selected tools and equipment precisely.</p> <p>Produce suitable lists of tools, equipment, materials needed, considering constraints.</p> <p>Select appropriate materials, fit for purpose; explain choices, considering functionality and aesthetics.</p> <p>Create, follow, and adapt detailed step-by-step plans.</p> <p>Explain how the product will appeal to the audience; make changes to improve quality.</p> <p>Accurately measure, mark out, cut and shape components.</p> <p>Accurately assemble, join and combine components.</p> <p>Accurately apply a range of finishing techniques.</p> <p>Use techniques that involve a number of steps.</p> <p>Be resourceful with practical problems.</p>
Evaluate	<p>Evaluate quality of design while designing and making; is it fit for purpose? Keep checking design is as best as it can be.</p> <p>Evaluate ideas and finished product against specification, stating if it is fit for purpose.</p> <p>Test and evaluate the final product; explain what would improve it, and the effect different resources may have had.</p> <p>Do thorough evaluations of existing products considering: how well they've been made, materials, whether they work, how they've been made, fit for purpose.</p> <p>Consider the impact of products beyond their intended purpose.</p> <p>Discuss some key manufacturers of products.</p>
Mechanisms	<p>Refine product after testing, considering aesthetics, functionality and purpose.</p> <p>Be confident to try new/different ideas.</p> <p>Use a range of cams to create movement.</p>
Construction and material	<p>Select tools, materials and equipment components accurately, whilst considering the design criteria and intended user.</p> <p>Design with a user in mind.</p> <p>Evaluate the design, and suggest improvements to the user experience.</p> <p>Assemble, join and combine materials.</p>