



SILVER AWARD

INVESTIGATE THE FIZZ IN FIZZY DRINKS



Typically 30 hours of project work
Recommended for 14-16 year olds



**Practical
project**

Investigate the effects of
fermentation and additives on
fizzy drinks.

#chemistry

#microbes

#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:
<https://www.stem.org.uk/STEMambassadors/localstem-ambassadorhubs>

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

- **Develop and lead the project**
- **Complete a minimum of 30 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 Silver Award project with the name(s) of the student(s) and the title of the project. If you don't have the details yet, 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 Silver 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.

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. 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 Silver CREST Award

Hard work deserves a reward! Celebrate and certify your students' achievements by entering their project for a Silver CREST 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 Silver!

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.

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

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

SILVER
AWARD

Investigate the fizz in fizzy drinks

Traditional fizzy drinks were made by fermentation using yeast. In this project, you're going to make some fermented fizzy drinks so you can investigate the effect of using additives and varying brewing conditions on their shelf-life.

Getting started

Find out about fermentation. What are the reactants and products of this reaction? Find a recipe for a homemade fizzy drink, popular ones are traditional lemonade and ginger beer.

Making your fizzy drink:

Make a bottle of fizzy drink using the recipe you've found. Then make more bottles, changing your recipe each time.

Lemon juice is used as an 'acidifier' - lots of fizzy drinks contain these types of additives to inhibit bacterial growth.

Look at other natural ingredients that could be used to inhibit bacterial growth, for example herbs and spices.

Increase and decrease the quantity of sugar added. Strain the drink before bottling to remove any 'bits'.

Remember, only change one variable at a time to make sure you get meaningful results. Make three or four bottles of each type of fizzy drink so you can monitor how they change over time.

Storing your bottles:

The drinks need time to ferment. Depending on the recipe, this might be some time at room temperature followed by some time in a fridge. Make sure your drinks are all kept in the same conditions. Or as a separate experiment you could leave bottles to ferment at different temperatures and see the effect. Remember all the other variables must be kept the same.

Comparing your results:

Investigate how your additives have affected your fizzy drinks. Open one of each type after six days - this is the usual shelf life of a homemade fermented drink - and compare:

- The appearance of the drinks
- How much carbon dioxide they give off when opened
- Their acidity - measure the pH values
- The sugar concentration
- The alcohol concentration - one of the products of fermentation is ethanol

Open another set of bottles after leaving them a further amount of time, for example another week. Compare them like you did the first time. You can then repeat this exercise over the period of time you have available.

Things to think about

Research the equipment you'll need to make your fizzy drink. Fermented fizzy drinks can explode if they aren't bottled properly. Investigate how to bottle your fizzy drinks safely.

Search for a ginger beer recipe online.



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SILVER AWARD



Health and safety

A 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, you should never drink anything that has been prepared in a laboratory or with laboratory equipment or chemicals. Take care not to add too much extra yeast, as it could cause the bottled drink to explode.

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.