

# Satellites Galore!

## 6 Week STEM Clubs



### Aim

*To introduce a set of satellites and the vital role they play in measuring climate change by researching five named satellites and creating a satellite mobile*

## 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.

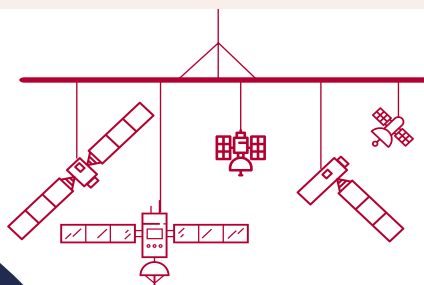
### Equipment

- Print out
  - Satellite Picture sheet
  - Satellite Fact sheet
  - World sheet
- Cardboard
- Paper
- Glue
- Scissors
- String

### Instructions for making your satellite mobile

- 1 Cut out the five satellites and the five blocks of facts
- 2 Conduct some research about each of the five named satellites
- 3 Using what you have learned pair each satellite with its associated facts and glue to an appropriately sized card
- 4 Carefully pierce a suitably positioned hole in each satellite card to use as a hang point
- 5 Glue the world circle onto card and cut out
- 6 On the world circle, carefully pierce a hole at each of the five 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 marked on the world circle
- 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 marked on the world circle

### Activity



### Useful links

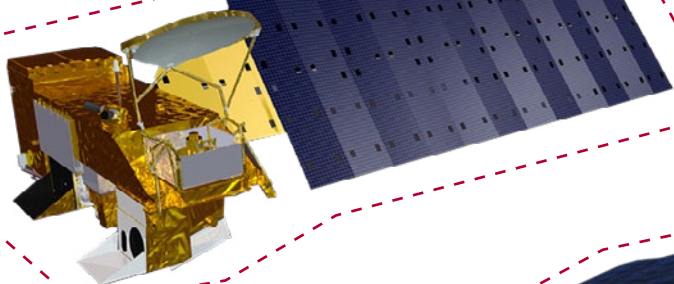
- The Afternoon Constellation  
<https://tinyurl.com/46fpk84n>
- The Aqua Satellite  
<https://tinyurl.com/wy6yc6w6>
- The Aura Satellite  
<https://tinyurl.com/y6xn8kxs>



