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# TOPIC 5: RADIOACTIVE MATERIALS: NUCLEAR ENERGY

## Fusion In the sun (or other stars)

Total mass of reactants > mass of product

Some mass is converted and released as energy

When two small nuclei fuse together to form a heavier nucleus

Not yet used on Earth to produce energy, as it always uses more energy than it gives out

## Fission

Splitting of an unstable nucleus into smaller nuclei

Usually started by a nucleus absorbing a neutron

Energy is also released as the kinetic energy of the products

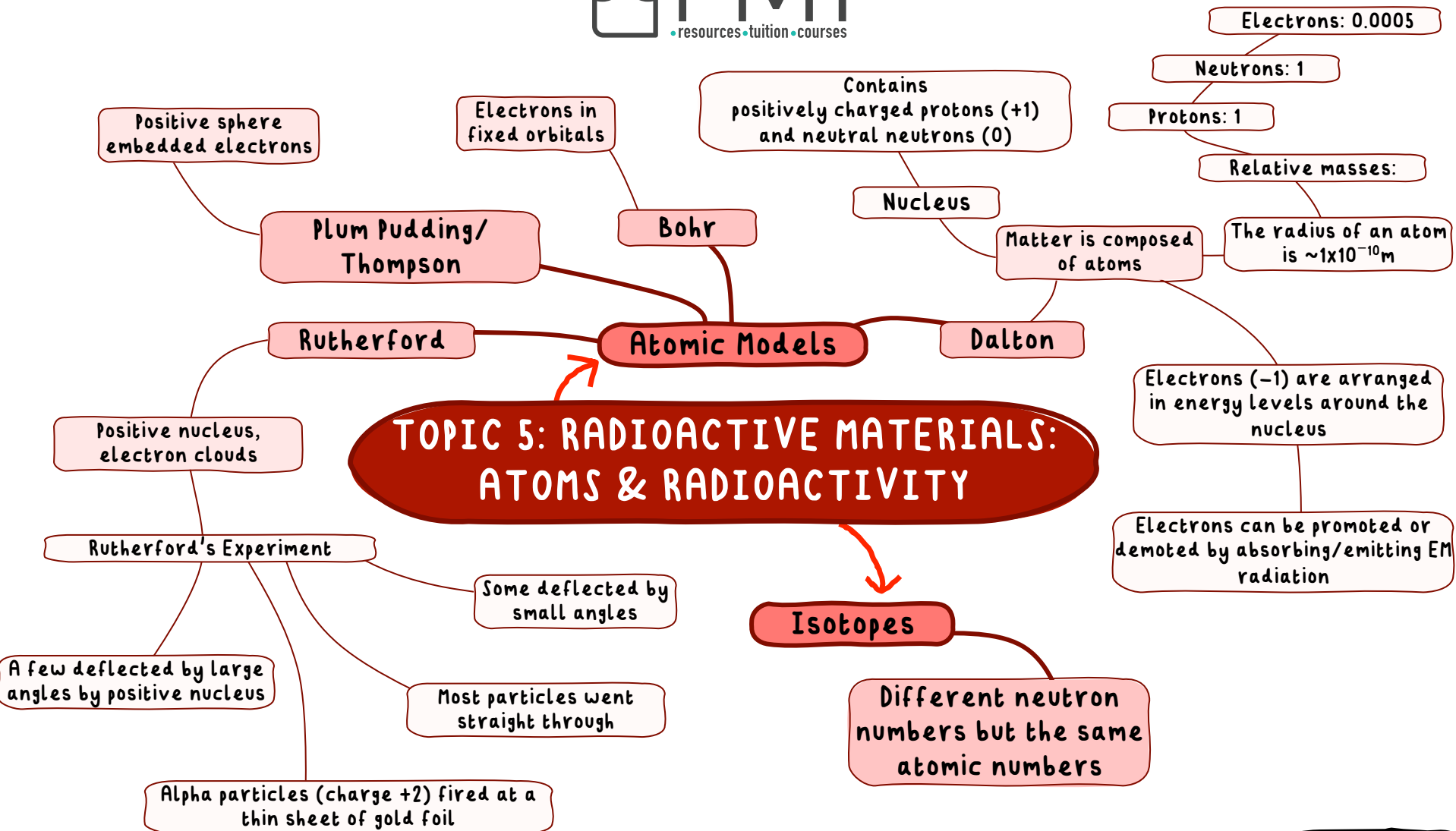
Produces 2 small nuclei, neutrons and gamma radiation

Chain reaction

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# TOPIC 5: RADIOACTIVE MATERIALS: ATOMS & RADIOACTIVITY

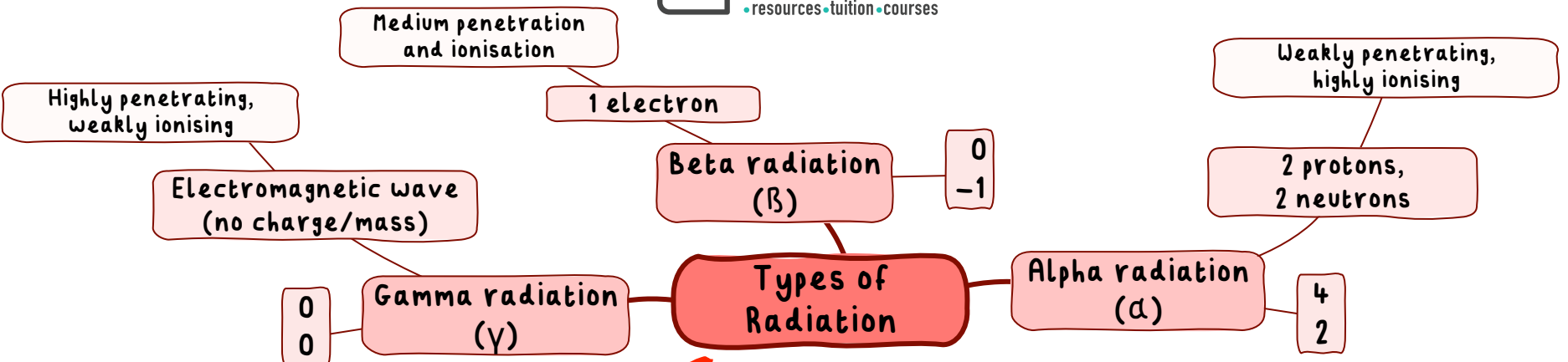


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# TOPIC 5: RADIOACTIVE MATERIALS: ATOMS & RADIOACTIVITY

## Types of Radiation



## Radioactivity (random process)

When a nucleus gives off radiation to become more stable

## Activity

The number of decays per second

Activity/count rate can be measured using a Geiger-Muller Tube

Half life is the time taken for the count rate to halve

Net decline  
= initial number - (initial number × (1/2)<sup>n</sup>)

## Conclusions:

Most of an atom is empty space

The positively charged nucleus occupies a very small volume

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