15.1: FORCES AND MATTER: SOLIDS

Elastic Potential Energy

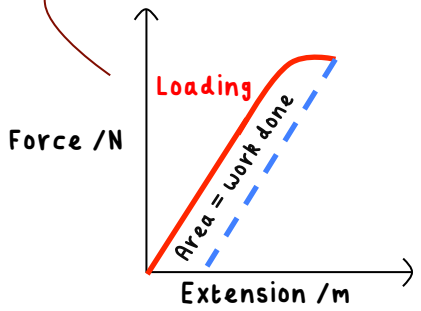
- Work done in stretching elastic objects
- Energy Stored as elastic PE
- $E = \frac{1}{2} k x^2$

Elastic Deformation

- Object returns to original shape when deforming forces removed

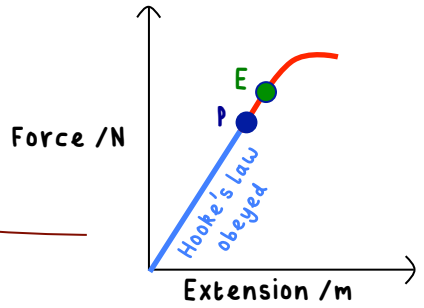
Plastic Deformation

- Compressing, stretching or bending always requires multiple forces
- Object does not return to original shape when deforming shape removed



Hooke's Law

- Extension is directly proportional to force applied, up to the limit of proportionality
- The point beyond which plastic deformation occurs
- Limit of proportionality
- $F = k x$
- Spring Constant
- Gradient = Spring Constant
- Measured in Nm^{-1}



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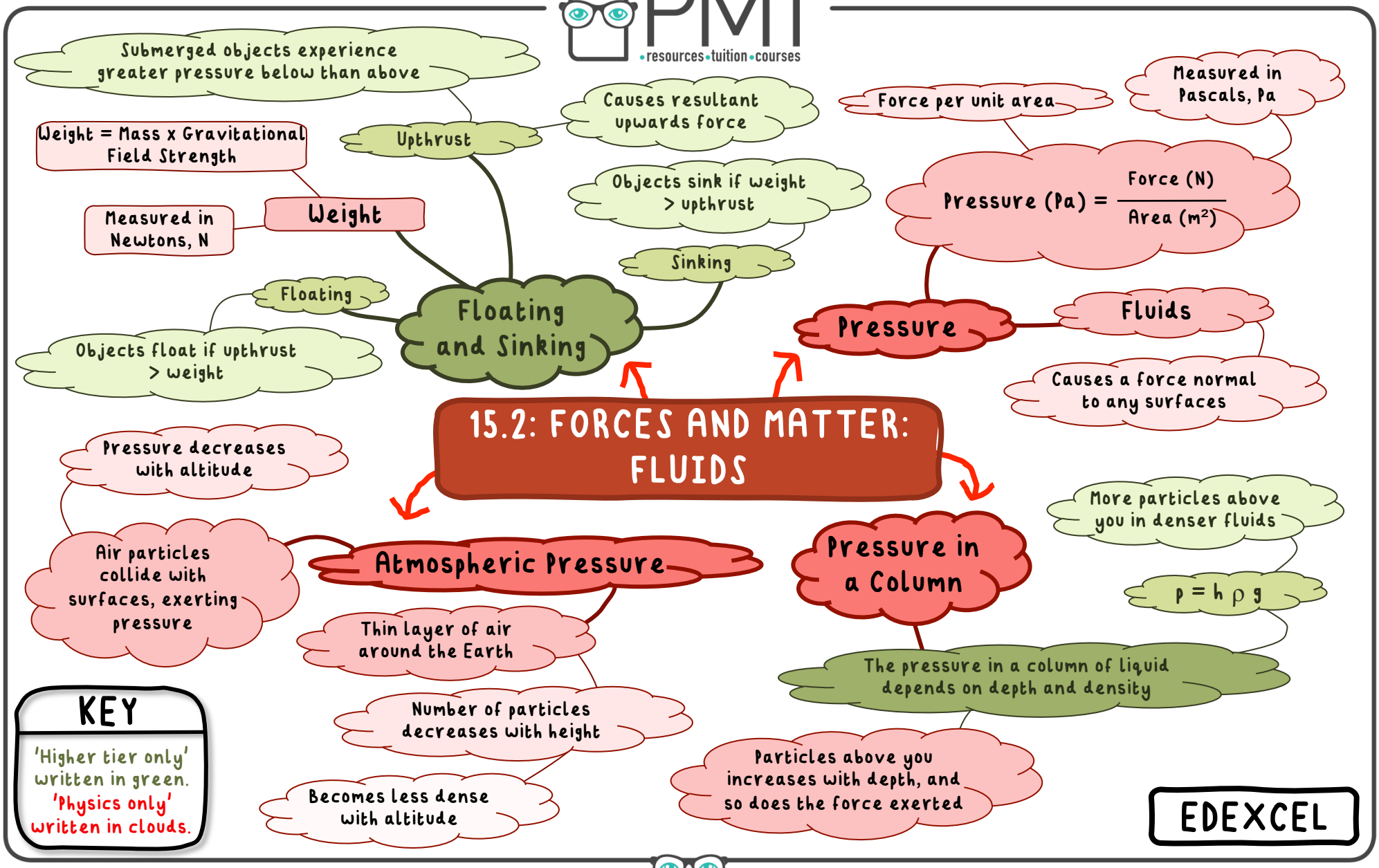
PMT
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15.2: FORCES AND MATTER: FLUIDS
Floating and Sinking
Upthrust
Submerged objects experience greater pressure below than above
Causes resultant upwards force
Weight = Mass x Gravitational Field Strength
Weight
Measured in Newtons, N
Objects sink if weight > upthrust
Sinking
Floating
Objects float if upthrust > weight
Pressure
Force per unit area
Measured in Pascals, Pa
Pressure (Pa) = Force (N) / Area (m²)
Fluids
Causes a force normal to any surfaces
Atmospheric Pressure
Pressure decreases with altitude
Air particles collide with surfaces, exerting pressure
Thin layer of air around the Earth
Number of particles decreases with height
Becomes less dense with altitude
Pressure in a Column
More particles above you in denser fluids
p = h ρ g
The pressure in a column of liquid depends on depth and density
Particles above you increases with depth, and so does the force exerted
KEY
'Higher tier only' written in green.
'Physics only' written in clouds.
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