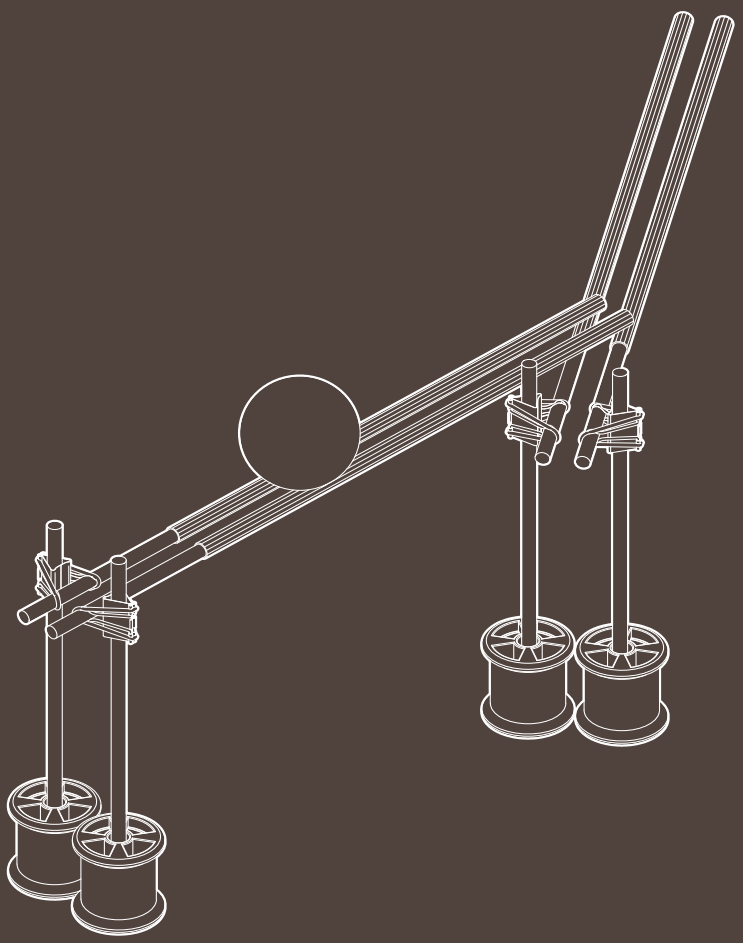
CHALLENGE 4

BALL RUN

In this challenge, teams will work together to create a track for a ping-pong ball to roll along.



TEACHING NOTES

SUMMARY

This resource provides you with everything you need to successfully run a ball run workshop with your students.

The ball run activity places focus on the "make, try and refine" segments of the innovation process. By viewing their ball runs as a prototype, students will be able to spend time refining and changing their creations.

Using simple crafting materials, students will be required to design and build their very own ball run that will need to keep the ball off the floor for the longest time, whilst constantly staying in motion.

This may seem like an easy ask, but this make will require creativity, teamwork and most importantly perseverance!

LESSON PLAN

ACTIVITY	DESCRIPTION	TIMING
Introduction	Introduce the goal of the session and hand out the student resource sheet. Divide students into teams of 4 students, providing a set of materials to each.	5-10m
Warm-up Activity A	Introduce the movement mechanisms exercise and ensure students have the required materials to complete it.	10-15m
Main Challenge	Explain to the students that their structures must ensure that the ball will remain off the ground for as long as possible, whilst in constant motion.	30-40m
Measuring Up	When the teams have finished building, they will need to test their ball run. The aim is for the ball to be moving on the track for the longest amount of time.	10-15m
Extension Activities	If any of your teams finish their build early, have them try one of the extension activities.	10-20m
Extra Content	Additional educational content for those with enquiring minds.	10-15m
Quiz	Ask your students to complete this quick quiz to test their knowledge.	10-15m
Wrapping Up	Cover the discussion points with the students to close the session.	10-15m

LEARNING OUTCOMES

Students will learn:

- To observe, discuss, compare and contrast results
- To make predictions and hypothesise
- How to make changes to an experiment in order to achieve desired results
- How to work through adversity to help build and achieve a problem solving mindset
- The varied properties of materials and their impact on forces and motion

CURRICULUM

KS1 Design and Technology

- Design purposeful, functional, appealing products for themselves and other users based on design criteria
- Evaluate their ideas and products against design criteria
- Build structures, exploring how they can be made stronger, stiffer and more stable

KS2 Design and Technology

- 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
- Apply their understanding of how to strengthen, stiffen and reinforce more complex structures
- Evaluate their ideas and products against their own design criteria and consider the views of others to improve their work

TOP TIP

Ensure each team has enough room to work, without the risk of disrupting other teams. They'll need plenty of space to test their run throughout the building process.

Help teams who are having difficulty by working with them to brainstorm solutions. Encourage them to come up with the answer as a team.

DOWNLOAD

Download and print student worksheets from imeche.org/stemtoolkit

WRAPPING UP

MEASURING UP

10-15m

The winning team will be the team who manage to keep their ball moving throughout their ball run for the longest time. This should be measured using a stopwatch by a designated time keeper. If the ball becomes stationary or falls from the run, the timer is stopped.

EXTENSION ACTIVITIES

Engineers are constantly editing and testing their designs to ensure that their structures do exactly what they want it to do. If a team has successfully built and tested their ball run, ask them to try the following:

A

10-15m

Do you like the look of a different team's ball run? Pair up with them and try to combine the two runs to extend the amount of time that your ball stays off the ground.

B

15-20m

Using your materials, design a run that mimics a ski jump. The challenge is to launch the ball off the end of the jump and catch it in a container.

DISCUSSION POINTS

10-15m

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

- What did teams find the most challenging throughout the design process?
- Did the teams find testing to be important during the design phase?
- If the teams had more materials, what would they do differently?
- What structures worked best for rolling their ball slowly?
- If teams were to build this full scale, what materials would they use and why?

REMEMBER

Provide a recap or short summary to the class highlighting the key engineering skills and what has been learnt during this activity.