

Lesson 13 - Revision 1

Physics - KS3

Forces and Motion

Mrs Wolstenholme



A force is a _____ or _____ on an object when it interacts with another object

If two objects must be touching for a force to act, it is a _____ force.

If two objects do not need to be touching for a force to act, it is a _____ force.



Match force to description

A: Magnetism
B: Upthrust
C: Weight
D: Air resistance
E: Water resistance
F: Friction
G: Normal contact
H: Thrust

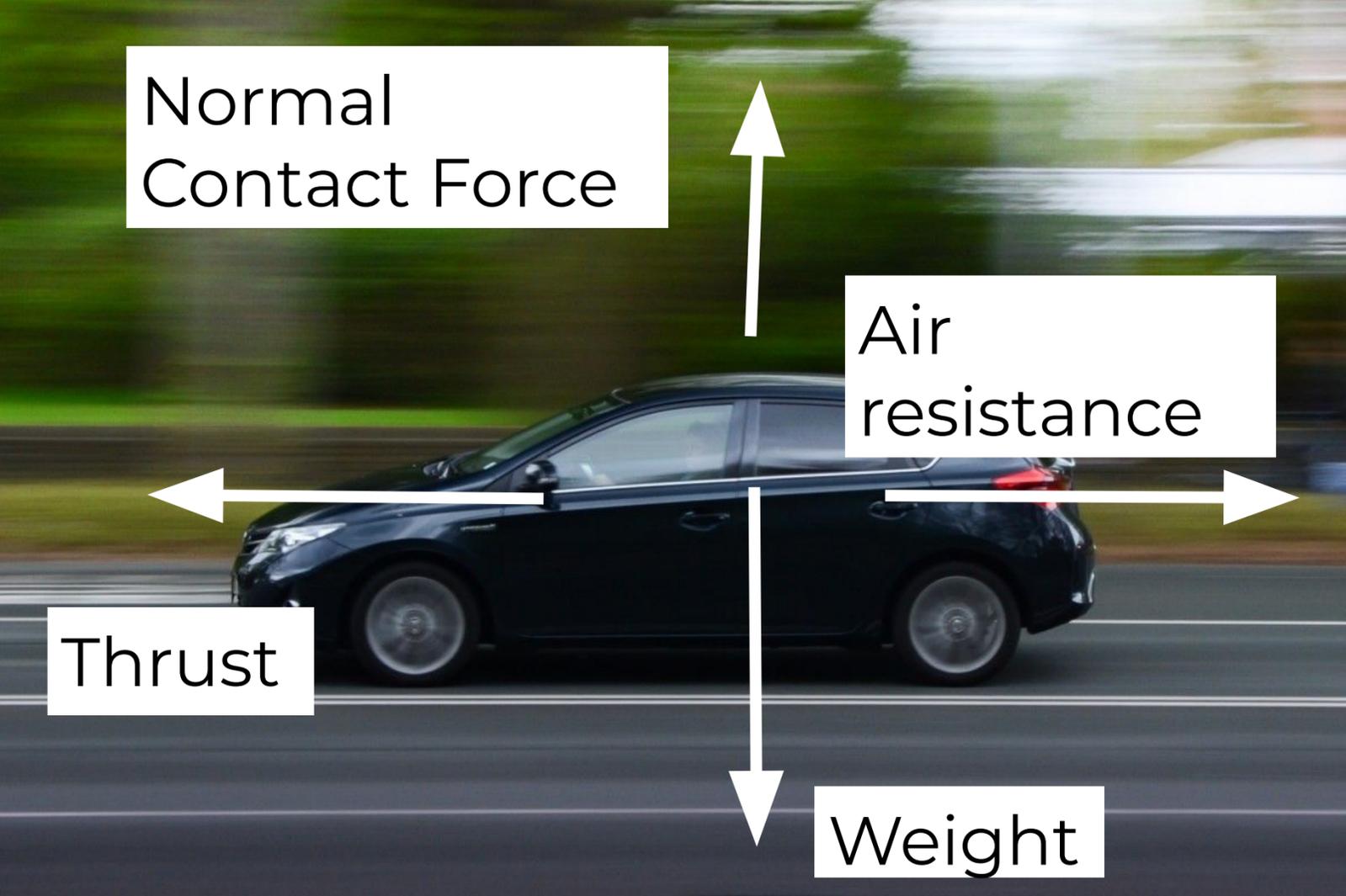
1: Forward push of an object moving on a solid surface
2: Attraction (pull towards) or repulsion (push away) of magnets and magnetic materials
3: Attraction between two objects with mass (Gravity)
4: Upward push of water on an object
5: Force which slows objects moving along a solid surface
6: Upward push of a solid surface on an object
7: Force which slows objects moving through water
8: Force which slows objects moving through air



