

Background Radiation: measuring your annual dose.

Notes for teachers:

This leaflet has been prepared as a classroom activity. It works best when done in groups or as a whole class activity, with time allowed for discussion as points arise.

Some of the data has been simplified in order to assist with teaching points. In particular, in (4) *Rocks and buildings*, gamma radiation emitted by rocks and soil varies from place to place as well as by dwelling type. Some of the doses included in the worksheet are negligible compared to the variability in others. They are included so pupils can have data from which they can deduce this fact themselves and accurately assess which are the most significant for them. It may come as a surprise to students to find out what are the most significant sources of background radiation.

See: <http://www.defra.gov.uk/environment/statistics/radioact/radsource.htm> for further detailed information about all the sources of background radiation. The Health Protection Agency website: <http://www.hpa.org.uk/> has more general information on both ionising and non-ionising radiation. The NRPB (now HPA) 'at a glance' leaflet, "Radiation Doses – Maps and Magnitudes" is available from the web-site and can also be purchased as a slide set. Click on 'radiation' and then 'publications' to find these resources.

For details on the mSv see a suitable textbook. The mSv measures the radiation dose. This is the energy absorbed per unit mass multiplied by a "quality factor" which estimates the sensitivity of cells to that type of radiation. (1 mJ/kg of alpha radiation has the same effect as 20 mJ/kg of beta. Both are 20 mSv)

The estimated total radiation dose should be in the range 2.1 - 7.8 mSv per year, with the average annual dose for people in the UK being 2.5 mSv. However, commercial aircrews and workers in the nuclear industry receive around 4.5 mSv a year. The average annual dose to a person in the UK from radon is 1.3 mSv.

There can be a significant variation in the estimated dose if people have had medical treatment over the course of the last year and this result can promote a useful discussion of the risks and benefits of such treatment. This discussion needs to be sensitive to the possibilities of students or their close relatives having serious and life threatening conditions.

See <http://www.ehsni.gov.uk/pollution/radiation/radon.htm> for more information about radon in Northern Ireland and <http://www.rpii.ie/index.aspx> for the Republic of Ireland. The information for the Republic is not available in a form that is compatible with the data for the UK.

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