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CREST Gold Award student guide

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Before your project

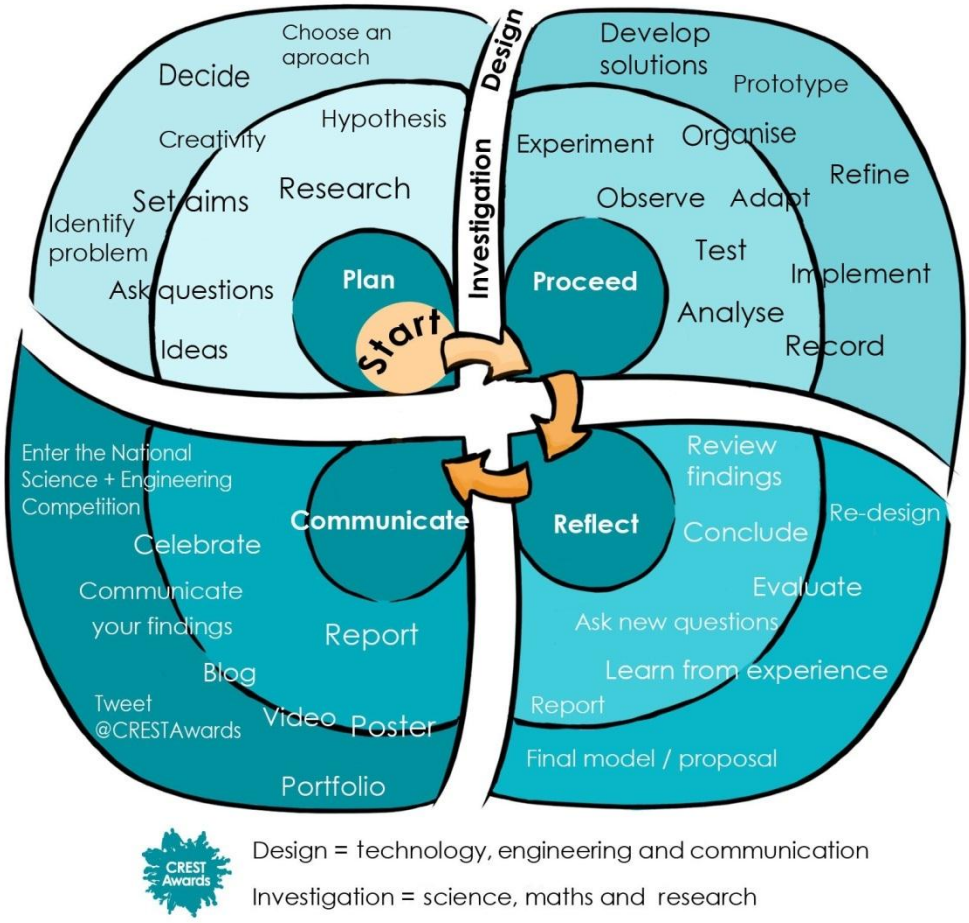
1. Read through this student guidance. It will make the CREST process easier for you, your mentor and your teacher, as well as your CREST Local Coordinator. If you are unsure of anything, your teacher or mentor should be able to answer any questions.

2. Please look at the criteria we use for CREST Awards below and make sure you understand what to do. **This table explains the criteria we use to assess your project, and explains what you need to do to get a CREST Gold Award.**

CREST criteria
1 – Planning your project
a. Project aims and objectives (clearly identify your aim and what you want to achieve, breaking it down into sensible, clearly explained steps)
b. Project context (describe the background to your project, including why it could be important to other people)
c. Selection of approach (identify a number of reasonable ways to complete your project and give reasons for why you choose the 'best' one)
d. Project strategy (choose a realistic way to do your project that will help you meet your aims. Show logic in your approach)
e. Planning and organisation (plan and organise your project carefully and think about the help you might get from other people)
2 – Throughout your project
a. Use of material and human resources (make sure you ask for help at the right time and in the right way to make good use of the resources you have)
b. Research (find out about the background and solutions to your project and think about how you find things out)
3 – Finalising your project
a. Conclusions and implications (come to logical conclusions based on your evidence make sure you understand what the conclusions mean)
b. Understanding of project outcomes (explain how the things you did affected the outcome of the project, these could be good or bad effects)
c. Reflection on learning (show that you understand what you have learned from the project and mention how you might have improved it)
Project-wide criteria
a. Scientific and/or technical knowledge (show you understand the science and technology behind your project and make it clear in your report)
b. Decision making (make decisions in a methodical and sensible way)
c. Creativity (try and think of different approaches when generating ideas and solving problems)
d. Problem solving (how you overcame difficulties during your project)
e. Communication (tell us about your project either in writing, by speaking to us, or by using other media)

The STEM project process

All science, technology, engineering and maths (STEM) projects should follow a clear process. There are different ways to show the process, and this diagram provides a general model that may be useful to consider. CREST projects should follow that same process and all these elements are covered by the CREST criteria:



Design = technology, engineering and communication

Investigation = science, maths and research

Doing your project

1. It might be helpful to use the CREST criteria and the general project process diagram above as a guide throughout your work, as they form a good framework and this will also make sure you cover all the CREST criteria as you work.

