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| **Sunglasses of the future** | | | |
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| Designing a new pair of futuristic and sustainable sunglasses | | | |
| **Subject(s):** Design & Technology, Engineering  **Approx. time:** 50 - 70 minutes |  | **Key words / Topics:**   * Aesthetics * Augmented reality * New materials and technologies * Plastic waste * Sketching * Sustainability | |
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| **Suggested Learning Outcomes** |  |  | |
| * To understand the purpose of sunglasses in terms of both functionality and aesthetics * To be able to design a futuristic and sustainable pair of sunglasses * To understand the importance of reducing plastic waste * To understand the application of new materials and technologies | | | |
| **Introduction** |  |  | |
| This is one of a set of resources designed to allow learners to use seasonal themes to support the delivery of key topics within design & technology and engineering. This resource is part of a group for the Summer that could be carried out either in school or at home. It could also be used for the plastic free month. This resource focuses on designing a pair of futuristic, sustainable sunglasses that are plastic free. | | |
| **Purpose of this activity**  In this activity learners will sketch and annotated design for a sustainable pair of sunglasses aimed at the young professional adults of the future.  This activity could be used as a main lesson activity to teach learners about generating design ideas or sketching, or part of a wider scheme of learning covering design processes and techniques. It could also be used as part of an introduction to sustainability issues, such as the negative impact of plastic waste on the environment. | | |
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| **Activity** |  | **Teacher notes** |
| **What is the purpose of sunglasses (10-15 mins)**  Teacher to discuss with learners the purpose of sunglasses in terms of their functionality and aesthetics. Teacher to ask learners what might be the requirements for sunglasses in the future – how could they be improved? What extra functionality and technologies could they have built into them?  **Introduction to design task (10-15 minutes)**  Teacher to explain that learners are going to design the ‘sunglasses of the future’ and discuss the design brief and design criteria shown in the teacher presentation.  ***Design brief***  ***Situation***  *Sunglasses protect the wearer from the potentially harmful effects of UV light from the sun. They are also seen as a stylish fashion accessory.*  ***Design Brief***  *Your task is to design a pair of sunglasses for the future. Your design must make use of new and/or future technologies. It must also be made from sustainable, plastic free materials.*  ***Design criteria***  *Your design must meet the following design criteria. It must:*   * *Protect the eyes from harmful effects of UV light from the sun* * *Be made from plastic free, sustainable materials* * *Make use of augmented reality and other new technologies* * *Be aesthetically pleasing to young professional adults*   **Future sunglasses design (30-40 minutes)**  Learners to sketch their design for their sunglasses and add annotations to explain how it meets the needs of the design brief and criteria. They can do this using the provided handout or on a blank sheet of paper. |  | **What is the purpose of sunglasses?**  Discussion about the purpose could include, for example, their functional purpose (e.g. to protect eyes from the effects of the sun, make vision easier in sunny conditions) and aesthetic purpose (e.g. fashion, style, use of shape and colour). Consideration of possible improvements could consider functionality, aesthetics and sustainability.  **Design brief and criteria**  Discuss the design criteria with learners and the meaning of the key terms. Augmented reality is the use of technology to enhance the viewing experience with computer generated information. For example, information about different shops and their products when walking down a high street, or the destinations and departure times of trains at each platform of a station.  As young adults often see sunglasses as a fashion accessory it is important that the functional requirements are considered in addition to the aesthetics.  Issues surrounding plastic waste and the importance of reducing this could be discussed, along with possible alternative materials that could be used.  **Future sunglasses design**  Learners could use the handout activity sheet or blank paper when producing their design. Encourage them to be creative! They must annotate their design to show how it meets the needs of the design brief and specification shown on slides 3 and 4 of the teacher presentation.  As an extension they could make a model of their design or create a more detailed design specification with additional criteria that must be taken into account within the design.  If learners have access to CAD software they could use this to produce a 3D model of their design. |

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| **Differentiation** |  | |  |
| **Basic** |  | | **Extension** |
| * Use sentence starters or prompts to aid with annotations of the designs. For example: ‘The technologies that my design uses are….’, ‘I have chosen this material because….’. * Produce templates to aid with sketching different shapes and styles of sunglasses that could then be added to with additional features. |  | | * Learners could produce a 3D CAD and/or physical model of their design. * Learners could use the design criteria to write a more detailed design specification for the sunglasses and take into account these additional criteria within their design. |
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| **Resources** |  | | **Required files** icon-docicon-pdficon-ppt |
| * A4 or A3 paper, if not using handout * Pencils, pens, coloured pencils and sketching tools * Optional, if available: 3D CAD software for extension activity |  | | icon-ppt Teacher presentation – Sunglasses of the future  icon-pdf Activity Sheet – Sunglasses of the future |
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| **Additional websites** |  | |  |
| * **Coroflot – Dan Winger:** Concept ideas and sketches for futuristic eyewear by US designer Dan Winger. <https://www.coroflot.com/WingerDesign/Eyewear> * **Google – Augmented reality:** Introduction to Google augmented reality technology that works using a mobile phone. <https://arvr.google.com/ar/> * **National Geographic – Plastic pollution:** An explanation of, and statistics detailing the harmful effects of plastic pollution on the natural environment. <https://www.nationalgeographic.com/environment/article/plastic-pollution> | | | |
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| **Related activities (to build a full lesson)** |  | |  |
| **Starters** (Options)   * Discuss the purpose of sunglasses in terms of both functionality and aesthetics. * Produce a client profile of the intended user as described in the brief and criteria. | | **Extension** (Options)   * Learners could produce a 3D CAD and/or physical model of their design. * Learners could use the design criteria to write a more detailed design specification for the sunglasses.   **Plenary**   * Self and/or peer assess designs created. * Q&A discussing topics covered and key concepts. | |
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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. * Engineers must have a knowledge and understanding of their moral and ethical responsibilities with regards to sustainability and the environment. For example, by ensuring products are made from sustainable materials. |

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| **Curriculum links** | |
| **England: National Curriculum**  Design & Technology   * KS3 1b, c, d, e   **GCSE D&T**  AQA D&T   * 3.1.1, 3.1.3, 3.1.6, 3.2.1, 3.2.3, 3.2.4, 3.3.1, 3.3.2, 3.3.4, 3.3., 3.3.7   Edexcel D&T   * 1.1.3, 1.1.7, 1.2, 1.4, 1.10, 1.13, 1.14, 1.17.1a, b, e   Eduqas D&T   * Core: 1, 2, 4, 11   OCR D&T   * 1.1a, 1.2a, 2.1a, 2.2a, 3.1a, 3.3a, 4.1a, 5.1, 5.2, 5.3e   GCSE Engineering   * 3.1, 3.5 | **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. |
| **Scotland: Curriculum for Excellence**  Technologies   * TCH 3-05a, TCH 3-06a, TCH 4-09a, TCH 4-10a, TCH 3-11a | **Wales: National Curriculum**  Design and Technology   * KS3 Skills: Designing 1, 2, 3, 4, 5, 6, 7, 8 |
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| **Assessment opportunities** |
| * Informal teacher assessment of design skills through observation of learners. * Formal teacher assessment of the designs produced. * Self/peer assessment of designs produced. |