



# Background Information

Occupation	Science qualifications	PPE needed	Job description
<b>Geologist</b>	Typically A level in Physics, Chemistry, Biology or Geology Degree in Geology or Earth Science or Geoscience	Full-face visor Gauntlets Lab coat Radiation dosage badge	Some geologists study the crystal structure of minerals. They use techniques such as X-ray Crystal Diffraction (XRD) and X-ray Photoelectron Spectroscopy (XPS). Techniques such as XPS need liquid nitrogen for the Ultra High Vacuum (UHV) pumps.
<b>Combustion physicist</b>	Typically A level in Physics Degree in Physics or Engineering	Lab coat Ear defenders Goggles	The combustion physicist works on the use of alternative fuels e.g. biodiesel. It involves the use of shock tubes which are very noisy when ignited.
<b>Quality Control Chemist</b>	Typically GCSE Double Science or Chemistry or A or AS Chemistry or Degree in Chemistry	Chemical splash suit Hardhat Safety boots Neoprene gloves Goggles or face visor	The QC chemist works on a chemical plant that produces sulfuric acid. Sulfuric acid is used in car batteries and in the manufacture of fertilisers. It is corrosive.
<b>Pharmaceutical microbiologist</b>	Typically A level in Chemistry plus two other subjects from Maths, Physics or a biological science Degree in Microbiology	Lab coat Disposable gloves Safety spectacles Hair covering	The pharmaceutical microbiologist works on the development of painkilling medicines. Hygiene is essential when working with medicines.
<b>Pathologist</b>	Typically A level in Biology or Chemistry Degree in Biomedical science	Lab coat Disposable gloves Face mask	The pathologist is a forensic scientist and performs autopsies to ascertain cause of death. Care must be taken to avoid breathing in possible harmful micro-organisms and to avoid direct skin contact.
<b>Space technologist</b>	Typically A level in Physics Degree in Physics or Engineering	Hair covering Safety spectacles Lab coat Shoe covers	The space technologist works in a carbon composites clean room. It is essential to avoid dust and fibres that might affect the composites that the satellite components are made from.



# Teacher Notes

Get Clobbered is an interactive 'dress-the-scientist' game aimed at introducing the concept of H&S in the workplace. It can also be used as a valuable resource in addressing some of the issues required in the new GCSE Science course from September 2006.

## Curriculum links

KS4  
GCSE Additional Applied Science and GCSE Applied Science (Double Award)

### Unit 1 Science in the Workplace

- Describe jobs and qualifications of employees and how they use science
- Research the issues of working safely in a workplace that uses science, including hazards and risks

## Activity 1 – Scientific occupations

- Use the 'Get Clobbered' interactive activity to allow the students to familiarise themselves with the idea of Health & Safety in the workplace. Discuss items of clothing and equipment that may be unfamiliar.
- Provide students with a copy of the Science in the Workplace worksheet plus the images of the scientist and PPE.
- Ask the students to select an occupation from the 'Get Clobbered' activity for their scientist. They must fill in all the information on the worksheet. They may take the information from the activity itself, the additional student notes or the websites recommended.
- The students can cut out the image of the scientist and dress him in the appropriate PPE for his occupation before pasting the image on the worksheet.
- Alternatively students can back the figures with card so that they stand up. The student can display their scientist and explain their decisions to the rest of the class.
- Once the work is completed, discuss with the students their choices and other hazards for which similar PPE might be used. Discuss the variety of occupations available in the scientific workplace.
- What science qualifications are needed for these types of occupations?

## Activity 2 – Hazards in the scientific workplace

- Provide students with a copy of the Science in the Workplace worksheet plus the images of the scientist and PPE.
- Provide students with one of the Hazard cards which gives information and recommended PPE for a particular hazard.
- Ask the students to dress their scientist according to the potential hazard.
- What happens when the scientist works with several hazards in the course of their job? How do they manage to combine particular types of PPE?

Consider obtaining a set of PPE such as

- protective gloves in different materials e.g. disposable, PVA, nitrile, neoprene
- earplugs or ear defenders
- hardhat
- steel toecapped safety boots
- safety spectacles and goggles in different designs

Students can be given the opportunity to dress appropriately for a given hazard.

Note: Discussion points

- Disposable gloves can be latex but these days are more commonly made of (thin) neoprene. This is because latex allergy is quite common and has been a serious problem in the NHS with several very expensive legal claims. As a result many hospitals now no longer use latex gloves.
- Neoprene is not the only chemically resistant material used in gloves. What other materials are available and what chemicals are they resistant to?

## Useful weblinks

### Use of personal protective equipment:

HSE A short guide to the Personal Protective Equipment at Work Regulations 1992

<http://www.hse.gov.uk/pubns/indg174.pdf>

Health and Safety Executive publication on Personal Protective Equipment (PPE)

Guide to Cryogenics

<http://www.shef.ac.uk/safety/guidance/cryogenics.html>

Safety guide to working with liquid nitrogen and other liquid gases by the University of Sheffield

A code of practice for the use of PPE

<http://www.phy.cam.ac.uk/cavendish/hands/cops/ppecop.pdf>

Department of Physics at the University of Cambridge guide to use of PPE

### Types of PPE:

Kimberly-Clark guide to glove material

<http://www.kcprofessional.com/us/safeskin/chemresist/search.asp?o=1>

This site lists chemicals and the recommended glove types for working with them. Note this is an American site.

Neoprene gloves

<http://www.ansellpro.com/main/productSearch3.asp?pid=83>

Photo and description

PVA gloves

<http://www.ansellpro.com/main/productSearch3.asp?pid=103>

Disposable gloves

<http://www.ansellpro.com/main/productSearch3.asp?pid=15>

Haz-mat suits

<http://www.cover-up.co.uk/hazmat/hazmat.htm>

Career information

Careers in chemical science

<http://www.rsc.org/Education/SchoolStudents/FAQsCareers.asp>

Careers in the pharmaceutical industry

<http://www.abpi-careers.org.uk/html/why.htm>

Physics careers

[http://learningphysics.iop.org/beyond\\_school/careers/index.html](http://learningphysics.iop.org/beyond_school/careers/index.html)

Qualifying routes to careers in physics

[http://learningphysics.iop.org/beyond\\_school/qualifying\\_routes/index.html](http://learningphysics.iop.org/beyond_school/qualifying_routes/index.html)

Careers using science

[http://learningphysics.iop.org/beyond\\_school/careers/careers\\_using\\_science.html](http://learningphysics.iop.org/beyond_school/careers/careers_using_science.html)

Careers in geology

[http://www.geolsoc.org.uk/template.cfm?name=geocareers\\_careers&home=false](http://www.geolsoc.org.uk/template.cfm?name=geocareers_careers&home=false)

Chemistry – the vital element for your future

<http://www.chemsoc.org/pdf/LearnNet/rsc/VitalElement.pdf>

Guide to the importance of chemistry in a diverse range of careers

Careers – Not just a lab coat

<http://www.sciencenet.org.uk/careers/careerindex.html>

Information on a wide range of careers in science

A day in the life of a space technologist

[http://www.planet-science.com/text\\_only/nextsteps/ditl/helen\\_mapson.html](http://www.planet-science.com/text_only/nextsteps/ditl/helen_mapson.html)