

ACTIVITY 2.4 DESIGN YOUR OWN ROCKET

From the Chapter Two of the Mission Mars Diary

marsdiary.org/activities/design-your-own-rocket

LEARNING LEVEL

KS2, P5-7, Y4-6

CURRICULUM LINKS & DIFFERENTIATION IDEAS

View detailed curriculum links for England, Scotland, Northern Ireland and Wales in the Teacher Toolkit, plus differentiation ideas for your region and year level.

marsdiary.org/resources/#teacher-toolkit



Resources Required

- Smartphone or device for Zap code (optional – see Useful Links)
- Squared paper, ruler, pencil, rubber etc
- Recyclable modelling materials including boxes, egg cartons etc, sticky tape, glue, scissors etc
- Computers including laptops or tablets and information books
- Construction toys including Lego, Mechno and Polydrons

Background to this Activity

This creative challenge involves research into different types of spacecraft, different shapes and designs and their suitability for the tasks outlined so far.

Spacecraft have two main parts: the rocket, which contains fuel and engines to propel the craft into space, and the capsule, where the astronauts sit and where the payload – supplies and equipment for the mission – are kept. After the launch, the rocket and capsule separate. The rocket returns to Earth and the capsule continues on to its destination.

In December 2015, ESA astronaut Tim Peake travelled to the ISS in a Soyuz rocket. The Soyuz capsule also has a Decent Module, which he used to return to Earth. Diagrams of the Soyuz rocket and capsule are available here: <http://blogs.esa.int/VITAmision/2017/07/26/soyuz-ms-spacecraft-in-infographics/>

Although the ExoMars mission won't carry any humans, its rocket looks similar to the one which carried Tim Peake. You can watch the launch here: https://youtu.be/p_ApOEVOM0g

To get to Mars, humans will need a space launch system with unprecedented power. NASA is currently

developing its Space Launch System – or SLS – which will launch missions exploring deep space, including Mars. SpaceX is also developing rockets capable of carrying humans to Mars. Its Falcon Heavy spacecraft is the most powerful rocket every made. This animation shows it launching, and carrying its payload (which includes humans) into space. <https://youtu.be/u26-CIDaazQ>

Running the Activity

Children could do this activity in groups or individually. Allow access to books about space and rockets as well as internet access. Lower ability children will need support to access the range of resources and could be guided through this process. Provide lower KS2 children with a list of recommended websites. Upper KS2 will begin to be more independent in finding useful information online.

Allow the children to choose how they wish to present their rocket design – it could be drawn on paper, created using recyclable modelling materials, on the computer etc.

Plenary: Children to present their designs to the class or to another group, discuss the pros and cons of their design.

Questions for the Class

- How is the ExoMars rocket different to the rocket that carried Tim Peake into space?
- Can you think of any alterations, enhancements or differences that would need to be made to carry humans to Mars on a rocket?
- What features or equipment do you think you need to survive on a rocket to Mars?

Additional Challenges / Extension Activities

Encourage the children to reflect on what is good about their design, or on ways that it could be improved. Would this be easily achieved?

Your Mission MARS DIARY

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Ideas for Differentiation

Lower:

- Support the pupils in their research, providing a shorter more comprehensive list of websites to visit or books to look at.
- Discuss the pros and cons of design features prior to beginning the design process and together write a 'success criteria'.
- Allow less 'choice' for lower ability children, giving more scaffolded support.

Upper:

- Encourage the higher ability children to decide on their own 'success criteria' based on their research.

Useful Links

Zappar Content: Download or view the Zappar content for this activity on its webpage (URL to the left) or access it via the Zap.

Tim Peake looks at his Soyuz capsule while it is on display at the Science and Media Museum in London:
<https://youtu.be/6FHOvZFQ6iA>

Charts of rockets from around the world: http://i.dailymail.co.uk/i/graphics/2015/02/space_shuttles_triple/images/small/small.png

ZAP! Students can independently access multimedia resources using the Zappar mobile/tablet app. See Zappar instructions at the link below and note that the mobile/tablet will need to be on a WIFI connection:
marsdiary.org/resources/#teacher-toolkit

If you don't have access to the internet in the classroom, all Zap code content is available to download on the activity's web page (see link to the left) as a PowerPoint presentation or as bundles of images.



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ZAP THE CODE



Find more great space-themed STEM resources at
<https://www.stem.org.uk/esero>