



Accredited

SCIENCE LEVEL 1/2

UNIT R071 - HOW SCIENTIFIC IDEAS HAVE AN
IMPACT ON OUR LIVES

MODULE 2 - KEEPING HEALTHY

DELIVERY GUIDE

VERSION 2 DECEMBER 2012



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INTRODUCTION

This Delivery Guide has been developed to provide practitioners with a variety of creative and practical ideas to support the delivery of this qualification. The Guide is a collection of lesson ideas with associated activities, which you may find helpful as you plan your lessons.

OCR has collaborated with current practitioners to ensure that the ideas put forward in this Delivery Guide are practical, realistic and dynamic.

We appreciate that practitioners are knowledgeable in relation to what works for them and their learners. Therefore, the resources we have produced should not restrict or impact on practitioners' creativity to deliver excellent learning opportunities.

Whether you are an experienced practitioner or new to the sector, we hope you find something in this guide which will help you to deliver excellent learning opportunities.

If you have any feedback on this Delivery Guide or suggestions for other resources you would like OCR to develop, please email resourcesfeedback@ocr.org.uk.

PLEASE NOTE

The activities suggested in this Delivery Guide **MUST NOT** be used for assessment purposes. (This includes the Consolidation suggested activities).

The timings for the suggested activities in this Delivery Guide **DO NOT** relate to the Guided Learning Hours (GLHs) for each unit.

Assessment guidance can be found within the Unit document available from www.ocr.org.uk.

OPPORTUNITIES FOR ENGLISH AND MATHS SKILLS DEVELOPMENT

We believe that being able to make good progress in English and maths is essential to learners in both of these contexts and on a range of learning programmes. To help you enable your learners to progress in these subjects, we have signposted opportunities for English and maths skills practice within this resource. These suggestions are for guidance only. They are not designed to replace your own subject knowledge and expertise in deciding what is most appropriate for your learners.

KEY



English



Maths

UNIT R071 - HOW SCIENTIFIC IDEAS HAVE AN IMPACT ON OUR LIVES

Guided learning hours : 60

AIM OF THE UNIT

In this unit, learners explore the way in which applications of science have an impact on our lives. The unit has been divided into three teaching modules:

MODULE 1: USING ENERGY
MODULE 2: KEEPING HEALTHY
MODULE 3: MATERIALS FOR A PURPOSE.

In each module there are opportunities to undertake practical work and develop skills in analysing, interpreting and evaluating evidence which will build towards the assessment of an investigation in Unit 3. Working with evidence is also assessed in Unit 2.

Learners produce a portfolio of work incorporating nine assessment tasks which are internally assessed and moderated by OCR. The tasks for each module are marked out of 40, giving an overall total for the unit of 120 marks.

The unit is weighted at 50% of the qualification and requires 60 GLH.

MODULE 2 - KEEPING HEALTHY

LO4	CONTENT
Understand how human health can be improved	<p>Learners should be taught the following content: that human health is affected by a range of environmental and inherited factors, by the use and misuse of drugs and by medical treatments, i.e.:</p> <ul style="list-style-type: none"> • environmental factors that may affect health, including diet, exercise, smoking, drug use, pollution, noise, agrochemicals • nutrients in foods • what is meant by 'good health' • assessment of fitness and health • inherited conditions that affect health • types of drugs including depressants, stimulants, hallucinogens • types of microorganisms that cause infectious diseases • prevention by immunisation and treatment by antibiotics.

LO5	CONTENT
Understand the risks and benefits of medical treatments	<p>Learners should be taught the following content: the use of contemporary scientific and technological developments and their benefits, drawbacks and risks, i.e.:</p> <ul style="list-style-type: none"> • in the context of developing medical applications (preventative and treatment) • the need to test medical developments, including surgery and drugs • in vitro testing, including testing antibiotics on bacterial cultures • in vivo testing • 'open label', 'blind' and 'double blind' trials • ethical considerations • the benefits and risks of medical treatments to include transplant surgery, blood transfusion, • immunisation, gene therapies and stem-cell technologies • quantitative treatment of risk.

