

# Q of D – 11/12/12

## Balanced and Unbalanced Forces

- Complete APPLE on  
DESK assessment probe

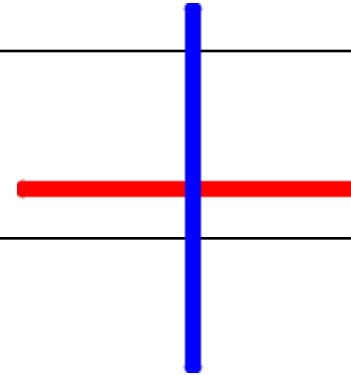


# OPENER

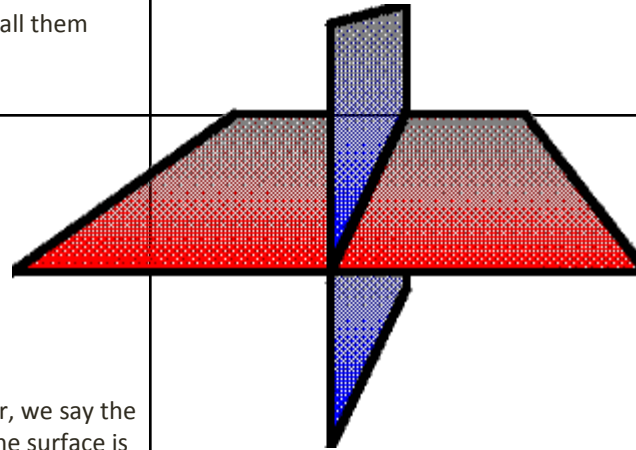
- Complete assignment in google classroom!

# Why is it called a Normal Force?

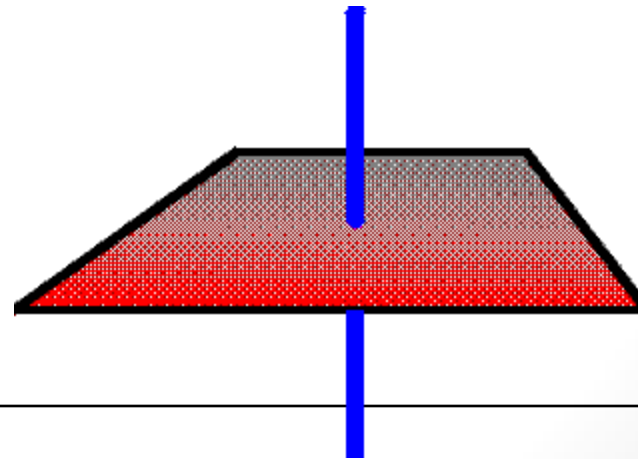
If two lines are at right angles to each other, we call them **perpendicular**.



If two surfaces are at right angles to each other, we call them **orthogonal**.



