Irradiation and Contamination

Ionising radiations

- Radioactive materials are hazardous. Nuclear radiation can ionize chemicals within a body, which changes the way the cells behave.
- It can also deposit large amounts of energy into the body, which can damage or destroy cells completely. Ultraviolet, x-rays, alpha, beta and gamma radiations are all examples of ionising radiations. Molecules in cells can be altered as well as the DNA.
- Here is some diseases which is due to dangerous radiation.

Eyes	High doses can cause cataracts.
Thyroid	Radioactive iodine can build up and cause cancer, particularly during growth.
Lungs	Breathing in radioisotopes can damage DNA.
Stomach	Radioactive isotopes can sit in the stomach and irradiate for a long time.
Reproductive organs	High doses can cause sterility or mutations.
Skin	Radiation can burn skin or cause cancer.
Bone marrow	Radiation can cause leukaemia and other diseases of the blood.

Irradiation

- **Definition:** Exposure to radiation called irradiation
- **Objects can become irradiated.** When we expose an object to nuclear radiation, it can become irradiated. This simply means that if there is a radioactive source, any objects exposed to it will be called **'irradiated'**.

- **Irradiation does not always lead to radioactivity.** Even if an object becomes 'irradiated', it does not become radioactive.
- Reducing irradiation: By keeping sources in lead lined boxes, standing behind barriers or using remote controlled arms when working with radioactive source

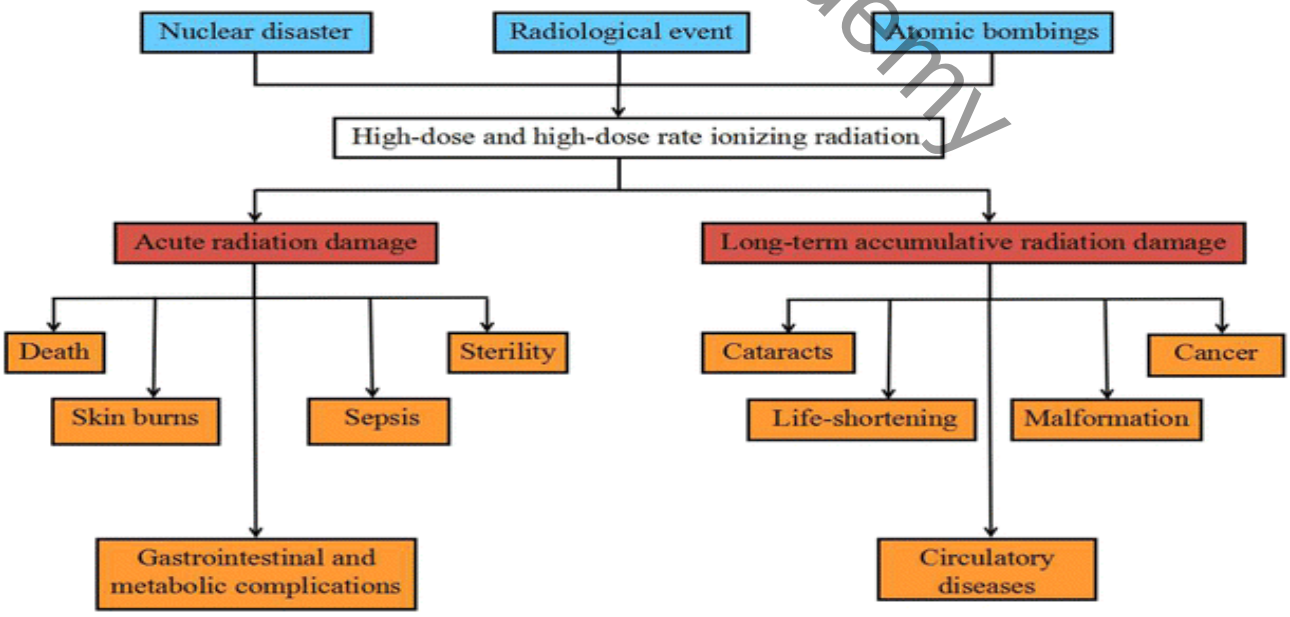
Contamination

- **Definition of contamination of radiation:** radioactive contamination occur when radioactive material is deposited on or in an object.
- **Contamination is unwanted radiation.** Unwanted radiation is called **radioactive contamination**. When radioactive particles come into contact with different objects, they might contaminate those objects, making them radioactive as well. This can potentially be **hazardous**.
- **The type of radiation affects hazard levels.** We know that there are various forms of radiation and each of types carries its own hazards.

a) Alpha radiation tends to contaminate a small area, san alpha source can be dangerous if it gets inside the body.

b) Beta source are less dangerous inside the body, some passes out of the body altogether! Some are absorbed over a wider area.

c) Gamma source are also less dangerous, as they pass straight and have a low ionising power.



Difference between Irradiation and Contamination

	Irradiation	Contamination
Description	Object is exposed to radiation but does not become radioactive	Object becomes radioactive and emits radiation
Source	Danger is from radiation emitted outside the object	Danger from radiation emitted within the object
Prevention	Prevented by using shielding, such as lead clothing	Prevented by safe handling of sources and airtight safety clothing
Causes	Caused by the presence of radioactive sources outside the body	Caused by inhalation or ingestion of radioactive sources