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| **UV protective clothing** |
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| Design an item of clothing to withstand UV |
| **Subject(s):** Design & Technology**Approx. time:** 60 - 90 minutes |  | **Key words / Topics:** * aesthetics
* clothing
* fabrics
* finishing techniques
* sketching
* textiles
* ultraviolet light
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| **Stay safe** Whether you are a scientist researching a new medicine or an engineer solving climate change, safety always comes first. An adult must always be around and supervising when doing this activity. You are responsible for: •        ensuring that any equipment used for this activity is in good working condition•        behaving sensibly and following any safety instructions so as not to hurt or injure yourself or others  Please note that in the absence of any negligence or other breach of duty by us, this activity is carried out at your own risk. It is important to take extra care at the stages marked with this symbol: ⚠  |
| **Suggested Learning Outcomes**  |  |  |
| * To understand what is meant by ultraviolet radiation (UV).
* To be able to design an item of clothing to withstand UV rays.
* To be able to use annotated sketches to generate ideas for textile products.
* To understand the purpose of finishing techniques.
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| **Introduction** |  |  |
| This is one of a set of resources designed to allow learners to use summer themes to develop their knowledge and skills in Design & Technology, Engineering, Science and Mathematics. This resource is part of a group for the Summer that could be carried out either in school or at home. It involves designing an item of clothing that can withstand UV light. |
| **Purpose of this activity**In this activity learners will produce a design for an item of clothing that can withstand UV light. They will discuss what is meant by UV and the dangers it presents. They will then produce a spider diagram of possible clothing ideas, followed by a final design in the form of an annotated sketch.This activity could be used as a main lesson activity to teach learners about generating design ideas for textile-based products, or part of a wider scheme of learning covering design processes and finishing techniques. There is the possibility for cross curricular work with the Science department to explore the effects of UV radiation further. |
| **Activity** |  | **Teacher notes** |
| **What is UV? (5-10 mins)**Teacher to ask learners what they think is meant by the term ‘ultraviolet radiation’ and discuss its effects on people.Teacher to explain the definition of UV using the teacher presentation. **How the effects of UV can be prevented (5-10 mins)**Teacher to discuss the reasons why clothing is designed to reduce the effects of UV. For example:* To guard against UV radiation when on holiday in hot climates.
* To provide extra protection when already wearing sun cream.
* For children to play more safely outside in the summer.

Teacher to outline different approaches used with fabrics to stop UV.**Clothing types spider diagram (20-30 minutes)**Learners to produce a spider diagram of ideas for clothing types that could be worn to reduce the effects of UV rays from the sun. Discuss who would wear the clothing and the possible target users. Learners to consider the requirements for their clothing design, for example:* Fabric type
* Who will wear it/target audience
* Colour and aesthetics
* Cost
* Durability
* Use of recyclable/recycled fabric

**Producing the design (30-40 minutes)**Learners to select a clothing item from their spider diagram and sketch their design for it. Learners to add annotations to show how their design prevents or reduces the effects of UV rays and how it meets any additional criteria identified in the spider diagram activity. |  | **How the effects of UV can be prevented**Slide 3 in the presentation can be used to support understanding of the reasons why clothing is designed to reduce the effects of UV. Slides 4 & 5 outline methods by which fabrics stop UV.**Clothing types spider diagram**Learners could use slide 6 of the teacher presentation to produce a spider diagram of ideas for a clothing item. E.g.:* What clothing types can learners think of?
* Why do you need to consider different types of clothing?
* What about subcategories, for example if choose tops, then go onto t-shirts, vests, shirts etc.

Slides 7 and 8 could be used as a prompt if needed. **UV resistant clothing design**Learners must annotate their design to show how it meets the requirements identified.Slides 9-11 give examples of designs for clothing items produced by other learners. |
| **Differentiation** |  |  |
| **Basic** |  | **Extension** |
| * Use sentence starters or prompts to aid with annotations of the designs. For example: ‘The finishes that my design uses are….’, ‘I have chosen this material because….’.
* Use prompts (e.g. those shown on slides 7 & 8 of the teacher presentation) to assist with spider diagrams and ideas for types of clothing that could be designed.
 |  | * Learners could produce a pattern, sample or full prototype of their design.
* Learners could design a range of accessories to compliment your clothing.
* Learners could create a social media advertisement for their designs.
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| **Resources** |  | **Required files** icon-docicon-pdficon-ppt |
| * A4 or A3 paper
* Pencils, pens, coloured pencils and sketching tools
 |  | icon-ppt Teacher presentation – UV protective clothing |
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| **Additional websites** |  |  |
| * **BBC bitesize - Non-communicable diseases in humans:** Useful revision notes to aid understanding of UV and its effects. <https://www.bbc.co.uk/bitesize/guides/zcgsk2p/revision/6> , <https://www.bbc.co.uk/bitesize/clips/zksjxnb>
* **YouTube – What is UV:** Video explaining the effects of UV on people. <https://www.youtube.com/watch?v=FHHysvZ2K2Q&t=23s>
* **Cancer Research UK – What is sunburn:** Information about how sunburn is caused and its effects. <https://www.youtube.com/watch?v=yCZ941N3z2M&t=6s>
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| **Related activities (to build a full lesson)** |  |  |
| **Starters** (Options) * Discuss what is meant by and the dangers of UV radiation from the sun.
* Identify activities where UV protection may need to be used.
 | **Extension** (Options)* Learners could produce a pattern, sample or full prototype of their design.
* Learners could design a range of accessories to compliment your clothing.
* Learners could create a social media advertisement for their designs.

**Plenary*** Write a tweet explaining the benefits of the design to possible customers.
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| **The Engineering Context** film |
| * Sketching is an important tool for designers and engineers to use when generating initial ideas for solutions.
* Designers and engineers must be able to respond creatively to design briefs and meet the criteria that they are given with their designs.
* Textile designers and engineers must understand the purpose and benefits of finishing techniques, such as those applied to fabrics and clothing items.
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| **Curriculum links** |
| **England: National Curriculum**Design & Technology * KS3 1a, b, e

**GCSE D&T**AQA D&T* 3.2.5, 3.2.9, 3.3.4, 3.3.5

Edexcel D&T* 1.17.1a, b, 1.17.2, 6.1.1, 6.3, 6.8

Eduqas D&T* Core: 12
* Textiles: 1, 2

OCR D&T* 1.1a, 1.2a, 4.1a, 5.2, 6.2a

  | **Northern Ireland Curriculum**Technology & Design* KS3 Knowledge, understanding and skills: Design – identifying problems; investigating, generating, developing, modelling and evaluating design proposals; giving consideration to form, function and safety.
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| **Scotland: Curriculum for Excellence**Technologies* TCH 3-04c, TCH 3-11a
 | **Wales: National Curriculum** Design and Technology* KS3 Skills: Designing 1, 2, 3, 4, 6
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| **Assessment opportunities** |
| * Informal teacher assessment of design skills through observation of learners.
* Formal teacher assessment of the designs produced.
* Self/per assessment of designs produced.
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