



London's  
Air Ambulance  
Charity

**KEY STAGE 3  
WORKSHEETS**



## HELICOPTER ENGINEERING WITH LONDON'S AIR AMBULANCE

London's Air Ambulance uses MD902 Explorer Helicopters. These have been specially engineered and modified to meet the performance requirements of saving lives across the capital. They are piloted by two pilots and carry an advanced trauma doctor and paramedic as well as all the equipment needed for specialist trauma treatments. One MD902 Explorer can be ready to launch in 3 minutes and can fly to any location in London in under 11 minutes.



**Captain Dave Rolfe**  
Pilot

### Activity 1

Look at the design features labelled in the photographs, and match the letter to the appropriate description in the table.



**G-LNDN SPECIFICATIONS.** Model: MD902 Explorer, Hull No: 68, Max all up weight: 2834 kg.  
Engines: 2 Pratt and Whitney 207e, Top speed: 140 knots, Mission ready endurance: 1 hour from the Helipad (130 miles)



## HELICOPTER ENGINEERING WITH LONDON'S AIR AMBULANCE

### Design Features

<b>A</b>	Two engines for safety
	Skids for landing on soft surfaces, made of steel for durability
	Rotorless tail, for safer flying in urban environments
	Flame retardant, reflective, high visibility nomex suit with adjustable zipped boots
	Lightweight body of aluminium, carbon fibre composite and polymers
	Modified interior with medical grade floor for cleanliness, stretcher and 176kg of portable life-saving equipment and medicines.
	Pitot tubes on the nose to measure speed in knots and air temperature

### Activity 2

Look at each design feature of London's Air Ambulance uniform. Give three reasons why the uniform could be classed as personal protective equipment (PPE)

- 1 \_\_\_\_\_
- 2 \_\_\_\_\_
- 3 \_\_\_\_\_

### Activity 3

Composites are manufactured materials made of two different materials that when joined, have enhanced properties. Carbon fibre is used for the helicopter's blades, as it is lightweight and tough. Research two more composite materials and their common uses.

Material	Use



## NAVIGATION WITH LONDON'S AIR AMBULANCE

London's Air Ambulance is only deployed when patients have critical injuries and are at risk of death or disability - this means that getting to the patient quickly is very important. Instead of using maps or street signs we set off from the helipad using bearings, flying directly in the patient's direction.