LO6	CONTENT
Be able to measure the environmental effects of human activity	<p>Learners should be taught the following content:</p> <p>that organisms are interdependent, i.e.:</p> <ul style="list-style-type: none"> • interdependence to include feeding relationships and competition for resources • indirect effects on organisms due to human activity, including effects on food webs and interspecific competition due to introduced species <p>that the effects of human activity on the environment can be assessed using living and non-living indicators – the health of environments, i.e.:</p> <ul style="list-style-type: none"> • components of an ecosystem: biotic and abiotic • effects that can be assessed such as air and water pollution, noise, land-use • measurement of living indicators that can be used to assess the effect of human activity on the environment, to include bio-diversity, frequency and distribution • measurement of non-living indicators that can be used to assess the effect of human activity on the environment, to include pH, temperature, chemical testing, particulates <p>how to collect data from primary or secondary sources, including ICT sources and tools, i.e.:</p> <ul style="list-style-type: none"> • sampling techniques, including use of quadrats and transects • measuring the level of indicators and the visualisation of data <p>how to work accurately and safely, individually and with others, when collecting first-hand data.</p>

MODULE 2 – KEEPING HEALTHY

Suggested content	Suggested activities	Suggested timings	Possible relevance to
Introduction to Module 2 – Keeping Healthy	Learners could be asked what 'Keeping healthy' means to them, leading to the production of a mind-map. Learners could then be shown the R071 Module 2 Introductory presentation which can be found here (http://www.ocr.org.uk/Images/77454-unit-r071-module-2-introductory-presentation.ppt) , which provides an overview of what will be covered in this module.	20 minutes	R071: LO4, LO5, LO6
	Learners could be shown the R071 Module 2 Introductory presentation which can be found here (http://www.ocr.org.uk/Images/77454-unit-r071-module-2-introductory-presentation.ppt) and could then create mind maps to explore the range of meanings of a number of key terms (e.g. health, medicine, drugs, healthy environment).	20 minutes	R071: LO4, LO5, LO6
	Learners could carry out a survey to examine what people think of as 'good health'.	45 minutes	R071: LO4
	Learners could create a diary for a person with a particular job or lifestyle noting the potential health impact of environmental factors they encounter during a normal day (e.g. diet, exercise, smoking, drug use, pollution, noise, agrochemicals).	45 minutes	R071: LO4
	Learners could observe the ' Going up in smoke ' practical demonstration from Practical Biology (http://www.nuffieldfoundation.org/practical-biology/going-smoke) to explore the health impacts of smoking	30 minutes	R071: LO4
Healthy eating and nutrients in food 	Learners could use the information from the Resource Link (http://www.ocr.org.uk/images/82424-unit-r071-resources-link.pdf) to design a healthy eating leaflet/poster for a GP surgery or the school canteen. The teacher could start the lesson with learners looking through a range of leaflets and ask what is good about them. The basis of these discussions could then be used to develop success criteria for their own posters/leaflets. Suitable posters/leaflets can be found at http://www2.sainsburys.co.uk/food/healthylifestyle/help_and_advice/downloadable+leaflets/leaflets.htm , http://www.easyhealth.org.uk/listing/healthy-eating-(leaflets) , http://www.nhs.uk/start4life/Pages/healthcare-professionals.aspx , http://www.slam.nhs.uk/media/305765/learningdisability-eatingahealthydiet.pdf .	1 hour	R071: LO4
	Learners could use the interactive '5 A DAY weekly meal planner and shopping list', found here (http://www.nhs.uk/Tools/Pages/5aday.aspx) , to develop their own meal plans for a week. The learners should record their plans.	30 minutes– 1 hour	R071: LO4

