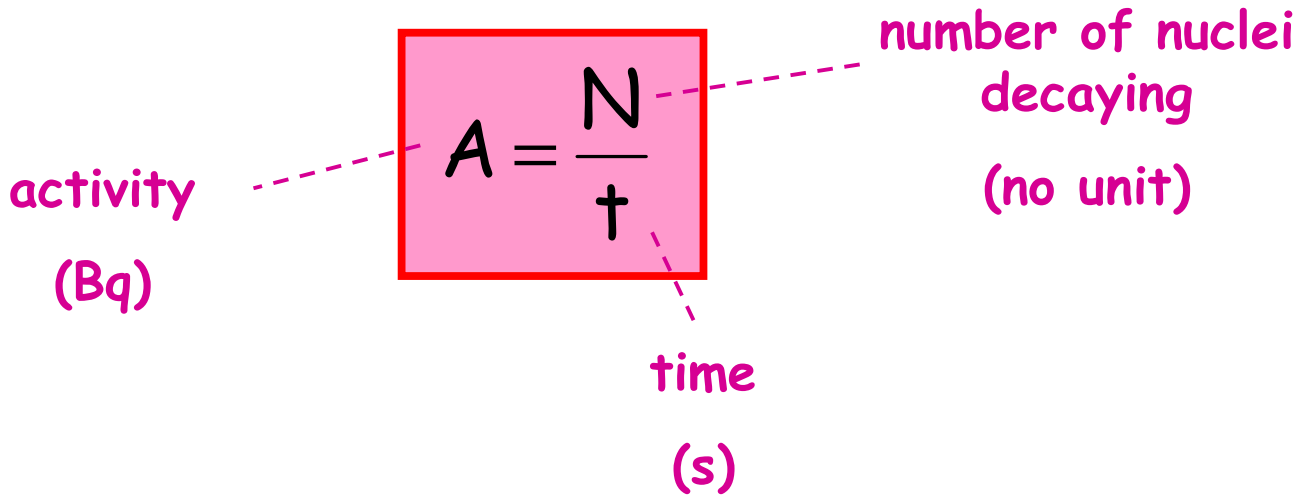
Activity of Radiation

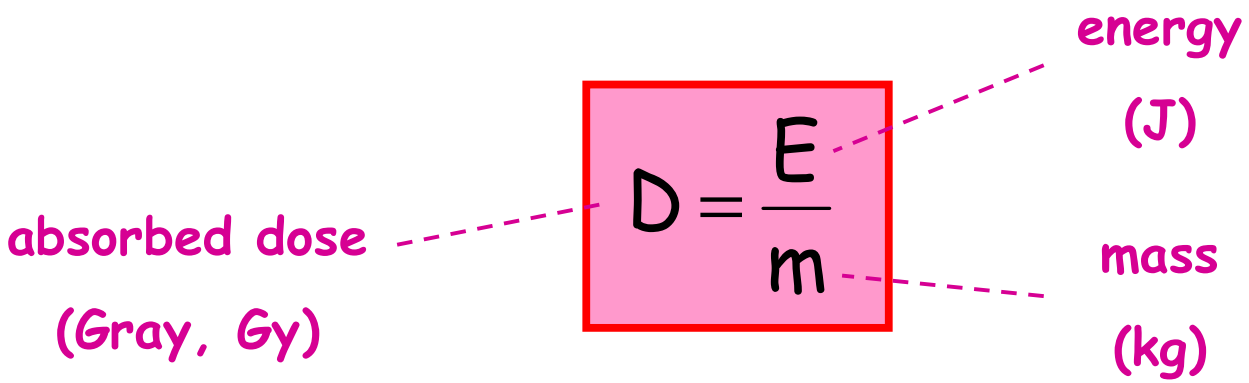
The activity of a radioactive source is the average number of nuclei decaying per unit time.



1 becquerel (Bq) = 1 decay per second

Absorbed Dose

When tissue is exposed to radiation, the **absorbed dose** is the **energy absorbed** per unit **mass** of tissue.



1 gray (Gy) = 1 joule per kilogram

The risk of biological **harm** to tissue depends on

- absorbed **dose**
- **type** of radiation
- body organ / **tissue** exposed.

Weighting Factor

The radiation weighting factor (W_R) is a measure of the biological effect of the radiation.

