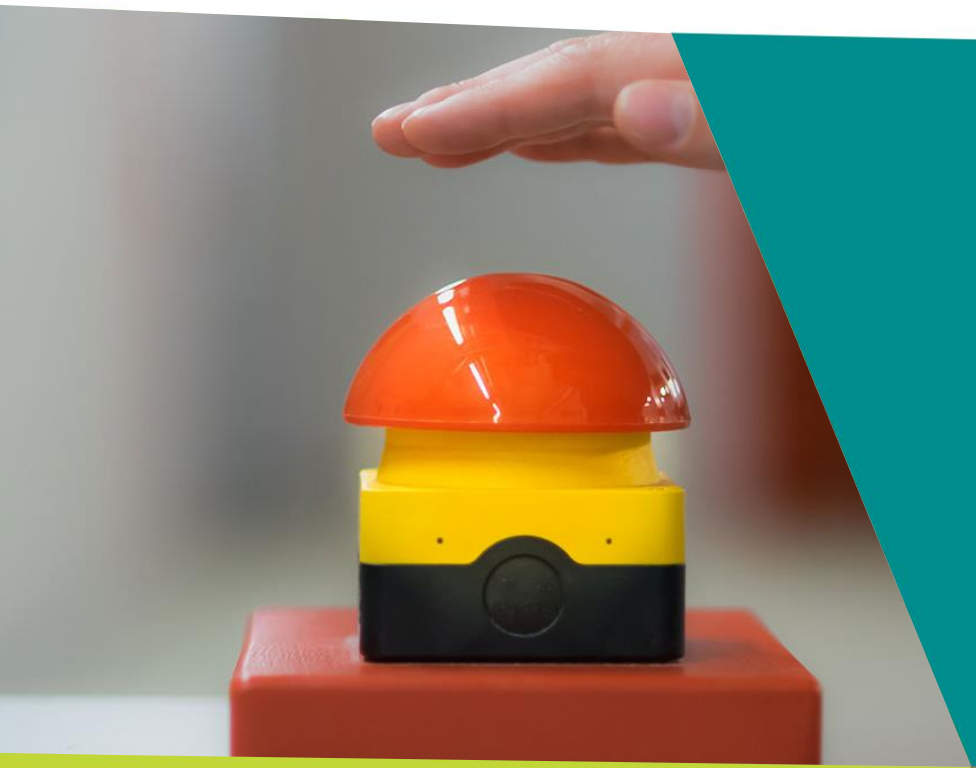
CREST AWARDS

GOLD AWARD

HOW QUICK ARE YOUR REACTIONS?

70H Typically 70 hours of project work
Recommended for 16-18 year olds



Practical project

Make a device to test people's reaction times.

#biology
#fitness
#design

HOW TO RUN CREST USING THIS ACTIVITY

Entering your project without a teacher or facilitator? No problem! You can enter your work yourself by following this link: **www.crestawards.org/sign-in**

Looking for some support? Find a mentor by contacting your local STEM Ambassador hub: **www.stem.org.uk/stem-ambassadors/local-stem-ambassador-hubs**

To use their project to achieve a CREST Gold 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**

Preparation

Ready to get going with CREST? Sign up for a CREST account here: **www.crestawards.org/sign-in**

Create a new Gold Award project with the name(s) of the student(s) and the title of their project. If you don't have all these details, you can fill them in later!

We have some super handy workbooks and profiles for your students to use when running a CREST Award. You can download these when you create your CREST account by following the link above.

Run the project

Encourage your students to use the Gold student guide to plan and carry out their project. Each student involved in the project should complete their own profile form.

You don't want all their good work to go to waste, so be sure they keep a record of all their amazing progress. Keeping a regular project diary will save them precious time when writing their final project report.

The students should spend at least 70 hours on the project in total.

Remember to consider safety and risks!

Reflection

So, your students have been hard at work and completed their CREST project, but don't let this be the end of their learning. At the end of the project, each student should complete a Gold profile form and communicate their project. This is a chance for them to reflect on all the interesting things they've learnt and the invaluable skills they have used.

