## Laws/Definitions/Equations

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|---|---|
| Hookes Law | force and extension are directly proportional under constant physical conditions |
| F | kx (where k is spring constant and x is extension) |
| elastic potential | 1/2 Fx = $1/2kx^2$ |

for a force-extension graph:
area under graph > energy
gradient > spring constant

## springs

| | | |
|---|---|---|
| for two springs in | k | extension |
| series | halved | extends more |
| parallel | doubled | extends less |

## Young modulus

every material has its own young modulus.
Ym = stress / strain
$\Delta L \propto 1/A \propto 1/d^2$
an object that has reached limit of proportionality will still return to its original state. only the force/extension will not be proportional
an object that has reached the limit of elasticity will not return to its original shape
ductile: large plastic region
brittle: high energy, no plastic region
ultimate tensile stress: maximum stress it can withstand before breaking
= maximum load / original area
Force/stress - extension/strain graphs:
(f-x and s-s graphs)
-the gradient is the energy (more g more e)
- the loading curve for example, is a straight line up to the limit of proportionality.
- after this point the unloading curve is underneath this
- the enclosed area created is the energy lost as heat during the processes