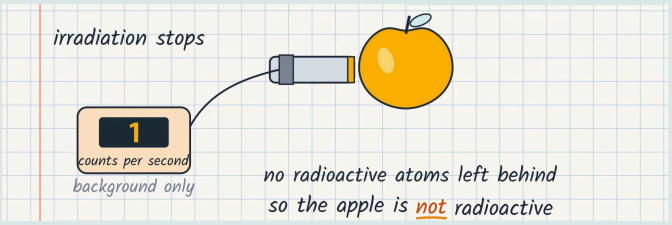
Radiation hazards

contamination and irradiation

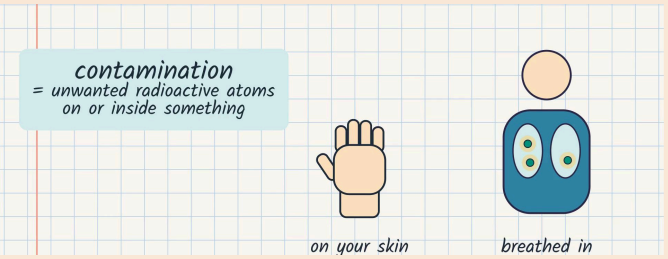
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Summary sheet

1 Irradiation



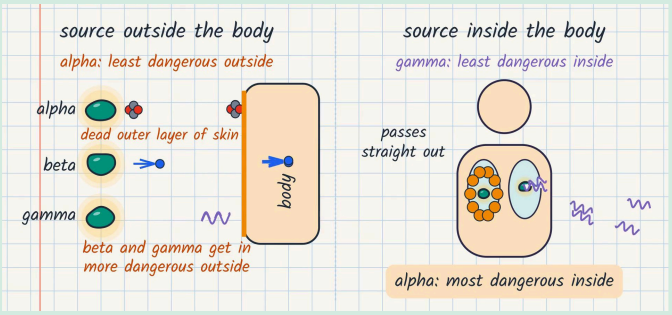
- **Irradiation** = being exposed to radiation (the arrows from a source). The object does **not** become radioactive: no radioactive atoms are left behind.
- Move the source away and the irradiation stops; a detector on the object reads only **background**.

2 Contamination



- **Contamination** = unwanted radioactive atoms on or inside something (as dust or in water: on the skin, or breathed in).
- Harder to deal with: the atoms go wherever you go and **keep decaying**, giving out radiation, until they are removed or have decayed away.

3 Which is more dangerous?



- **Outside the body**: alpha is the least dangerous (stopped by air and the dead outer layer of skin); **beta and gamma** can get in, so they are the main hazards.
- **Inside the body**: **alpha** is the most dangerous (all its radiation is absorbed by nearby cells, and it is strongly ionising); gamma is the least (most passes straight out, weakly ionising).

4 Staying safe



- **Distance** (long tongs), **shielding** (lead) and short **time** near the source **reduce** irradiation; they never stop it completely.
- Prevent contamination with gloves, protective clothing, masks and **sealed** sources stored safely. Radiation studies are published and checked by other scientists: **peer review**.

Exam tip

Use the right words: "distance reduces the irradiation", not "distance stops irradiation". Radiation is the arrows; radioactive material is the pebble.

Check yourself

- 1 Food is irradiated with gamma rays. Is it now radioactive?
- 2 Why is an alpha source most dangerous inside the body?

Answers: 1. No: irradiation doesn't make an object radioactive 2. All its radiation is absorbed by nearby cells, and alpha is strongly ionising