CREST AWARDS

GOLD AWARD

EVERYTHING IS BRIGHTER AFTER A CUP OF TEA

70H Typically 70 hours of project work
Recommended for 16-18 year olds

Practical project

Investigate and explain the health benefits of tea.

#chemistry
#health
#food

HOW TO RUN CREST USING THIS ACTIVITY

Entering your project without a teacher or facilitator? No problem! You can enter your work yourself by following this link: **www.crestawards.org/sign-in**

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

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

- **Develop and lead the project**
- **Complete a minimum of 70 hours of project work**
- **Consider the broader impact of their project and demonstrate an innovative approach**
- **Write a project report or portfolio of evidence**
- **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**

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

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.

Run the project

Encourage your students to use the Gold student guide to plan and carry out their project. Each student involved in the project should complete their own profile form.

You don't want all their good work to go to waste, so be sure they keep a record of all their amazing progress. Keeping a regular project diary will save them precious time when writing their final project report.

The students should spend at least 70 hours on the project in total.

Remember to 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. At the end of the project, each student should complete a Gold profile form and communicate their project. This is a chance for them to reflect on all the interesting things they've learnt and the invaluable skills they have used.

Students working in a group can either submit a joint report or separate reports, but they must each complete a profile form.

Use the CREST criteria on the profile form to help the students check that they have included everything in their report.

Enter your project for a CREST Gold Award

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

Log in to your CREST account at **www.crestawards.org/sign-in**

Select your project and upload the profile form per student, project report and other evidence, such as pictures and diagrams.

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

Congratulations on submitting for CREST Gold!

What next?

Is university on the horizon for your students? They can use their project to help demonstrate their newly found STEM skills and knowledge in UCAS personal statements.

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**

STUDENT BRIEF

GOLD AWARD

Everything is brighter after a cup of tea

You are going to produce a leaflet entitled: “Everything looks brighter after a cup of tea –Fact or Fiction”. It will explain all the health risks and benefits of drinking tea. You will substantiate any of your claims by investigating tannin, caffeine and flavonoids in tea. You will carry out analytical tests on tea samples and your leaflet should be able to list a number of different types and brands of tea with the findings from any tests explained.

Getting started

You should start by looking at the range of teas that are available. You will need to pick a wide selection of types to test. Try choosing a range of different types and brands of tea.

Tannin content:

You need to do some research to find out what tannin is. Find out what it does to your cup of tea, both in appearance and flavour. Find out if it has any other uses. Does it have any harmful/beneficial effects on health? Find out if any teas give information about their tannin levels on the packaging.

Design a test to determine which of your tea samples contain the most tannin. When you’ve got some rough, comparative results, find out how to determine actual quantities of tannin in tea samples. You will need to investigate protein precipitation and spectroscopy. When you’re up to speed with the method you should set about determining the tannin levels in your tea samples.

Caffeine content:

There’s a lot of literature available about why too much caffeine is bad for us. Conduct your own research and collate your findings. Try also to find out if caffeine is beneficial in any way. Find out if any teas give information about their caffeine levels on the packaging. Pick decaffeinated as well as caffeinated teas to test. Design some tests to see if drinking caffeine can affect performance.

Flavanoid and fluoride content:

Tea contains flavanoid, a type of polyphenol. Find out about the health benefits of flavanoids. Find out if any teas give information about the number/amount of flavanoids on the packaging.

Polyphenols are extracted using 70% methanol/water solvent. The content is determined by a method called ‘Folin Ciocalteu spectrophotometry against gallic acid standards’.

Tea also contains fluoride. Find out the health benefits/risks of fluoride. Find out if any teas give information about the amount of fluoride on the packaging.

As with flavanoids, determining the content of fluorides won’t be possible within a school/college. Again, research the methods and, if possible, contact someone in industry to demonstrate them.

Remember to think about how you will communicate your results.

Things to think about

Work out if it’s possible to determine the caffeine levels in your tea samples. You will need to find out about High Performance Liquid Chromatography (HPLC). You could also determine the caffeine levels in a variety of coffees. Which contains more caffeine, tea or coffee?

Think about the target audience for your leaflet. This should impact how it is written.

You may need to link up with a university or someone from industry if your school/college doesn’t have the appropriate equipment.

STUDENT BRIEF

GOLD 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.

Only conduct these tests if you have written permission from the subjects. Don't use more tea or more cups of tea than people would normally consume. Make sure the tests are done hygienically.

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.