Contact or Non-contact?

A: Magnetism
B: Upthrust
C: Weight
D: Air resistance
E: Water resistance
F: Friction
G: Normal contact
H: Thrust





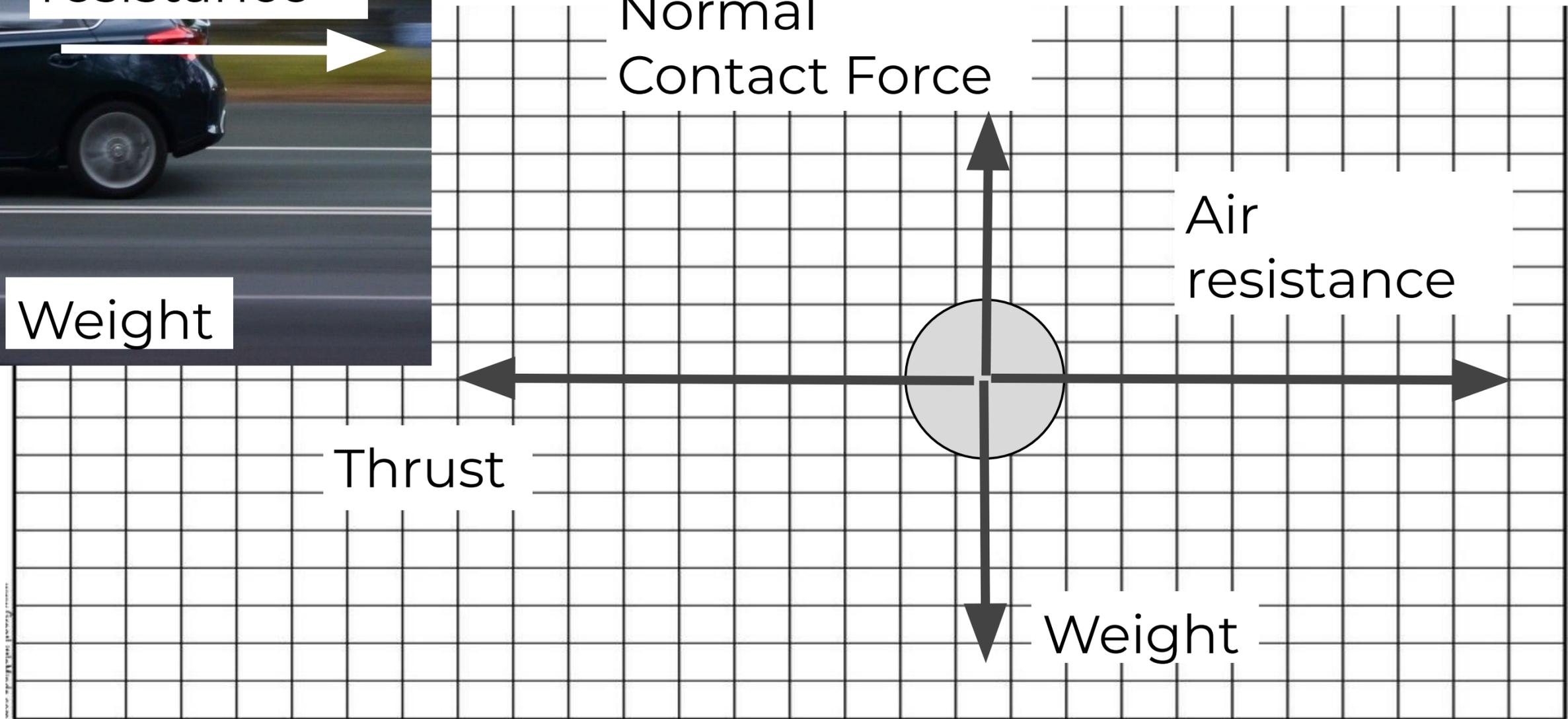
Thrust

Normal Contact Force

Air resistance

Weight

Credit: public domain



Normal Contact Force

Air resistance

Thrust

Weight



If opposing forces are equal, the forces are _____.

