CREST AWARDS

SILVER AWARD

TESTING TOOTHPASTES

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

Practical project

Make your own toothpaste and design a test to compare it with different shop bought varieties.

#chemistry
#health
#toiletries

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

Testing toothpastes

In this project, you will make your own toothpaste and compare it to toothpastes you can buy in the shop. You will then do some tests to find out which toothpaste cleans the best.

Getting started

You should start by writing down the ingredients of numerous different brands of toothpaste and how much they cost.

Try to find out what the various ingredients do. Decide which you think gives the best value for money.

Next make your own toothpaste using the recipe on the right.

Now design an experiment to compare your toothpaste with the shop bought stuff. You'll need something to clean! Egg shells provide a reasonable alternative to teeth and they have similarly high calcium content. Hard boiled eggs are a good idea.

You will then need to think about how you are going to stain the egg shells. Make sure each egg is stained using the same procedure.

One method for staining an egg is to place your egg in a cup of boiling water, with 1 teaspoon of vinegar and 20 drops of food colouring, Leave it for half an hour then dry the egg on a paper towel. Alternatively, you could try leaving the egg in a cup of tea, coffee or fruit drink.

When you've got some stained eggs, you'll need to think how to clean them using the toothpastes. Brushing is the obvious way, but make sure it is a fair test.

Things to think about

How will you decide which is the best toothpaste?

What sort of brush will you use and for long will you brush each egg?

Which toothpaste was most abrasive (scratchy)?

How could the abrasiveness be measured more accurately?

How could pH affect the cleaning ability of toothpaste?

Toothpaste recipe

You will need:

- bicarbonate of soda
- salt
- glycerol

1.Mix six tablespoons of bicarbonate of soda with two tablespoons of salt.

2.Add three teaspoons of glycerol.

3. Mix the ingredients thoroughly in a bowl and add just enough water to make it toothpaste like.

SILVER 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.

If you are going to test your toothpaste on people (e.g. a taste test), you will need to make it in a food technology room using clean, hygienic equipment and only use chemicals that are fit for human consumption.

Remember, some people are allergic to certain food colourings.

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.