

Unit B1 - Revision Lesson 5 Health				
Specification learning outcomes	HSW statements	Exemplar teaching activities	Main differentiation	Resource sheets
<p>3.1 Define a drug as a chemical substance, such as a narcotic or hallucinogen, that affects the central nervous system, causing changes in psychological behaviour and possible addiction.</p> <p>3.2 Describe the general effects of:</p> <p>a) painkillers that block nerve impulses, including morphine b) hallucinogens that distort sense perception, including LSD c) stimulants that increase the speed of reactions and neurotransmission at the synapse, including caffeine d) depressants that slow down the activity of the brain, including alcohol.</p> <p>3.3 Investigate reaction times.</p> <p>3.4 Explain the effects of some chemicals in cigarette smoke, including: a) nicotine as an addictive drug; b) tar as a carcinogen; c) carbon monoxide reducing the oxygen-carrying ability of the blood.</p> <p>3.5 Evaluate data relating to the correlation between smoking and its negative effects on health.</p> <p>3.6 Evaluate evidence of some harmful effects of alcohol abuse: a) in the short term - blurred vision, lowering of inhibitions, slowing of reactions b) in the long term - liver cirrhosis, brain damage.</p> <p>3.7 Discuss the ethics of organ transplants, including: a) liver transplants for alcoholics, b) heart transplants for the clinically, obese c) the supply of organs.</p> <p>3.8 Recall that infectious diseases are caused by pathogens.</p>	<p>HSW 1, 5, 6, 7, 8, 9, 10, 11, 13, 14</p>	<p><u>The theme of this lesson is health and disease.</u></p> <p><b>Starter:</b> <i>Health spider diagram.</i> Write the word 'health' in the centre of the board and invite students to suggest related words, to add in order to create a spider diagram. Try to make sure that students cover drugs, smoking, alcohol and pathogens. They could further subdivide pathogens into protection against pathogens and drugs that help us fight them. Students should suggest the best place to add a new word. It would be useful to revisit this spider diagram at the end of the lesson.</p> <p><b>Main:</b> <i>Different types of drugs.</i> Worksheet B1.20c can be used to revise the different types of drugs and their effects. <i>Investigating reaction times.</i> Question 5a on the Nov'11 Biology Foundation paper (5BI1F) is based on an investigation into reaction time. <i>The problems with smoking and alcohol.</i> Worksheets B1.22d and B1.23d help students to revise smoking, alcohol and their effects on health. This can then lead to a class discussion about the ethics of transplants. <i>Preventing infection.</i> Draw the outline of a human (a stick man will do!) and label the ways in which pathogens can enter the body on one side of the diagram, use the other side to label the body's defences. <i>Investigating microbial cultures.</i> Show students a Petri dish and ask them what they would see if an antibiotic was dropped onto a lawn of bacteria - and remind them that this can be used to show how effective different antibiotics are.</p> <p><b>Plenary:</b> <i>Drug spider diagram revisited.</i> Return to the spider diagram from Starter 1 and ask students whether any words need to be moved, added or amended in any way.</p> <p><b>Homework:</b> Ask students to compile a table which shows what antiseptic, antibiotic, antibacterial and antifungal substances do. Students working towards the Higher tier should include information on antibiotic resistance.</p>	<p><b>Stretch:</b> Divide the students into two groups. One group could do worksheet B1.22d and the other B1.23d. Each group could then summarise the worksheet for the other group.</p> <p>Worksheet B1.25d helps students to revise vectors and pathogens.</p> <p><b>Support:</b> Students may need to be given vectors and the barriers to infection as subheadings for their diagram.</p>	<p>Worksheet B1.20c Worksheet B1.22d Worksheet B1.23d Worksheet B1.25d [Nov'11 Biology Foundation paper (5BI1F). Petri dish with or without culture]</p>

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**3.9** Describe how pathogens are spread, including: a) in water, including cholera bacterium, b) by food, including Salmonella bacterium, c) airborne (e.g. sneezing), including influenza virus, d) by contact, including athlete's foot fungus, e) by body fluids, including HIV f) by animal vectors, including: (i) housefly: dysentery bacterium (ii) Anopheles mosquito: malarial protozoan.

**3.10** Explain how the human body can be effective against attack from pathogens, including: a) physical barriers - skin, cilia, mucus b) chemical defence - hydrochloric acid in the stomach, lysozymes in tears.

**3.11** Demonstrate an understanding that plants produce chemicals that have antibacterial effects in order to defend themselves, some of which are used by humans.

**3.12** Describe how antiseptics can be used to prevent the spread of infection.

**3.13** Explain the use of antibiotics to control infection, including: a) antibacterials to treat bacterial infection, b) antifungals to treat fungal infections.