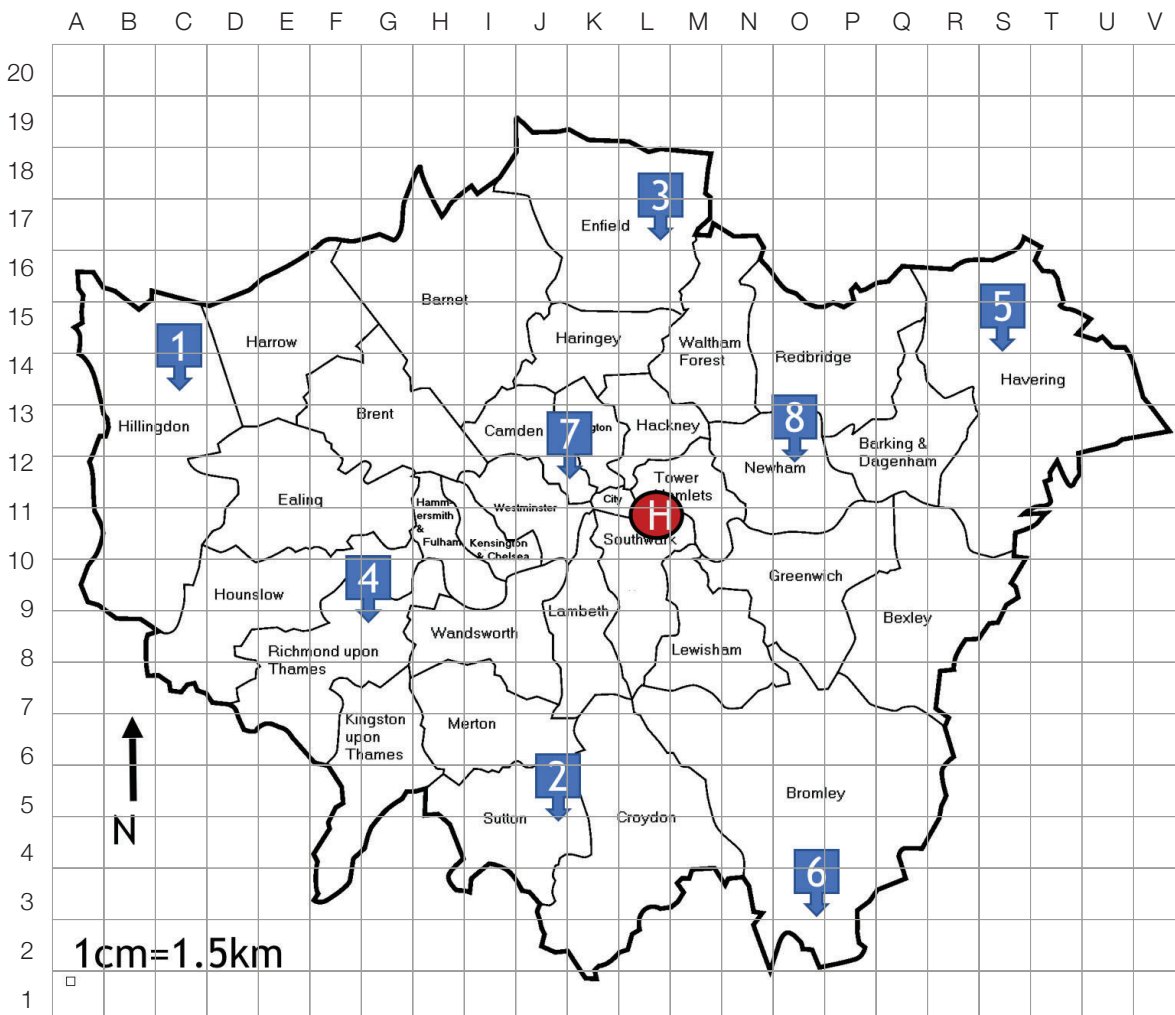


**Captain Dave Rolfe**  
Pilot

### Activity

Remember that  
a bearing of 20°  
is written 020°!

Use the map to work out the bearings and distance of each casualty from the Helipad (H), using a protractor and ruler.





## NAVIGATION WITH LONDON'S AIR AMBULANCE

Casualty	Borough	Bearing	Distance (km)
1			
2			
3			
4			
5			
6			
7			
8			



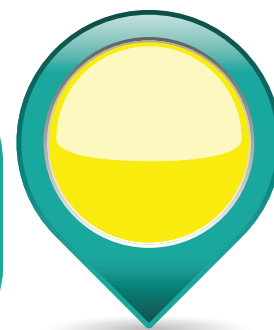
**London's Air Ambulance** Helipad is located on top of The Royal London Hospital in Whitechapel. **All 999 calls** in London are monitored for critical injuries that require deployment of **London's Air Ambulance**.

On average, **London's Air Ambulance** treats **FIVE critically injured patients a day**.



## FINANCING LONDON'S AIR AMBULANCE

London's Air Ambulance Charity relies on many different income streams. In 2015/16, our income increased and after a long campaign we managed to buy a second helicopter for our fleet. We mostly rely on ordinary people donating and raising funds for us – funds which could help save you, your best friend, parent or sibling from critical injury.



