

# RAF Cyber-Intelligence Lessons

## Overview

These lessons are designed to be used in a sequence, where students will work through a series of challenges which all tie into a narrative that they follow. Students will learn how to use map-reading, database interrogation, encryption and decryption skills and basic directional programming over the course of them.

## The Lessons

### Lesson 1:

You have been asked to monitor the skies above Heathrow Airport. You will look at an interactive map showing flying objects in different flight zones. You have to make notes of which objects are possibly in the wrong area (or shouldn't be there at all)!

You will then look at a database of the known objects and use filtering and searching techniques to corroborate your findings.

The flying objects that are either in the wrong place, or should not be in any flight corridors are:

Boeing 787-8 Dreamliner

Reg Code: 5Y-KZJ

Flight KQ101

Heathrow to Nairobi

Unknown Balloon

Boeing 787-10 Dreamliner

Reg Code: A6-BMD

Flight EY20

Heathrow to Abu Dhabi

Unknown Small Aircraft (possibly a drone)

Boeing 777-323(ER)

Reg Code: N733AR

Flight AA21

Heathrow to Dallas

## Lesson 2:

You have received strange messages from one of the aircraft you identified. The RAF would like you to decode the messages that have been received so that the next steps can be determined.

The children will either create a cipher wheel by printing out a template, cutting it out and using a split pin or paper clip to assemble, or will use an online cipher wheel that is linked to help them to decrypt the messages.

### Solutions:

**First code:** TESTING YOUR CODING SKILL

**Second code:** SOS I AM EXPERIENCING A TECHNICAL PROBLEM AND NEED EMERGENCY ASSISTANCE

**Third code:** I HAVE LOST MY ALTIMETER AND CANT SEE THE RUNWAY

## Lesson 3:

RAF Emergency Command have asked for information about what is wrong with the plane. All messages to and from them have to be encrypted for security reasons. You will encode messages to send to them. The cipher wheel from the previous lesson can be used to help with this.

### Solutions:

**First code:** An encrypted message using a cipher shift of 7 of the problems the pilot is having.

**Database task:** The children should find that RAF Emergency Command have a cipher shift of 11

**Second code:** The children should have encrypted: PXPCRPNYJ PDNZCE CPBFPDEPO HPGP ATNVPO FA L ATWZE TY ECZFMWP

**Third code:** The children should decrypt: ROGER THAT ESCORT DISPATCHED

## Lesson 4:

The emergency escort has been dispatched. However, they don't know where to go! It is your job to plan which airport they should fly to with the troubled flight and to determine the route they should take. You also need to ensure that all communications are encrypted. This lesson will use all of the skills that have been developed so far.

### Solutions:

**Available runways:** Edinburgh Runway 2, Norwich International Runway 1, Cardiff Runway 1

**First code:** An encrypted message using a cipher shift of 10 which tells the RAF the airport chosen and the directions that would need to be taken to get there (worked out from the Scratch program they have used).

**Second code:** The same encrypted message but now encoded as ASCII using decimal numbers.

## Conclusion

To finish there is a 'Time to Climb' quiz where the children can test their knowledge of everything they have learned over the last four lessons.

### Answers:

- 1: What is Encryption?: *The method of changing something into code so it can't be read by other people.*
- 2: What does Decryption mean?: *Changing code back into a readable message.*
- 3: What is a cipher?: *A way of disguising a message with a code.*
- 4: Who needs to use encryption?: *Everyone!*
- 5: What does ASCII stand for?: *American Standard Code for Information Interchange.*
- 6: What does filtering do to a database?: *Hides any information you don't need to see.*

The children will finally be able to fill in a Google Form (if they have permission) which will email them a certificate of completion (they will need a valid email address for this).

## Background

You can learn about all the Royal Air Force people, careers, aircraft, projects and much more here: <https://www.raf.mod.uk>

To hear about other RAF youth engagement projects, follow on social media:



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