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| **Design a football kit to use on the Moon** | | |
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| Designing and evaluating a football kit for the first football team on the Moon | | |
| **Subject(s):** Design and Technology, Engineering  **Approx time:** 60-100 minutes |  | **Key words / Topics:**   * annotation * colour * design brief * design criteria * evaluation * football kit * moon * new technologies * sketching * specification |
| **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 the problems associated with playing football on the Moon * To be able to write a design specification for a football kit for the first football team to play on the Moon * To be able to design a home football kit for the first football team to play on the Moon * To be able to evaluate their designs against the design criteria | | |
| **Introduction** |  |  |
| This is one of a series of resources that are designed to allow learners to use the theme of football on the Moon to develop their knowledge and skills in Design & Technology and Engineering. This resource focusses on learners designing a home kit for the Moon’s first football team – Moon United. | | |
| **Purpose of this activity**  In this activity learners will make use of the theme of football on the Moon to design a kit for the first Moon-based football team. They will discuss the problems associated with playing football on the Moon. They will then write a design specification before producing a labelled sketch of their design idea. Finally, they will evaluate their idea against the design criteria.  This activity could be used as a main lesson activity to teach about designing textile and graphics-based products in context, and the use of new technologies within designs. It could also be used as part of wider scheme of learning focussed on the design process. | | |
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| **Activity** |  | | **Teacher notes** |
| **Introduction (5-10 minutes)**  Teacher to use presentation slide 3 to introduce the theme of playing football on the Moon and discuss the problems that could be faced when doing this:   * How would you be able to breath? * How would you cope with much lower gravity? * What surface would you play on?   Can learners think of any others?  **Design brief and criteria (5-10 minutes)**  Teacher to use presentation slide 4 to introduce the design brief and explain the task to learners.  Using slides 5 and 6, class to discuss the design criteria for the football kit and other issues to consider when producing the designs. For example, how will learners ensure their design is original and creative?  **Writing a design specification (20-30 minutes)**  Learners to build upon the design criteria to produce a six point design specification for a football kit than can be used by Moon United to play football on the Moon. Learners to write their response on the design specification page of the worksheet (presentation slide 7).  **Sketching kit design idea (20-30 minutes)**  Learners to sketch and label their design idea for the football kit.  The examples shown on slide 10 of the presentation can be used to help if needed.  **Evaluation of designs (10-20 minutes)**  Learners to evaluate how well their design meets the design criteria:   * Which points does it meet? How? * Which points does it not meet? Why? * How could the design be improved? |  | | This activity could be done as individuals or in pairs.  **Design brief and criteria**  Discuss the brief and criteria with learners. Ensure they understand what their design needs to include to be successful.  The context sets the scene for the design problem, the brief gives the problem itself that is to be solved. The design criteria is a list of design points that the finished solution must meet.  If appropriate, refresh understanding of the terms originality and creativity.  **Design specification**  A design specification gives specific and measurable criteria that must be met by the design. It should therefore expand on the design criteria.  For example, what exact materials, colours and technologies will be used?  Extra points could also be added e.g. how the design could be sustainable, make use of solar energy etc.  **Sketching kit design idea**  The Moon United worksheet (slide 8) can be used by learners to present their ideas, or these could be presented on blank A4 or A3 paper.  Learners should use notes and labels to explain their idea, how it meets the design criteria and any interesting features.  **Evaluation**  Evaluation involves checking the design produced against the design criteria and identifying where improvements could be made.  A check list could be provided to compare against, with spaces for comments, or the evaluation page of the worksheet (presentation slide 9) could be used. |
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| **Differentiation** |  | |  |
| **Basic** |  | | **Extension** |
| * Produce outlines of the backpack shapes for learners to add detail and features to. * Provide sentence starters for labelling of sketches. |  | | * Design an away kit for Moon United. * Design a football pitch for Moon United to play on. |
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| **Resources** |  | | **Required files** icon-docicon-pdficon-ppt |
| * Pens, pencils and coloured pencils * A3 or A4 paper |  | | icon-ppt Design a football kit to use on the Moon  presentation  icon-pdf Design a football kit to use on the Moon  worksheet |
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| * **Prezi – Football on the Moon:** A slideshow explaining some of the issues with playing football on the Moon. <https://prezi.com/wyf5demmfga2/football-on-the-moon/> * **YouTube – If the football World Cup was on the moon:** A fun video that could be sued as an introduction to this activity. <https://www.youtube.com/watch?v=o5tD7eP8izE> * **IET Moon football 2023 competition winners:** Useful to show 2023 competition winners that were turned into actual kits. <https://eabw.theiet.org/kids-stem-competition/> | | | |
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| **Related activities (to build a full lesson)** |  | |  |
| **Starters** (Options)   * Discuss the problems that could be faced when playing football on the Moon with learners. How could they be overcome?   Watch the video ‘If the world cup was on the moon’: <https://www.youtube.com/watch?v=o5tD7eP8izE> | | **Plenary**   * Self/peer assessment or produced designs. * CLOZE (missing word/letters) questions to assess knowledge gained. * Anagrams of key words used. | |
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| **The Engineering Context** | | | |
| * Travelling and potentially living on the Moon presents all sorts of challenges for engineers to overcome. For example, how will we breathe, how will we cope with much lower gravity, how will we play sports and keep fit? | | | |

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| **Curriculum links** | |
| **England: National Curriculum**  Design & Technology   * KS3 Design - develop specifications to inform the design of innovative, functional, appealing products that respond to needs in a variety of situations. * KS3 Design - develop and communicate design ideas using annotated sketches. * KS3 Evaluate - investigate new and emerging technologies. * KS3 Evaluate - test, evaluate and refine their ideas and products against a specification, taking into account the views of intended users and other interested groups. * KS3 Evaluate - understand developments in design and technology, its impact on individuals, society and the environment, and the responsibilities of designers, engineers and technologists. | **Northern Ireland Curriculum**  Technology & Design   * KS3 Design – identifying problems; investigating, generating, developing, modelling and evaluating design proposals; giving consideration to form, function and safety. * KS3 Communication – use of free-hand sketching. * KS3 Explore issues related to Cultural Understanding - Critically evaluate the influence of cultural trends in products designed for young people, for example, the styling, colour schemes and materials used in sports and leisure equipment. |
| **Scotland: Curriculum for Excellence**  Technologies   * TCH 3-04c * TCH 3-05a * TCH 3-09a, TCH 3-11a | **Wales: National Curriculum**  Design and Technology   * KS3 Skills: Designing 1, 3, 4, 5, 6, 9 |

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| **Assessment opportunities** |
| * Formal teacher assessment of the completed specifications, design idea sketches and evaluations. * Self/peer assessment of the completed specifications, design idea sketches and evaluations. |