



**GOLD AWARD**

# FRUIT JUICE OR FIZZY DRINKS?



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



**Communication  
project**

Investigate if fruit juices are really healthier than fizzy drinks.

**#biology**

**#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](http://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](http://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](http://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](http://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](http://www.crestawards.org)

# STUDENT BRIEF

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## Fruit juice or fizzy drinks?

Fizzy drinks are considered unhealthy due to their high sugar content and the amount of additives they contain. On the other hand, fruit juices are often seen as a healthy alternative and of greater nutritional value. In this project, you are going to carry out quantitative experiments to determine the concentration of some of the ingredients of these two types of drinks. Using your results, you will decide what the health benefits or risks are from drinking them and publish your findings for a particular target audience.

### Getting started

Choose a range of products to analyse, including a range of fizzy drinks and pure fruit juice.

#### Perception of sweetness:

Many fizzy drinks contain artificial sweeteners whereas pure fruit juices are naturally sweetened. Devise an experiment to compare the relative sweetness of artificial and natural sweeteners. This could involve carrying out taste tests with dissolved solutions of the sweeteners found in fizzy drinks and the natural sugars found in fruit juices, comparing sweetness and other taste differences.

#### Determining reducing sugars concentration:

You could use a test strip to provide a semi-quantitative result. For more accurate results, try using a compound called 3,5-dinitrosalicylate. When added to a solution containing reducing sugars, DNS is reduced to a compound called ANS, which is a red colour. The density of this colour varies depending on the concentration of reducing sugars, this density value can be measured using a colorimeter.

#### Determining the amino acids present by chromatography:

Which drink contains the most essential amino acids?

#### Determining the effect of fizzy drinks and fruit juices on tooth decay:

Extracted teeth can be sourced from dentists and left in drinks to study their effect.

#### Caffeine content:

Carry out research into the caffeine content of the drinks you are investigating. You need to use a technique called High Performance Liquid Chromatography (HPLC) to determine the amount of caffeine in a substance.

#### Antimicrobial effects of caffeine:

It is claimed that caffeine can prevent microbial growth. Carry out a further experiment to investigate this claim. Test the antimicrobial activity of different concentrations of caffeine solution against different concentrations of other anti-microbials to determine if caffeine is more effective than other anti-microbials at any concentration, and at what concentration caffeine has the most anti-microbial effect.

#### Publishing your findings:

Illustrate the findings and conclusions from your experiments and research work in a poster or information leaflet which is aimed at a particular target audience.

#### Things to think about

Think about who the most appropriate target audience could be for your findings. This could be children and teenagers who frequently drink fizzy drinks or parents who want to decide what drinks are best to buy for their children.

#### Useful resources

You are unlikely to have some of the required equipment at your school or college; however, you could approach a local university to see if you could use their facilities.





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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, taste tests must not be conducted in a laboratory but in a food technology room. Make sure you use food grade chemicals and carefully follow hygiene procedures.**

**3,5-dinitrosalicylate (DNS) is an IRRITANT.**

**You must adopt strict a sterile technique, including autoclaving any plates without opening them after incubation.**

### 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.