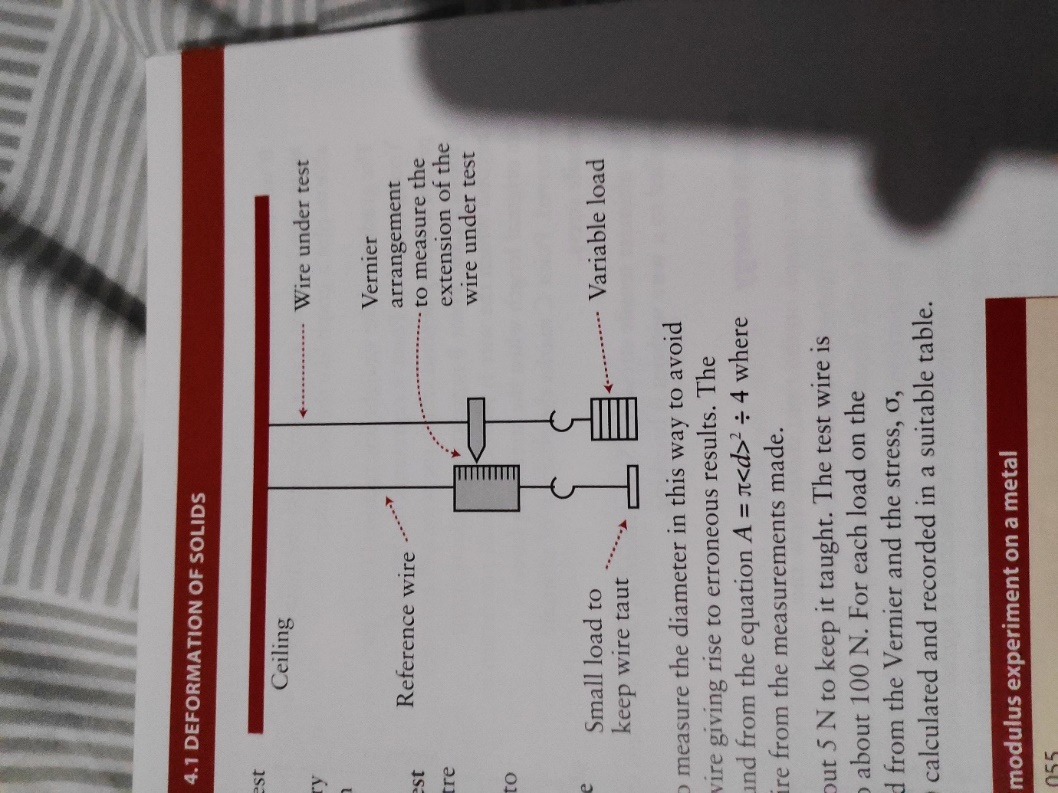
**Hooke’s Law:** F directly proportional to x produced provided proportional limit not exceeded, F=-kx

F is restoring force

**Elastic Limit:** max load specimen can experience and return to original length when deforming F removed. **Elastic Deformation,** after this is **Plastic Deformation**

**UTS**: max stress applied to wire without breaking/fracturing

**Elastic Strain Energy**: Es = (work done in stretching material held as Ep)

**Strain gauge** to measure crack width in walls

measure unstretched L. Measure x for range of F, L with metre rule clamped to pointer, x with ruler, d of wire at several places with micrometre gauge and avg, wear goggles as wire could break under tension

**Combined spring constant: Series**: //F is same for all springs. **Parrallel**: //x is the same for all springs

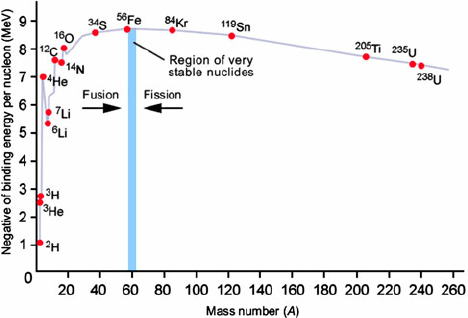
Reduction in m when E released. **Binding E\***: E that must be supplied to separate nucleus to an infinite distance. **Mass Defect**: difference between total no. constituent nucleons that make up nucleus & mass of nucleus when nucleons are combined.. **Fission**: massive nucleus divides into two less massive nuclei. Avg binding E of fragments > original. Due to >E, some mass of original nucleus converted to Ek of fragments. Release of E via fission only with heavier nuclei. **Fusion:** joining of 2 smaller nuclei to produce heavier more stable nucleus. Release of E since avg binding E of products>original. Due to >E, some mass of original nucleus converted to Ek of products. Mass heavier nucleus < combined mass of lighter nuclei. E release via fusion only with lighter nuclei. No fusion at room temp due to repulsive electric force between +ve charged nuclei. Only when speed of colliding nuclei is great enough to overcome repulsion and enter range of strong nuclear F is fusion triggered. 15 million °C for H nuclei. **Exam Technique:** work out Δm in u, convert to kg, multiply by to get E in J, convert to MeV by dividing by , Binding E per nucleon = E/no. nucleons **Fusion v Fission:** more than 3 times as much E released per nucleon in fusion than fission. Fusion has no long-lived radioactive waste products. Almost unlimited supply of fuel for fusion.

Figure 1- note that graph doesn't go over 9 MeV, peak at A=60 and downslope doesn't go below 6MeV

\* E required to split nucleus into component nucleons

Nuclei to left of peak undergo fusion to move up curve – fusion of light nuclei to heavier nucleus

Nuclei to right of peak undergo fission to move up curve – fission of heavy nucleus to lighter nuclei

Nucleons w/ > BE/n more stable as it takes more E to disintegrate them

How . used for nuclear reactions: m\_nuclei b4 reaction > m\_nuclei after reaction, therefore linked to E

Why heat generated in fission: Ek of fragments

How melting control rods leads to uncontrollable reaction: amount U > critical value, no control over neutrons

Why could U 🡪 Ba + Kr + 2n + Q occur spontaneously? Daughter products are further up BE/n curve & are more stable than U