AIMING FOR AWESOME

1918 2018

Logistics challenge

Student Booklet

Royal Academy of Engineering

THIS IS ENGINEERING

ROYAL AIR FORCE Youth STEM

The aim of this resource is to give students the opportunity to investigate how science, technology, engineering and mathematics (STEM) is used when planning a mission.

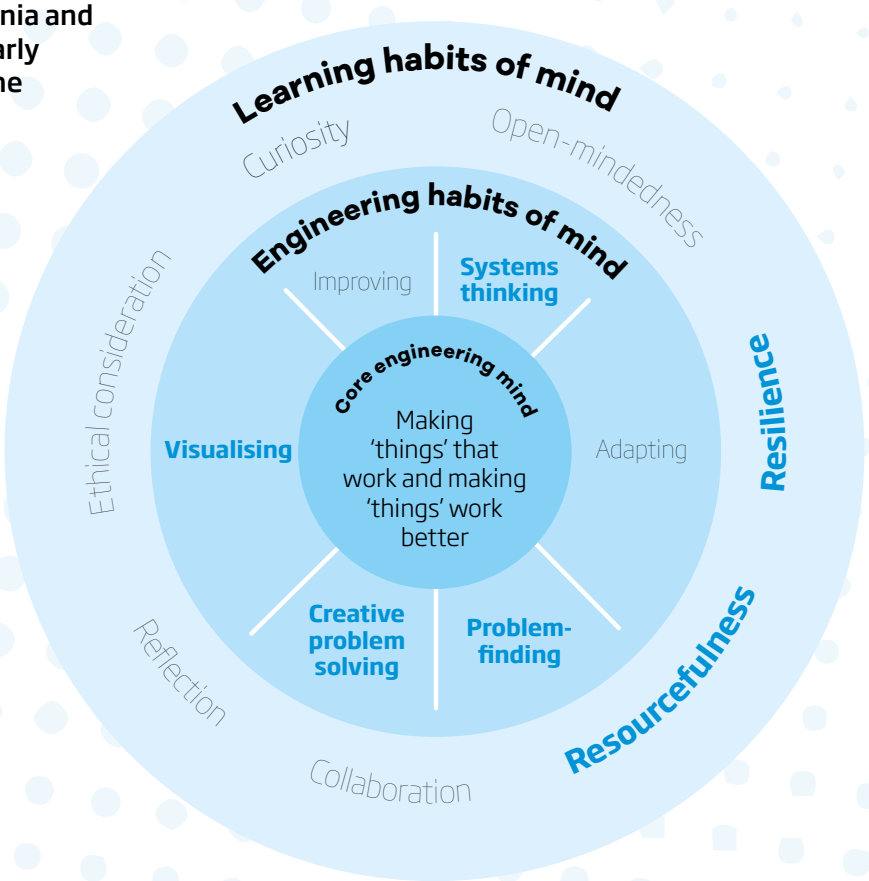
Operation Cheshire

Operation Cheshire, the operation to deliver aid to inhabitants of Sarajevo, the capital of Bosnia and Herzegovina, during the civil war in the early 1990s was the longest running airlift in the RAF's history.

Road and rail networks had been destroyed or cut off by the conflict so delivering aid by air was the only way to ensure it was delivered to those who needed it.

For almost four years the RAF used Hercules C130 aircraft to deliver supplies to those trapped by the fighting.

By the end of the operation the RAF had delivered over 26,000 tonnes of supplies.



TIME TO PLAN

You are a logistics team working for the RAF to plan and deliver humanitarian aid to the people of Sarajevo.

You need to use all the information to work out a movement plan that demonstrates how you will deliver all the essential equipment from RAF Leeming to Sarajevo. Delivering humanitarian aid to a war zone requires a different approach to delivering aid in the aftermath of a natural disaster.

To assist with your mission, you have been given access to a Hercules C130s aircraft.

