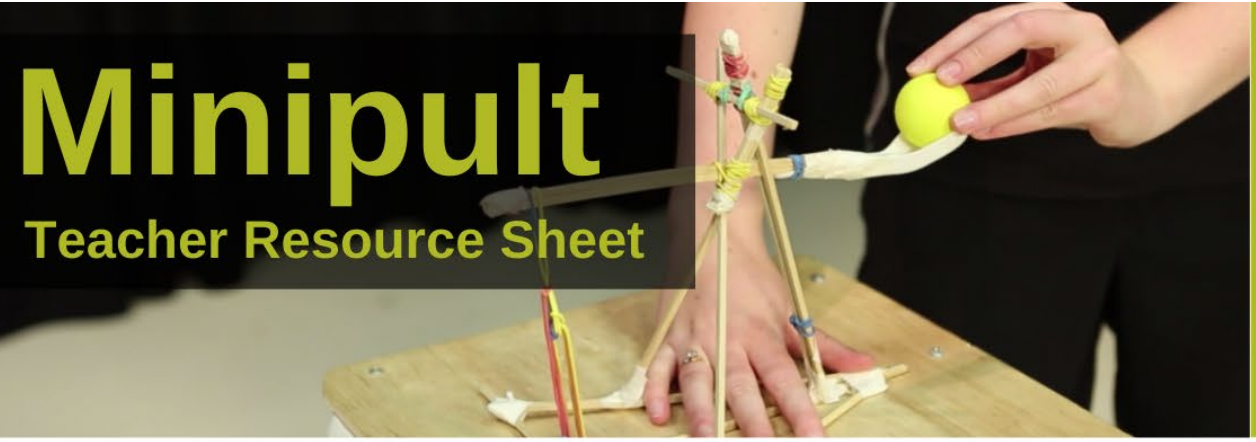
Minipult

Teacher Resource Sheet



science and engineering challenge

ON THE EVENT DAY

Half-day activity

Students will build a miniature catapult (minipult) using simple materials, with the aim of firing a projectile accurately and over a long distance.

(Please remember that students cannot bring notes, models or other paperwork on the event day)

ACARA LINKS (Year 5/6)

- Science involves testing predictions by gathering data and using evidence to develop explanations of events and phenomena and reflects historical contributions **(ACSHE081, ACSHE098)**
- Identify, plan and apply the elements of scientific investigations to answer questions and solve problems **(ACSIS086, ACSIS103)**
- With guidance, pose clarifying questions and make predictions about scientific investigations **(ACSIS231, ACSIS232)**
- Select appropriate materials, components, tools, equipment and techniques and apply safe procedures **(ACTDEP026)**
- Develop project plans that include consideration of resources when making designed solutions individually and collaboratively **(ACTDEP028)**

Visit the ACARA website...

BACKGROUND

A catapult is used to launch a projectile a great distance without the aid of an explosive device. The basic principle behind the classic catapult involves an understanding of levers, force, gravity and motion.

REAL-LIFE EXAMPLES

Catapults have been in use since ancient times, and have proven to be one of the most effective mechanisms during warfare. Various types of early catapults were used by the Greeks, Romans and Chinese. The classic spring-arm style (otherwise known as the mangonel) is arguably the most popular catapult. It had an effective range of up to 450 metres and was responsible for levelling many medieval castles. In modern times, a "slingshot" catapult can be used for launching aircraft from a ship.

RELATED CAREERS

- Civil Engineer
- Risk Analyst
- Mechanical Engineer
- Research Scientist

RELATED DEGREES (UON)

- Bachelor of Engineering (Civil/Mechanical)
- Bachelor of Mathematics
- Bachelor of Science (Physics)

Find out more...

Watch VIDEO – **"What is Engineering"?**

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The Science and Engineering Challenge

THE UNIVERSITY OF NEWCASTLE AUSTRALIA

VOCABULARY

Catapult	A machine used to launch an object
Force	A push or pull on an object which causes it to speed up, slow down or change
Gravity	Force that attracts objects towards the Earth
Lever	Simple machine that consists of a bar that pivots on a fulcrum (which is the pivot point where the lever is supported)
Machines	Devices which make life easier
Mangonel	A type of catapult used in the medieval period
Motion	Change in position
Projectile	An object that is launched from a catapult
Swinging Arm	Part of a catapult that moves and holds the projectile

RESOURCES/LINKS

Catapult Physics (Real World Physics) – Describes the main types of catapults used in ancient times, with pictures and illustrations (trebuchet, mangonel, onager, ballista).

Projectile Physics and Catapult Science (Science Buddies) – Explore the physics behind a catapult with simple DIY catapult models.

Simple Machines from Super Teacher Worksheets – a large collection of activities around aimed at primary students to teach about simple machines

Ready to Go Lessons: TED-Ed lesson on the mathematics of levers.

Ready to Go Lessons: Investigate catapults through the lens of Newton's laws.

Ready to Go Lessons: Launch into Learning – Catapults! (from TeachEngineering.com)

Trebuchets and Sieges – A 7-minute video on the history and physics of catapults, with real-world examples.

What is engineering? (UON) – This short video explains engineering through animation – from mobile phones and computer games to toothpaste.

The cool maths behind engineering (UON) – Discover the role maths plays in all kinds of unexpected places.

YouTube Playlist of useful videos

EXAMPLES OF LEARNING ACTIVITIES

- Have students look up the definitions of the words in the 'Vocabulary' section above.
- Demonstrate to students the different types of catapults (keeping in mind they will be building a traditional mangonel catapult, not a trebuchet or slingshot, on the event day)
- Experiment: Make a first-class lever to lift a heavy textbook using one finger. Slide part of a wooden ruler under a heavy textbook and place a pencil under the ruler. While holding the pencil in place, push down on the ruler to lift the book. Change the positioning of the pencil (fulcrum) to investigate what happens.
- Experiment: Demonstrate the potential energy of rubber bands. Pull a rubber band back to five different stretch lengths and measure how far it travels when released. Record the results in a table and graph. Join more rubber bands together and repeat the experiment.