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| **Personal transport system** |
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| Designing a personal transport system for the future |
| **Subject(s):** Design & Technology, Engineering**Approx time:** 50 - 60 minutes |  | **Key words / Topics:** * design brief
* design criteria
* sketching
* propulsion
* flight
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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 be able to design a personal transportation system of the future
* To be able to communicate design ideas using sketches, notes and annotations.
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| **Introduction** |  |  |
| This is one of a series of resources designed to allow learners to use the theme of the future of flight to develop their knowledge and skills in Design & Technology and Engineering. This resource focusses on designing a futuristic personal transport system.  |
| **Purpose of this activity**In this activity, learners will design a futuristic personal transport system. The transport will use a chosen method of propulsion to allow it to fly through the air to carry an individual or a group of people.This could be used as a one-off main lesson activity to build knowledge and understanding of flight. Alternatively, it could be used as a part of a wider scheme of work or to develop design skills and creativity in Design & Technology and Engineering.  |
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| **Activity** |  | **Teacher notes** |
| **Introduction - jet packs in action (10 mins)** Show the paramedic mountain rescue video and discuss the science behind the jet pack, as an example of an alternative method of flight.**Design brief and design criteria (10 mins)**Using the presentation, introduce and discuss the design brief and design criteria with the class. What is the reason for each of the requirements? (For example, be lightweight - to allow it to fly quickly).**Designing the product (20-30 mins)**Learners sketch their idea for a personal transport system that meets the needs of both the brief and the design criteria given. They should ensure that they show and fully explain how it achieves and maintains flight.Designs can be produced on the handout provided or on blank A4/A3 paper.**Peer review (10 mins)**Learners to ask three people to suggest one improvement each to their design. They should then select one of these suggested improvements and use it to update the design. |  | **Links with ‘The Moving World’**This activity also provides opportunities to link with the ‘The Moving World’ suite of activities. This includes the resources ‘Overcoming Friction’ and ‘Designing a Hoverboard’. The resource ‘Understanding Aerodynamics’ can also be used as a complimentary activity or to recap previously taught knowledge on the topic.**Designing the product**Depending upon the prior learning, this could give the opportunity for learning a 3D drawing method (e.g. perspective, oblique etc.).Learners should be encouraged to be diverse and creative - potential ideas could range from jet packs and jet powered vehicles to helicopters, blimps, gliders, canons, baskets tethered to large flying creatures etc.Learners should use notes and detailed annotations to explain and describe how their design meets the needs of the brief and design criteria. They should especially focus on how the personal transport system would function and the underlying technology and engineering that would enable this to happen. |
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| **Differentiation** |  |  |
| **Basic** |  | **Extension** |
| * Allow access to the internet to research sustainable flight technologies or links to additional examples of products that use various methods of achieving flight.
* Advise a suggested method of propulsion that could be used (e.g. from the list in the teachers notes).
 |  | * Learners could consider other potential uses of the personal transport system that they have designed.
* Learners could think about how the technologies used could be modified to meet other social and/or environmental needs, such as moving injured people around a hospital or transporting heavy goods.
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| **Resources** |  | **Required files** icon-docicon-pdficon-ppt |
| * Projector/whiteboard
* Sketching equipment
 |  | icon-ppt Presentation Personal transport system icon-doc Personal transport system handout |
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| **Additional websites** |
| * YouTube, Paramedic Mountain Rescue: https://www.youtube.com/watch?v=gtvCnZqZnxc
* IET Faraday Resources – Understanding Aerodynamics: A free resource that can be used to build learner knowledge and understanding of the principles of aerodynamics. <https://education.theiet.org/secondary/teaching-resources/understanding-aerodynamics/>
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| **Related activities (to build a full lesson)** |  |  |
| **Starters** (Options) * Understanding Aerodynamics activity/watch Paramedic Mountain Rescue video
 | **Plenary*** Peer review, giving feedback on designs
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| **The Engineering Context** film |
| * Engineers look to improve existing transport systems to make them better, more efficient and widely available to everyone. As new propulsion methods are made smaller and materials get lighter and stronger personal transportation systems will be developed.
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| **Curriculum links**  |
| **England: National Curriculum**Design & Technology KS3 1a, 1b, 1d, 1e, 3c, 3d**Scotland: Curriculum for Excellence**Technologies* TCH 3-05a, TCH3-07a, 4-09a, 3-11a
 | **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.
* Communication – use of free-hand sketching and formal drawing techniques and ICT tools (including 3D modelling).

Learning Outcomes:* Demonstrate creativity and initiative when developing ideas and following them through.
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|  | **Wales: National Curriculum** Design and Technology* KS3 Skills: Designing 1, 2, 3, 6, 8
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| **Assessment opportunities** |
| * Formal summative assessment of completed work by the teacher.
* Peer assessment and feedback on designs produced.
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