

Moving Toys D&T Class Kit (TE00774)



This unit encourages children to look at different types of movement produced by cam mechanisms and to consider how these could be used to make a moving toy.

The class kit contains resources such as lengths of square section wood, mixed cams and wooden wheels, enabling hands-on experience with mechanical design.

In this download you will find ideas for planning your D&T project on Moving Toys. We hope you enjoy them.

Contents (Parts included in the class kit):

1. 100x lengths of 10mm square section wood
2. 39x mixed cams
3. 100x wooden wheels
4. 500x card triangles
5. 35x card boxes
6. 100x 2mmthick card discs
7. 50x cotton reels
8. 10x card tubes
9. 29x lengths of dowel
10. 5m of 8mm clear tubing



Ideas for using the Class Kit

Top Tips	Glossary
• <i>If making teaching aids, wheels mounted onto a cardboard or foam board backing are quick and easy to make. Card or foam wheels are easy to cut to different shapes.</i> • <i>Avoid decorating any teaching aids as this often influences the children's designs. Encourage discussion about what could move up and down or in and out.</i> • <i>If time is short and the children have already had experience of drilling, pre-drilled wheels could be provided.</i> • <i>A boxed cam can be made more interesting by cladding in shaped card or foamboard. This also allows the box to be hidden from view.</i>	Cam – an off centred or specially shaped wheel. Follower – the device which follows the movement of the cam. Linear Motion – movement in a straight line. Rotary Motion – movement that goes round. Shaft – a long thin piece of wood or metal that forms the axle, connecting a pair of wheels on a vehicle. Axle – a pin or shaft on which a wheel or pair of wheels turn.

Depending on teacher confidence, this activity could be structured so that all children product the same mechanism in the same box or framework. They have a choice on how to finish and decorate their product according to the design criteria i.e. illustrate a nursery rhyme. Alternatively, where the teacher is more confident with mechanisms, the children could choose the cam mechanism to use and choose the framework to set it in. Whichever way the activity is structured, the children should be encouraged to plan carefully the order of assembling their product.

Introduce Cam Mechanisms

Teach pupils about cam mechanisms and their applications in moving toys. Use models and diagrams to illustrate how the different parts are connected to allow free movement.

A discussion about different types of movement that we see around us could be the first starting point. The term 'rotary motion' for round and 'linear motion' for up and down or in and out could be introduced.

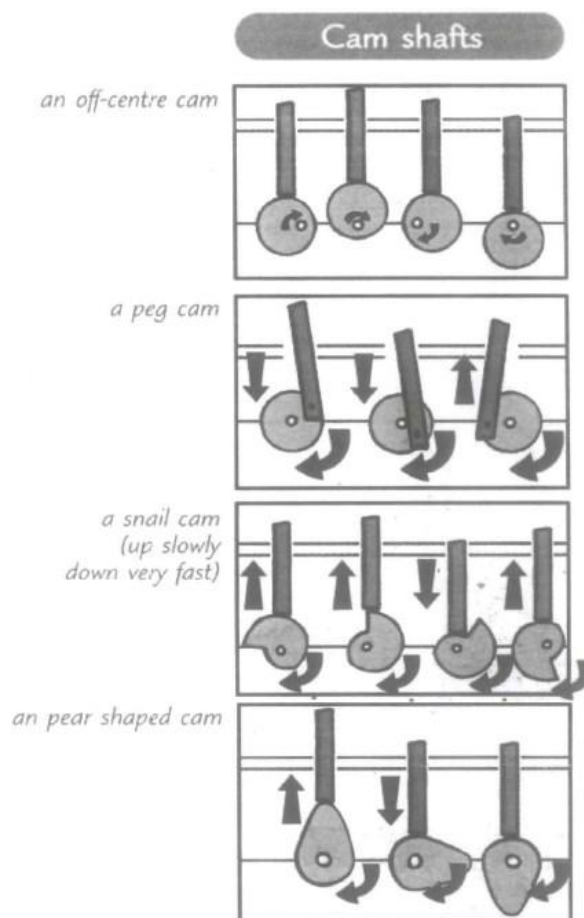
Where are cams used in everyday life? – In clocks, hole punchers, machining machines, sewing machines, in engines, in moving toys. Look at and investigate existing products. Simple toys can be used to show the change from rotary to linear motion. It may not be possible to see the mechanism at work without damaging the toy. Therefore, some simple teaching aids will need to be made.

Show examples of moving toys using videos, real models or pictures. Discuss what makes them move.

Investigate Techniques for Cam Mechanisms

Show a model of a cam mechanism. How can a cam be used to make a toy move? 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.

Explore different cam shapes and their effects on movement. What do all the parts of the cam mechanism do? Label a diagram to explore cam mechanisms and use appropriate vocabulary. Which parts turn/move? How are the parts attached? Label the types of motion- linear, rotary, etc. Experiment with simple cardboard cam models.



Decide on the cam type you want to use for your model.

Design and Plan

Look at different types of moving toys. Pre-school toys are often simple colourful designs and useful here.

Sketch initial ideas showing how the mechanism will work and label the parts and materials in the drawings.

Plan a moving toy using the design criteria and use annotated sketches to describe what you will do. Choose a theme for the toy e.g. an animal, vehicle or character from a nursery rhyme. Use feedback from peers to refine designs.

Make a list of the resources needed to make the moving toy and the tools needed for the job.

Practise using the tools and try different techniques. Discuss safety for using the tools and resources.

Collect materials to use with the model, such as bottles, boxes, scraps of fabric etc.

Test out ideas using prototypes.

Make models and prototypes and use these to make improvements. Learn how to use the tools correctly and safely and learn to measure and mark out accurately. Children can be given pre-cut cams made from card wheels to mount on a piece of board and observe their movement.

Encourage children to use a piece of scrap wood under the wooden wheel to avoid drilling through the bench hook or even the table.

Stress the importance of measuring accurately and checking before cutting any holes or gluing anything into place. It is important to line up the cam and the follower otherwise the mechanism may not work smoothly.

Make a moving toy selecting a range of tools and equipment.

Provide opportunities for children to explore and build their own moving toys using various materials and components. The class kit contains resources such as cams and wooden wheels for lots of hands-on activities. More complex mechanisms and systems can be introduced as the pupils gain experience.

Make your moving toys. Build the frame/body first and then add the mechanism. Test the movement and adjust where necessary. Decorate to match theme e.g. a nursery rhyme using materials such as paints and fabrics.

Make adjustments so that the toy works better, consider the quality of the finish to make the product look good. Demonstrate the toys to the rest of the class and provide feedback for each other.

Evaluate the moving toys against the design criteria and suggest improvements.

Encourage the children to evaluate their moving toys by assessing their functionality and creativity. Does your cam work? Would you make any changes to your design if you were to make it again? Did you encounter any problems?

Talk about how the toys move and test the success of the toys. Listen to others feedback and consider ways to improve the moving toys.



Extension Activity Idea

Give your toy a name and create a short story featuring the toy.