

Marbulous Structures!

This term's focus is to build a roller coaster for a marble.

We will be learning to design a marble roller coaster, make a prototype, select appropriate materials, tools and techniques and use a cam design.

In this unit children will:

Design and build a marble roller coaster.

Learn how to create a variety of designs and produce alternative detailed step by step plans, saying what are good points and drawbacks of each. Then produce a prototype before building the final design.

Select appropriate materials, tools and techniques - cutting, shaping, marking, joining and finishing accurately.

Develop an understanding of how mechanical systems create movement

Produce a rollercoaster with a mechanical cam, gear and pulley and include key features such as bridges and turns.

Create a variety of different, freestanding structures.

We will evaluate our products and others products at the end of the topic.

Prior Learning

Year 1 - Moving pictures

Year 2 - Building Australian landmarks

Year 3- Creating pyramids

Year 4 - Mechanical systems

Cross Curricular links: Science, Art

Key Vocabulary

Mechanical cam- A **cam** is a rotating or sliding piece in a **mechanical** linkage used especially in transforming rotary motion into linear motion. It is often a part of a rotating wheel

Pulley- a wheel with a grooved rim around which a cord passes, which acts to change the direction of a force applied to the cord and is used to raise heavy weights.

Gears- a toothed wheel that works with others to alter the relation between the speed of a driving mechanism (such as the engine of a vehicle) and the speed of the driven parts (the wheels).

Marble Run - A toy consisting of a **track** with bends, obstacles, etc. that **marbles** can be made to **run** down.

Design- a plan or drawing produced to show the look and function or workings of a building, garment, or other object before it is made.

Prototype- a first or preliminary version of a device or vehicle from which other forms are developed.

Evaluation- the making of a judgement about the amount, number, or value of something; assessment.

Key Knowledge

Marbles have been found in the ashes of Pompeii and in the tombs of ancient Egyptians, and they were played with by Native American tribes, so it's impossible to pin down a precise country of origin.

The earliest examples were simply stones that had been polished smooth by a running river, but for centuries artisans made them by hand from clay, stone, or glass.

Berlin-based artist walter mason created and installed one of the longest **marble runs**—measuring 238 meters and stretching over three flights of stairs—at a museum in Wolfsburg, Germany.

A pulley is a simple machine and comprises of a wheel on a fixed axle, with a groove along the edges to guide a rope or cable. **Pulleys** are used to reduce the time and energy taken to lift heavy objects. When you put two or more wheels together, and run a rope around them, you have created a great lifting machine

Cams are commonly **used** in engines to control valves (in which the valve is the follower), sewing machines, children's toys and many other mechanical applications. The shapes of individual **Cams** are designed to produce specific types of motion.

The **input** part of the **system** is any type of motion and force that drives the **mechanical system**.

The **process** part of the **system** is where mechanisms are used to convert the **input** motion and force into an **output** motion and force.

The **output** is the change created in the **input** motion and force by the mechanism.



Key Questions

Who created and installed one of the longest marble runs?

What is the benefit of producing lots of alternative designs of a product?

How will you make your marble rollercoaster stable?

How does each mechanism in your marble run roller coaster make it exciting to use?