CREST AWARDS

SILVER AWARD

WORLDWIDE WASHING

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



Practical project

Investigate how sanitation can help solve global health challenges.



#biology
#hygiene
#sanitation

CREST AWARDS

YOUTH GRAND CHALLENGES

TEACHER GUIDE

SILVER AWARD



PROJECT IDEAS WORLDWIDE WASHING

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

Research: WHAT A WASTE
Practical: WASHING WITH PLANTS
Communication: TOP TOILETS

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

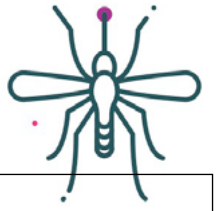
To support educators and young people in the Youth Grand Challenges competition the British Science Association has released a suite of new CREST resources on the theme of infectious diseases. These resources have been produced by Practical Action and 4Science for the Youth Grand Challenges, in partnership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





WHAT A WASTE

Research project

How is water processed before it reaches our homes?
- Trace the path of water from rain into your school or house

What happens to the waste water that leaves our homes via the sewage system?
- Can you see where waste water leaves your house or school?
- Do you know where your nearest water treatment plant is?

How is waste processed to make it safe?
- Find out about waste water treatment.
- What solid and liquid materials must be made safe?
- What turns materials from harmful waste into safe materials?

What happens to the materials when they are processed?
- What material are produced as a result of treatment?
- What are they used for?

What alternative toilet systems are there that people in the developing world might use?
- Do all toilet systems work like ours do?
- What happens when there is no water supply or sewage system?

What is the impact on health and wellbeing when toilet systems are introduced in these communities?
- Do they cause any problem?
- Are there health or wider social implications?

What is the link between standing water and malaria?
- Find out about how Malaria is spread
- What part does water play in the spread of Malaria?

What is being done to reduce the spread of Malaria?
- What can individual people do?



WASHING WITH PLANTS

Practical project

Initial research to find out what plants might work well.
- What sorts of plants are used in products you can buy?
- Are there groups or families of plants that appear to work well?
- Use nature books and biology guides to identify key plants.

Deciding how you will find out if they affect bacteria.
- What methods could you use?
- Use textbooks/ the internet/ teachers and technicians to find out

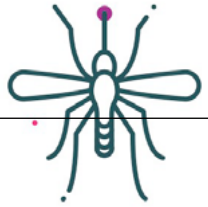
What measurements might you take that will help you decide which is the most effective plant?
- What could you measure and record to see if there is a difference?
- How could you present your measurements?

Does the way you process the plant make a difference?
- Think of different ways of extracting plant materials.
- Try testing to see which is the most effective.

What safety precautions must you take when working with bacteria?
- This is important, what risks might there be?
- Put together a risk assessment to ensure you are doing this safely.

Is a single experiment good enough?
- How will you make your tests fair?
- Will you need to repeat anything?

Can you collaborate with other groups to verify your findings?
- Collaborating will enable you to see if you get the same results and others, and if not think about why not.
- You might be able to test more plants if you share your results.
- Collecting data from more than one group could help you get better results.



TOP TOILETS!

Communication project

What low tech but effective sanitation solutions are there?
- Look at different types of toilets used across the world.
- Which ones do not require plumbing and sewage systems?

How do these systems work, what materials are required and how much time and effort is needed to build them?
- Look for diagrams, descriptions and videos online

How will the maintenance of these systems be organised
- What ongoing maintenance do these systems need?
- How often do they need servicing
- Do they need a skilled person to do that?

Why do these systems benefit groups such as the elderly or women in particular?
- Why might these groups need special consideration?
- What additional problems might they face that others don't?

What problems might going to the toilet in the open cause?
- Imagine yourself in this situation, what would you feel?
- What are the health consequences?
- find out about 'flying toilets'

Which groups are the hardest to persuade and why?
- Identify different groups, Why might they take a different view?

What economic benefits might the community gain from developing such systems?
- Think about the consequences of the systems not being there?
- What problems might they solve?
- How would this enable people to work more, grow more or earn more?

Does defecation into standing waste water have other disease implications?
- Think about diseases that stagnant water might encourage.
- Are any of these significant problems in the developing world?

Useful Links

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.bit.ly/40-shocking-facts-about-water
Interesting facts and statistics on water

www.youtube.com/watch?v=LCKsU4bPFOQ
Video on why Global Goal 6 is important in eradicating poverty

www.wateraid.org
Information about the challenges of water and sanitation

www.practicalaction.org/improved-toilets-3
Sanitation systems used in different countries

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

Silver

By working towards a CREST Silver Award, students begin to develop their own project idea – they are encouraged to lead it and use their teacher, club leader or supervisor as a sounding board for discussions.

