Satellites Galore!

6 Week STEM Clubs

ROYAL AIR FORCE Youth & STEM

Aim

Children are introduced to a set of satellites and the vital role they play in measuring climate change

Introduction

Man-made satellites are machines which orbit the Earth, or something else in space. We are looking at five polar-orbiting satellites; these travel in a north-south direction, from pole to pole scanning the entire globe, one strip at a time.

These satellites study the environment and the changing climate and are called: **Aura**, **Aqua**, **Cloudstat**, **Calipso** and **OCO-2**. They travel fast, completing a full revolution of the Earth in about 100 minutes, taking measurements of the narrow strip below them before repeating along an adjacent strip.

After just over 230 revolutions they've scanned the entire Earth, one strip at a time, which takes just over a fortnight.

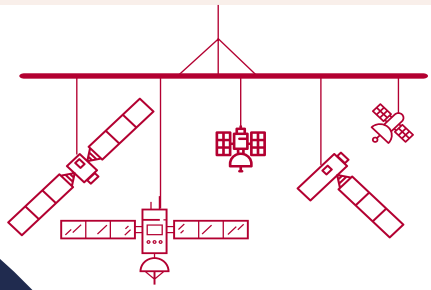
Activity

Equipment

- Cardboard
- Paper
- Glue
- Scissors
- String

Instructions

1. Cut out the satellite shapes and the blocks of facts
2. Conduct your research, pairing each satellite with the associated facts
3. After checking your findings, glue satellite shapes, and their facts, to either side of an appropriately sized piece of card
4. Carefully pierce a suitably positioned hole in the card to use as a satellite hang point
5. Glue the world circle onto card and cut out
6. Carefully pierce the holes marked on the world: 5 hang points (red circles marked with **H**), 3 anchor points (blue circles marked with **A**)
7. Using different lengths of string, suspend the satellites from the hang points
8. Now suspend the entire creation from a single point by knotting together 3 equal lengths of string that pass upwards through the anchor points



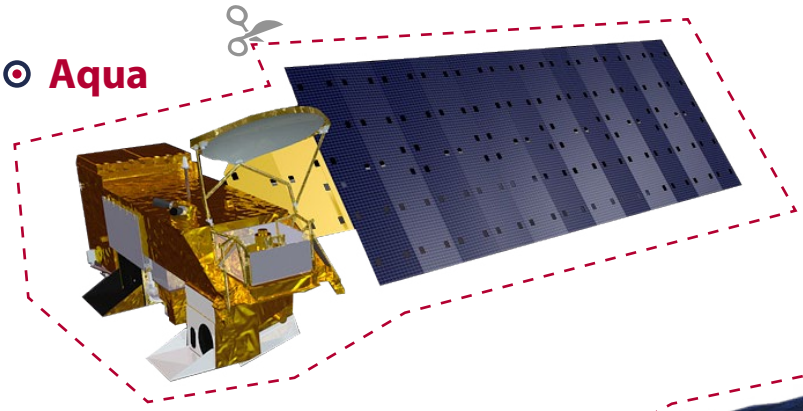
Useful links

SCAN ME

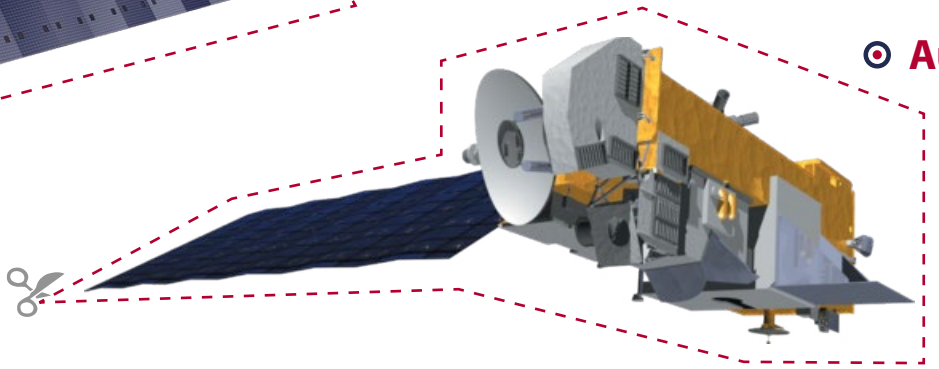
- The Afternoon Constellation
  https://tinyurl.com/y3h6h6f4
- The Aqua Satellite
  https://tinyurl.com/yylgtolk
- The Aura Satellite
  https://tinyurl.com/y3vlhryw