Students working in a group can either submit a joint report or separate reports, but they must each complete a profile form.

Use the CREST criteria on the profile form to help the students check that they have included everything in their report.

Enter your project for a CREST Gold Award

Hard work deserves a reward! Celebrate and certify your student's achievements by entering their project for a CREST Gold Award. Simply:

Log in to your CREST account at **www.crestawards.org/sign-in**

Select your project and upload the profile form per student, project report and other evidence, such as pictures and diagrams.

Finally, complete the delivery and payment details for assessment and to order your snazzy certificates.

Congratulations on submitting for CREST Gold!

What next?

Is university on the horizon for your students? They can use their project to help demonstrate their newly found STEM skills and knowledge in UCAS personal statements.

Don't keep all the fun to yourselves, encourage others to take part in CREST projects and share the wonder of science. For free ideas on how to get started, see **www.crestawards.org**

STUDENT BRIEF

GOLD AWARD

How quick are your reactions?

For this project, you are going to design, make and test a device to test people's reaction times.

Getting started

Devices that measure reaction time work on the principle that there are two switches, one operated by the experimenter and the other by the subject. A recording device measures the time between when the two switches are pressed. The experimenter shouldn't give the subject any clue that they're about to press the switch.

The sorts of reaction times you wish to measure may alter the design of your measuring device. Think about what sort of reaction times you wish to test.

Reaction time to sight:

Get the subject to watch the experimenter press his switch. As soon as the subject sees the experimenter pressing his switch, they press their switch. The reaction time is measured. This process should be repeated about ten times to get an average value.

Reaction time to touch:

The subject should close their eyes, and the experimenter rests his foot lightly on the subject's foot. The experimenter presses their switch and simultaneously treads on the subject's foot. As soon as the subject feels the pressure they press their switch.

Compare the reaction time to sight and touch:

Identify possible sources of error and try to overcome them. If you've got enough data, you could do a 't-test' to test whether the differences between the results are significant.

Reaction time to coloured lights:

The experimenter's switch should be connected to two coloured lights, one red, the other green. Find out if a person reacts at the same speed to a red light as to a green light of the same intensity. Do your results support the use of red lights as a warning colour? Was there a significant difference between the results? What happens when you vary the intensity but keep the same colour?

Reaction time to sound:

Connect the experimenter's switch to a sound generator and headphones which are worn by the subject. Test the hypothesis that a subject reacts more quickly to a loud sound than to a quiet sound.

Things to think about

When you've got an idea of how to design the device, you'll have to think about the electronic circuitry involved. Think about the power supply, input device, processor and output device. Draw a circuit diagram. Set about making the circuitry. You could try making a printed circuit board (PCB).

You might also want to make a casing for the device. Recording systems could include a pair of switches linked to a triggered cathode-ray oscilloscope, microcomputer, chart recorder or stimulus marker on a kymograph.

Reaction times give only an approximate idea of how quickly nerve impulses are transmitted in the nervous system. Why is it only approximate? Suggest other, more accurate ways of measuring transmission speeds in the human nervous system.

STUDENT BRIEF

GOLD AWARD

Health and safety

Science project work is both dynamic and exciting but can also carry some risk. To avoid any accidents, make sure you stick to the following health and safety guidelines before getting started:

- find out if any of the materials, equipment or methods are hazardous;
- assess the risks (think about what could go wrong and how serious it might be);
- decide what you need to do to reduce any risks (such as wearing personal protective equipment, knowing how to deal with emergencies and so on);
- make sure your teacher agrees with your plan and risk assessment.

Take care when using tools. Make sure tools are only used in a properly supervised workshop or D&T room.

Remember!

Science isn't just about data. The most successful projects will demonstrate good communication skills and show original ideas that address a real-world problem.

Look at the world around you and consider all the innovative ways that you could address the challenge. Even if things go wrong, use this to show what you have learned. Don't forget to use the student profile form to help structure your project.