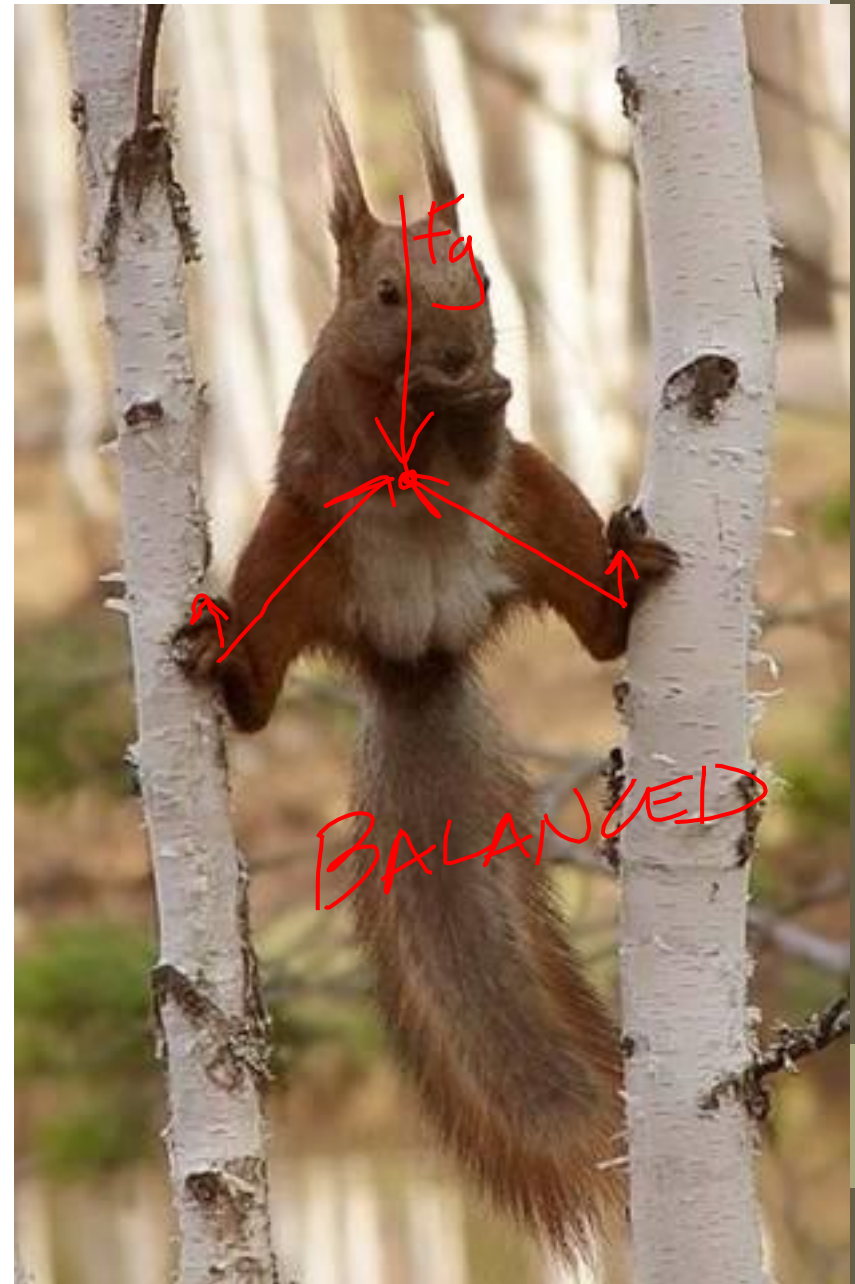
If a surface and a line are at right angles to each other, we say the line is **normal**. So any line that is at a right angle to the surface is called a normal line. If there is a force coming from the surface and at a right angle to the surface then we call it a **Normal** line. Any force coming from the surface and acting at a right angle to the surface is called the **Normal Force**.



# Skydiving in car

- <http://www.youtube.com/watch?v=GMxXHY1f8Xk&feature=related>

# Balanced and Unbalanced Forces



# BALANCED FORCES

TWO OR MORE OPPOSITE FORCES ARE **BALANCED** IF THEIR EFFECTS CANCEL EACH OTHER AND DO NOT CAUSE A CHANGE IN AN OBJECT'S MOTION



If the forces on an object are balanced (or if there are no forces acting on it) this is what happens:

- **an object that is not moving stays still (apple on desk)**
- **an object that is moving continues to move at the same speed and in the same direction (car driving at constant  $v$ )**

# Unbalanced Forces

- UNBALANCED FORCES DO NOT CANCEL EACH OTHER AND
- They CAUSE A CHANGE IN MOTION; SPEED AND OR DIRECTION.
- THE FINAL FORCE AND ITS DIRECTION ARE CALLED A **NET FORCE** or a **RESULTANT** (tonight's hmwk)

