

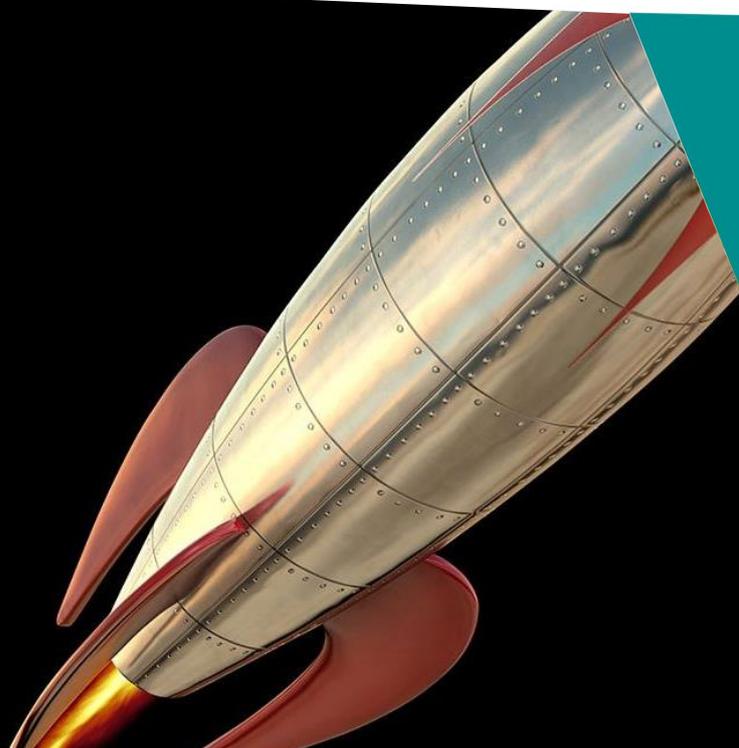


**BRONZE AWARD**

# HOW DO ROCKETS WORK?



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



**Practical  
project**

Investigate how rockets are propelled by building and testing a model rocket kit.

***#physics***

***#forces***

***#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 CREST Bronze 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 CREST Bronze Award

Hard work deserves a reward! Celebrate and certify your student's achievements by entering their project for a CREST Bronze 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)

## BRONZE AWARD



### *How do rockets work?*

In this project you will make and test a model rocket kit taking great care when firing it. You could also measure the height reached by the rocket and factors that affect this.

#### *Getting started*

You must follow guidance from the UK Rocketry Association and especially their Code of Practice. Take great care when firing rockets – make sure you follow the manufacturer's instructions to the letter, and always have an adult supervising you.

If you have a calm day, and different powers of engine, investigate the effect of differing engine size. You could measure the maximum altitude reached by a rocket by using a clinometer and a long tape measure or trundle wheel – a distant observer measures the maximum angle reached by the rocket, and then uses trigonometry to calculate the height. You might have to get some help or carry out some research to find out what all these different terms mean. Your teacher would be a good starting point!

You could also measure the flight time – a calm day is absolutely essential for this. Some model rockets have a nose cone with a compartment that can carry a payload such as plasticine. How does the maximum altitude or flight time vary with payload mass? What are the consequences of this for firework manufacturers?

#### *Things to think about*

Which model rocket kit are you going to use and why? When are you going to test your rocket?

#### *Useful resources*

A model rocket kit can be purchased from model toy shops or online.

## BRONZE AWARD



### **Health and safety**

A science project 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.

***Choose your launch site carefully. Launching where the rocket might land on a road is very dangerous. Launching model rockets requires authorisation from the Civil Aviation Authority, even if your launch site is a long way from the nearest airport. UKRA ([www.ukra.org.uk/notam](http://www.ukra.org.uk/notam)) provides information and advice for submitting a notification. This should be requested at least 28 days before the launch, so some planning will be required.***

### **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.