

A

**Turning effect of force**

# Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ ( ) Class: \_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_

**1. Recap!!!**

Hinge

Pivot

Force A

-A smaller force is needed if applied nearer to hinge

Force B

-A larger force is needed if applied further from hinge

**2. Moment of Force**

* **Definition**

The **moment of a force (torque)** is the product of the force and the perpendicular distance from the pivot to the line of action of the force.

* Moment of Force= FxD where

F is the force and

D is the perpendicular distance from the pivot

* **Examples**

C- 10cm

Weight Z= 5N

Perpendicular distance of C = 10cm= 0.1m

Moment of Weight Z about the pivot(A)

= Z x C

= 5N (Weight) x C (Distance)

=5x0.1

=0.5N m

The force needed to lift the weight Z is 0.5N m.

**3. Equilibrium**

d

d

Mg

How did the objects balance?

The force acting on the two objects would be the same, right?

* Remember, Moment of Force can move anti-clockwise or clockwise.

So,

d

d

Sg

Mg

Mg= Mass x gravitational force

Sg= Total standard masses x gravitational force

* Anti-clockwise moment= Mg x d

Clockwise moment= Sg x d

* Since they are equal:

Mg x d= Sg x d

M= S

In simpler words,

The above equation derived us why the beam is balanced.

**4. Principle of Moments**

What happens if the distance of your 2 objects is different away from the pivot?

Can we still calculate the force exerted?

OF COURSE!!!!!!!! We would then use the principle of moments.

* From the equation below:

Mg x d= Sg x d

* We know that the clockwise moment of force is the same as the anti-clockwise moment of force in an equilibrium
* Let’s do an experiment to prove it!

W2- 0.4N

W1- 0.5N

d2

d1