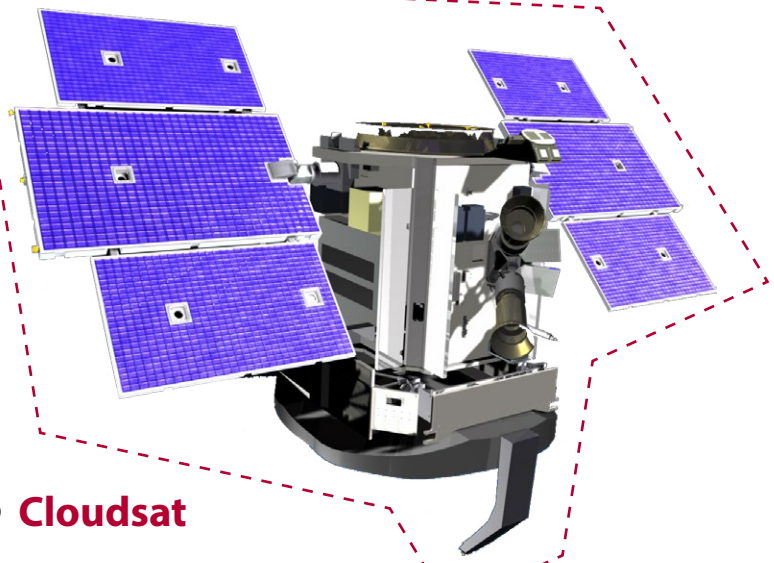
In association with all about STEM

Aqua



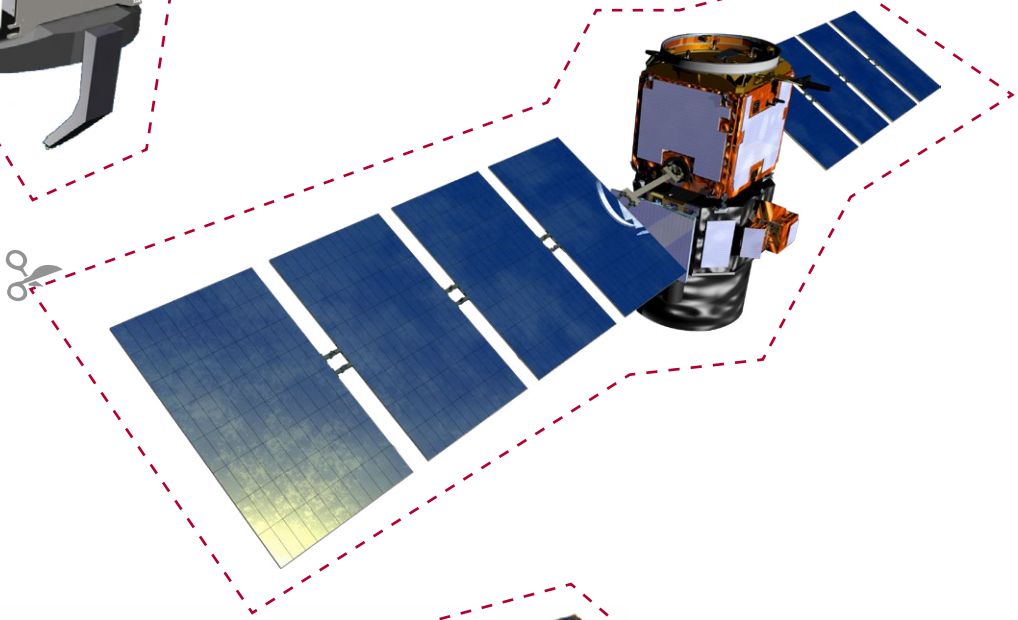
Aura



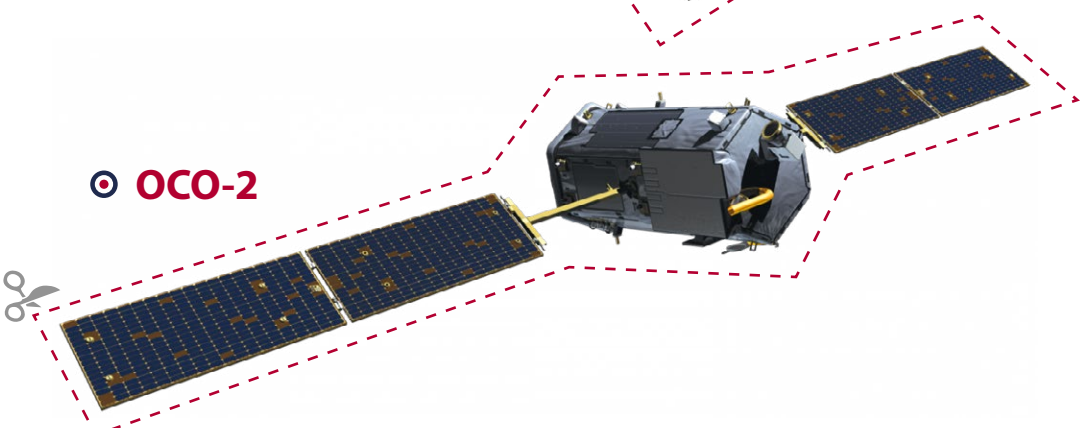


Cloudsat

Calipso



OCO-2



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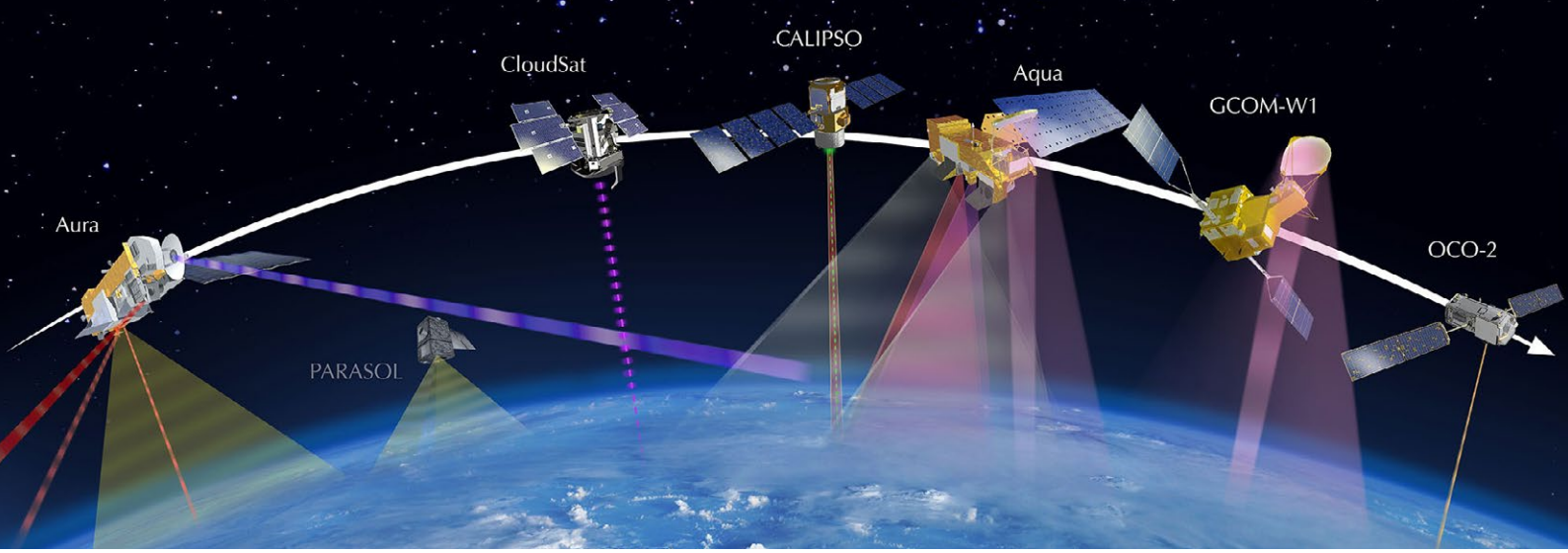

Name:

Analyses gases and their effect on both the ozone hole in the Earth's atmosphere and global warming, it has 4 instruments on board

Launch Date: 15th July 2004

Weight: 1,765 kilograms

Size: 7m long

Single solar panel: 15m long

This flies about 15 minutes behind Aqua and its name is latin for breeze

Name:

Analyses the atmosphere to understand how clouds regulate the Earth's climate and affect global warming

Launch Date: 28th April 2006

Weight: 700 kilograms

Size: 2.54m x 2.03m x 2.29m

Wingspan: 5m

This had a battery malfunction in 2011 but continues during daytime using sunlight and solar panels

Name:

Analyses the atmosphere, measuring concentrations of a critical greenhouse gas, carbon dioxide (CO_2)

Launch Date: 2nd July 2014

Size: 2.12m x 0.94m (stowed)

Weight: 454 kilograms

It uses 3 high-resolution spectrometers measuring light and analysing atoms

Name:

