



**BRONZE AWARD**

# QUALITY CONTROL



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



**Practical  
project**

Find out about quality control  
by taking on the role of a  
factory quality checker.

**#physics**

**#materials**

**#food**



# 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)

# STUDENT BRIEF

**BRONZE  
AWARD**

## Quality control

Imagine that you work in the quality control department of a company that manufactures pre-packaged consumer products. Your job is to sample packages to check that they contain the right mass or volume of product. If not, the filling machines need adjusting.

### Getting Started

Your first task in this project is to choose two products to check – one solid and one liquid. You need to check at least 10 packs of each, so choose products that keep well so they can still be used, or consumed, after the project. The contents are bound to vary slightly, particularly if the product contains individual pieces which vary in size – for example a packet of crisps. What other causes of variation can you think of?

**Check weighing a solid product:** Decide how to check the mass of the contents of your sample packs. Remember, it's the mass of the contents that matter, not the packet as well. Check the weight of the contents of at least 10 packs and work out whether they comply with the e-mark rules – both for average mass and for 'negative tolerance'. Think what you will do if your results appear to show an anomaly – a result significantly different from normal. Remember, never open food or drink in the laboratory if you're going to eat or drink it afterwards.

**Checking a liquid product:** Again, it's the contents of your cans or bottles that you need to check, but without opening them all. Clearly, it's not possible to measure the volume of the contents directly while they're still inside the container, so you need to think up a cunning plan – think density. As with your solid product, check at least 10 cans / bottles, and decide whether they conform to the rules.

**The results:** You need to report your results to your manager. Decide on the best way to display them visually, for example as tables, charts or diagrams, so that they can be quickly and easily understood. Investigate the use of 'box and whisker' diagrams, as well as more familiar methods – you might like to find out about 'statistical process control'.

### Things to think about

The e-mark (e) means that the average contents of a packet must be at least the nominal amount shown on the label – if not, the company may be fined for selling short measure. If the average is much more than the nominal amount, it means the company is giving away extra product, reducing its profits. So your job is very important!

### Useful Resources

You will need to look up rules about the e-mark, to find out what is the minimum amount your packets are legally allowed to contain. This is called the 'negative tolerance'. This will help you to decide how precisely you need to measure your packs, for example to the nearest 1, 0.1 or 0.01 g or ml.

**Equipment check:** You can't check the amounts unless your equipment measures accurately – you could check yours by using accurate masses, for example a set of 'weights' from a two-pan balance. Think about how to measure the volume of liquid products with the necessary precision. Devise a procedure to check the accuracy of your measuring instruments.





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## 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.

**Remember, never open food or drink in the laboratory if you're going to eat or drink it afterwards.**

## 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.