They are also expected to consider the broader impact of their project, demonstrate an innovative approach, and write a project report or portfolio of evidence to present 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 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 and using a student profile form

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

STUDENT BRIEF



WORLDWIDE WASHING

SILVER AWARD

Access to clean water and sanitation to help prevent the spread of diseases is global issue. Educating people is as important as providing the equipment needed. In order to support people in the developing world who may not have access to clean water and toilets we need solutions that are local, fairly inexpensive and can be understood in a local context.

WHAT A WASTE

Research project

Have you ever wondered... how much water a toilet uses?

Every time you flush the toilet you use water that is good enough to drink. The waste that leaves your home travels a long way to be processed and made safe, which is expensive. In some parts of the developing world people don't have access to enough water for cooking and drinking, let alone for flushing a toilet.

Imagine you are a research assistant for a Government funded project just starting in Kenya and:

- Find out where our drinking water comes from
- What happens to the waste we produce?

Some things to think about...

- How has water been processed before it reaches our homes?
- What happens to the waste water that leaves our homes via the sewage system?
- How is waste processed to make it safe?
- What happens to the materials once it has been processed?
- What alternative toilet systems are there that people in the developing world might use?
- What might be the impact on health and wellbeing when toilet systems are introduced to these communities?
- What is the connection between standing water and malaria?
- What is being done about this to reduce the number of cases of malaria?

WASHING WITH PLANTS?

Practical project

Have you ever wondered...why some hygiene products contain plant extracts?

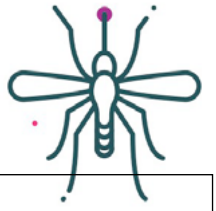
Some people in the developing world do not always have access to commercial soaps or hand cleaning products but may have access to natural plant materials. You know that many plant materials have antibacterial properties and that in some situations people could use these instead.

Imagine you are a botanist for the Royal Society and do some practical experiments to:

- Collect and process common plant materials
- Test if they have antibacterial properties

Some things to think about...

- Initial research to find out what plants might work well
- Deciding how you will find out if they affect bacteria.
- What measurements might you take that will help you decide which is the most effective plant?
- Does the way you process the plant make a difference?
- What safety precautions must you take when working with bacteria?
- Is a single experiment good enough?
- Can you collaborate with other research groups to verify your findings?



TOP TOILETS!

Communication project

Have you ever wondered...how simple solutions can improve people's health and wellbeing?

Imagine you are a WASH (Water and Sanitation) expert working for the international development charity Practical Action. You will know that good sanitation improves lives. Composting toilets or other simple sanitation solutions can make a big difference but sometimes you need to persuade the communities you want to help to see the benefits for the time and effort they will need to put in. Use your communication skills to:

- Explain why developing simple low tech sanitation solutions benefits the health of the whole community
- How better sanitation protects vulnerable people

Some things to think about...

- What low tech but effective sanitation solutions are there?
- How do these systems work, what materials are required and how much time and effort is needed to build them?
- How will the maintenance of these systems be organised?
- Why do these systems benefit groups such as the elderly or women in particular?
- What problems might going to the toilet in the open cause?
- Which groups are the hardest to persuade to use toilets and why?
- What economic benefits might the community gain from developing such systems?
- Does defecation into standing water have other disease implications?



Useful Links

www.bit.ly/40-shocking-facts-about-water
Interesting facts and statistics on water

www.unicef.org/wash/index_wes_related.html
Information about common water and sanitation-related diseases

www.youtube.com/watch?v=LCKsU4bPFOQ
Video on why Global Goal 6 is important in eradicating poverty

www.wateraid.org
Information about the challenges of water and sanitation

www.practicalaction.org/improved-toilets-3
Sanitation systems used in different countries

Health and safety

If you carry out any experiments or practical activities then you will need to put together a risk assessment. To do this you will need to:

1. Find out if any of the substances , equipment or procedures you plan to use are hazardous
2. Assess the risk to yourself and others (which means what could go wrong and how serious that could be, low medium or high)
3. Decide what you need to do to reduce that risk e.g. wearing goggles or other protective equipment and knowing how to deal with any potential accidents

You will need to show your risk assessment to your teacher and get his/her approval before doing any practical activities.

Remember! Judges will be looking for projects that demonstrate good communication skills, show innovation and creativity and that address a real-world problem.
Use the Student Profile form to help structure your project www.crestawards.org