

Overview

Skin cancers are extremely common, with more than 75 000 new cases registered each year in the UK. There are two main types of skin cancer: malignant melanoma of the skin and non-melanoma skin cancer (NMSC). In the UK, about 9000 people are diagnosed with melanoma each year. About 3 out of every 100 cancers diagnosed (3%) are melanomas. Although not one of the very commonest cancers, melanoma is important because it is easily curable if picked up early. The main cause of melanoma is UV radiation from the Sun.

The activities

There are five activities in this unit. They have been written to follow sequentially. Two activities are optional. The 'Effectiveness of sun protection lotions' activity is a possible practical investigation to compare the effectiveness of different sun lotions*. 'Plenary' is a summary exercise and could be set for homework or as a cover lesson at the end of the topic. It could also be used as a starter activity for research.

Melanoma

Students learn about melanoma and analyse data on the age-related and sex-related incidence of melanoma.

What's the risk?

Students learn about the UV index forecasts produced by the Met Office and the factors that affect the strength of the UV radiation on Earth. They learn about the six different skin types and assess the risk of sunburn at different locations.

Market survey (optional)

Students collect and analyse data on the different types of sun protection available. This activity could be set as homework or as research using the Internet.

Effectiveness of sun protection lotions (optional)

This is a practical activity to investigate the advertised SPFs of different sun lotions.
(See weblinks page.)

Plenary

Students produce a concept map or mind map to link and explain terms covered during the topic.

* The investigations in this activity have not been tested or assessed for safety by ASE. You should carry out your own risk assessment before use.

Curriculum links (for students aged 14–16)

How Science Works (from POS KS4 for England)

Data, evidence, theories and explanations

1b how interpretation of data, using creative thought, provides evidence to test ideas and develop theories

1c how explanations of many phenomena can be developed using scientific theories, models and ideas

Practical and enquiry skills

2b collect data from primary or secondary sources, including using ICT sources and tools

Communication skills

3a recall, analyse, interpret, apply and question scientific information or ideas

3b use both qualitative and quantitative approaches

3c present information, develop an argument and draw a conclusion, using scientific, technical and mathematical language, conventions and symbols and ICT tools

GCSE or equivalent 14–16 specifications

England (GCSE)

AQA Science A 4461

Unit Physics 1b: Radiation and the Universe 13.5 What are the uses and hazards of the waves that form the electromagnetic spectrum?

AQA Science B 4462

Physics Unit 1: 13.5 What are the uses and hazards of the waves that form the electromagnetic spectrum?

AQA Physics 4451

Unit Physics 1: 11.5 What are the uses and hazards of the waves that form the electromagnetic spectrum?

Edexcel 360 Science 2101

Chemistry C1: Topic 8 – Designer Products

Physics P1b: Topic 11 – Now You See it, Now You Don't

OCR Science A (21C science) J630

Module P2: Radiation and Life

P2.2 Which types of electromagnetic radiation harm living tissue and why?

P2.5 What ideas do citizens and scientists have about risk?

OCR Physics A (21C) J635

Module P2: Radiation and Life

P2.2 Which types of electromagnetic radiation harm living tissue and why?

P2.5 What ideas do citizens and scientists have about risk?

OCR Science B (Gateway Science) J640

Module P1: Energy for the Home; Item P1h: Stable Earth

OCR Physics B (Gateway Science) J645

Module P1: Energy for the Home; Item P1h: Stable Earth

Scotland (SCE standard grade)

Physics

Unit 3: Health Physics Section 4: Using the Spectrum

Wales (WJEC GCSE)

Science

Physics P1: 7. The Electromagnetic Spectrum

NI (CCEA GCSE)

Science (Single Award)

Module 2 Human Activity and Health: Adaptation and Variation

Module 5 Electricity, Waves and Communication: Waves

Biology

Section 3.3 Variation – 3.3.13, Know that radiation can cause genetic mutation, including: the role of UV light and skin cancer

Physics

Section 3.3 Waves, Sound and Light – The Electromagnetic Spectrum

Learning objectives

By working through the unit, students come to understand:

- that UV radiation is part of the electromagnetic spectrum
- that UV radiation can damage human cells and lead to skin cancer such as melanoma.
- that melanin produced by the skin provides some protection from UV radiation but that everyone is at risk
- that the Met Office produce UV index forecasts
- the factors that affect the amount of UV radiation that reaches the Earth
- the connection between the ozone layer and the transmission of UV radiation
- how to assess the risk of sunburn
- the meaning of 'sun protection factor'.

Teaching and learning approaches

Learning Skills, learning by/from:

- interpreting and evaluating data
- gathering information from a variety of sources
- handling ideas and information: using computers (ICT)
- interacting with a variety of audio-visual media
- case-studies in a variety of contexts

For further information about Learning Skills for Science (LSS) click [here](#).

Downloads

Melanoma

- Presentation
 - slide 1 – starter stimulus
 - slide 2 – melanoma – what is it?
 - slide 3 – where is melanoma most common?
 - slide 4 – incidence of melanoma 1975–2004
 - slide 5 – age-related incidence of melanoma in 2004
- Activity sheet A – Melanoma
- Activity sheet B – Melanoma (simplified version)
- Information sheet – Melanoma

What's the risk?

- Presentation
 - slide 1 – starter stimulus
 - slide 6 – the solar UV index
 - slide 7 – factors affecting the UV index
 - slide 8 – what is your skin type?
 - slide 9 – what's your risk?
 - slide 10 – incidence of melanoma – Europe in 2002 (optional)
 - slide 11 – incidence of melanoma – World in 2002 (optional)
- Activity sheet A – What's your risk?
- Activity sheet B – What's your risk? (simplified version)
- *Preventing skin cancer* leaflet from Cancer Research UK (optional), available to download as a PDF file. Follow the links from: publications.cancerresearchuk.org

Market survey (optional)

- Presentation
 - slide 12 – sun protection (optional)
 - slide 13 – buying sun lotions (optional)
 - slide 14 – market survey of sun protection
 - slide 15 – what is SPF?

Effectiveness of sun protection lotions (optional)

Practical activities to investigate the advertised SPFs of different sun lotions are suggested at:
outdoorphysics.educ.umu.se/en/res/UV/index.htm

www.data-harvest.co.uk/downloads/worksheets_curriculum.html

(Data Harvest Activity 18 'How good is your suntan cream?')

NB These activities have not been tested or assessed for safety by ASE. You should carry out your own risk assessment before use.

Plenary

- Presentation
 - slide 16 – summing up (not sunning up)
 - slide 17 – summing up 2 (not sunning up)

Acknowledgements

This unit was written by Graham Jackson and edited by Silvia Newton. Information about cancer is available in the original SATIS (14–16) unit 901 – The Chinese Cancer Detectives, and SATIS 16–19 unit 85 Cancer.

The information shown in the slides of the Presentation is from Cancer Research UK.

Slide 4 incidence in UK; **Slide 5** age related incidence UK; **Slide 10** incidence Europe; **Slide 11** incidence world

<http://info.cancerresearchuk.org/cancerstats/types/skin/incidence/>

(accessed 3rd December 2008)

Slides 8 and 9

Preventing skin cancer leaflet from Cancer Research UK (optional), available to download as a PDF file. Follow the links from: publications.cancerresearchuk.org