MODULE 2 – KEEPING HEALTHY

Suggested content	Suggested activities	Suggested timings	Possible relevance to
Healthy eating and nutrients in food	Learners could be asked to investigate what the 5 major food groups are using the internet or textbooks. They could be asked to identify which foods belong to each group and why, what good they do you and how much of each you should be eating every day.	1 hour	R071: LO4
	Learners could work through the interactive 'Food detective – Activity' found here (http://www.bbc.co.uk/schools/ks3bitesize/science/organisms_behaviour_health/food_detective/activity.shtml).	20 minutes	R071: LO4
	Learners could carry out Practical Biology's ' Measuring the Vitamin C content of foods and fruit juices ' practical (http://www.nuffieldfoundation.org/practical-biology/measuring-vitamin-c-content-foods-and-fruit-juices) to examine a range of predictions about whether heating or treating food and drinks changes their nutrient level.	45 minutes	R071: LO4
	Learners could carry out research and propose a new health food product that provides a range of nutrients (eg iron, calcium, magnesium, vitamins) to support a particular life phase (eg pregnancy, early years etc.).	1 hour	R071: LO4
Effects of recreational drugs on health  	Learners could take part in a class discussion about the difference between medical and recreational drugs. The health-related and recreational uses of cannabis could be used to prompt the discussion about why the majority of recreational drugs are illegal.	15 minutes	R071: LO4
	Learners could use information from the Resource Link , (http://www.ocr.org.uk/images/82424-unit-r071-resources-link.pdf) and other useful websites such as http://www.talktofrank.com/ , http://teens.drugabuse.gov/facts/index.php to produce a table of drugs, which includes the names of drugs, street names, short term effects and long term effects. Possible drugs to investigate include - marijuana, ecstasy, cocaine heroine crystal mesh, LSD, painkillers and Ritalin.	1 hour	R071: LO4
	Each Learner could select, or be allocated by the teacher, one drug to investigate using Resource Link , pages 18 and 19 (http://www.ocr.org.uk/images/82424-unit-r071-resources-link.pdf) and other useful websites such as http://www.talktofrank.com/ , http://teens.drugabuse.gov/facts/index.php . They should find out the street name of the drug, short and long term effects and where people can go for help. In small groups learners could create a blog for their peers about drugs and the effect they have on health. Some of the websites above have video clips which the learners may wish to incorporate or link to in their blog. Once reviewed by a teacher the blog could then be made available to other learners at the centre.	Up to 2 hours	R071: LO4

MODULE 2 – KEEPING HEALTHY

Suggested content	Suggested activities	Suggested timings	Possible relevance to
Effects of recreational drugs on health 	Learners could complete the OCR ' What's the conclusion ' activity (the presentation, student sheets and teacher guide can be found within the support material section on this page: http://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-additional-science-b-j262-from-2011/) to explore the difference between stimulants and depressants).	1 hour	R071: LO4
Assessment of fitness and health 	The teacher could provide learners with a range of data for different individuals, eg male/female; age, height and weight. Learners then calculate the BMI using the Resource Link , page 17 (http://www.ocr.org.uk/images/82424-unit-r071-resources-link.pdf). They can then decide whether each individual is underweight, overweight, obese or within a healthy range. This activity could be extended by having learners produce a written report on how to improve or maintain the individuals BMI.	45 minutes– 1 hour	R071: LO4
	The website (http://serendip.brynmawr.edu/sci_edu/waldron/) under the title 'Regulation of Human Heart Rate' provides a learner worksheet which teaches learners how to measure their heart rate accurately. The worksheet also supports students in designing and carrying out an experiment to test the effects of an activity or stimulus on heart rate, analyse and interpret the results, and present their experiments in a poster.	1 hour	R071: LO4
	Learners could complete a self-assessment task to rate their fitness using the Resource Link , (http://www.ocr.org.uk/images/82424-unit-r071-resources-link.pdf). Those that are happy to could then discuss their results and what they could do to improve their fitness levels.	30 minutes	R071: LO4
	Learners could develop a fitness and health assessment tool to be used by a new gym or health centre to assess their new members.	1 hour	R071: LO4