2. You may want to keep notes showing your planning/thoughts from early on in the project process to submit in your personal reflections.

3. Towards the end of the project you need to write a project report. This will provide evidence towards your CREST assessment. The CREST criteria will be especially useful at this point.

Producing your report

At Gold level, your report should introduce, describe and evaluate your work.

Alongside your report you will need to complete the CREST Gold Award student profile document that will help you show your assessor that you have completed your project in a well-thought-out way.

The CREST Gold Award student profile includes both the checklist and personal reflections. **The purpose of the checklist is for you to check you've covered all the assessment criteria in your report. This means it's there to help you as you write your report, so completing it at the end with your report should be very straightforward.**

Remember to:

- Use your own words. We want to hear about **your** project and what **you** did.
- Number the pages. This will help you reference areas of the report when you fill out the checklist.

If you are working as part of a team, your team should produce a joint report but each team member should have a separate student profile.

Notes from past projects – things to look out for

Each year, we collect lists of issues we find in the CREST projects we look at. For Gold projects, the main issues we find are:

- A small number of students used information **copied straight from the internet** in their reports. Please tell us about your project and the research behind it in your words, not someone else's. If we find evidence of plagiarism in your report, we will raise it with your school as a serious issue. We know from experience that CREST Gold produces amazing projects done by amazing students, so please don't waste the opportunity to tell us what **you** learnt and did. This almost always occurred in the research sections of reports, so please be careful to summarise any relevant research in your own words, and always acknowledge sources.

- Some students **did not list the sources** of their research information. We don't require you to use academic referencing standards, just to give us the information we need to find any sources you used. If you want advice on this, please ask your teacher.

Showing you've met the CREST criteria: CREST Gold checklist

Each student who contributed to the project needs to submit a checklist as part of their individual student profile.

When you fill in the checklist, put the **page numbers** where the assessor can find the evidence and the **paragraph number** on that page. It's very important that the pages in your report are numbered. You don't need to number the paragraphs in your report, just the pages.

A sample checklist might look like this:

CREST Criteria	Where do you show this in your report? (give page and paragraph)	Your notes to the assessor (optional)
1 – Planning your project		
Project aims and objectives (Check: you set a clear aim and have broken it down into smaller steps/objectives)	Pg 1 para 2-3, pg 2 all	....
Project context (Check: your project links to everyday life)	Pg 1 para 2	....
Selection of approach (Check: you considered different ways to do the project and gave reasons for the one you chose)	Pg 2 all, pg 3 para 4, pg 6 para 2	Changed approach part-way through after reflecting on how things were going, see appendix B

If you think evidence for some criteria can be found in your personal reflections, you should refer the assessor to these sections using the same system as above.

If you don't think your report or personal reflections cover all the criteria, you can add to your personal reflections by writing more to tell us about how you demonstrated all the skills.

Writing your personal reflections

As well as the report that focuses on what you actually created or discovered and the process of your project, each student needs to submit personal reflections as part of their student profile.

This is where you think about what you did during the project and what **you** have learnt. It is an opportunity to think about what you did well in your project and tell us what you think you could have done differently.

This process of reflective learning is widely used in industry and universities to help people to learn and it is an essential part of the CREST process. It's an amazingly powerful tool, and will help you learn about what you do well and what you can improve, so please take it seriously. Check out the following guidance and examples for team and individual personal reflections.

5. Personal reflections – in a team

For team projects

Each team member will need to complete around **half a page** of reflection covering:

- **My role in the team and tasks I completed**
- **How my project was successful/not successful**
- **What I learnt**
- **What impact the results of my project might have on other people/the wider world**
- **What I would have done to improve my work**
- **What I'd do to develop the project in the future**

We use this to see what everyone in the team did. Very rarely, we will only give some team members the full award if it's clear one or more team members didn't contribute fully. Be clear and honest about what you contributed and don't be shy about telling us your individual achievements!

A good example of a student's personal reflections from a team project would be:

"I acted as team leader for our project. This meant I helped pull everyone else's work together, and helped everyone make sure we stuck to the plan we set at the beginning. Sometimes we disagreed about aspects of the project, and we discussed this as a team. I would try to find a way that everyone was happy with, or when this wasn't possible, made the best decision for the project on the information I had available.

I had never led a team before so I had to learn ways to get everyone to work together, stick to deadlines, and not take things personally. I struggled a lot at first, but I talked to our team mentor and he helped me find ways to do this really well. These included learning how to manage a meeting, and keep information flowing so everyone knew what was going on.