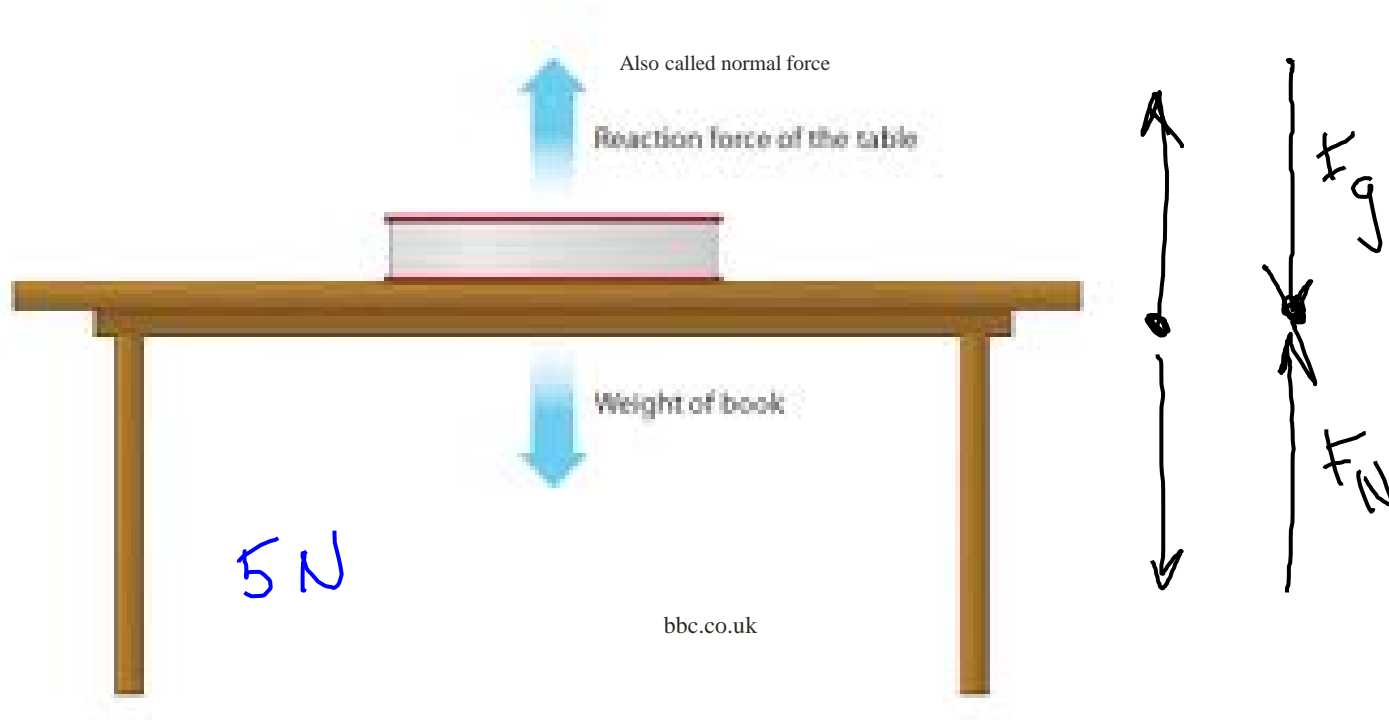


# Free Body and Vector Diagrams

- PRACTICE DRAWING VECTOR DIAGRAMS FOR EACH OF THE FREE BODY DIAGRAMS THAT FOLLOW



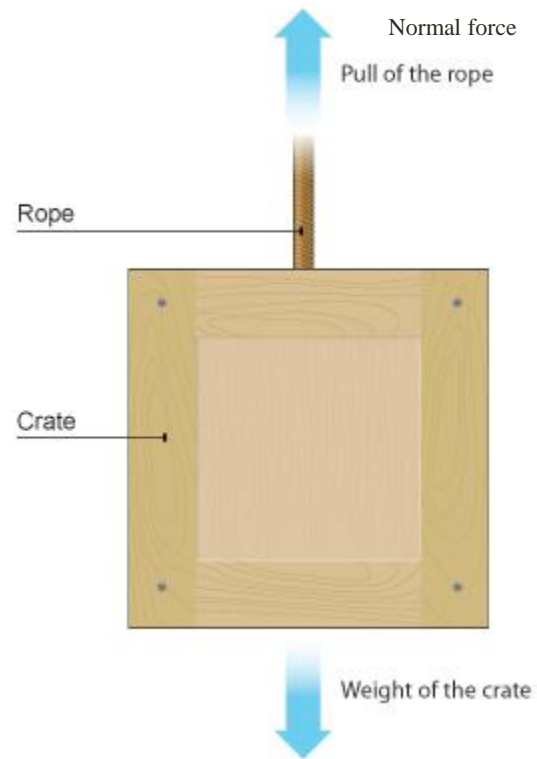
# Balanced Forces = no change in motion



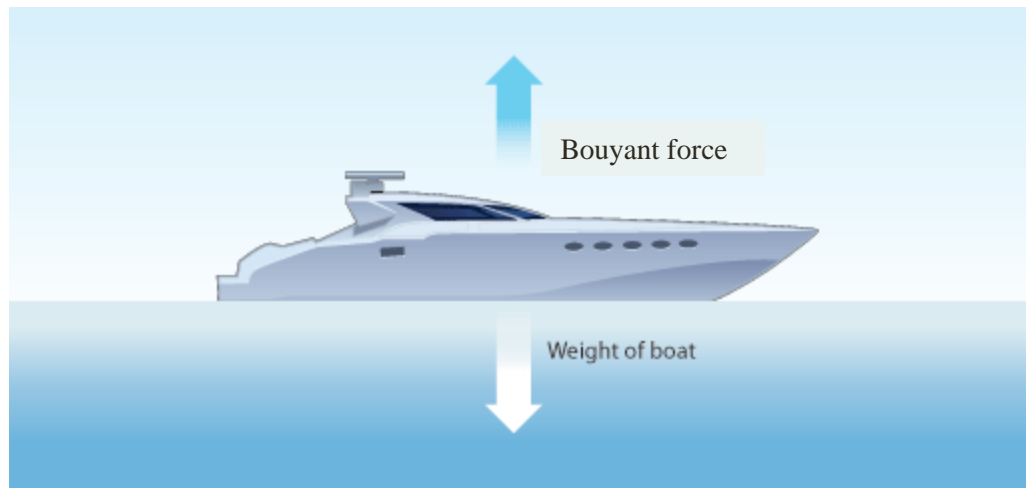
Examples of Force Drawings

[http://www.bbc.co.uk/schools/ks3bitesize/science/energy\\_electricity\\_forces/forces/revis\\_e5.shtml](http://www.bbc.co.uk/schools/ks3bitesize/science/energy_electricity_forces/forces/revis_e5.shtml)