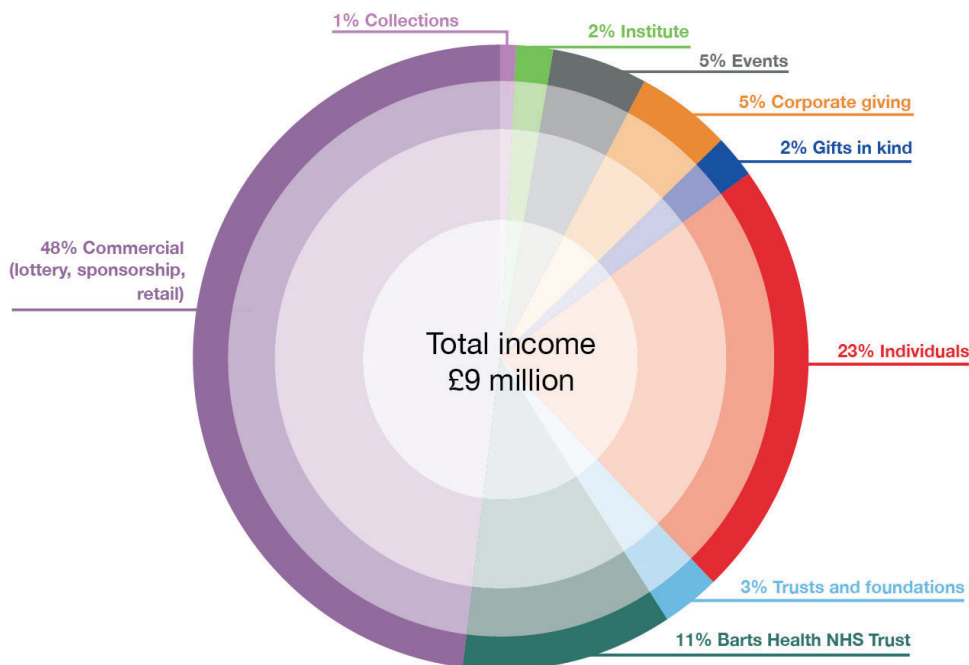
### Activity 1

Using the total amount raised and the chart below, work out how much money London's Air Ambulance received from each funding stream in 2017/18. Fill in the table below with your answers.



**Jonathan Jenkins**  
Chief Executive Officer

Funding Stream	Income (£)
Gifts in Kind	
Institute	
Commercial including retail, sponsorship & London's Air Ambulance Lottery	
Bart's Health NHS Trust	
Events	
Collections	
Corporate Giving	
Individuals	
Trusts & Foundation	





## FINANCING LONDON'S AIR AMBULANCE

### Activity 2 Solve these tricky problems!

**63p** of every **£1** raised is spent on life-saving services. In **2017-18** London's Air Ambulance Charity raised **£9million**.

How much money was spent of the 2017/18 income saving lives?

£

London's Air Ambulance Charity raised **£9million** in **2017-18**.

If they increased their income by 50%, how much would they raise?

£

**1 litre** of fuel is used up every **ten seconds**. The average flight is **7 minutes**.

How many litres of fuel are used in an average flight?

London's Air Ambulance can fly to any location in London in **11 minutes**.

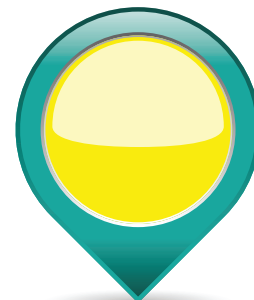
What is the maximum amount of fuel that could be used in a single flight?





## MEDICAL BIOLOGY WITH LONDON'S AIR AMBULANCE

As an advanced trauma doctor at London's Air Ambulance, I can perform complex medical procedures at the roadside. I bring the hospital to the patient's side when every minute counts. I have the equipment and medicine to administer anaesthetic and perform open chest surgery anywhere it is needed – procedures normally only carried out in the hospital's Emergency Department. This can save lives.