To improve our project I would have spent more time getting the details of what the mentor wanted clear for all of us at the beginning of the project, so we had a much better idea of what we were aiming for. This would have helped us set off in the right direction instead of wasting time going in directions that wouldn't work for the mentor.

In future, we would develop a more reliable propulsion system, and reduce the weight of the chassis, as we know the strain on the engine caused by the weight of the chassis was part of the reason why it failed. We also think our vehicle could be used in other production lines, and want to investigate the possibilities and potential markets for our mentor."

6. Personal reflections – individual

For individual projects

You need to add around **half a page** of reflection at the end of your report. It should cover:

- **Tasks I completed and how my project was successful/not successful**
- **What I learnt**
- **What impact the results of my project might have on other people/the wider world**
- **What I would have done to improve my work**
- **What I'd do to develop the project in the future**

A good example of a student's personal reflections from an individual project would be:

"I was attached to Dr Thomas' research team, working with him and one of his PhD students. My role was to investigate the tidal patterns in the Estuary to work out when the work on flood defences could be carried out. To complete my project I had to gain an understanding of the work which needed to be done, the issues the tide would cause, and how available tidal information related to our site. I then had to come up with a way to use all of this information to provide the answer we needed. I did this by joining in the work of the group, to see how it all fitted together and bouncing ideas off my supervisor, Dr. Thomas, and his PhD students. I was lucky that they also involved me in their work.

I have learned a lot of new engineering knowledge, about hydrodynamics, geology and flood defences. I have also discovered how difficult project work can be because it requires people with different skills and knowledge to work together. It takes a lot of effort to make sure everyone understands each other and doesn't make wrong assumptions.

To improve my project I would have spent more time understanding what was required at the beginning, so I had clearer aims and objectives, and asked more questions when I didn't understand. This would have saved me a lot of work later in the project. I would also have used more than one set of tidal data to make my predictions more accurate.

In future I would like to investigate the use of 'soft' flood defences which help to maintain biodiversity while providing effective flood defence."

To develop the project in future I would look at helping the moulding company to move to recyclable polymers, as many of the polymers they use are not recyclable, and this is a big issue for the future when we are running out of crude oil.

7. Assessment

After your project

Your CREST Local Coordinator will need the following in order to assess you:

- A copy of your project report
- A completed CREST Gold Award student profile, which includes the project checklist and personal reflections about your experience and what you learnt.

When the project is done by a team, each team member needs to submit an individual student profile.

Your CREST Local Coordinator will not start assessment of your project without having seen these documents first.

To get a CREST Gold Award you need to demonstrate at least 11 of the CREST criteria at acceptable standard or above, covering all four sections of the criteria. You should also complete around 70 hours of project work. Your teacher has more information about what 'acceptable' means in their guidance.

How we assess

The CREST Local Coordinator will either assess your project themselves, or will ask an appropriate assessor, such as a volunteer from a local company or university, or a scientist, engineer or STEM Ambassador.

1. The assessor will read the documents you submitted. This will help them identify areas where they need to ask you further questions.

2. After reading the documents the assessor will either visit the school to ask further questions, or will send a list of questions or issues on which they require further information. The assessor may also speak to your mentor and teachers to find out how well you as an individual or team performed during your project. Once the assessor has had a conversation with you, or received your answers, they will consider everything they've read and heard and complete the assessment. If you meet the standard, you will receive your Gold Award. If not, we can:

- Offer you a Silver Award if you're close to the standard for Gold
- Ask for further work to be done or request further information
- Make no Award at all

The assessor does not have to recommend everyone in a team for the same level of Award.

CREST assessors will also check for copied and pasted content.

8. What next for your CREST Award?

What can you do with your CREST Award?

Join a growing community of like-minded scientists and engineers

Once you've received your CREST Award, you can join the **CREST Alumni Network**.

It is free and aims to highlight other STEM events, competitions and opportunities for young people (and those at university and beyond) as well as capturing inspirational case studies about students' projects and education/career paths.

To find out more, and fill in the simple five minute registration visit www.britishscienceassociation.org/crestalumni

You can also keep up with CREST Awards on via Facebook and Twitter

Facebook: /CRESTAwardsUK

Twitter: @CRESTAwards

Communicate your achievements

University applications

CREST is the only STEM scheme currently endorsed by UCAS for use in personal statements as part of applications to universities, and can help you stand out from the crowd by making the most of your project experience.

Job interviews

You should mention your Award in your personal statement on job applications and in interviews. When you mention your project, it's a good idea to include some reflections on the skills you used and what you learnt through the CREST process. You can refer back to your CREST Gold Award student profile to help you remember what you learnt.

Celebrate!

If you want to celebrate your project further, meet some fantastic scientists and engineers, and maybe even win some prizes, you can enter your CREST Gold project into the **National Science + Engineering Competition** online or through regional heats at 'Big Bang Near Me' fairs. To find out how to enter, go to: www.nsecuk.org