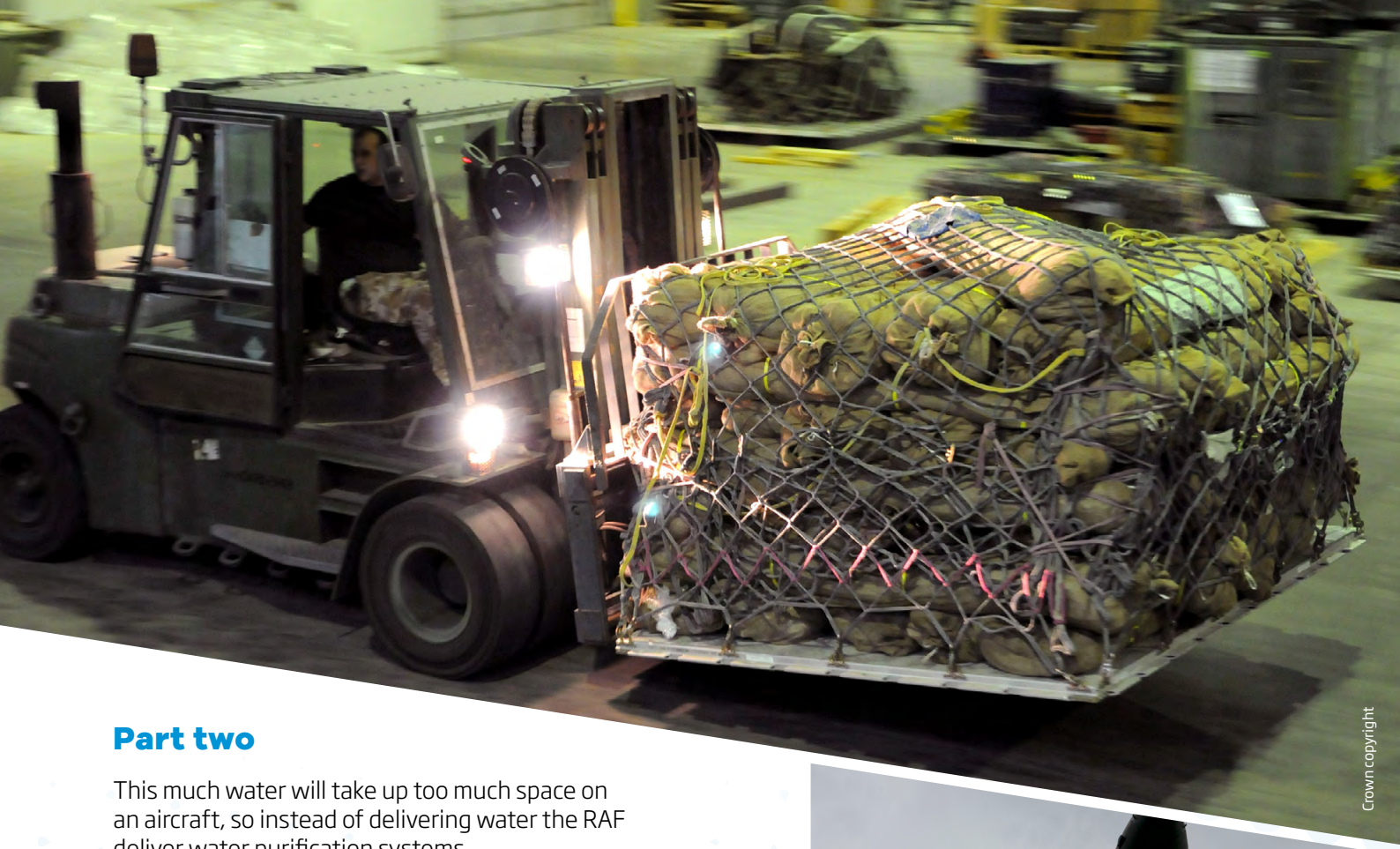
Part one

One of the key supplies that civilians will need is water. It is currently recommended that a person drinks 1.2 litres of water a day.

» If you are delivering aid for 5,500 people to last 10 days, how much water will you need to deliver?

Step 1: calculate how much water one person will need for 10 days.

Step 2: calculate how much water 5,500 people would need.



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Part two

This much water will take up too much space on an aircraft, so instead of delivering water the RAF deliver water purification systems.

Next, you must pack your aircraft. You will be delivering emergency lifesaving aid, including food, water purification systems, healthcare and clothes. Complete the table below and use logistics challenge support sheet one to work out the best way to pack your aircraft to make the fewest journeys.

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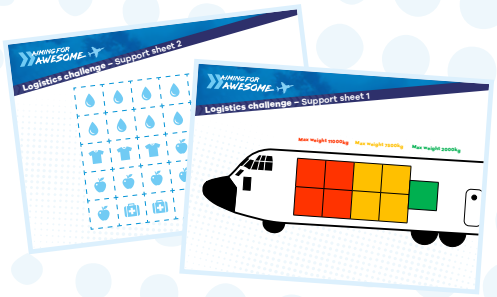
Aircraft information

Flying speed:	330mph
Maximum load:	20,500kg
Pallet space:	9 pallets
Range:	2400 miles
Time to load:	5 minutes per 1000 kg of weight
Time to unload:	10 minutes per 1000 kg of weight
Time to refuel:	2 hours



Aid items to be sent:

Item	Quantity to be sent	Number of items per pallet	Number of pallets	Weight per pallet (kg)	Total weight (kg)
Water purification	360	30		3000	
Food	10000	1000		2000	
Medicine	1000	500		1000	
Clothes	500 bags	200 bags		500	

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Part three

Now you must work out the time it will take for you to deliver the all equipment and return to base.

The distance from RAF Leeming to Sarajevo is 1155 miles

Hints:

- break each stage of the journey down into time to load the aircraft, time to fly and time to unload.
- do not forget to refuel your aircraft after 2400 miles
- it might be easier to calculate the time to pack the aircraft in minutes first and then convert to time in hours. Remember; there are 60 minutes in an hour.
- to calculate the flight time, use the equation speed = distance ÷ time.

What can you do to reduce the total delivery time?

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We're influencing policy through the National Engineering Policy Centre – providing independent expert support to policymakers on issues of importance.

We're engaging the public by opening their eyes to the wonders of engineering and inspiring young people to become the next generation of engineers.

ROYAL AIR FORCE Youth STEM

The RAF Youth STEM programme is designed to engage and inspire young people by building their interest in engineering and technical career pathways.

From cyber specialists to aerospace, aviation, electronics, and mechanical disciplines, the RAF is committed to widening participation in STEM, extending opportunities to all, and encouraging greater diversity in this critical area of national skills shortages.

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