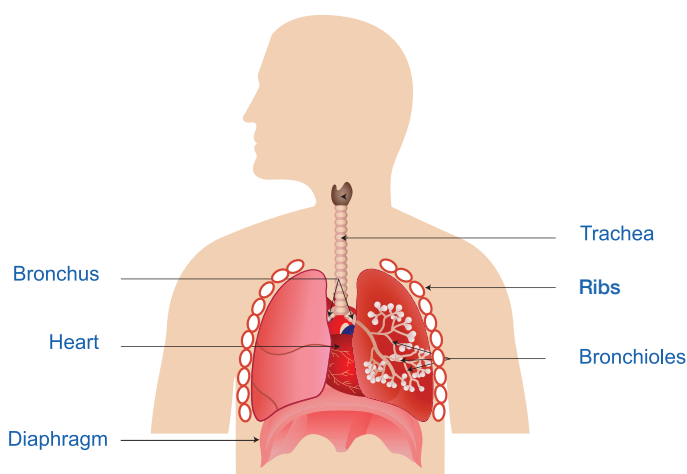
**Dr Gareth Davies**  
Advanced Trauma Doctor

### Respiratory System

The respiratory system is vital to providing the oxygen needed for you to survive. As the diaphragm and intercostal muscles pump air in through the trachea, it splits at the bronchi, and then branches off into the bronchioles. Oxygen then enters the blood at the air sacs.

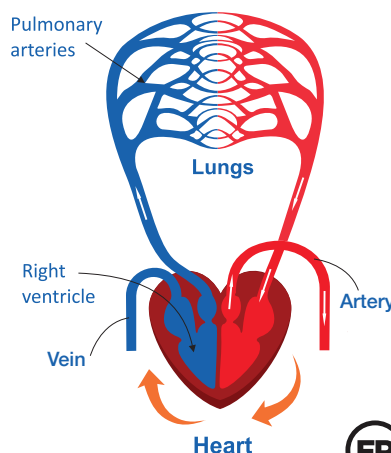
A punctured lung or a broken rib cage from a fall or car accident could be fatal. London's Air Ambulance can install a **chest drain** to remove trapped air or leaked blood from the pleural cavity, as well as provide artificial breathing through a **ventilator**.

Even though each helicopter comes equipped with a stretcher, most patients are treated in situ, then taken to hospital by road ambulance.



### Circulatory System

Your circulatory system consists of your heart as well as veins, arteries and capillaries, taking oxygenated blood from the lungs in arteries to every cell in your body for respiration. Severe bleeding could cause a lack of oxygen to the brain and over 40% loss could cause death. London's Air Ambulance carry the equipment not only to perform **open heart surgery** (thoracotomy), to fix a punctured heart and perform heart massage, but they also carry a **blood transfusion kit** and a special balloon to plug broken arteries and stop patients bleeding to death - a procedure called **REBOA**.





## MEDICAL BIOLOGY WITH LONDON'S AIR AMBULANCE

### 1. Fill the blanks

Oxygen is vital to your survival. Oxygen is absorbed by \_\_\_\_\_ in your \_\_\_\_\_ and transported around your body in your \_\_\_\_\_.

Your \_\_\_\_\_ pumps the blood to every \_\_\_\_\_ in your body for \_\_\_\_\_.

### 2. Name the specialist equipment found on board a London's Air Ambulance helicopter.

Equipment	Function
	Machine to help a patient breathe
	Inflating plug which stops bleeding from damaged arteries
	Device for removing blood or air from lung cavity
	Medicine used for pain relief only normally used in hospitals