# Hanging Objects

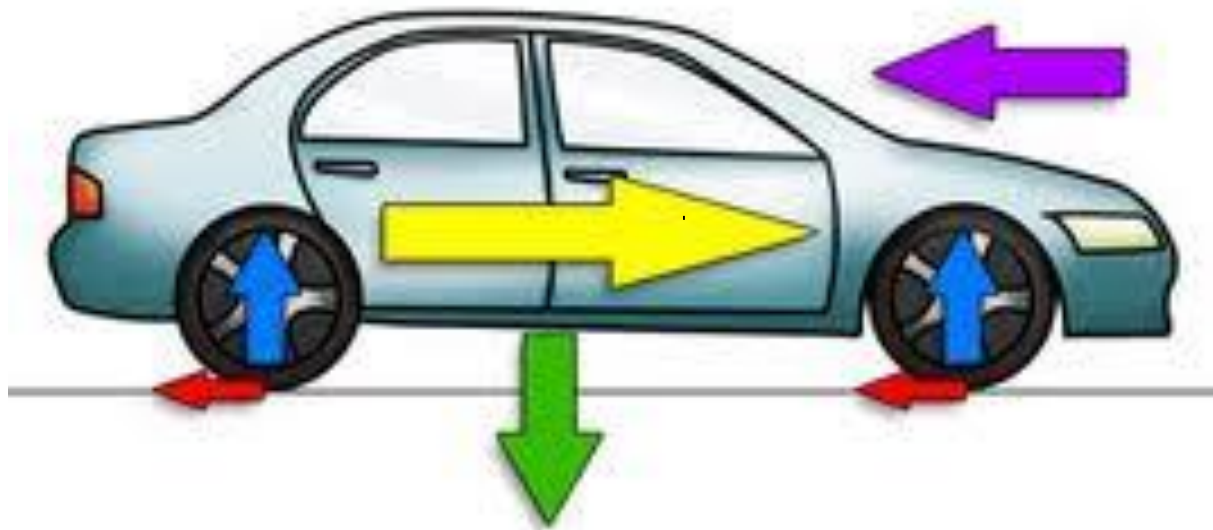




# Floating Objects



- Floating blocks/boat demo

# Objects moving at constant speed in a straight line



 weight  
 reaction force  
also called  
normal force

 driving force  
 friction  
 air resistance

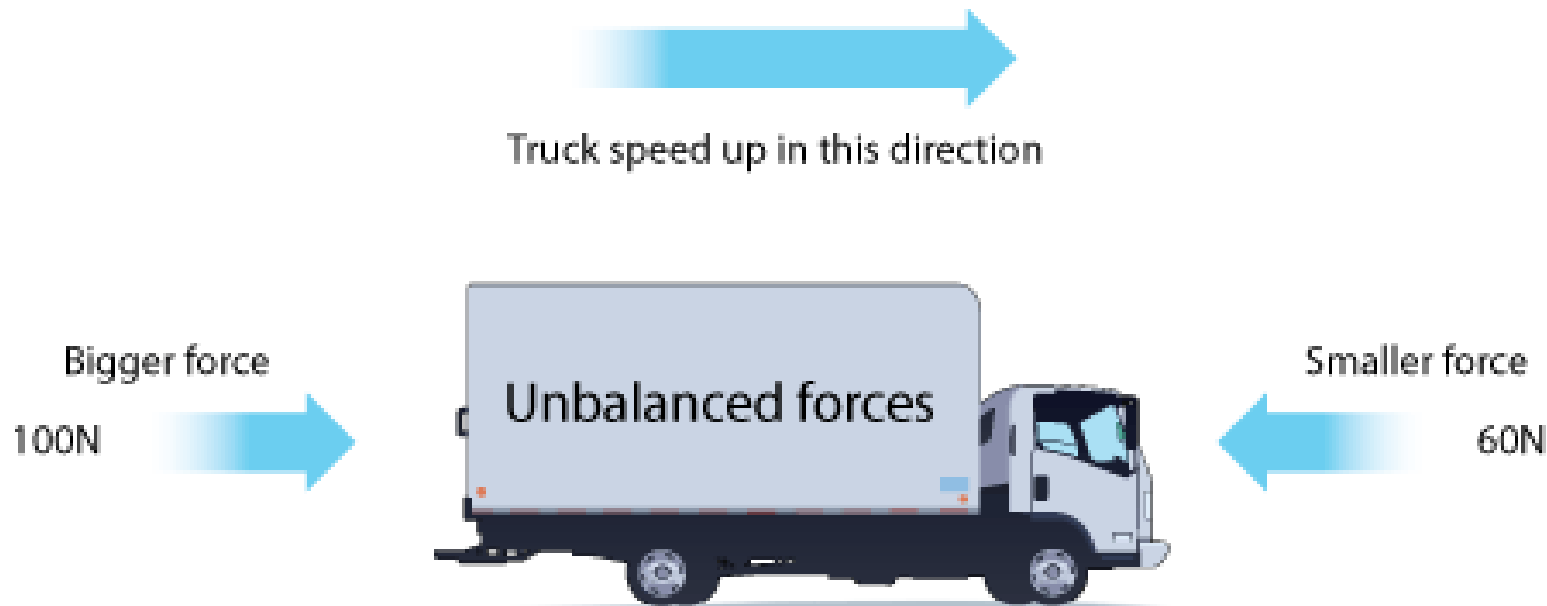
toy car demo

# Review of Unbalanced Forces

When two forces acting on an object are not equal in size, we say that they are **unbalanced** forces.

If the forces on an object are **unbalanced** this is what happens:

- an object that is not moving starts to move
- an object that is moving changes speed or direction





