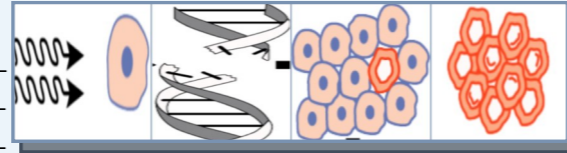


Name: \_\_\_\_\_ Class: \_\_\_\_\_

# Additional Science Homework

**6.9 Demonstrate an understanding of the dangers of ionising radiation in terms of tissue damage and possible mutations and relate this to the precautions needed**

Explain how cancer is caused by ionising radiation: \_\_\_\_\_



State and explain the precautions put in place by professionals who work with ionising radiation: \_\_\_\_\_

**6.10 Describe how scientists have changed their ideas of radioactivity over time, including the awareness of the hazards associated with radioactive sources and why the scientific ideas change over time**

Compare how Marie Curie handled radioactive materials with how modern scientists handle radioactive materials.

Marie Curie	Modern Scientists

Explain why Marie Curie handled radioactive material so differently to the way modern scientists do: \_\_\_\_\_

State what Marie Curie died of and explain how this may be relevant: \_\_\_\_\_

**6.11 Discuss the long-term possibilities for storage and disposal of nuclear waste**

Method of disposal	Advantages	Disadvantages

**6.12 Evaluate the advantages and disadvantages of nuclear power for generating electricity, including the lack of carbon dioxide emissions, risks, public perception, waste disposal and safety issues**

Arguments for building Nuclear rather than Coal power stations: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Arguments for building Coal rather than Nuclear power stations: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Conclusion: \_\_\_\_\_

\_\_\_\_\_

## P2 Physics for your future

### Topic 6: Advantages and disadvantages of using radioactive materials

**6.1 Explain what is meant by background radiation, including how regional variations within the UK are caused in particular by radon gas**

**6.2 Recall the origins of background radiation from Earth and space**

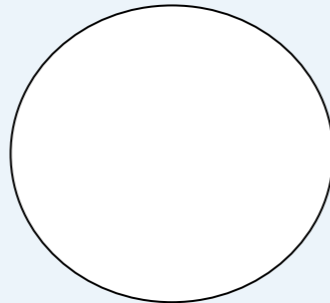
Name a region of the UK where planning laws require extra ventilation in buildings due to the release of radon gas from the ground: \_\_\_\_\_

State the name of the rock which releases radon gas: \_\_\_\_\_

State the sources of background radiation then draw a pie chart (including a key) to show the proportion of background radiation which comes from each source.

Sources of background radiation

**Background radiation**

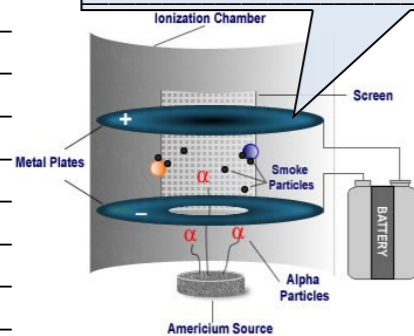


**6.3 Describe uses of radioactivity, including: household fire (smoke) alarms, irradiating food, sterilisation of equipment, tracing and gauging thicknesses, diagnosis and treatment of cancer**

Describe the process for each of these situations:

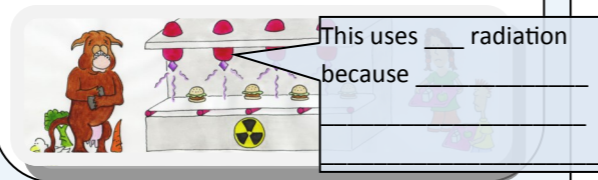
**Smoke alarms**

This uses \_\_\_ radiation because \_\_\_\_\_



**Irradiation of food**

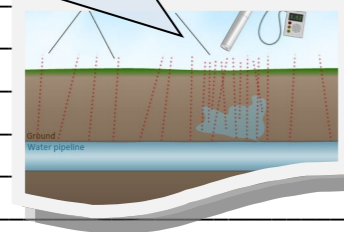
This uses \_\_\_ radiation because \_\_\_\_\_



This uses \_\_\_ radiation because \_\_\_\_\_

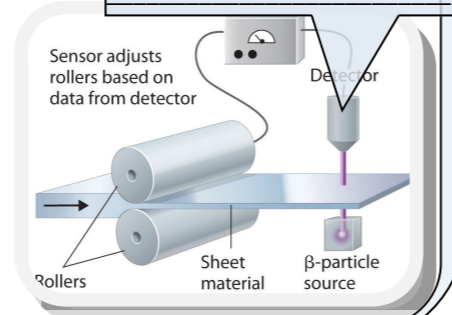
**Sterilisation of equipment**

This uses \_\_\_ radiation because \_\_\_\_\_



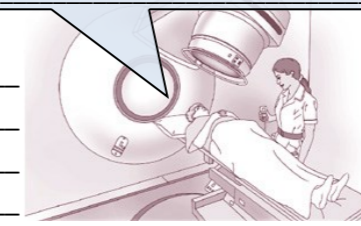
**Gauging thickness**

This uses \_\_\_ radiation because \_\_\_\_\_



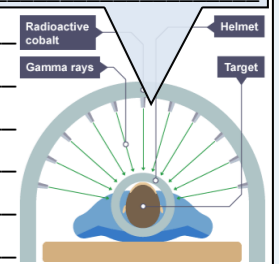
**Detecting cancer**

This uses \_\_\_ radiation because \_\_\_\_\_



**Treating cancer**

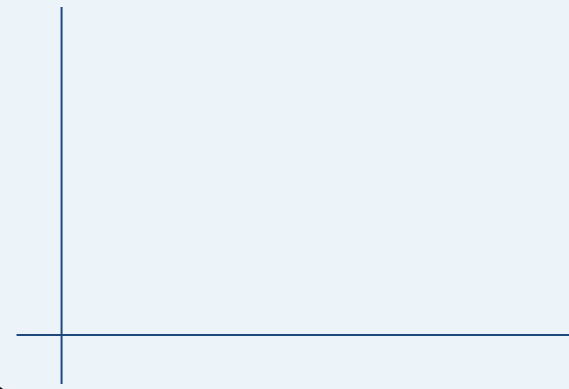
This uses \_\_\_ radiation because \_\_\_\_\_



**6.4 Describe how the activity of a radioactive source decreases over a period of time**

**6.5 Recall that the unit of activity of a radioactive isotope is the becquerel, Bq**

Sketch a graph of radioactivity against time, including units, for a radioisotope of half-life of 100 days with an initial count rate of 800 Bq.



**6.6 Recall the meaning of the half-life of a radioactive isotope**

Explain what is meant by the "half life" of a radioactive isotope. Refer to the graph plotted in 6.4.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Predict the radioactivity of the radioactive source in 6.4 after 500 days. Explain how you reached your answer \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**6.7 Use the concept of half-life to carry out simple calculations on the decay of a radioactive isotope, including graphical representations**

Uranium 238 decays (through various stages) into Lead 206, which is a stable isotope of Lead. Uranium 238 has a half-life of  $4.5 \times 10^9$  years. A rock sample contains three particles of Lead 206 for every particle of Uranium 238. Assuming no Lead 206 was present at the formation of the rock, calculate the age of the rock.

**Calculate the proportion of Uranium 238:**

**Count how many half lives you need to achieve this proportion of Uranium 238:**

**Calculate the age of the sample:**

**6.8 Investigate models which simulate radioactive decay**

Explain how dice can be used to model radioactive decay: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Explain how the decay rate and the number of remaining radioisotopes are proportional: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_