

Willerby Carr Lane Primary School – Design and Technology

Topic: Moving Toys

Year: 5

Strand: Mechanisms

What should I already know?

- How movement can be created with levers and sliders, wind up mechanisms, pneumatics and pop ups.
- How to handle tools safely
- The working characteristics of some sheet materials

What will I know / be able to do by the end of the unit?

Where are cams used in the real world?	<ul style="list-style-type: none"> • In moving toys • In engines • In sewing machines, dishwashers, washing machines • In hole punchers • In clocks
How can a cam be used to make a toy move?	<ul style="list-style-type: none"> • When you turn the handle, the axle turns • 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
Can you explain why your toy is successful? (Before and during the making process)	<p>Before the making process:</p> <ul style="list-style-type: none"> • Looked at and investigated existing products • Knew who I was making it for • Knew what my toy had to do to be successful • Produced step-by-step plans and annotated drawings <p>During the making process:</p> <ul style="list-style-type: none"> • Made models / prototypes • Made improvements as I worked • Used tools correctly and safely • Measured and marked out accurately • Made adjustments so the toy worked well. • Thought about the quality of the finish – the product looked good <p>After the making process:</p> <ul style="list-style-type: none"> • Evaluated my own toy, thought about what went well, what didn't go so well and ways I could change to improve the moving toy. • Listened to other people's feedback about what worked well and what could be improved

Vocabulary

Designing

sequence	a particular order in which related things follow each other
annotated diagram	Annotated drawings include a combination of notes and labeled drawings that provide an explanation about a process
sketch	a rough outline or drawing showing the main features of something
prototype	an original or first model of something from which other forms are copied or developed

Making

assemble	make by putting pieces together
mark out	careful and accurate drawing with pencil made before cutting or shaping a material

Knowledge and Understanding

axle	a pin or shaft on which a wheel or pair of wheels turn
cam	specially 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 lever which is moved by the rotary motion of a cam.
force	a push or pull on an object. A force can cause an object to accelerate, slow down, remain in place, or change shape
framework	a structure supporting or containing something
guide / slide	used to limit the movement of the follower when it is moved by a cam (eg: to stop it moving sideways when it should be moving up or down)
linear motion	linear motion is motion in a straight line
mechanism	Within a machine or machinery, any tool used to convert or control motion or transmit control or power. A mechanism changes input forces and movement into a set of output forces and movement that the user desires
off-centre / offset / eccentric	Not in the centre of something

pivot	to turn, rotate or swivel, like a hinge
rotary motion	rotary motion is motion around the circumference of a circle - like the drum of a washing machine
shaft	a long, thin piece of wood or metal that forms the axle, connecting a pair of wheels on a vehicle

Key Design Decisions & Skills

- Children learn about controlling movement with a cam mechanism as part of a simple toy. The purpose of the toy is negotiated with the children.
- They develop their designing skills by using information sources to generate ideas and formulate an understanding of how cam mechanisms can be used to produce movement.
- They extend their making skills by developing techniques in cutting, shaping and joining to combine components and by selecting tools and equipment to measure, mark out and cut accurately.
- Working safely with a range of tools and equipment.
- Through these activities they gain an understanding of the working characteristics of the materials and components and how they can be combined to create more useful properties.
- They consider both functional and decorative attributes in a finished product.

Tools and Resources

- a collection of toys containing cams
- construction kits

Materials:

- stiff sheet materials, *eg card, foamboard, corrugated plastic*
- wooden cams (*egg and snail cams and off-centre wheels*)
- wooden wheels with 5mm centre hole
- 5mm doweling
- cardboard boxes or wooden frames
- PVA glue
- masking tape

Tools and Equipment:

- bench hooks, saws, hand drill, G-cramp, round file, single-hole punch, paper drill,
- metal safety ruler, craft knife, cutting mats and glue gun (for teacher use)

Pictures