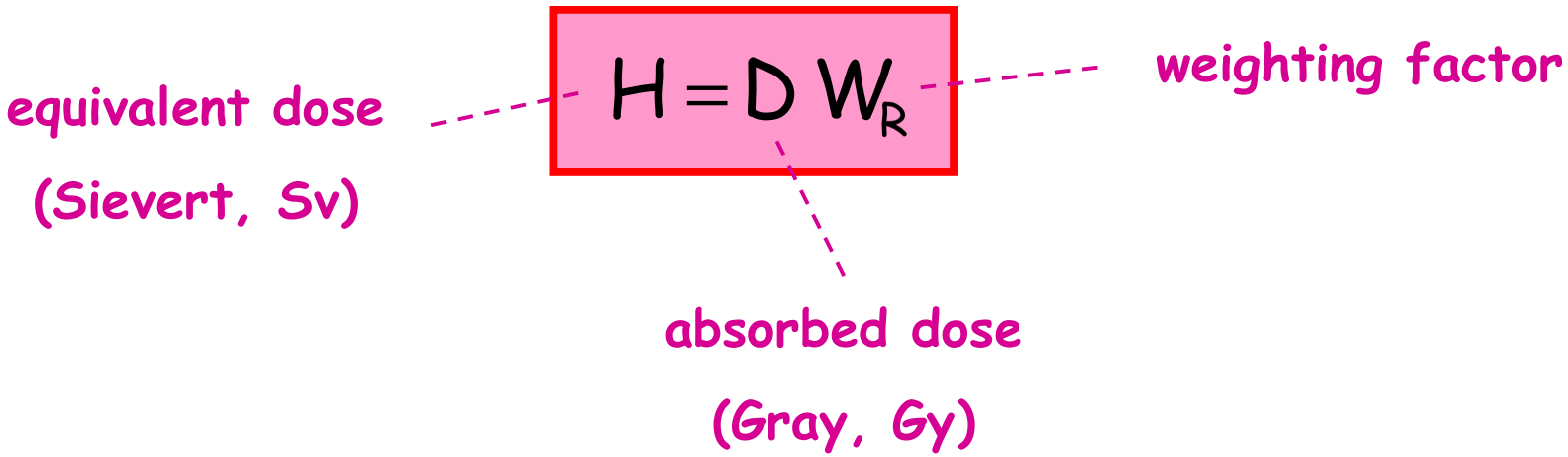
Radiation	Weighting Factor
α particle	20
fast neutrons	10
gamma rays	1

Weighting factor has **no unit**.

Equivalent Dose

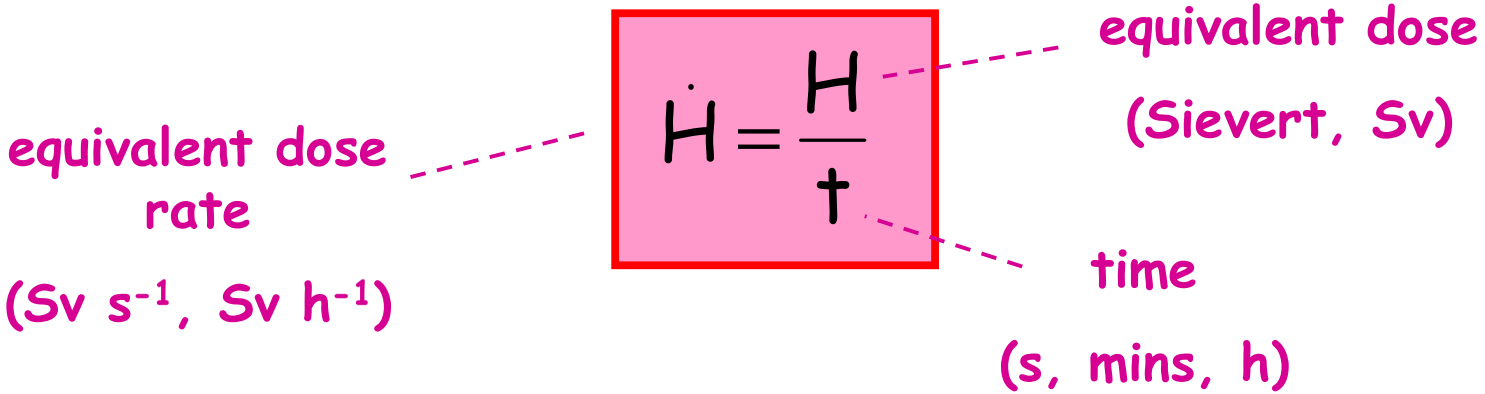
The **equivalent dose** is a measure of the **biological damage** caused by radiation on living tissue.

Equivalent dose is the **product** of **absorbed dose** and radiation **weighting factor**.



Equivalent Dose Rate

Equivalent dose rate is the dose per unit time.



Background Radiation

Every day we are exposed to small amounts of radiation known as background radiation.

The average annual effective dose for people in the UK is 2 mSv.

Background Radiation	Effective Dose
Cosmic rays from space.	0.3 mSv
Radioactivity from rocks & soil	0.3 mSv
Radioactivity from human body	0.4 mSv
Inhaled radon gas	1.0 mSv

Exposure Limits

For the **general public**, the limit is **5 mSv** per year in addition to background radiation.

Workers who are exposed to **radiation** during their employment, the limit is **50 mSv** per year in addition to background radiation.

Reducing Exposure

The **equivalent dose rate** from a radioactive source is **reduced** by

- **shielding** (placing an absorber in the path of radiation)
- **increasing distance** from the source.

The **reduction** in equivalent dose rate **depends** on the **material** and **thickness** of absorber used.