



**BRONZE AWARD**

# MAKE A ROLLERCOASTER FASTER



Typically 10 hours of project work  
Recommended for 11-14 year olds



**Practical  
project**

Design and test your own  
rollercoaster to see how you  
can make it go faster.

**#physics**

**#design**

**#entertainment**



# HOW TO RUN CREST USING THIS ACTIVITY

Looking for some support? Find a mentor by contacting your local STEM Ambassador hub:  
[www.stem.org.uk/stem-ambassadors/local-stem-ambassador-hubs](http://www.stem.org.uk/stem-ambassadors/local-stem-ambassador-hubs)

To use their project to achieve a Bronze CREST Award your students will need to:

- **Complete a minimum of 10 hours of project work**
- **Consider the broader impact of their project and demonstrate an innovative approach**
- **Complete the project workbook or short report in another medium**
- **Reflect on their work during the project using a student profile form**

## Preparation

Ready to get going with CREST? Sign up for a CREST account here: [www.crestawards.org/sign-in](http://www.crestawards.org/sign-in)

Create a new Bronze Award project with the name(s) of the student(s) and the title of their project. If you don't have all the details, you can fill these in later!

## Run the project

We have some super handy workbooks and profiles for your students to use when running a CREST Award. You can download these when you create your CREST account by following the link above.

Encourage your students to use the workbook or profile to plan and carry out their project, keeping a record of all their amazing progress.

Make sure you consider safety and risks!

## Reflection

So, your students have been hard at work and completed their CREST project, but don't let this be the end of their learning. They should now fill in any remaining sections of their workbook. This is a chance for them to reflect on all the interesting things they've learnt and the invaluable skills they have used.

## Enter your project for a Bronze CREST Award

Hard work deserves a reward! Celebrate and certify your students' achievements by entering their project for a Bronze CREST Award. Simply:

Log in to your CREST account at [www.crestawards.org/sign-in](http://www.crestawards.org/sign-in)

Select the project and upload a sample of the students' workbooks or other project evidence.

Check the participating students have met each of the criteria on the teacher assessment page.

Finally, complete the delivery and payment details to order your snazzy certificates.

Congratulations on completing CREST Bronze!

## What next?

The scientific discovery doesn't need to end here. Students can have a go at the next level up - CREST Silver.

Don't keep all the fun to yourselves, encourage others to take part in CREST projects and share the wonder of science. For free ideas on how to get started, see [www.crestawards.org](http://www.crestawards.org)

# STUDENT BRIEF

## BRONZE AWARD



## Make a rollercoaster faster

The classic rollercoaster ride involves a wheeled car moving down an angled track. One of the really exciting things about rollercoasters is the speed of the car when it reaches the bottom of the track. But do you know how the height of the track affects the speed of the car?

### Getting started

First, you need to make a simple model rollercoaster. Use some sort of flexible plastic, or tubing cut in half lengthways. Think about how you can increase the height. Perhaps you could use a clamp and stand to hold it in place.

There are lots of things to think about when you set up your test:

- How can you measure the speed of the car? Ask your teacher if it's possible to use a light-gate and a data logger.
- As the car starts to move, it speeds up. The speed isn't constant - it accelerates - so you need to decide where you should measure the speed. You could measure the speed at different points to see how much it accelerates.
- How does the speed vary as the car moves down the track?
- How are you going to vary the height?
- How do you make the investigation a fair test?
- Does the shape of the track matter?
- Does the mass of the car make a difference?
- Does the shape (streamlining) of the car make a difference? Take care when using tools. Remember, any use of tools needs to be well supervised, possibly in a workshop (depending on the tools used).
- Does the number of wheels on the car change the speed?

### Things to think about

You will also need a rollercoaster car, you could make a simple one yourself, use a toy car or you could even simply use a ball bearing. Whatever you choose, make sure it rolls freely down your 'track'.

### Useful resources

You could start by investigating how rollercoasters are made. Try searching for 'rollercoaster design' or 'rollercoaster project'.

You could try adding a hill or – if you're really adventurous – a loop-the-loop to the rollercoaster. You'll have to keep adjusting the height so the car goes over the hump without flying off the track.

# STUDENT BRIEF

## BRONZE AWARD



### Health and safety

Science project work is both dynamic and exciting but can also carry some risk. To avoid any accidents, make sure you stick to the following health and safety guidelines before getting started:

- find out if any of the materials, equipment or methods are hazardous;
- assess the risks (think about what could go wrong and how serious it might be);
- decide what you need to do to reduce any risks (such as wearing personal protective equipment, knowing how to deal with emergencies and so on);
- make sure your teacher agrees with your plan and risk assessment.

**Take care when using tools.**  
**Remember, any use of tools needs to be well supervised, possibly in a workshop (depending on the tools used).**

### Remember!

Science isn't just about data. The most successful projects will demonstrate good communication skills and show original ideas that address a real-world problem.

Look at the world around you and consider all the innovative ways that you could address the challenge. Even if things go wrong, use this to show what you have learned. Don't forget to use the student profile form to help structure your project.