



SILVER AWARD

# MAKE AND ANALYSE PAIN RELIEVERS



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



Design & make  
project

Learn about pain relievers by making and analysing them.

**#chemistry**

**#medicine**

**#painrelief**



# 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: <https://www.stem.org.uk/stem-ambassadors/local-stem-ambassador-hubs>

To use their project to achieve a CREST Silver 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](http://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 CREST Gold Award

Hard work deserves a reward! Celebrate and certify your student's achievements by entering their project for a CREST Silver 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 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](http://www.crestawards.org)

# STUDENT BRIEF

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## Make and analyse pain relievers

In this project, you will make your own aspirin or paracetamol. You will then test the purity of your homemade pain-reliever and compare it to shop-bought pain-relievers.

### Getting Started

You should start this project with some research into over-the-counter (OTC) pain relievers.

Analysing OTC pain-relievers: When you've made your pain-relievers, you should try to use standard procedures to test their purity. Try using the same standard procedures to check the purity of some shop-bought pain-relievers. See if they contain the stated amounts of active ingredients.

You should also find out about how to use chemical tests and chromatography to identify unknown OTC pain relievers. When you've discovered how it's done, try the test yourself. Get a few different tablets, mix them up, and try to work out what they are.

### Things to think about

What are OTC medicines?

Ask people what OTC pain relievers they use and why. Among the people you ask, what are the most popular OTC pain-reliever brands?

Group various products according to active ingredient. These are written on the side of the packaging. Which ones do you think offer the best value for money?

Think about the range of forms OTC pain relievers are available in - for example, tablets, capsules, liquid. Why do you think there is such a variety?

What other information can you find on the labels - for example, recommended doses, instructions for storage?

### Useful Resources

You can find standard procedures in pharmacopoeias, or you could try looking on the internet. Alternatively, you could contact an analytical chemist in industry or a university and ask for advice.



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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, there are many things in the lab that could contaminate your pain relievers. So don't let them pass your lips - even if you have a headache!**

**You will need to think carefully about the hazards of the chemicals you use and the steps you will take to reduce the risks from them. Don't assume the textbook gives correct or up-to-date information.**

**Remember, published standard procedures may be aimed at industrial laboratories, not schools with different facilities or equipment.**

## 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.