

Teacher training: Rocket Challenge video transcripts

Video 1

Welcome to the Rocket Challenge

Kia ora! I'm Alison from the Wonder Project.

Welcome to the Wonder Project Rocket Challenge training for teachers.

The Wonder Project is Engineering New Zealand's free school programme, designed to get young Kiwis excited about science, technology, engineering and maths – also known as STEM.

There's a huge skills shortfall in STEM, with not enough young people pursuing careers in these fields. The Wonder Project aims to change that by taking young kiwis on a creative, dynamic and fun learning journey.

We pair teachers with STEM professionals across Aotearoa to build confidence in students, so they can achieve remarkable things at school, in their communities and in their future careers.

In the following videos, we'll take you through everything you need to know to become an amazing Rocket Challenge teacher.

Video 2

Preparing for day one

Let's prepare for day one. Over the 6 to 8 weeks of the challenge, you'll become Mission Command for your students, that means you're there to guide students to successfully launch their water rockets. If you have a Wonder Project ambassador working with you, they'll be part of Mission Command too.

As a teacher, your role is to take the lead and guide students through the Rocket Challenge. You'll have everything you need to launch your rockets including access to our online Learning Hub, module plans and your own rocket kit.

Wonder Project Ambassadors are STEM professionals who are volunteering an hour of their time each week to get kids excited about STEM. Their main role is to support you and your students with

their STEM knowledge... Arrange to meet up with your ambassador, so together you can plan a visit to understand what resources are available and decide who will assemble the launcher from the rocket kit.

But if we're unable to find your class a Wonder Project Ambassador, don't worry! You have access to everything you need to have a blast! Plus, you can join the Wonder Project Facebook group to get advice from fellow teachers and ambassadors across the country.

Each module will take around 1 to 2 hours to complete. Our resources provide you with a framework to extract meaningful STEM learning opportunities from the experience with your students.

Video 3

Module 1: Mission Command

Start your epic journey by taking students through Module 1. This introduces the Rocket Challenge and your ambassador to students. Listen to your ambassador's career story and unpack your rocket kit together.

The rocket kit includes: <<visual of kit with items being unpacked>>

- 1. the rocket launcher
- 2. hi vis vests
- 3. safety glasses
- 4. a Wonder Project parachute
- 5. a clipboard
- 6. and a bunch of stickers for students to monitor their progress on their progress chart.

You'll need to source your own 1.5 litre empty carbonated drink bottles and a bike pump – a foot pump version works best.

Students will discover the importance of working together as a team – and you should encourage this throughout the challenge. They'll also learn the first step of the Engineering Design Process – Ask! Make sure you have the Engineering Design Process poster up in the classroom so you can refer back to it throughout the modules. The process we use for the Rocket challenge is:

Ask, Imagine, Design, Improve

Students are challenged to ASK themselves: how do I make my water rocket fly? They'll identify other problems they can solve too, just like an engineer.

Each module is packed full of resources and information to explain important STEM concepts to help your students launch some amazing rockets!

Make sure you watch the videos in each module with your students, and complete the Mission Brief activities. To enter the final blast off challenge, students must complete all the Mission Briefs. Each time they complete a brief, they get a sticker for their progress chart.

Video 4

Module 2: Fly

Students get to test out the rocket launcher with a plain soda bottle!

But to do this, students will need to learn what rockets need to launch and how to keep everyone safe.

Here's a few safety tips:

- 7. use the safety gear in your kit and share it between teams
- 8. aim rockets away from people, buildings and trees
- 9. check the rocket launcher connections and valves
- 10.use new 1.5 litre soda bottles
- 11.don't pump the bottle pressure above 60 psi
- 12.assess hazards with students before each launch session.

And now... students are ready to launch their first test flights. The first launch will require a lot of help from Mission Command as students learn.

The focus of the first test flight is to experiment with the water and air variables. Assign some helpers, and then have the remaining students take turns to record the outcomes on the worksheet.

Remind students of the health and safety rules before commencing each launch. And discuss what happens after every flight — success and failures!

Video 5

Module 3: Force

Students get to meet Isaac Newton in this module and learn the science behind rocketry – starting with force.

They'll learn Newton's first law which explains how an object will remain at rest or keep moving forever at the same speed and in a straight line, unless there is another force acting on it.

So, students will discover how thrust, drag, lift and aerodynamics can move their rocket.

Next up, students are introduced to the second step of the Engineering Design Process – Imagine! So, they can then begin designing their rockets by brainstorming concepts on paper.

Video 6

Module 4: Aerodynamics

Students begin to get their rockets moving by improving the aerodynamics.

They'll learn about Newton's second law of motion, which explains how a heavier rocket needs a stronger force to make it accelerate.

And they'll need to keep this in mind as they begin developing their own rocket prototype.

They'll also get to explore the third step of the Engineering Design Process — Create. This is where students consider what materials work best for the nose cone and fins, and how best they're going to put their rocket together. Plus they'll begin to understand how different shapes and design features can impact a rocket's flight and stability.

Video 7

Module 5: Thrust

Students learn about Newton's third law of motion, which explains that for every action there is an equal and opposite reaction. They'll use this knowledge to further improve their rocket designs and do their second test flights.

Encourage student crews to run the second test flights themselves – it's fun, easy and increases their self-belief.

Remind them about pre-launch health and safety checks, and how to collect accurate data.

Collecting flight data helps students refine and improve their rocket prototypes to get the best results possible from their rocket launches.

Video 8

Module 6: Final blast off

The last module is all about the final blast off!

Your students' have now mastered Newton's laws and have tested and launched their rockets multiple times. In this module, they'll learn the fourth step of the Engineering Design Process — improve. And get to improve their rocket for their final flight.

You also get the opportunity to enter into the final blast off challenge. It's a great way to showcase your schools' epic journey!

Get students to reflect on what everyone has learnt and celebrate your successes in this module.

Create a video using the footage you've collected throughout the challenge. And remember only one school can be crowned the winner!

Let's get ready for blast off!