Forces – PHYSICS ONLY

Moments

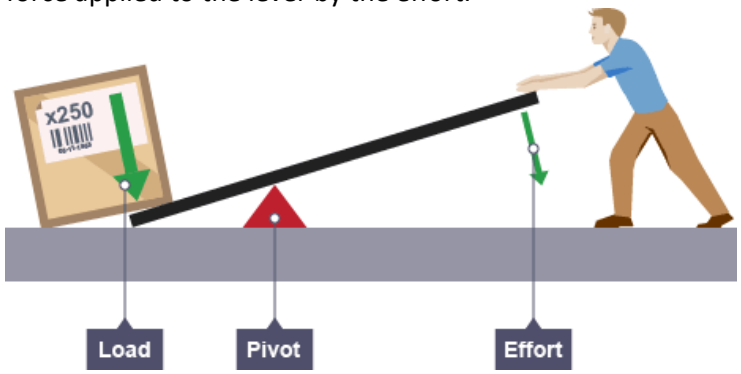
1. The moment of a force is the **turning effect** of the force on an object.
2. The moment of a force about a pivot is **M = Fd**.

Moment (Nm) — Force (N) — Distance from the line of action of the force to the pivot (m)

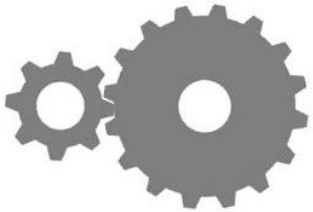
3. To increase the moment of a force, increase F or increase d.

Levers and Gears

4. A lever is used as a **force multiplier** – to exert a greater force than the force applied to the lever by the effort.



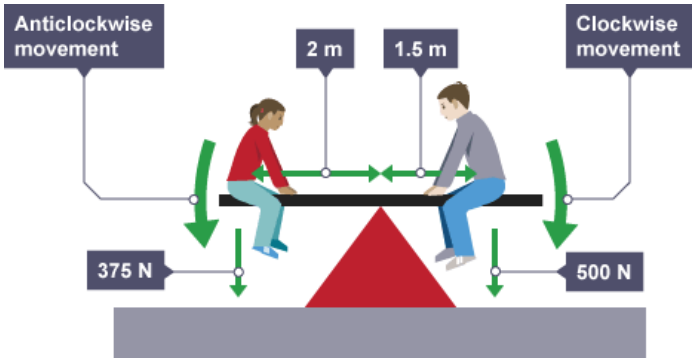
5.
6. The pivot of a force multiplier is nearer to the line of action of the force it exerts than to the force applied to it.
7. Gears are used to change the moment of a turning effect.
8. To increase the moment of a turning effect, a small gear wheel needs to drive a larger gear wheel.



Moments and Equilibrium

9. If an object at rest doesn't turn, the sum of the anticlockwise moments about any point = the sum of the clockwise moments about that point. This is the **principle of moments**.
10. All the forces acting on an object that don't pass through a **fixed point** (pivot) can turn an object about that point.
11. The direction of the force and the position of the fixed point determines whether the moment acts clockwise or anticlockwise.
12. To calculate the force needed to stop an object we use the equation:

$$W_1 d_1 = W_2 d_2$$



13. E.g. 2 x 375 = 1.5 x 500