

Taking Off

You need: a calculator

ACTIVITY ONE

Ground crew carefully monitor the mass of an aircraft. If a plane is overloaded, it won't fly. Here are some details for a Boeing 737:

Plane (empty)	32 000 kg
Limit (before fuel)	47 000 kg
Crew (5)	400 kg
Pantry	500 kg
Passengers	136 maximum (82 kg average, including hand baggage)
Baggage	Allow an average of 15 kg per passenger
Cargo	Depends on the spare capacity

1. If the full load of 136 passengers is on board, calculate the approximate mass of these people and their baggage.

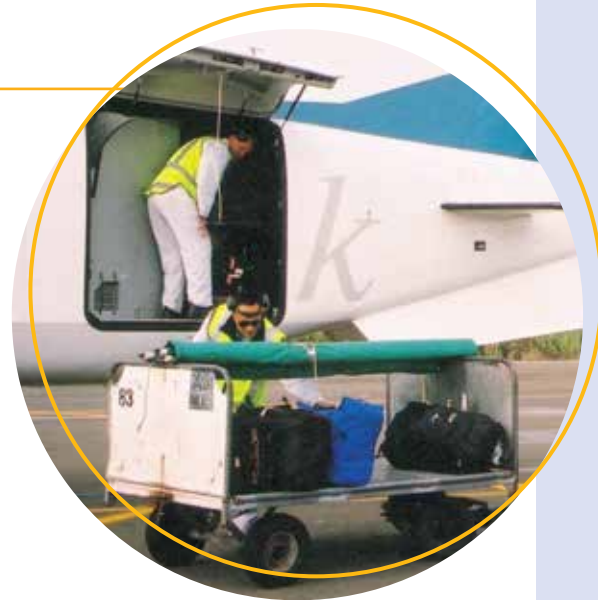


2. A Boeing 737 has 2 holds, each with a capacity of 10 cubic metres. In a full plane, passengers' baggage takes up a lot of this space. 15 kilograms of baggage has an average volume of about 0.05 cubic metres.
 - a. Allowing for 10 percent of the available space to be wasted, estimate the total volume of baggage for 136 passengers.
 - b. How much space will be left in the holds for cargo?
 - c. What is the maximum mass of that cargo?

ACTIVITY TWO

Beech 1900D aircraft can take up to 19 passengers, their baggage, and cargo.

Plane and crew	4 940 kg
Limit (before fuel)	6 885 kg
Passengers	19 maximum (82 kg average, including hand baggage)



1. If the plane has a full load of passengers, each with the maximum 20 kilograms of checked baggage, what mass of cargo can it also take?
2. A school cricket team of 15 players and 2 adults is flying to a tournament in a Beech. Their masses, including their hand baggage, are 56, 62, 69, 65, 57, 53, 47, 54, 58, 60, 66, 56, 70, 61, 59, 83, and 77 kilograms.

Each person takes the allowable 20 kilograms of baggage, and the team also has 3 kit bags weighing 21, 26, and 32 kilograms. The other 2 seats on the plane are empty.

- a. What is the total mass of the passengers and their baggage?
- b. What is the maximum mass of cargo the plane could also safely take?