MODULE 2 – KEEPING HEALTHY

Suggested content	Suggested activities	Suggested timings	Possible relevance to
Types of micro-organisms that can cause infectious diseases	<p>Working in groups learners could be asked a series of questions and complete a task about microorganisms – this will enable the teacher to establish the learners prior knowledge. The starter questions may include:</p> <ol style="list-style-type: none"> 1) List different words you know for microorganisms. 2) Create a spider diagram of infectious diseases you know. Where possible, include the name of the microorganism that causes the disease, the symptoms, and any treatment you know of. 3) List how infectious diseases are passed on (transmitted). 4) Suggest ways infectious diseases can be prevented. 5) What diseases pose a threat to you today? <p>The teacher could collate the comments from the groups and refer back to them once this part of the module has been taught. The learners can then make changes to original ideas, make additions, and consolidate their learning.</p>	20 minutes	R071: LO4
	<p>Learners could work through the information about ‘Infectious diseases – pathogens’ from the abpi website (http://www.abpischools.org.uk/page/modules/infectiousdiseases_pathogens/.cfm?coSiteNavigation_allTopic=1). The learners could then complete the ‘Pathogens’ quiz, found on page 10 of the resource.</p>	30 minutes	R071: LO4
	<p>Learners could carry out ‘Bacteria and antibiotics research task’ page 3 of 4, from the abpi website (http://www.abpischools.org.uk/page/modules/bacteria/bacteria3.cfm). In addition the website provides a great deal of information on infectious diseases here (http://www.abpischools.org.uk/page/modules/diseases/diseases1.cfm).</p>	1–2 hours	R071: LO4
	<p>Learners could carry out research so that they can build 3D models of the different types of micro-organisms that cause diseases. This activity provides a good opportunity to tackle misconceptions that can arise around the size and scale of microorganisms as well as the idea that learners can develop from looking at 2D models that microorganisms (as well as cells and other biological features) are flat.</p>	1 hour	R071: LO4

MODULE 2 – KEEPING HEALTHY

Suggested content	Suggested activities	Suggested timings	Possible relevance to
Types of micro-organisms that can cause infectious diseases	<p>The teacher could explain to the learners that there is an on-going debate between scientists on which they cannot agree. The two sides of the debate are:</p> <p>a. We need to clean up our act to get rid of microbes and disease.</p> <p><i>Keep everything, including ourselves, as clean as possible to eliminate harmful microbes.</i></p> <p>b. We are too clean! Our bodies do not know how to fight infection any more.</p> <p><i>Because we are too clean, our bodies have not built up immunity to many harmful microbes therefore we are more prone to get sick!</i></p> <p>Learners could be put into groups and asked to carry out research to support one of the above viewpoints. They are then to prepare for a classroom debate on how they feel about the topic based on their individual research. Remind students that there is no right or wrong answer, scientists cannot agree on this. (Adapted from here, page 28, http://www.e-bug.eu/lang_eng/secondary_pack/downloads/UK%20Senior%20Pack%20Complete.pdf)</p>	1–2 hours	R071: LO4
Prevention by immunisation and treatment by antibiotics	<p>Starter Activity:</p> <p>Teacher could display a list of diseases with the following question: Which of these diseases are you immune to? (E.g. TB, measles, mumps, diphtheria, malaria). Picture of symptoms for each disease could be included.</p>	10 minutes	R071: LO4
	<p>Starter to review learners prior knowledge - learners could put these statements about natural immunity into the right order by numbering them 1–5:</p> <p>A. Microbes multiply and create illness. B. Microbes enter the body. C. Body responds slowly. D. Body responds quickly. Microbe is killed before it has a chance to multiply and cause illness. E. Body produces enough antibodies and white blood cells to kill invading microbe. As microbe dies the symptoms disappear. F. Same microbe re-enters the body.</p> <p>Correct order (B, C, A, E, F, D)</p>	10 minutes	R071: LO4

