



Practical ACTION

TEACHER GUIDE

BRONZE AWARD



PROJECT IDEAS INCREDIBLE INOCULATIONS

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

Research: VITAL VACCINATIONS

Practical: VACCINES ARE COOL

Communication: SPREAD THE WORD

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

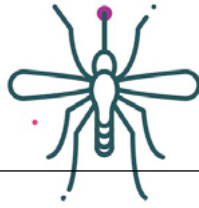
SUPPORTING YOUR STUDENTS

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.



VITAL VACCINATIONS!

Research project

Where they were first used and who thought of the idea

- Who is usually credited developing the idea of vaccination
- What observations did they make that led them to thinking of it?
- Are there earlier observations or uses of techniques like vaccination?

How scientists tested their ideas out

- What experiments were done?
- Who was it tested on?
- How were the findings shared with other scientists?

What diseases can be protected against with vaccines

- Find out about diseases in this country
- What diseases in the developing world can be vaccinated against?

How do vaccines work

- What happens when vaccine is given to someone?
- How does their body react?
- Why don't they get ill from the vaccination?
- How do they provide protection?

What vaccinations have you have had?

- Can you find your record or ask your parents/carer
- What vaccinations are commonly given to children in this country?

Why some important diseases, like malaria, cannot be vaccinated against

- What types of diseases does vaccination protect against?
- How is Malaria spread?
- Why can't it be vaccinated against?

What is being done about these other diseases

- How can individuals protect themselves against Malaria
- What is being done by communities and scientists to combat it?



VACCINES ARE COOL!

Practical project

The temperature you want to keep the box below

- What temperature do vaccines have to be kept at?
- Will you choose this temperature or another more convenient one?
- What will the outside temperature be?

The insulation you might use?

- What materials are good insulators of heat?
- What materials do manufacturers of fridges and cool boxes use?

The amount of ice you can you pack into it

- Are you comparing your design to other groups?
- Will you keep this the same for all groups?

What conditions your box will need to stand up to?

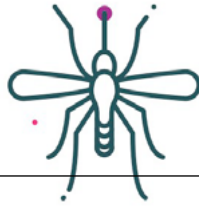
- Are you just interested in testing this in the laboratory/classroom or are you going to make a design that will work in the real world?
- If you are going for a real world design what conditions will it need to stand up to in a developing country?

The volume of 'vaccine' you need to store

- Are you competing with other groups?
- Will you need to agree what volume your cool box might need?
- What volume of vaccine might a community need?

If you use high tech materials or materials that could be sourced in a developing country

- Modern high tech materials may work very well.
- Will this be a local solution that people in developing countries can copy with materials they have?
- Using waste materials and recycling may be important in very poor communities.



SPREAD THE WORD

Communications project

A variety of techniques can be used to make key messages clear, simple to remember and accessible

- Short sentences with clear themes work well
- Pictures can say as much as words and are more memorable

Sometimes songs, poems plays or cartoons can work better than written materials

- Making messages relevant to people's lives is important
- Something catchy will be repeated far more often and remembered
- Popular culture is a useful tool

Think big and think small, you want reach as many people as possible

- Not everyone responds to the same things
- Think about different age groups and interests

Fun things are easy to remember even if the messages are serious

- Something that makes us smile will stick in your mind
- People pass humorous ideas on to each other and share them

You could try to find out about literacy levels in different parts of the world to judge how to make your materials accessible to everyone.

- There will be a wide variety of literacy skill, some will be very well developed others less so
- Each audience will need materials of the correct level if they are to engage



Useful Links

The following links are recommended in the pupil notes:

www.unicef.org/wash/index_wes_related.html

Information about common water and sanitation-related diseases

www.un.org/sustainabledevelopment/health/
Information on Global Goal 3 'Health and Well-being'

www.nhs.uk/conditions/vaccinations/pages/the-history-of-vaccination.aspx

The history of vaccines

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

Bronze

By working towards a CREST Bronze Award, students experience the project process; improving their enquiry, problem solving and communication skills. They have the opportunity to develop the project using their own ideas, taking decisions about how to progress with on-going support from their teacher.

The most important thing is that there is an element of investigation and exploration, and that the project sets out to answer a question or solve a problem.

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

- Develop a project using their own ideas, taking decisions about how to progress through it
- Complete a minimum of 10 hours of project work
- Write about their findings and evaluate their project in their profile form or workbook

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