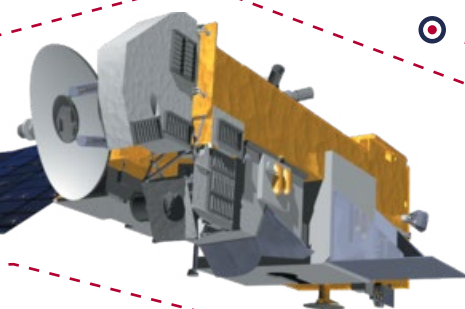
In association with

# Satellite Picture sheet

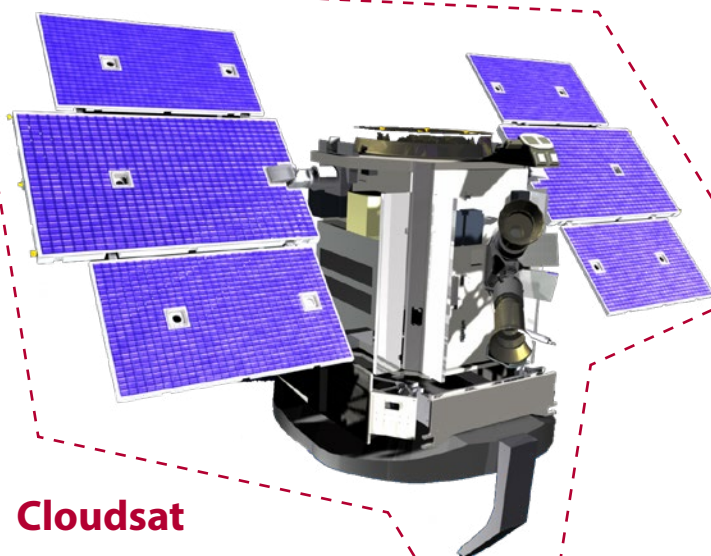
✪ Aqua



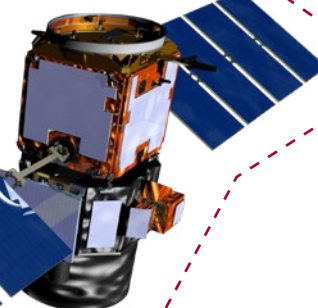
✪ Aura



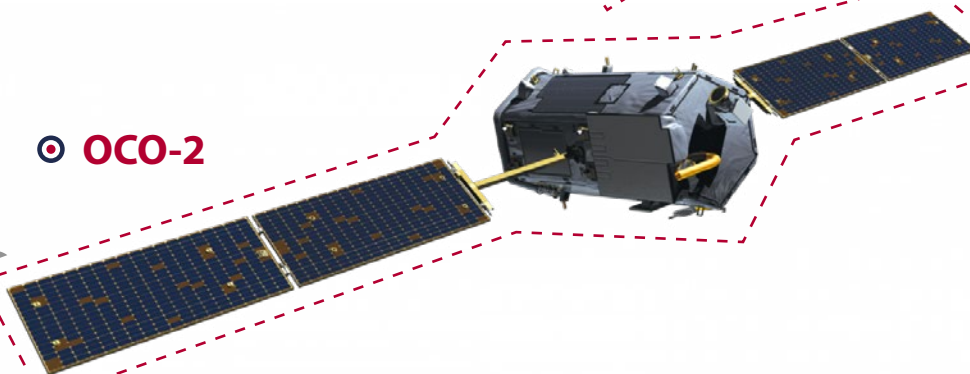
✪ Cloudsat



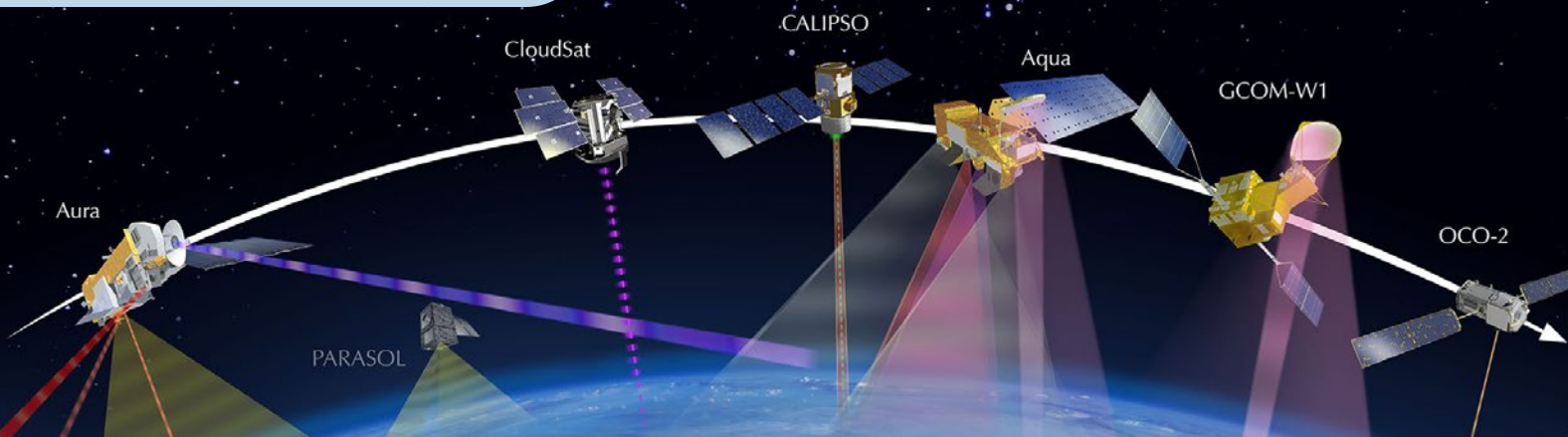
✪ Calipso



✪ OCO-2



# Satellite Fact sheet



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<sub>2</sub>)