If one of the opposing forces is larger than the other, the forces are _____

On a free body diagram, the length of the arrows represent the _____ of the force and the direction the arrows point represents the _____ of the force.



We call the overall force the resultant force.

To calculate the overall force, we add forces in the same direction and subtract forces in opposite directions.

If the resultant force is 0, the object is balanced and it will have a constant speed and direction.

If the resultant force is not 0, the object will accelerate in the direction of the force. Its speed and direction could change.

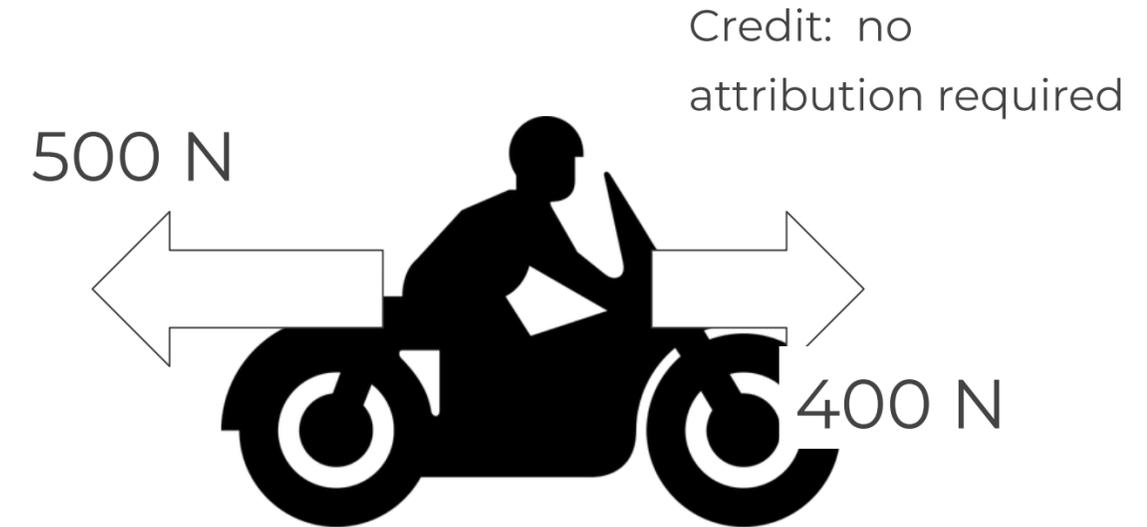
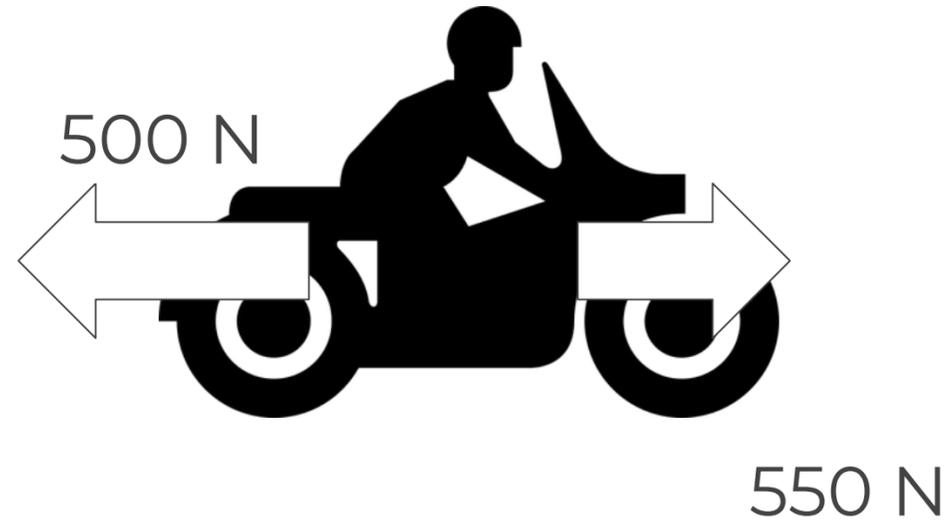
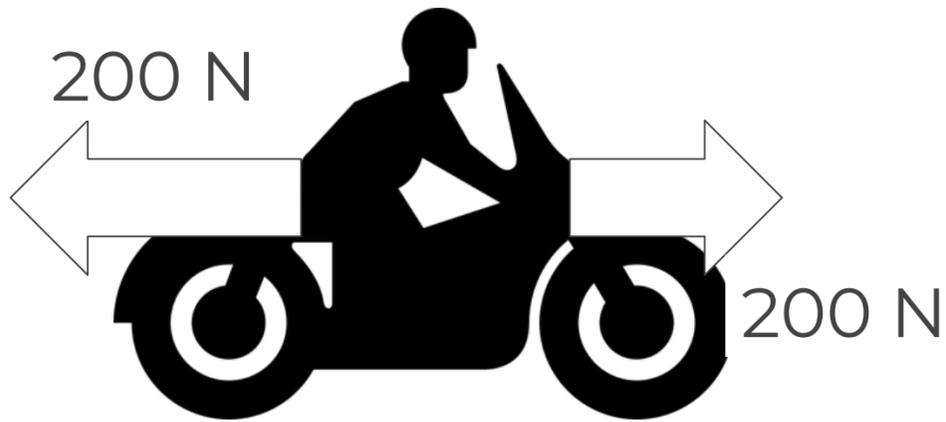


