Teachers Guide

This CREST-accredited project can be put towards achieving a CREST Bronze Award

Background

Respecting the environment is a key concern in engineering and construction. All new projects must undergo rigorous analysis to check that they meet with environmental standards concerning their impact on the natural environment, historical environment and the local area. We have to think carefully about how new additions to our built environment impact the site and its surroundings, and how they may affect the health and wellbeing of the people who work in and around them.

This activity encourages students to think in the same way about their school environment and the surrounding area, and to work scientifically to analyse and suggest solutions to improve it.

We hope with this activity students will recognise the complexity of factors which influence their environment, from human behaviour to architecture and design. We also hope that this project will encourage students to take responsibility for their surroundings, and to recognise that they can have a positive impact on improving the world around them. By completing this project students will also learn to use their science skills in a new but immediate real-world context where they can contribute to positive change.

Overview

In this project students will use their science skills to create an environmental improvement plan for their school that focuses on a key area of their own choosing. Students will design their own investigation and using their results propose an action plan to improve the school environment in their focus area.

In the student hand-out we have proposed several focus areas for students to investigate, such as biodiversity in the school grounds, traffic congestion around the school, noise in and around the school building or litter. Students are also encouraged to suggest their own area of investigation for the project.

Learning Objectives

Students will learn to:

- Work scientifically to plan an investigation;
- Analyse and evaluate data;
- Evaluate risks;
- Reflect on their learning.

Essential Skills

This project incorporates the Skills Builder Framework for Essential Skills. Students will have the opportunity to use their essential skills of problem solving and teamwork. See the Skills Builder Framework for Essential Skills for more information at **https://www.skillsbuilder.org/**.

This activity has been designed for student to work in teams of two to four students. Students may choose to work on their own, however they will not have the opportunity to use the Essential Skill of teamwork (see below).

Project Outcome

Students may present their investigation however they like, however it should include the aims, method, results and conclusion of their investigation, as well as their action plan and reflection on their learning. Note that we do not expect students to undertake their action plan; it should be a suggested plan for future action.

Students should consider how they will present their results and choose an appropriate table and graph.

To give the project more status you could propose that students present their plan to senior leaders of the school on its completion; this will no doubt excite students to produce something that could have genuine impact.

Assessing the Project

The School Environment Improvement Plan activity can be put towards achieving a CREST Bronze Award. Students' project work should be accompanied by a CREST Student Profile (**https://secondarylibrary.crestawards.org/crest-student-profile-form/62632654**). Work should be assessed using the CREST Bronze criteria guidance (**https://help.crestawards.org/portal/en/kb/articles/criteria-for-bronze-silver-and-gold-crest-awards**). See the CREST website for more details on how assessment should be completed and submitted.

Should students require more structure in writing up their investigation, they can alternatively structure their write-up using a CREST Bronze Workbook (**https://secondarylibrary.crestawards.org/crest-bronze-workbook/62639482**). In this instance students should use the 'space for further notes' to outline their action plan, and they do not have to supply a CREST Student Profile with their work.

Supporting your students to complete their project

Bronze Awards are student-led and should be completed over ten hours of student work. Your role as a teacher or mentor is to:

• Assist students in finding an investigation focus that is realistic in ambition and achievable within the scope of the project;

• Encourage and nurture students' ideas and support them in developing them;

• Assist students to plan and design their investigation so that it will provide precise accurate data;

• Encourage students resilience and perseverance in the face of mistakes and setbacks;

• Provide access to useful and relevant learning resources;

• Advise students on how to approach other adults and students in the school who may have a role in the project;

• Support students to access professionals or experts who could support them;

• Help students to assess risk and to be responsible for the safety of the students as they complete the project. You could consult with CLEAPSS to help with this;

• Support students in developing their essential skills across the project;

• Support students in seeing the careers links between what they are doing and the work of real life professionals. Handout 2: Environment Manager has been created to provide a careers link to the activity;

• Provide a CREST Student Profile Sheet, CREST Workbook, Student Brief and Handouts;

• Support students to reflect on their learning.

As a further note, students will particularly require support at the beginning of the project. This may be their first time planning their own experiment, and they will need lots of encouragement and organisational tips to get from ideation to actualisation. They will also need a little more help towards the end of the project when they are writing up, as some members of the group may see the 'fun bit' as over or they may not realise how much work is still ahead of them. Help them to divide up the workload between them and provide them with examples of good quality investigation write-ups.

Rewarding completion is also important. Like at the end of any big project, make sure that the students are rewarded with a letter home or other appropriate reward along with the presentation of their certificates. Recognition at this point is very important, especially if you want the students to progress onwards to a silver or gold award.

Additionally, some projects of this type can run beyond the normal ten hours recommended for a Bronze Award. There is no problem with this in terms of the award, however if you are concerned that students may take too long to complete the project, support them in creating a timeline for project delivery, and in assessing if their experiment will be overly time consuming and beyond the scope of the project.

Health and safety

- Students should be encouraged to make their own risk assessment before they carry out any activity, including surveys. They can use the CLEAPSS student safety sheets to help them **science.cleapss.org.uk/Resources/Student-Safety-Sheets/**

- They should write out their project plan, identifying the risks involved in each stage and the control measures and precautions they will take.
- In all circumstances this must be checked by a competent person.
- Students using specialised equipment should be supervised at all times. Students may want to set up unorthodox experiments and you may need to seek specialist advice. Contact CLEAPSS directly cleapss.org.uk for advice if you are unsure. Teachers in Scotland should refer to SSERC **sserc.org.uk**.

Prompts

Use these questions to prompt your students thinking.

- What factors will you need to consider to make sure that your results are accurate?
- How can you make sure that your results are precise?
- How will the data you collect help you to make useful recommendations?
- How long will your data take to collect?
- Will your results vary according to the time of day that they are collected?
- How many times will you repeat your investigation?
- How will you collect control data?
- What are the safety considerations for your investigation?
- How will you make sure that you are not negatively impacting on the environment during your investigation?
- Who else might you have to inform about your investigation?
- What extra information or skills will you need to complete this investigation?
- How should the results be presented?
- What additional safety precautions will need to be taken when working off-site?
- Why is improving the school environment important?
- How could you influence other students to take responsibility for the environment?