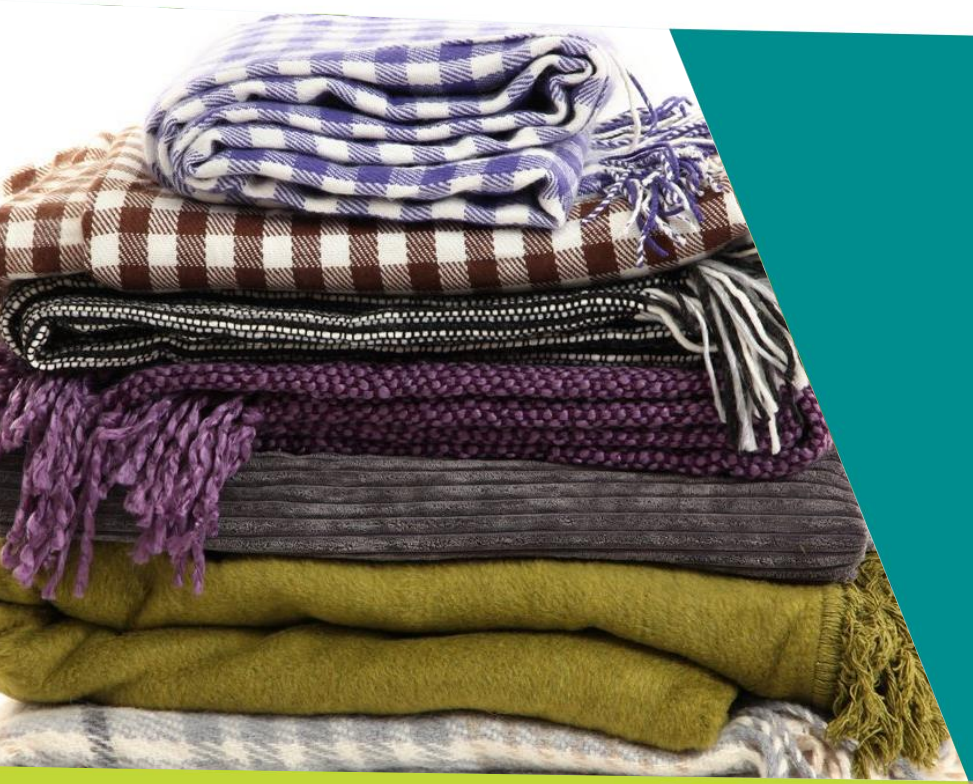
CREST AWARDS

BRONZE AWARD

INSULATING FABRICS

10H Typically 10 hours of project work
Recommended for 11-14 year olds



Practical project

Devise an experiment to compare the insulating properties of different fabrics.

#textiles

#energytransfer

#clothes

HOW TO RUN CREST USING THIS ACTIVITY

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 Bronze Award your students will need to:

- **Complete a minimum of 10 hours of project work**
- **Consider the broader impact of their project and demonstrate an innovative approach**
- **Complete the project workbook or short report in another medium**
- **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 Bronze Award project with the name(s) of the student(s) and the title of their project. If you don't have all the details, you can fill these in later!

Run the project

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.

Encourage your students to use the workbook or profile to plan and carry out their project, keeping a record of all their amazing progress.

Make sure you 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. They should now fill in any remaining sections of their workbook. This is a chance for them to reflect on all the interesting things they've learnt and the invaluable skills they have used.

Enter your project for a CREST Bronze Award

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

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

Select the project and upload a sample of the students' workbooks or other project evidence.

Check the participating students have met each of the criteria on the teacher assessment page.

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

Congratulations on completing CREST Bronze!

What next?

The scientific discovery doesn't need to end here. Students can have a go at the next level up – CREST Silver.

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

BRONZE AWARD

Which fabrics are the best insulators?

Heat is transferred from hot places to cold places. Hot things cool down and the heat is transferred to something else, which warms up. Outside on a cold winter's day we usually try to reduce our heat loss by wearing extra layers of clothing. In this activity, you will compare the insulating (thermal) properties of different materials.

Getting started

Do a little research into clothing and other items such as sleeping bags and duvets to find out how their heat insulating properties are achieved. You might also want to find out what terms such as 'thermal insulation' and 'thermal conductance' mean.

Next, you should obtain some suitable samples.

Devise an experiment to compare the insulating properties of your samples. For example, you could devise a test procedure that involves wrapping a layer of fabric around a 250 ml beaker of hot water and measuring with a thermometer and stop-clock how long the hot water takes to cool down.

Do this for each fabric, but make sure your tests are fair and that they enable you to make a comparison of the thermal properties of your sample fabrics. You will need to do trial experiments before you can make your final plans.

You'll need to present your results as suitable graphs or charts and discuss any patterns you find in the results.

Try to relate what you find in your tests to what the manufacturers claim about the thermal properties of their fabrics.

Things to think about

Consider: whether you should have the same volume of water in each beaker; if you need a lid on the beaker; what start and finish temperatures you are going to use for measuring the cooling time. Alternatively, you could measure the temperature drop in a certain time interval.

Useful resources

Contact a manufacturer of fabrics designed to be thermal insulators or manufacturers of sleeping bags, duvets, fleece jackets or other clothing designed to keep the wearer warm. Hopefully you will be able to get some free samples of fabric!

STUDENT BRIEF

BRONZE AWARD

Health and safety

A science project 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.