	Resultant Force is 0	Resultant Force is not 0
Balanced or Unbalanced?		
What will happen to its speed?		
What will happen to its direction?		



What will happen to the motorcycle?

The motorcycle is **stationary**. Calculate the resultant force and state which direction it will move in.

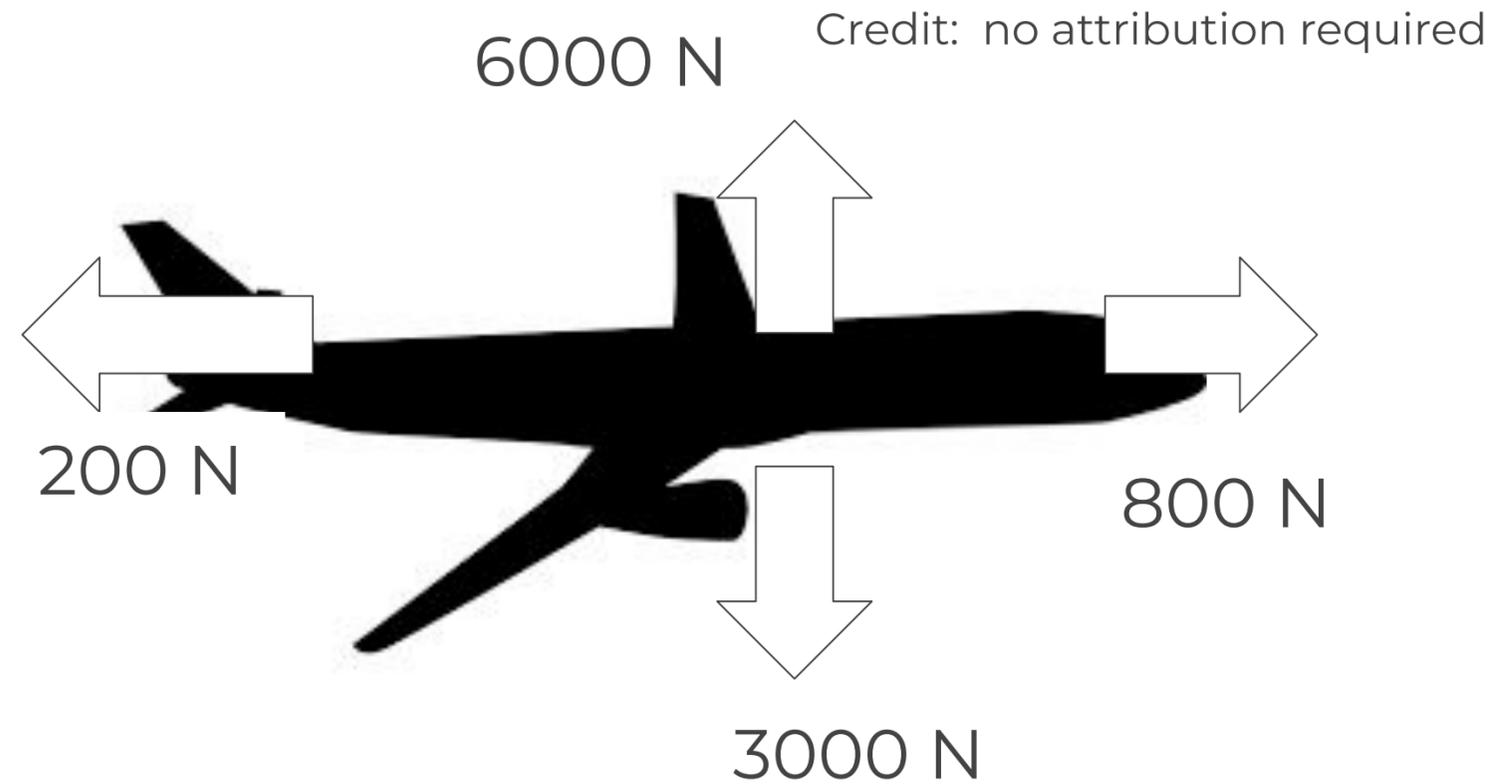
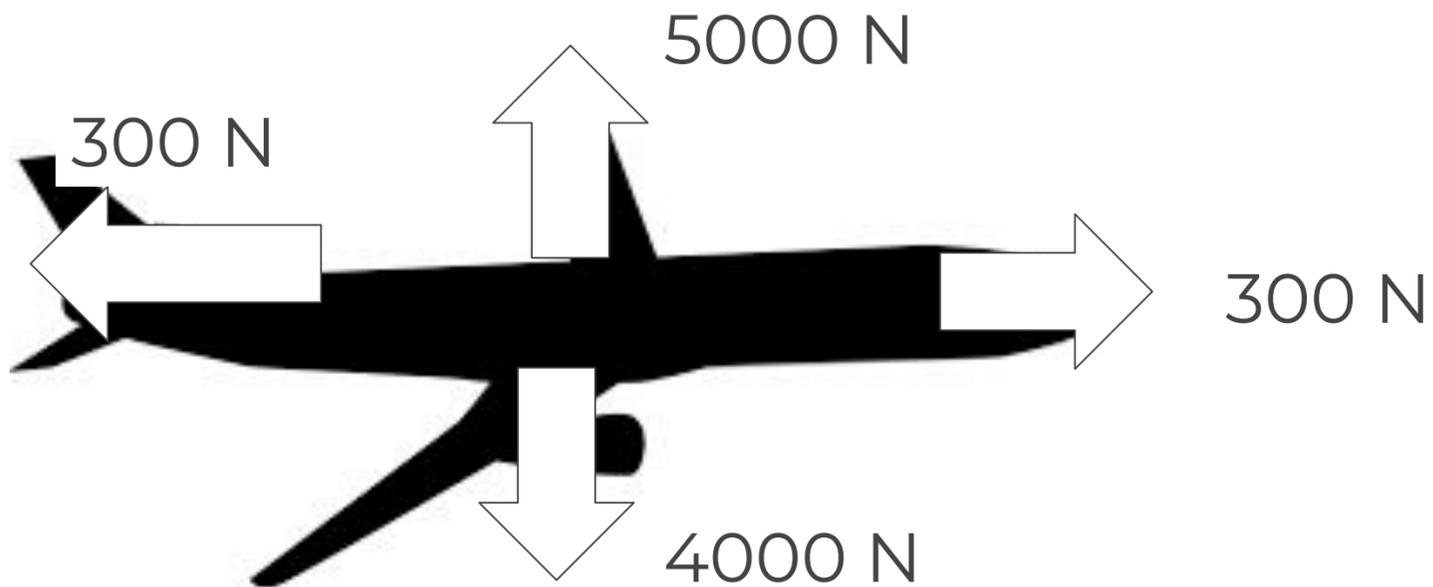


Credit: no attribution required



What will happen to the plane?

