Spirit of Innovation STEAM Resources

Engineering

Year Three

Cams and Followers

Ups and Downs

Links

Design

- Use research and develop design criteria to inform the design of innovative, functional, appealing products that are fit for purpose, aimed at particular individuals or groups
- Generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer-aided design

Make

- Select from and use a wider range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing], accurately
- Select from and use a wider range of materials and components, including construction materials, textiles and ingredients, according to their functional properties and aesthetic qualities

Evaluate

- Investigate and analyse a range of existing products
- Evaluate their ideas and products against their own design criteria and consider the views of others to improve their work
- Understand how key events and individuals in design and technology have helped shape the world

Technical knowledge

- Apply their understanding of how to strengthen, stiffen and reinforce more complex structures
- Understand and use mechanical systems in their products [for example, cams]

Resources

- Scissors
- Glue
- Sticky tape
- Cardboard
- Paper
- Split pins
- Pegs
- Dowel
- Drinking straws
- String
- Boxes
- Lolly sticks
- Wooden wheels
- Wooden cams
- Shoe boxes/sturdy boxes
- Hole punch
- Recycled materials
- Cams PowerPoint (Download)
- Blueprint Design Sheet (Download)

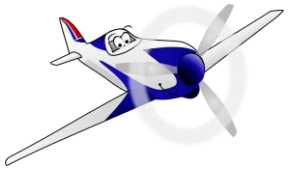
Suggestion for materials
https://www.tts-group.co.uk/search/?q=cams&searchType=simple-search

Skills

- Working as an individual
- Working as a pair
- Communicating ideas

Questions

- What cam set up are you going to use?
- What are you going to make?
- Which part will move?



- Selecting suitable tools and materials
- Understanding cams and their output
- Demonstrate and range of joining techniques
- Improving and evaluating designs

- What materials are you going to use?
- What tools will you require? Why?
- What will you use to join each material? Why?

Activity

Activity One
Individual/Pairs
(40 - 60mins)

Cams and followers PowerPoint (Download)

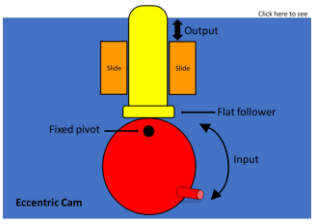
This is an introduction to simple cams, followers and some new vocabulary. Pupils to discuss the input and output of each cam arrangement, there are some YouTube links to help with this, if required.

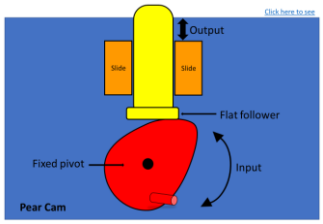
Pupils should be asked to design a moving model based on The Spirit of Innovation Project. There are a few examples within the PowerPoint for those pupils that require some ideas/inspiration.

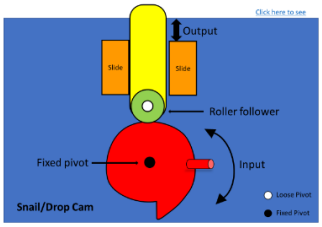
The design should have at least one moving part; for example, an aeroplane rising above clouds, plugging in the electric charging cable, a design engineer working at a computer.

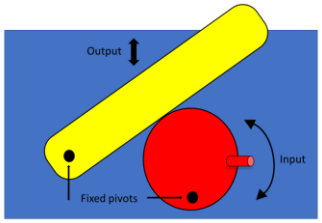
Using the design sheet (Download) pupils need to sketch and label their moving models.

For ease of build, a shoe box or other sturdy box could be used as the casing for the moving parts. This box should be measured and the measurements recorded onto the design sheet in preparation for the build.





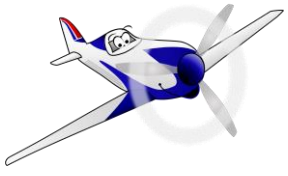




Activity Two
Individual/Pairs or A Small Group
(40 - 60mins)

Using the design sheet (Download) and the measured sturdy box from lesson one; pupils should gather the tools and materials required to create their moving model that incorporates at least one cam.

Adults should guide pupils towards safe handling of tools as well as appropriate choices of joining techniques and materials.



Once their model is near completion, pupils should review each part to see if their design requires improvements; for example, making parts stiffer or joints stronger. They should also check their moving parts to ensure that the movement is smooth and their design responds as planned.