

### ACTIVITY 5.3 ENERGISE YOUR CITY

From the Chapter Five of the Mission Mars Diary  
[marsdiary.org/activities/energise-your-city](http://marsdiary.org/activities/energise-your-city)

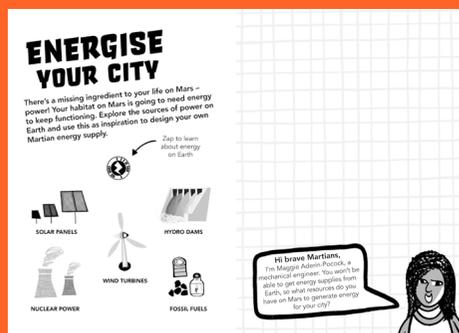
### LEARNING LEVEL

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](http://marsdiary.org/resources/#teacher-toolkit)



### Resources Required

- Smartphone or device for Zap code (optional – see Useful Links)
- Access to information via books and online

### Background to this Activity

If humans are to spend extended periods of time on Mars, whether they are conducting research projects or living there on a more permanent basis, it will be essential to design an energy source.

Solar power will be used to power the ExoMars rover. Dust can be a problem however, covering panels and impacting on power generation. Mars is also further away from the sun than Earth, which means the heat and light from the sun isn't as intense, making solar power less efficient than on Earth. While the winds are great at stirring up the dust on Mars, they aren't powerful enough to efficiently generate energy to run a city. Geothermal energy looks like a viable option to power a settlement on Mars. Aerospace engineer Robert Zubrin believes that the methane puffs detected by NASA's Curiosity rover indicate potential geothermal power below the Martian surface. Drilling into Mars would release the hot water below its surface in the form of steam, which would be used to power a turbine and therefore generate power.

To prepare for this activity, you may wish to revisit Activity 3.1 'Weather on Mars', to discuss the Martian climate, as well as 3.4 'Design Your Mars Rover' to remind students that the ExoMars rover is powered by solar panels.

### Running the Activity

Encourage the children to become an 'expert' on one of the energy types noted on the activity sheet. Where is this type of energy used on Earth? Ask students to share with the rest of their group/with the class. What would be best, one type of energy or a combination?

What energy sources does Mars already have? Do we already use that energy on Earth? How?

Ask students to design and draw their 'energy plant'. Some children may go on to create a 3D model of how energy could be harvested in Mars, showing how they will use energy below and above the ground. They could do this by using recyclable materials, playdough/clay or construction toys.

### Questions for the Class

- What does 'sustainable energy' mean?
- What is the difference between renewable and non-renewable energy?
- Is your energy plant a sustainable energy source? Why or why not?
- Think about the energy sources we use on Earth. Which of those are sustainable and which aren't?
- Why is it important to use sustainable energy sources?

### Additional Challenges / Extension Activities

Ask students to research energy sources throughout history, or in a particular era of human history. Where these energy sources sustainable? What were the pros and cons of using each energy source?

Investigate where your local energy comes from. What types of energy sources are used in your local area?

### Ideas for Differentiation

Lower:

- Lower ability pupils can complete a survey of what energy is used in the classroom.
- Can they find evidence of these energy types in school, or can they find out how the school is

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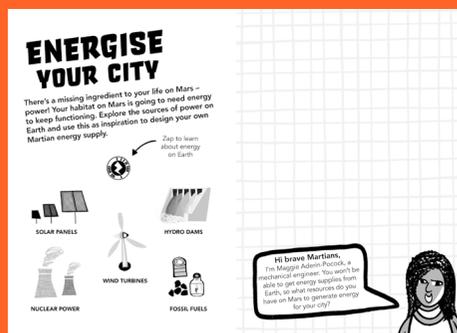
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powered? Ask students why it is important that energy is not wasted.

Upper:

- This would be a good opportunity to encourage debate about sustainable energy and discuss renewable and non-renewable energy sources on earth. If we were going to start again (for example on Mars), what could we do differently? Students can research renewable and non-renewable energy sources and split to 'argue' the case for either.
- Higher ability students could produce an energy manifesto for a future Martian city, providing a rationale for their energy choices.

## 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.

Clip about different types of energy: <https://www.youtube.com/watch?v=KEeH4EniM3E>

Clip about different potential energy sources on Mars (includes artist's impression of future Martian city): [https://www.youtube.com/watch?time\\_continue=141&v=ysLHApdznic](https://www.youtube.com/watch?time_continue=141&v=ysLHApdznic)

**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](http://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>