MODULE 2 – KEEPING HEALTHY

Suggested content	Suggested activities	Suggested timings	Possible relevance to
Prevention by immunisation and treatment by antibiotics	Learners could carry out an investigation into the anti-microbial action of a range of different hygiene or cleaning products by carrying out this activity from Practical Biology (http://www.nuffieldfoundation.org/practical-biology/investigating-anti-microbial-action).	2 hours	R071: LO5
	Teacher could have learners model how a vaccine works by using the lesson plan from here , page 65 (http://www.e-bug.eu/lang_eng/secondary_pack/downloads/UK%20Senior%20Pack%20Complete.pdf).	1 hour	R071: LO4
	Learners could carry out a practical investigating how antibiotics work – this website , page 79; (http://www.e-bug.eu/lang_eng/secondary_pack/downloads/UK%20Senior%20Pack%20Complete.pdf) provides a lesson plan and resources for this practical.	1 hour	R071: LO4
	 Learners could create a guide for parents about immunisation and the risks and benefits to their children.	1 hour	R071: LO4
The need to test medical developments including surgery and drugs	 The teacher could run this slide show which shows the timeline of the development of a new medicine (http://www.abpischools.org.uk/res/coResourceImport/modules/bacteria/en-flash/rnd.html). Learners could then be provided with an individual blank time line of medicine development. Learners could complete the timeline using bullet point notes using the slide show as the basis.	30 minutes	R071: LO5
	Learners could complete the RSC's ' Masterminding Molecules ' game (http://www.rsc.org/learn-chemistry/resource/res00000877/masterminding-molecules) which gives learners an opportunity to explore the basic concepts in the design of new drugs. The game also provides an opportunity to revise basic chemical concepts.	45 minutes	R071: LO5
	 The abpi website provides a resource, 'Beating bacteria', Resource Link , page 19 (http://www.ocr.org.uk/images/82424-unit-r071-resources-link.pdf). Learners make decisions on which drug to develop as a new antibiotic treatment for infections. After deciding which compound to progress they look at production and marketing timescales. This resource is differentiated and higher level data provided.	1–2 hours	R071: LO4, LO5

MODULE 2 – KEEPING HEALTHY

Suggested content	Suggested activities	Suggested timings	Possible relevance to
The need to test medical developments including surgery and drugs	Learners could use the example of the 2006 'TGN1412' drug trial in which 6 volunteers became seriously ill (case study details can be found here: http://www.i-sis.org.uk/LDTC.php) to explore ideas about why human drug trails are used and why people volunteer to take part. Learners could then take part in a debate about whether drugs should be tested on humans.	1 hour	R071: LO5
	Alternatively learners could complete the Science upd8 activity about this drug trial (http://www.nationalstemcentre.org.uk/elibrary/resource/297/double-blind) which also introduces the concept of double blind testing.		
	Learners could research the terms <i>in vivo</i> and <i>in vitro</i> and create a list of advantages and disadvantages of the different approaches. Learners should be encouraged to consider the ethical implications of each approach as well as the scientific reliability.	30 minutes	R071: LO5
'Open label' 'blind' and 'double blind' trials	Learners could be introduced to some key ideas in experimental design - open label, blind and double trials. Working in small groups different learners could then design different experiments using these three approaches to test the statement 'A glass of cola contains enough caffeine to raise a person's heart rate by 5 beats per minute'. A class discussion could then be used to explore the advantages and disadvantages of different approaches.	45 minutes	R071: LO5
Benefits, risks and ethical considerations of medical treatments - transplant surgery, blood transfusion, immunisations, gene therapy and stem-cell technology	Learners could be split into small groups or work individually to carry out research to find out the benefits, risks and ethical considerations of the following medical treatments: <ul style="list-style-type: none"> - transplant surgery (http://www.nhs.uk/Conditions/Organ-donation/Pages/Risks.aspx, http://www.organdonation.nhs.uk/ukt/how_to_become_a_donor/living_kidney_donation/pdf/medical_information-your_questions_answered.pdf) - blood transfusion (http://www.nhs.uk/Conditions/Blood-transfusion/Pages/Risks.aspx, http://www.mountsinai.on.ca/patients/your-hospital-stay/preparing_for_surgery/blood-transfusions/blood-transfusion-and-conservation-risks-and-benefits) - immunisations (Resource Link, page 24, (http://www.ocr.org.uk/images/82424-unit-r071-resources-link.pdf)) - gene therapy (Resource Link, page 25, (http://www.ocr.org.uk/images/82424-unit-r071-resources-link.pdf)) - stem-cell technology (Resource Link, page 25, (http://www.ocr.org.uk/images/82424-unit-r071-resources-link.pdf)) 	Up to 1 hour	R071: LO5

