CHALLENGE

CORK LAUNCHER

Working individually or in a team, students will construct a cork launcher, which they will then use to create their own unique game.

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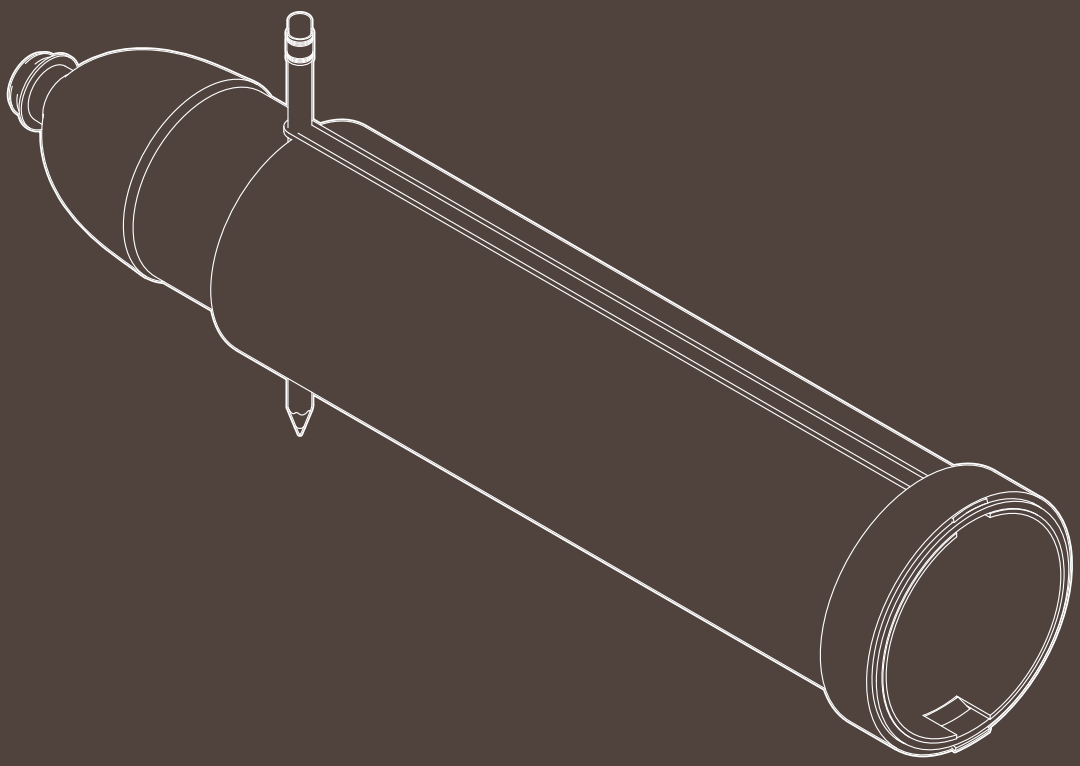

TEACHING NOTES

SUMMARY

This project will teach students how to build their own Cork Launcher. The structure is an alternative type of catapult that works like a slingshot. It uses an elastic band and a trigger mechanism to shoot the cork.

Working individually or in teams, students will use everyday items to build and decorate their cork launcher, which they will then use as the basis for their own game. The game aspect of this build will encourage creativity, whilst the build will introduce students to the science behind projectiles in motion.

At the end of the session, they have the option to complete a short quiz to test their knowledge.

LESSON PLAN

ACTIVITY	DESCRIPTION	TIMING
Introduction	Set out the goal of the session and hand out the student worksheets. Divide them into teams of 2-3, providing a set of materials to each. Students can also work on their own.	5-10m
Warm-up Activity A	Introduce the projectile activity and ensure students have the necessary materials to complete it.	5-10m
Warm-up Activity B	Introduce the game activity and ensure students have the necessary materials to complete it.	10-15m
Main Challenge	Explain to students that once they have built their projectile launcher they will have to create their own game, with their own points system. We have included an example of how this can be done in the build instructions.	30-40m
Measuring Up	When students have finished constructing their launcher and have their game rules finalised, they're ready to play.	10-15m
Extension Activities	If any of your teams finish their build early, have them try one of the extension activities.	10-15m
Extra Content	We have provided additional educational content for those with enquiring minds.	10-15m
Quiz	Ask your students to complete the quick quiz at the end to test their knowledge.	10-15m
Wrapping Up	Cover discussion points with students to close the session.	10-15m

LEARNING OUTCOMES

Students will learn:

- How force affects the motion of a projectile.
- Optimum angles for launching a projectile the farthest.
- The importance of accuracy and precision in the design phase.
- The effects of potential and kinetic energy on the final design.
- To observe, discuss, compare and contrast results.

CURRICULUM

KS1 Design Technology

- **Design** - design purposeful, functional, appealing products for themselves and other users based on design criteria.
- **Design** - generate, develop, model and communicate their ideas through talking, drawing, templates, mock-ups and, where appropriate, information and communication technology.
- **Make** - select from and use a range of tools and equipment to perform practical tasks e.g, cutting, shaping, joining and finishing.

KS2 Design Technology

- **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.
- **Evaluate** - evaluate their ideas and products against their own design criteria and consider the views of others to improve their work.

KS3 Design & Technology

- **Evaluate** - test, evaluate and refine their ideas and products against a specification, taking into account the views of intended users and other interested groups.
- **Technical Knowledge** - understand and use the properties of materials and the performance of structural elements to achieve functioning solutions.

KS2 Science

- **Year 5, Forces** - explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object.

KS3 Science

- **Physics, Motions and forces** - forces as pushes or pulls, arising from the interaction between two objects.

KS4 Mathematics

- **Algebra** - interpret graphs of non-standard functions in real contexts, to find approximate solutions to problems such as simple kinematic problems involving distance, speed and acceleration.

TOP TIP

Ensure students have enough room to work without the risk of disrupting others.

DOWNLOAD

Download and print student worksheets from imeche.org/stemathome

WRAPPING UP

MEASURING UP

10-15m

Students will test their launcher and game at the end of the session. Give them 10-15 minutes to complete a round of their game, and then declare the winner!

EXTENSION ACTIVITY

10-15m

If students finish their build with time to spare, have them try one of these extension activities:

A

Ask students to experiment with the angle of their projectile launcher by adding a barrier between their launcher and target.

Make sure that the barrier is taller than the target.

Not only will they have to consider the angle of their launcher, but also the projectile they're using.

B

Ask students to iterate their design to improve the accuracy, stability or power of their launcher.

Get them to think about the different parts of the launcher and what materials they have that could help with a solution.

If they need additional help, here are some ideas:

Accuracy - change their projectile
Stability - add a handle
Power - add more/thicker elastic band

DISCUSSION POINTS

10-15m

To close the session, hold a class discussion and cover the following points:

- Did the students succeed in creating a working launcher that was able to launch a projectile?
- If not, why did it fail?
- What do the students like about designs from other teams?
- Do the teams think it would have been easier to work alone? Why?
- What would students change if they were to attempt the task again?
- What additional materials would the students need to improve their design?

REMEMBER

Provide a recap or short summary to the class, highlighting the key engineering skills that have been learnt during this activity.