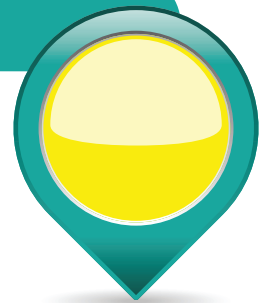


## SKETCHING MAPS WITH LONDON'S AIR AMBULANCE

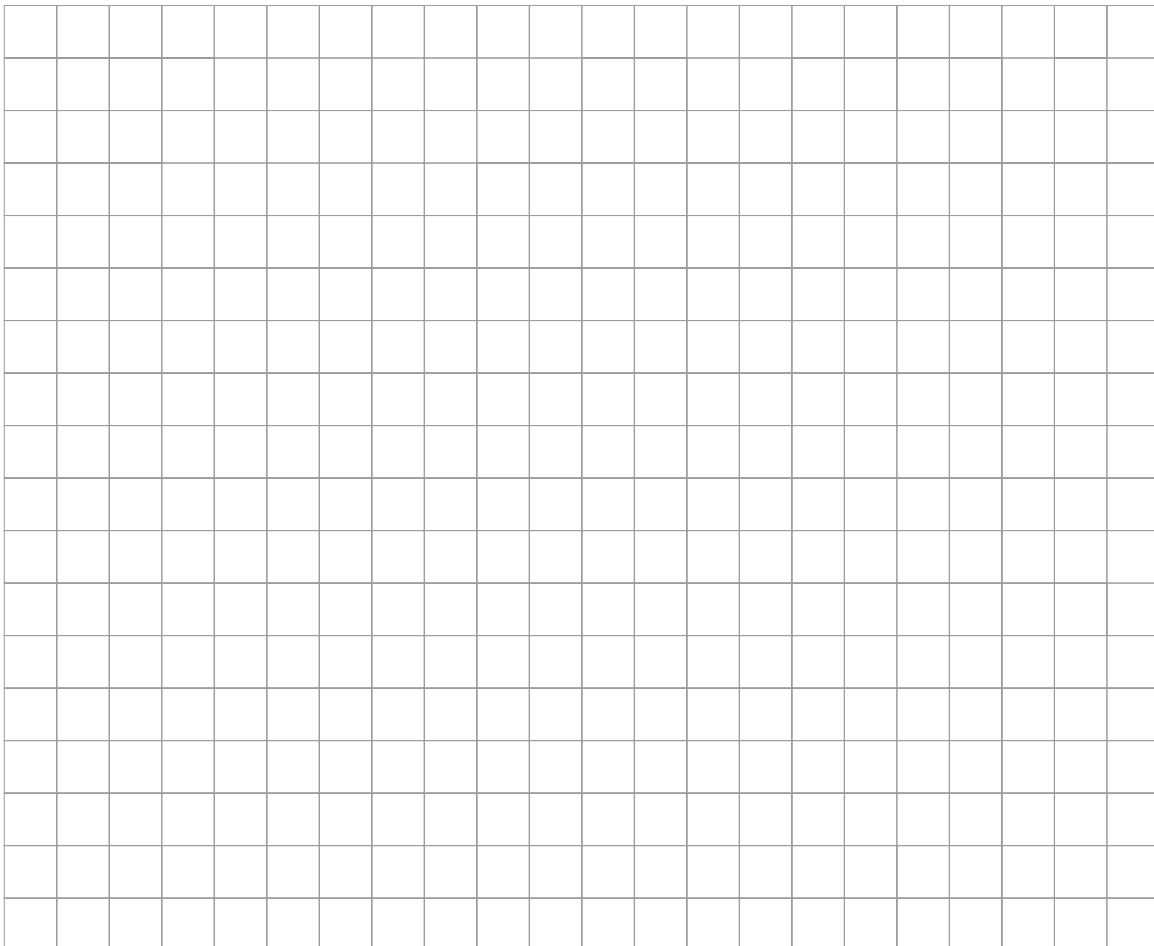
As a pilot for London's Air Ambulance, I need to make sure that the helicopter can land safely. We need an area at least the size of a tennis court, but can land on school playgrounds, bridges, box junctions or multi storey car parks. In the past we have landed in Trafalgar Square, Piccadilly Circus and on Horse Guards Parade.

### Activity 1

Use the grid below to draw a sketch map of your school playground. Include a scale, and mark an 'H' where you think the best area for a helicopter to land would be. Remember, the bigger the area, the better, and include any obstacles such as bins or picnic tables that might get in the way. Include a scale and a key, and plot coordinates down the side.



**Captain Dave Rolfe**  
Pilot





## SKETCHING MAPS WITH LONDON'S AIR AMBULANCE

### Activity 2

Answer these questions!

1. What is the smallest area a London's Air Ambulance could land?

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2. Name three famous London locations where the London's Air Ambulance has landed

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3. What is the coordinate of the most favourable place to land in your school grounds?

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4. Why did you choose this location for the helicopter to land?

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