Analyses how aerosols and clouds regulate the Earth's climate

Launch Date: 28th April 2006

Weight: 587 kilograms

Size: 1.49m x 1.84m x 2.31m

Wingspan: 9.7m

It has a Lidar (Light Detection and Ranging) instrument, using pulsed lasers to measure distances to the Earth

Name:

Analyses evaporation from the oceans and clouds, measuring water vapour, rain, snow, and ice levels. It collects information about the Earth's water cycle and its name means water

Launch Date: 4th May 2002

This has 6 instruments on board

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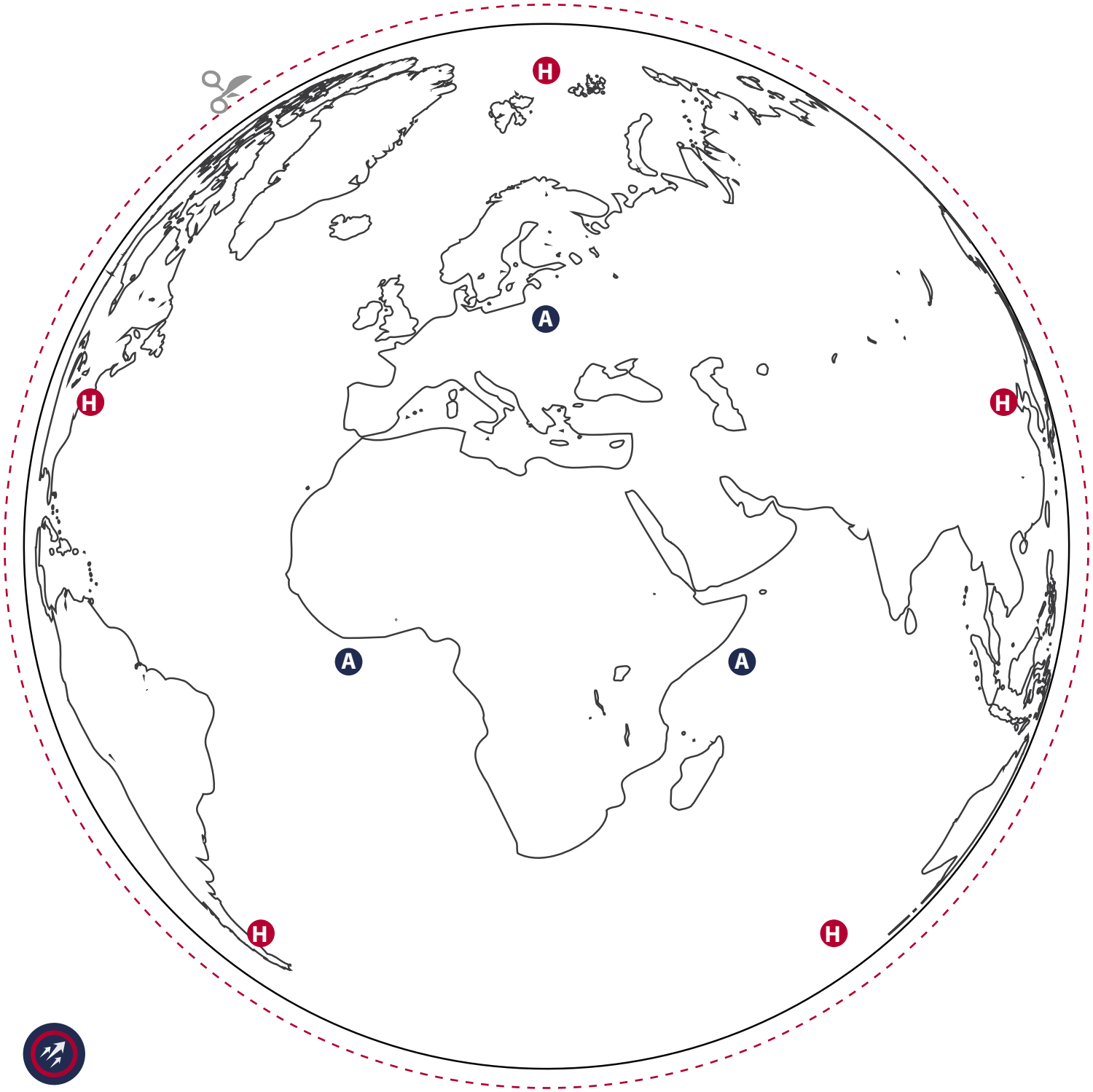
Colour-in if you want to!



Next steps

- Come up with some other ideas regarding what you could use to hang from your product (eg) research other satellites, what they are measuring and why
- There are other types of satellites that are called Geo-stationary. Gather some key facts on what this term means