**3.14** Evaluate evidence that resistant strains of bacteria, including MRSA, can arise from the misuse of antibiotics.

**3.15** Investigate the effects of antiseptics or antibiotics on microbial cultures.

Unit B1 - Revision Lesson 6 Interdependence				
Specification learning outcomes	HSW statements	Exemplar teaching activities	Main differentiation	Resource sheets
<p>3.16 Recall that interdependence is the dynamic relationship between all living things.</p> <p>3.17 Demonstrate an understanding of how some energy is transferred to less useful forms at each trophic level and this limits the length of a food chain.</p> <p>3.18 Demonstrate an understanding that the shape of a pyramid of biomass is determined by energy transferred at each trophic level.</p> <p>3.19 Explain how the survival of some organisms may depend on the presence of another species: a) parasitism, including: (i) fleas (ii) headlice (iii) tapeworms (iv) mistletoe, b) mutualism, including: (i) oxpeckers that clean other species (ii) cleaner fish <b>H</b> (iii) nitrogen-fixing bacteria in legumes; (iv) chemosynthetic bacteria in tube worms in deep-sea vents.</p> <p>3.20 Analyse, interpret and evaluate data on global population change.</p> <p>3.21 Explain how the increase in human population contributes to an increase in the production of pollutants, including phosphates, nitrates and sulfur dioxide.</p> <p>3.22 Explain how eutrophication occurs and the problems associated with eutrophication in an aquatic environment.</p> <p>3.23 Investigate the effect of pollutants on plant germination and plant growth.</p> <p>3.24 Demonstrate an understanding of how scientists can use the presence or absence of indicator species as evidence to assess the level of pollution: a) polluted water indicator - bloodworm, sludgeworm, b) clean water indicator - stonefly, freshwater shrimps, c) air quality indicator - lichen species, blackspot fungus on roses.</p>	<p>HSW 1, 3, 5, 6, 7, 8, 9, 10, 11, 12</p>	<p><u>The theme of this lesson is interdependence.</u></p> <p><b>Starter:</b> <i>Pyramids of biomass.</i> Show a pyramid of biomass and ask students to comment on what the pyramid diagram shows. Attempt to elicit responses such as 'the amount of biomass in each trophic level of a food chain', or 'how the amount of biomass in a trophic level gets less the higher up a food chain you are'. Remind students about food chains, trophic levels and that all living things are interdependent.</p> <p><b>Main:</b> <i>Building Pyramids of biomass.</i> Worksheet B1.28d allows students to revise pyramids of biomass and how to draw them. <i>Parasites and mutualists.</i> Students use their knowledge to produce two concept maps: one for the term 'parasite' and one for 'mutualist', including definitions and examples. <i>Population and pollution.</i> Worksheet B1.30c helps students to revise population and the effect on pollution. <i>Investigating acid rain.</i> Show students the criteria from the specification for controlling variables and ask them to explain how they would control the variables if they were investigating the effect of acid rain on seedlings. <i>Water sample analysis.</i> Show students worksheet B1.32b and discuss how the table could be used to give an indication of how clean a stream is. <i>Recycling.</i> Ask students to write a short report on the pros and cons of recycling waste instead of dumping in landfill tips. They should cover the following areas: demand for resources, monetary cost, impact on the environment.</p> <p><b>Plenary:</b> <i>Key term questions.</i> Give students a list of key terms from this and the previous topic and ask them to write questions for which these terms are the answers.</p> <p><b>Homework:</b> Worksheet B1.33c is designed for students working at a lower level and contains questions on the carbon cycle. Worksheet B1.34c is designed for students working at a higher level and provides text and questions on the relationship between nitrogen-fixing bacteria and legumes.</p>	<p><b>Stretch:</b> When drawing the concept map students should include nitrogen-fixing bacteria in legumes and chemosynthetic bacteria in tube worms in deep-sea vents.</p> <p>Students should be asked to draw both a carbon and nitrogen cycle and annotate them appropriately.</p> <p><b>Support:</b> The pyramid construction could be carried out in pairs or small groups, or as a class activity.</p> <p>The concept map on parasites may need to be structured with subheadings.</p> <p>Students could be given a list of variables for the investigation and then could discuss how to control them.</p>	<p>Worksheet B1.28d Worksheet B1.30d Worksheet B1.32b Worksheet B1.33c Worksheet B1.34c [A picture of a pyramid of biomass]</p>

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<p>3.25 Demonstrate an understanding of how recycling can reduce the demand for resources and the problem of waste disposal, including paper, plastics and metals.</p> <p>3.26 Demonstrate an understanding of how carbon is recycled: a) during photosynthesis plants remove carbon dioxide from the atmosphere, b) carbon compounds pass along a food chain, c) during respiration organisms release carbon dioxide into the atmosphere, d) decomposers release carbon dioxide into the atmosphere, e) combustion of fossil fuels releases carbon dioxide into the atmosphere.</p> <p><b>H</b> 3.27 Demonstrate an understanding of how nitrogen is recycled: a) nitrogen gas in the air cannot be used directly by plants and animals, b) nitrogen-fixing bacteria living in root nodules or the soil can fix nitrogen gas, c) the action of lightning can convert nitrogen gas into nitrates, d) decomposers break down dead animals and plants, e) soil bacteria convert proteins and urea into ammonia, f) nitrifying bacteria convert this ammonia to nitrates, g) plants absorb nitrates from the soil, h) nitrates are needed by plants to make proteins for growth, i) nitrogen compounds pass along a food chain or web, j) denitrifying bacteria convert nitrates to nitrogen gas.</p>				
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