The plane is moving forwards. Calculate the resultant force and state what will happen.



Gravity is the force of attraction between any objects with mass.

All objects have a gravitational field around them, but it is only noticeable around huge objects like stars and planets.

The force caused by the gravitational field of a planet on an object is called its **weight**.



Sort the statements into mass or weight

Mass

Weight

Does not depend on the gravitational field of the planet.

How much matter an object is made of.

Measured in Newtons (N)

Measured in g or kg

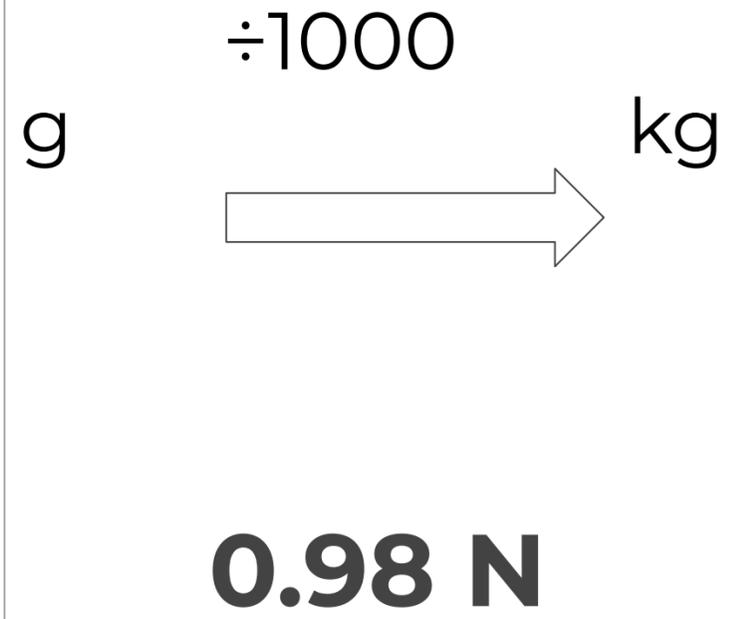
The force of gravity on an object.

Depends on the gravitational field.



Weight = mass x gravitational field strength
 (N) (kg) (N/kg)

	Calculate the weight of a 100 g bag of sweets in a gravitational field with a strength of 9.8 N/kg.
Values	mass = 100 g = 100 ÷ 1000 = 0.1 kg . Gravitational field strength = 9.8 N/kg
Equation	$W = m \times g$
Substitute	$W = \mathbf{0.1 \times 9.8}$
Rearrange	Not needed for this question
Answer	0.98
Units	N



Weight = mass x gravitational field strength
 (N) (kg) (N/kg)

	Calculate the mass of a 525.1 N astronaut in a gravitational field with a strength of 8.9 N/kg.
Values	Weight = 525.1 N Gravitational field strength = 8.9 N/kg
Equation	$W = m \times g$
Substitute	525.1 = m x 8.9
Rearrange	$525.1 \div 8.9 = m \times 8.9 \div 8.9$ $525.1 \div 8.9 = m$
Answer	59
Units	kg



Independent Practice

$$\text{g} \xrightarrow{\div 1000} \text{kg}$$

$$\begin{array}{ccccccc} \text{Weight} & = & \text{mass} & \times & \text{gravitational field strength} & & \\ (\text{N}) & & (\text{kg}) & & (\text{N/kg}) & & \end{array}$$

Values

Equation

Substitute

Rearrange

Answer

Units

1. Calculate the weight of a 10 kg object in a gravitational field with a strength of 9 N / kg.
2. Calculate the weight of a 5 kg object in a gravitational field with a strength of 6 N / kg.
3. Calculate the weight of a 100 **g** object in a gravitational field with a strength of 8 N/kg.
4. Calculate the **mass** of a 350 N object in a gravitational field with a strength of 7 N / kg.

