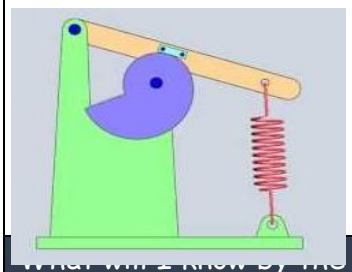
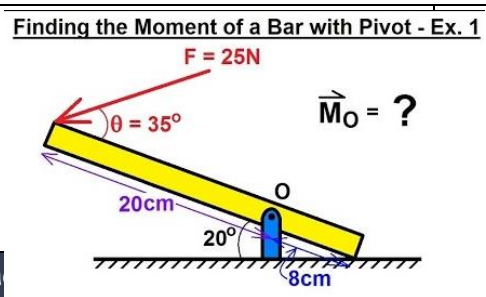
Knowledge Organiser

Subject: Design & Technology Unit: Moving Toys

Overview
Children will investigate different moving toys. They will learn about cam mechanisms and explore different toys that use them. Children will design a moving toy with a cam mechanism. They will have to consider their target audience, what shape the cam will be, the structure, decoration and materials needed to construct it.

What should I already know?	Vocabulary:	
Design • Can name and describe the features and functions of an existing design (fire engine) • Can investigate ways to combine wheels, axles and chassis • Can make a design for a fire engine that includes wheels, axles, chassis and a body • Can list and select the appropriate materials and explain their choices • Can communicate their ideas and plan by describing them to someone else including what the purpose is. **Make** • Can follow a design to make a fire engine that moves **Working with tools** • Can use tools such as ruler, scissors, hack-saw, glue spreaders, tape dispensers accurately and safely. • Can join card, paper, dowelling and straws using glue, tape (sellotape/masking tape) and threading through **Evaluate** • Can develop own designs through reflection and evaluation of others products • Can identify what works well and what might be improved. **Technical Knowledge** • To know that a wheel is a circular object that revolves on an axle • To know that an axle is a rod that passes through the centre of a wheel • To know that a chassis is the base frame of a wheeled vehicle. • To know that there are two ways of attaching a wheel to an axle: - • Fixed (the axle and wheel move together) • Rotating (the wheel rotates separately to the axle)	design brief components construct movement Pivot Lever cam shaft precise	a set of instructions given for a designer to follow to create a part or element of a larger whole; wheels are components of a car. to build from a variety of materials a change or development a central point on which something turns a bar used to push something heavy, which is on a pivot a projection on a rotating part in machinery, designed to make sliding contact with another part while rotating and impart motion to it. a long cylindrical rotating rod for the transmission of motive power in a machine with the greatest of accuracy





What will I know by the en

Design

- Can investigate examples of cam toys and explain how they work.
- Can investigate and talk about how different shaped cams change the movement of the follower.
- Can make suggestions how different cams could be used for different kinds of toys (steam engines – circular, carousel pear shaped etc.)
- Can create a design for a moving toy with a cam that:
  - has a clear purpose and audience
  - has a moving part
  - has a sturdy structure as the base for the toy.
- Can create a detailed plan, recording how the design meets the needs of the user, the purpose; the equipment and the order of work for the making process.
- Can suggest some alternative designs and discuss the benefits/drawbacks
- Can identify the parts of the process that will be easy and more challenging.
- Can identify how they can overcome the challenges – ask for help

Make

- Can use a template to investigate the ways different cams affect the movement of the follower
- Know a range of techniques to make a structure sturdier:
  - use a cardboard triangle to reinforce corners
  - for a wooden frame, use pieces of wood to create a triangular reinforcement
  - double up card or cardboard to make it stronger
  - create feet at the base of the structure so it is easier to balance
- Can independently follow their design to make a successful, moving toys that:
  - has a cam mechanism that works effectively
  - is sturdy

testing

refine

accuracy

follower

rotate

target audience

enabling a product to be tried and refined to ensure it meets its designed function

make minor changes to improve

exact in all detail

a machine part that moves by being pushed or pulled by another part.

move or cause to move in a circle round an axis or centre

a particular group at which a product is aimed

- is appropriate for the intended audience
- looks like the design

Working with tools

- Measure and cut precisely to millimetres
- Can independently organise appropriate equipment and materials needed.
- Can use a range of tools and equipment with good accuracy and effectiveness, within established safety parameters e.g., thick card, dowelling, tubing, cams, wood, glue, saws, scissors,
- Can experiment with a variety of materials, tools and techniques

Evaluate

- Can develop own designs through reflection and evaluation of others products
- Can identify what works well and what might be improved using these prompts:
  - Which parts of the making process went well.
  - What are you particularly pleased with?
  - Did you encounter any problems in the making process? How did you overcome them?
  - Did you change any part of your design during the making process, if so, why?
  - How well does your product for the design criteria and the intended purpose?
  - Would you change anything about your finished product if you were to make it again?

Technical Knowledge

- A cam mechanism is a linkage system which has a follower to convert rotary movement (moving round and round) to linear movement (moving up and down).
- As the cam is rotated by the dowelling, the follower is lifted up and down because of the shape of the cam
- The shape of the cam affects the movement of the follower.
- Lots of children's toys have objects attached to the follower to create a fun moving toy