CREST AWARDS

YGC YOUTH GRAND CHALLENGES

PROJECT IDEAS
WORLDWIDE WASHING

Inspired by the Global Grand Challenges presented by infectious diseases, three project ideas have been developed:

Research: THE SANITATION DIVIDE
Practical: EXTRAORDINARY EXTRACTIONS
Communication: SANITATION FOR ALL

YOUTH GRAND CHALLENGES

The Youth Grand Challenges is a new STEM competition that aims to inspire young people, aged 11-to-19, to see how science and technology can be deployed to tackle global health issues. The competition calls on students to come up with innovative solutions that have the potential to change the world, and will reward the best projects from young people created in response. The theme for 2016/17 is infectious diseases.

To participate in the Youth Grand Challenges competition, students must undertake a CREST project on a topic of their choice that relates to the overarching theme of infectious diseases – such as mosquitos, sanitation, or vaccines, and that is in an eligible topic area aligned with a current theme of research supported by the Global Grand Challenges http://gcgh.grandchallenges.org/

To enter your students for the Youth Grand Challenges competition, go to www.youthgrandchallenges.org

SUPPORTING YOUR STUDENTS

To support educators and young people in the Youth Grand Challenges competition the British Science Association has released a suite of new CREST resources on the theme of infectious diseases. These resources have been produced by Practical Action and 4Science for the Youth Grand Challenges, in partnership with the CREST Awards scheme.

For each project, there is a Student Brief, providing a project idea and questions to get your students started, and a Teacher Guide, with some useful links and tips for prompting your students in their projects.

If you would like your students to achieve a CREST Award for their project, or for more information on how to support your students in their CREST Award project please go to www.crestawards.org.

Alternatively, if you do not wish to register for the full CREST Award, you can still use these resources on their own.
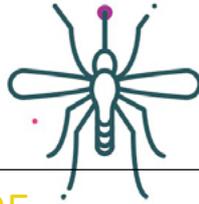
THE SANITATION DIVIDE
Research project

Different toilets across the world
- Find out about the distribution of toilets in different areas, use data on how many people have to share a toilet
- Toilets might be in private homes or in communal areas

Sanitation projects that are improving people's lives
- Find out about previous or current projects
- How successful or unsuccessful have they been?

Trends over time within and between countries
- How has the situation changed in recent years?

Ways of communicating that many audiences can access
- What might the best way to communicate your research?
- What makes for effective presentations or information for different audiences?

Benefits of good sanitation to health and wellbeing
- What are the health benefits for individuals and communities?
- Are there other benefits beyond just improved health?

Impacts on groups such as the elderly and women
- What problems does a lack of an organised sanitary system create for specific groups such as the elderly and women?

The role people in developed countries can play
- What support might individuals or groups provide?
- What support might NGOs or governments provide?
- What role should we be playing in supporting developing countries?

EXTRAORDINARY EXTRACTIONS
Practical project

The separation techniques that will give you the purest samples
- Think about simple and more complex extraction techniques
- Would combining more than one technique be helpful?
- Removing the bulky plant matter will be important but you don't want other chemicals you add to affect your investigation.

Methods that could test plant's antibacterial properties
- Consider experiments you may have done in the past with bacteria
- Remember the context is the removal of existing bacteria not inhibiting the growth of bacteria

Development of a hand sanitizer from the extracted chemicals
- Does the plant require a medium to apply it?
- Consider shelf life and transport.

Testing to see if they are safe to use
- In theory how would you test the extracts?
- Do a risk assessment on testing extracts on your skin (with help)

Collaboration with others to test many plants not just a few
- Scientists from different groups often share results
- Verifying your own findings, adding information from other studies and peer review are all important processes in science investigations

Developing the extraction techniques that people in developing countries without specialist equipment can also use
- What specialist equipment have you used?
- Can you substitute your equipment with something cheaper and/or more sustainable?
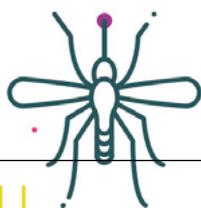
SANITATION FOR ALL
Communication project

Successes in this area of work
- What can you find out about projects that have worked well in the past?
- What can you learn from them?

Projects that have failed in the past and why
- Can you find out about problems some projects have experienced?
- Can you learn anything from their experiences?

The costs involved
- Costs are a major consideration, can you estimate any costs?
- Previous projects may help to give you a guideline.

The funding that could be used to support these developments
- Find out where similar projects have secured their funding from
- What large organisations fund global development projects?

The benefits to health and wellbeing
- Consider the health benefits to different groups of people
- Are there wider benefits for specific groups of people or vulnerable individuals?
- What problems can a good sanitation system it help overcome?

Persuading local officials who may not live in the area themselves that this is an important project
- Not everyone may think this is progress, who might be against such projects or not interested in supporting them and why?
- What arguments might you use to persuade them of the benefits to the area as a whole?

Health and safety

Please do encourage students to take out their own risk assessments if they are carrying out a practical project or a survey, then check them yourself. CLEAPSS will provide any advice should you need it.

www.cleapss.org.uk

GENERAL GUIDANCE

Project health and safety

Students should be encouraged to make their own risk assessment before they carry out any activity, including surveys. 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.

Organisations such as CLEAPSS and the Royal Society of Chemistry are able to help. The MISAC (Microbiology in Schools Advisory Committee) can provide advice concerning microbiological investigations.

Support and Guidance

CREST gives students the chance to participate in hands-on science through investigations and enquiry-based learning. Students must decide their own focus; however, you may need to give additional support to students.

Your role is to:

- Act as a sounding board for students' ideas and nurture the students' work
- Help students see mistakes and setbacks as an opportunity for positive learning and lateral thinking (leading to creativity)
- Encourage your students in reflecting on their own performance and learning
- Where relevant, support students to find mentors from academia/industry
- Where relevant, ensure technician support is available to students
- Provide access to the Internet, library books and magazines (such as New Scientist)
- Provide direction to identify suitable sources of relevant information at an appropriate level. (NB. Students must research and select information for themselves).

Prompts

The student briefs give some triggers to start students thinking. They should realise that each trigger implies several items to research and compare. Encourage students to identify these themselves.

If students struggle to identify these the teacher guide provides extra prompts to help you guide them.

CREST AWARDS

Gold

By working towards a CREST Gold Award, students will develop and deliver largely self-directed projects. The aim is for students' work to contribute something new to the scientific or technological community or to a particular field of study. They are supported by an industry or higher education mentor, who can offer guidance and advice, and are required to prepare a final report and present the outcomes of their project to their CREST assessor.

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

- Develop and lead the project
- Complete a minimum of 70 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

For full details about the CREST Gold Award visit www.crestawards.org/run-crest-awards/crest-gold/