



**GOLD AWARD**

# BUILD A PINHOLE CAMERA



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



**Design & make  
project**

Investigate pinhole cameras  
and design and build your own

**#physics**

**#art**

**#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](http://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](http://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](http://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](http://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](http://www.crestawards.org)

# STUDENT BRIEF

**GOLD  
AWARD**

## Build a pinhole camera

Pinhole cameras can be made very simply, and they take reasonable pictures. But it's a little more complicated to make a pinhole camera that takes a good picture, has an automatic shutter, has a mechanism to wind on photographic film and looks like a real camera. In this project, you'll investigate pinhole cameras and design and build your own.

### Getting Started

Start by carrying out some research. A great website to start from is [pinhole.cz](http://pinhole.cz), it also has numerous links to other excellent pinhole camera websites. The website also has instructions about how to make a Dirkon Paper Camera (first published in a 1970s Czechoslovakian magazine). You could start designing your pinhole by making this and thinking about how to improve it.

Browse through the various websites to find out the different ways people make pinhole cameras, then design your own.

Some features you may wish to think about are:

- Can your camera have a controlled, automatic shutter?
- Can you build a mechanism so the camera winds on commercially-available camera film?
- What will you build your camera from? Will it need a case to protect it?
- What is a 'bellows'. Can you make a bellows? How?

Finally, you need to think about processing your pictures. You will need to research how this is done - you could try altering different variables in the process to see what affect they have.

### Things to think about

You will also notice from your research there are a number of ways in which pinhole cameras may differ. You may wish to vary these factors and investigate the effects. For example:

- Focal length
- pinhole diameter
- number of pinholes
- image format
- flat or curved film plane
- type of light-sensitive material

### Useful Resources

You should also work out how to calculate the correct exposure time for your pinhole camera. Many websites also have information about this. There's even a pinhole designer programme that can be downloaded for free.



# 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.

## 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.