**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

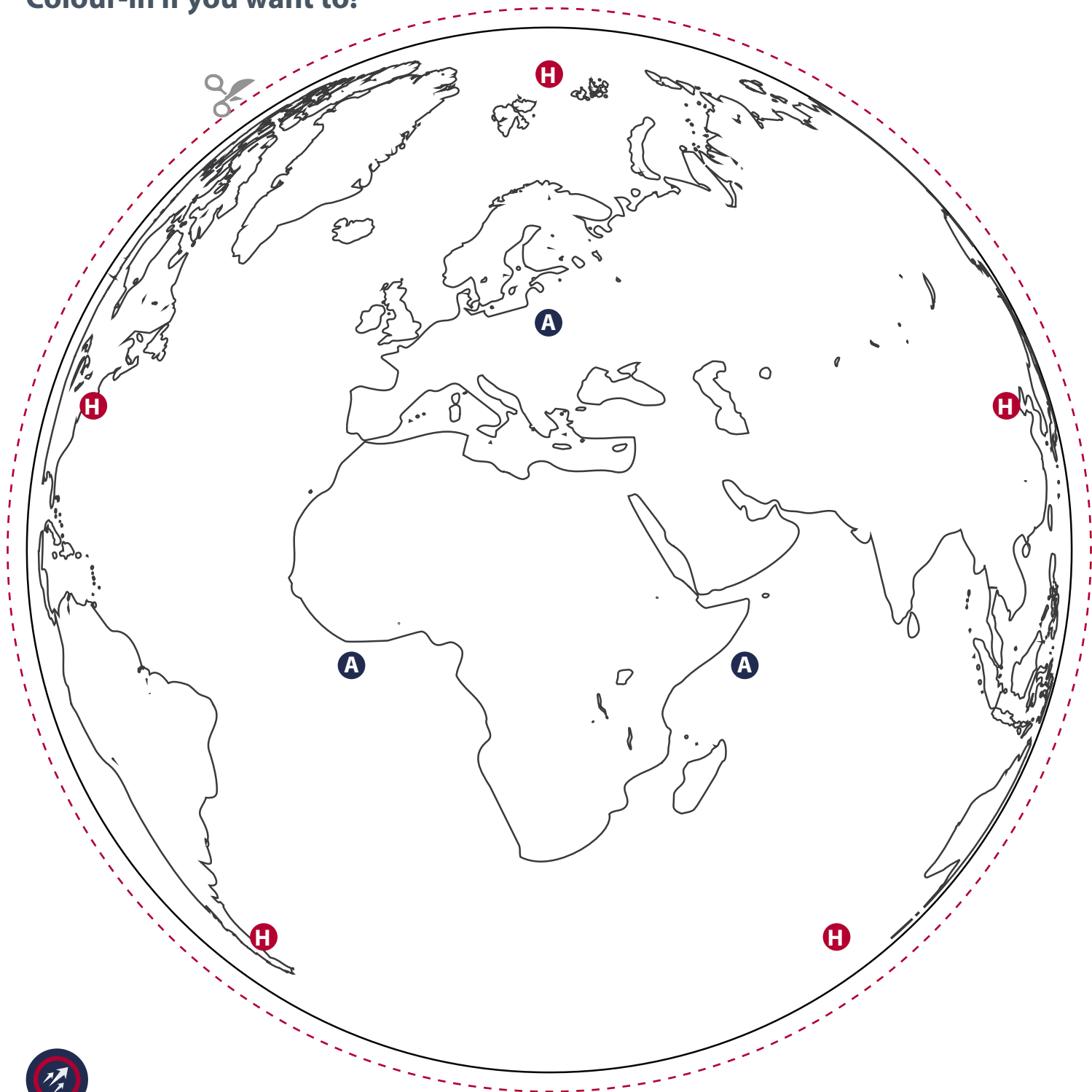
Name:

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

Colour-in if you want to!



## Next steps

- Research other satellites you could hang from your mobile and list five key facts about them
- There are other types of satellites that are called Geo-stationary. Research some key facts on what this term means