MODULE 2 – KEEPING HEALTHY

Suggested content	Suggested activities	Suggested timings	Possible relevance to
Quantitative treatment of risks	Learners could use this interactive calculator (http://euroscore.org/patienteuroscore2logistic.html) to work out the risk of dying from a heart operation. Learners should be provided with details for patients A, B, C and D. The activity could lead on to a whole class discussion as to whether benefits outweigh risks for these patients.	30 minutes	R071: LO5
Interdependence – feeding relationships, competition for resources and the effect of human activity 	http://www.nationalstemcentre.org.uk/dl/a20fbb7a15d0faba83f07da59eee7cb14feca94/16331-Interdependence_SG.pdf - The National Strategies guide to teaching Interdependence contains a range of activities structured within a teaching approach which is designed to tackle common misconceptions.	30 minutes– 1 hour	R071: LO6
	Learners could use the information here (http://sitemaker.umich.edu/gc2sec7labgroup3/over-fishing) to produce a summary of how over fishing by humans can affect food chains.	30 minutes	R071: LO6
	Learners could work through the interactive ecology lab (http://www.learner.org/courses/envsci/interactives/ecology/). The interactive lab allows learners to build their own ecosystem and to explore the effects of interrelationships.	1–3 hours	R071: LO6
Assessing effect of human activity – measurement of living indicators	Learners could read through information and then carry out classroom activities of sampling and analysing http://www.concord.org/~btinker/gaiamatters/investigations/lichens/index.html .	10 minutes– 3 hours depending on activity carried out	R071: LO6
	Learners could carry out the fieldwork exercise, found here (http://www.nuffieldfoundation.org/practical-biology/monitoring-water-pollution-invertebrate-indicator-species) The exercise involves sampling water from streams (ideally) or ponds, in two different situations.	Half day	R071: LO6
	Learners could be introduced to fieldwork techniques within the school grounds using this class practical (http://www.nuffieldfoundation.org/practical-biology/biodiversity-your-backyard).	1 hour	R071: LO6
Assessing effect of human activity – measurement of non-living indicators	Learners could complete a data analysis task measuring the quality of air on a busy road near school. Learners collect slides and count particulate on each slide. Class data is shared and the results can be plotted on a graph - see PowerPoint presentation for data-analysis task. The methods described in the Resource Link (http://www.ocr.org.uk/images/82424-unit-r071-resources-link.pdf).	Initial set-up 30 minutes. Analysis 1 hour	R071: LO6

MODULE 2 – KEEPING HEALTHY

Suggested content	Suggested activities	Suggested timings	Possible relevance to
How to collect data from primary and secondary sources – sampling techniques	<p>Learners could carry out this online ecology practical exercise, Ecology Practical 1 - Measuring abundance and random sampling (http://www.saps.org.uk/secondary/teaching-resources/258-ecology-practical-1-measuring-abundance-and-random-sampling). The online practical gives learners an opportunity to practice random sampling to measure the abundance of various different species on an area of grassland, before they carry out practical fieldwork. Learners look at images of quadrats, identify the plants and measure the abundance. This can then be followed by Ecology Practical 2 – The distribution of species across a footpath (http://www.saps.org.uk/secondary/teaching-resources/127-ecology-practical-distribution-of-species-and-fieldwork-sampling) and Ecology Practical 3 – Abundance and random sampling at Waun Las Nature Reserve, Wales (http://www.saps.org.uk/secondary/teaching-resources/768-ecology-practical-abundance-diversity-and-random-sampling).</p>	1 hour for each ecology practical	R071: LO6
	<p>Teacher guide (http://www.nationalstemcentre.org.uk/dl/af7d42e421b98d01b7ad5b0eb45177059cbe353b/20861-16%2B_ecological_survey.pdf) on a range of biotic and abiotic sampling techniques. This can be used as the basis for a lesson on sampling techniques.</p>	20 minutes	R071: LO6

Contact us

Staff at the OCR Customer Contact Centre are available to take your call between 8am and 5.30pm, Monday to Friday.

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