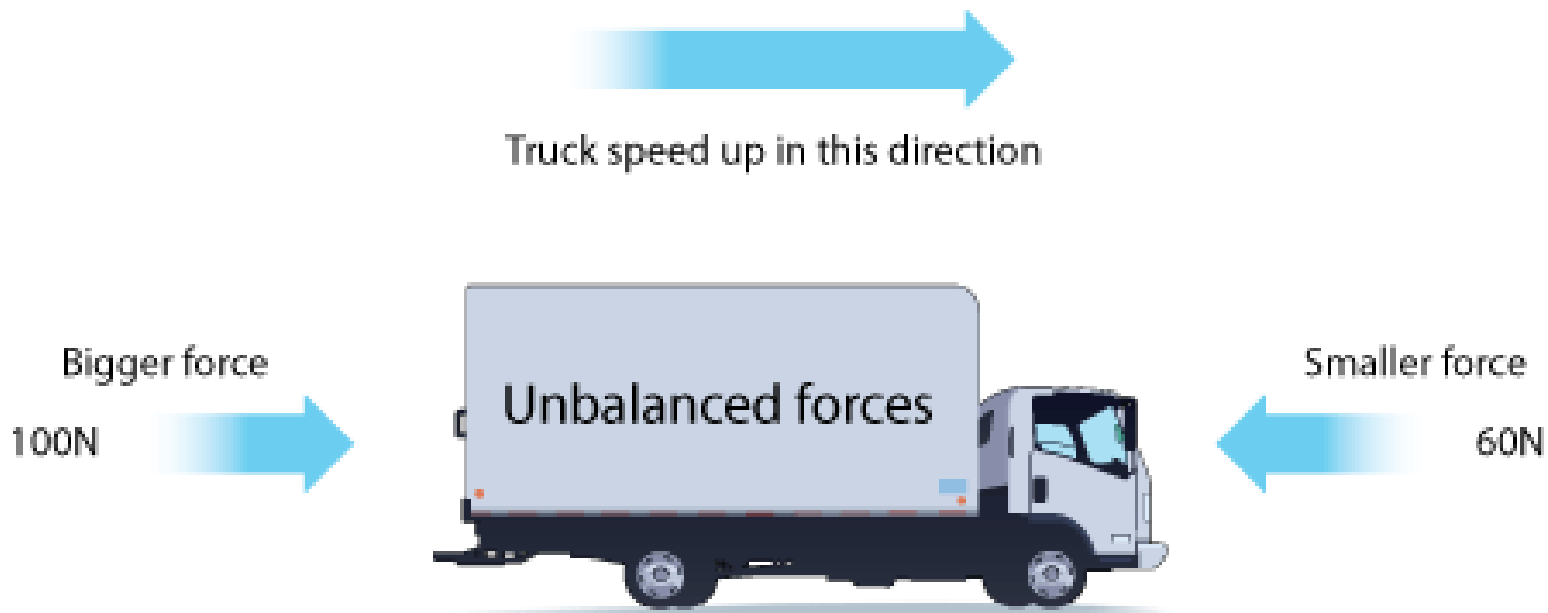
# UNBALANCED FORCE= change in speed or direction

UNBALANCED FORCES DO **NOT**  
CANCEL EACH OTHER OUT...

AND **DO** CAUSE A CHANGE IN  
MOTION, SPEED AND/ OR DIRECTION.

Ball and string demo

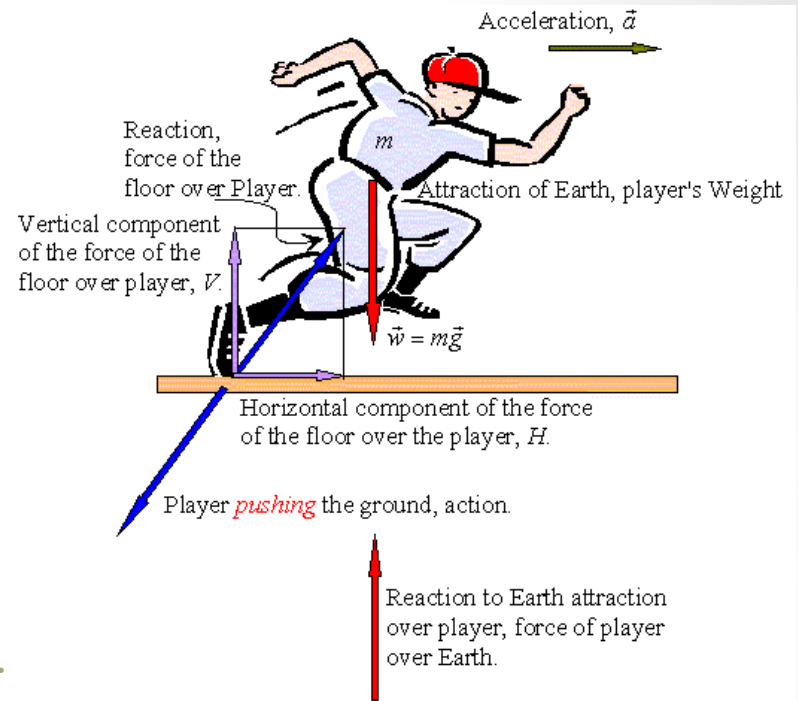
# Review of Resultant Forces



The size of the overall force acting on an object is called the **resultant force**. If the forces are balanced, this is zero. In the example above, the resultant force is the difference between the two forces, which is  $100 - 60 = 40$  N.

# Examples of Free Body Diagrams

- <http://www.racemath.info/forcesandpressure/resultants.htm>
- [http://www.bbc.co.uk/schools/ks3bitesize/science/energy\\_electricity\\_forces/forces/revise3.shtml](http://www.bbc.co.uk/schools/ks3bitesize/science/energy_electricity_forces/forces/revise3.shtml)



- [bbc.co.uk](http://bbc.co.uk)

