**Escape from the International Space Station**

<https://eo-cdt.org/escape-room/>

**Teachers Notes**

This virtual escape room activity provides a series of challenges that asks children to complete crosswords, word searches, crack codes, mazes and word puzzles as they try to escape the International Space Station. It allows children to develop problem solving skills and apply logic. Extension tasks provide opportunities for aspects of the curriculum including: research, creative writing, explanation texts, and observational drawing, mapping the local area from above and recognising features on satellite images which shown how environments change over time.

There are 14 daily challenges, each with extension activities. This could be done as a timed escape room, or as daily science lessons with the extension activities.

The specific topics of the curriculum covered are:

* What satellites are (science)
* Natural and artificial satellites; active and passive satellites (science)
* Geostationary and polar orbits (science)
* What satellites are used for (science)
* Reading grid references (geography)
* Recognising features in satellite imagery (geography)
* Addition, subtraction, multiplication, division, brackets, shapes, sudoku logic (maths)
* Crosswords, anagrams (English)

Subjects that but can be linked:

* Light, wavelengths, speed of light
* Gravity
* Stars, galaxies
* Volcanic eruptions
* Iceberg formation

**Answers**

Full code for the escape pod = 3, N, 8, M, 7, 2, 7, 5, D, 9, 3, B, C, 1

*Question 1*

1 down = days

2 down = sleep

3 down = toilets

4 down = hours

5 down = kilometres

6 across = minutes

7 across = computers

8 across = cars

Letters in red = T H R E E

Answer = 3

*Question 2*

Fill in the sudoku (if this is difficult, the hints lead through exactly where to start and with which numbers).

The red letters spell out SPUTNIK

Answer = N

*Question 3*

A satellite is an object that orbits something else. There are two types of satellite: natural and artificial. The moon is a natural satellite. Machines that we launch into space to move around the Earth are artificial satellites.

Code spells E I G H T

Answer = 8

*Question 4*

Missing word is ‘communication’

Answer = M

*Question 5*

Glacier**s**

S**e**a

**V**olcanoes

W**e**ather

Vegetatio**n**

Ear**t**hquakes

Gravit**y**

Red boxes spell S E V E N T Y

Answer = 7 (seventy divided by 10)

*Question 6*

Satellites at the bottom (in order) and number of times they appear in the grid:

Landsat (5), GRACE (4), Quickbird (6), Cryosat (7), GOES (3).

Answer = ( 5 x 4) ÷ ( 6 + 7 – 3)

Answer = 2

*Question 7*

A = 5 x 3

B = 3 + 2

C = 5 + 2 + 3

Answer = 10 – (15 ÷ 5) = 7

*Question 8*

Polar orbit speed – geostationary orbit speed = 8 – 3 = 5 kilometers per second

Answer = 5

*Question 9*

Maze spells CLOUDS

Answer = D

*Question 10*

Yellow star = (4,5) = 20

Blue triangle = (5,8) = 40

Purple square = (5,2) = 10

Green hexagon = (9,3) = 27

Black pentagon = (6,4) = 24

Red circle = (1,9) = 9

Answer = (20 + 40) ÷ 10 x (27 – 24) – 9

Answer = 9

*Question 11*

I = Island

II = Boats

III = Road

IIII = Lake

 = Muddy water

 I = Bridge

 II = Mountain

 III = Ocean

 IIII = Field

 = River

I = City

A = (8 – 3) x 2 = 10

B = 10 x 4 ÷ 5 = 8

C = (6 x 7) – 11 = 31

D = (C + 9) ÷ B = (31 + 9) ÷ 8 = 5

Answer = (A ÷ D) + 1 = 10 ÷ 5 + 1

Answer = 3

*Question 12*

B is the first image after the volcano erupted (forest/grass is burned, the river is larger due to increased run-off, the lake is lighter blue due to ash providing fertilisation).

*Question 13*

Order is D, A, C, B

Answer = C

Information here: <https://www.earthobservatory.nasa.gov/world-of-change/larsenb.php>

D = At the start of the series, the ice shelf (left) is tattooed with parallel lines of blue dots. The dots are pools of meltwater, and they are arranged in lines because the water drained into existing crevasses. Beneath a thin layer of clouds, a smattering of icebergs appears in the dark, open waters of the bay (right).

A = By February 17, the leading edge of the C-shaped shelf had retreated about 10 kilometers (6 miles) as the shelf began to splinter.

C = By March 7, the shelf had disintegrated into a blue-tinged mixture (mélange) of slush and ice bergs. Many of the bergs were too tall and narrow to float upright. They toppled over and spread out across the bay like a neat row of books that had been knocked off a shelf. When the bergs tipped over, the very pure ice on the bottom side of the ice shelf was exposed. The pale blue color is largely due to the reflection from this ice. Pure, thick ice absorbs a small amount of red light. Photo-like satellite images are made by combining the satellite’s observations of red, green, and blue wavelengths of light reflected from the Earth’s surface. When all these visible wavelengths are strongly reflected, the surface looks white; when the reddest light is absorbed, the reflection takes on a cyan tinge.

*Question 14*

First line reads ‘T H E F I N A L A N S W E R I S 1’

Answer = 1

**ESERO-UK: Links to further resources:**

**Karsten Spaans - Scientific Researcher**

Karsten works at the University of Leeds as a scientific researcher, in the School of Earth and Environment.  He uses images taken by satellites to look the movement of structures such as railways, roads and gas lines.  He also examines the movement of the Earth due to volcanic eruptions and earthquakes.

<https://www.stem.org.uk/rxfr6a>

**Anna Hogg – Glaciologist**

Anna works at the University of Leeds.  She uses satellite data to look at glaciers at the poles of the Earth.  She uses optical and radar data to track ice movement.  She explains how she went to Greenland and Antarctica for field trips to obtain more data for her research.  Anna explains how we need to study ice sheets since melting can cause sea levels to rise that will impact many of us across the globe.

<https://www.stem.org.uk/rxfr65>

**Colour in the Earth**

This resource provides activities that link in which geography at primary level, using images of cities and Islands around the World taken from Space. These images taken by Tim Peake, support children in recognising human and natural features from an aerial view. They develop their understanding of maps and keys/legends using simplified line drawings created from Tim’s photos. guide to support the running of the activities in class.

<https://www.stem.org.uk/rxbrrj>

**From the Ground and From the Sky**

This activity introduces the idea of remote observation by asking children to match photographs such as lakes, mountains and cities taken from the ground with early astronaut photographs. Children then compare the images from the ground with the astronaut picture of the same place.

<https://www.stem.org.uk/rx35tt>

**Viva Las Vegas**

This activity shows how Earth observation can be used to study human geography by comparing the satellite images of Las Vegas over the last few decades.

<https://www.stem.org.uk/rx35tu>

**Watching a glacier**

Astronauts have been taking photographs of the Earth from space for over 50 years and Earth observation scientists have used satellite images for a similar amount of time. This EO Detective activity aims to demonstrate how a vantage point in space, such as the International Space Station, provides a unique perspective from which people can monitor environmental processes and change.

<https://www.stem.org.uk/rxerte>

**Meet the EO Detectives**

Earth Observation (EO) scientists collect information about the Earth – the land, the sea and the atmosphere – using sensors carried on satellites, aircraft, ships, buoys floating on the ocean and thousands of weather stations around the world. There is now a great deal of data available and scientists are finding more and more ways to use it to study our planet and make predictions about its future. This resource features people involved in gathering, processing, understanding and sharing this data.

<https://www.stem.org.uk/rxenpv>