

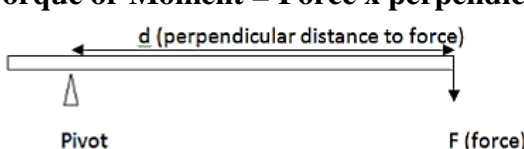
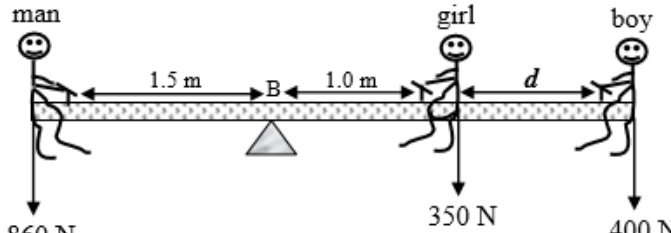
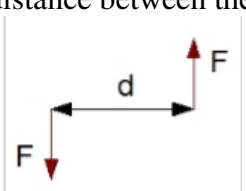
SUVA SANGAM COLLEGE

YEAR 12

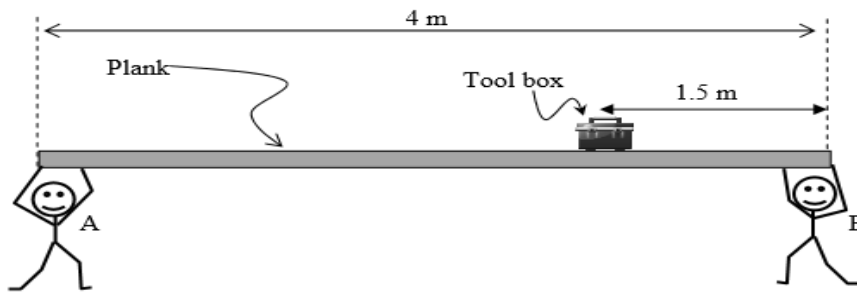
PHYSICS

WORKSHEET 9

STRAND 1 MECHANICS

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| NO. | <p>CONCEPT IN BRIEF: MOMENTS</p> <p>Torque or Moment refers to the turning effect of force and is measured by the product of the force and the perpendicular distance of the force from the turning point.</p> <p>Torque or Moment = Force x perpendicular distance</p>  |
| 1 | <p>The diagram below shows a man weighing 860N sitting on a see-saw 1.5m from its point of balance. He is balanced by a boy and a girl sitting on the other side. The girl, who weighs 350N, is 1.0m from the pivot and the boy of weight 400N is behind the girl.</p>  <p>What distance, d, behind the girl should the boy sit in order to balance the see-saw? (Assume see-saw beam is of negligible mass)</p> |
| | <p>CONCEPT IN BRIEF: MOMENTS</p> <p>Couple</p> <ul style="list-style-type: none">- Is equal but opposite forces acting a distance apart.- Causes rotation only- Moment of the couple about any point is Force x distance i.e. one of the force by the perpendicular distance between the two force.  <p>1.5.10 Equilibrium</p> <ul style="list-style-type: none">- Equilibrium occurs when an object is at rest or moving uniformly, as describe in Newton First Law.- An object is describe as being in equilibrium when both the resulted force is zero and the sum of all the torque acting on the object is zero. |

2 Two carpenter A and B are carrying a 5kg plank of uniform weight as shown below. A tool box of mass 10kg is placed 1.5m from one end as shown.



If the two carpenters are of the same height, find the force each carpenter supports to enable them to keep the plank balanced so that the tool box doesn't fall off.

CONCEPT IN BRIEF: MOMENTS

EQUILIBRIUM

1. The resultant force acting on the object is zero; i.e. the vector sum of the force acting is zero.

$$\sum F = 0, F_x = 0$$

$$F_y = 0$$

The acceleration is zero so the object will either be stationary or have a uniform motion.

2. The sum of all the torque acting on the object is zero.

$$\sum \text{Torque} = 0$$

As the result, the object will not twist or rotate. Clockwise moment equal Anticlockwise moment about any point on the object.

3 The diagram below shows a uniform metal tube of length 5m and weight 90N suspended horizontally by two vertical wires attached at 0.5m and 1.5m respectively from the ends of the tube.

- (i) If one of the conditions of equilibrium is “the sum of all torque around a point is equal to zero,” what is the other condition of equilibrium?
- (ii) Find the tension in the wire, T_1 if the beam is in a state of equilibrium.

