Zero Emissions

Participant name: _____

Participant age: _____

eDofE ID: _____

DofE Level (Bronze, Silver, Gold): _____

Start Date: _____

DURATION
3 months

MATERIAL REQUIRED
Pen and paper (optional), glass container, 9v battery, paper clips, salt, photo or video recording device

Help and support for this program may also be provided through our STEM team at the CAA (DofE@caa.co.uk).

The Duke of Edinburgh's Award Zero Emissions

Thank you for choosing the Zero Emissions course through the UK Civil Aviation Authority. We are passionate about on sharing our knowledge with the next generation of talent to enter the aviation industry and giving you the opportunity to learn a new talent. This course will contain key skills such as learning about Net Zero aviation and how to make hydrogen.

The below is a series of signposts of work that can be undertaken in any order. Each activity should last a minimum of one hour per week for the minimum time suggested. This course is designed for Bronze level award lasting 3 months (13 weeks), and can also be used to combine to achieve Silver and Gold awards.

After completion of the course please confirm you have done so by emailing **dofe@caa.co.uk** with your eDofE ID so we can process your skills award.

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1

Decarbonisation

Why is it difficult to decarbonise aviation?

2

Net Zero Aviation 1

What year does the UK aim to reach net zero aviation emissions?

3

Net Zero Aviation 2

What does net zero mean?

4 Current Aviation Emissions

What emissions do current aircraft engines produce using kerosene as an aviation fuel?

5 Non-CO$_2$ Emissions
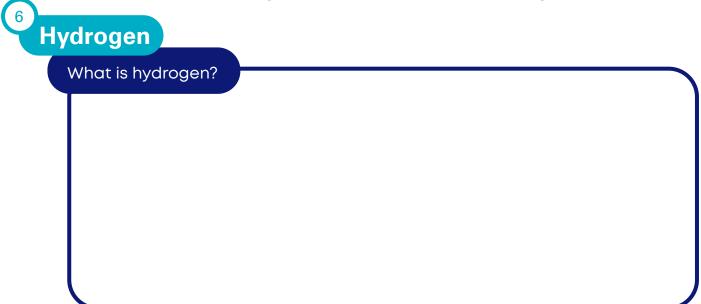
What are the definitions of CO_2, NO_x and contrails?

6

Hydrogen

What is hydrogen?

7

Hydrogen Properties

Can you name 5 properties of hydrogen?

8

Hydrogen Colours

Name 3 colours of hydrogen and name the source and process for each one

9

Hydrogen Process

Using the findings for the above questions, what happens to the CO_2 in each of these processes?

10

Making Hydrogen

How to make hydrogen - Electrolysing Water – Splitting hydrogen and oxygen from water (only complete part 1)

https://www.wikihow.com/Make-Hydrogen-%28Science-Experiment%29

Please carry out with adult supervision.

Equipment needed:
- 1 x glass container
- 1 x 9v battery
- 2 x paper clips
- 1 x tablespoon of salt (to add to the water)
- water

You should be able to see bubbles from each paper clip, the paper clip attached to the negative (-) terminal of the battery produces hydrogen and the paper clip connected to the positive (+) terminal of the battery produces oxygen.

Complete the experiment and video the process of completing the task

11 12 13 Hydrogen Airport

Design a small green hydrogen airport with the following requirements:

- Terminal building(s)
- 10 x aircraft stands
- 12 x vertiports
- Runway(s)
- Taxi ways
- Hydrogen fuel storage area
- 1 x air traffic control tower
- Ground support equipment for use at the airport

Within the design outline:

- how the hydrogen will get to the airport
- how the airport will create green electricity
- other sustainable technologies that an airport can use to decrease their CO_2 emissions

Draw or create on PowerPoint your airport design

Congratulations on completing the logbook!