

UNIT 7 Co-ordination; Nervous and chemical

	Learning Outcomes	Suggested Teaching Activities	Online Resources	Other resources
	<p>9 (a) Define sense organ</p> <p>9 (b) List the stimuli to which sense organs respond: light energy, sound energy, temperature change, touch and chemical stimuli. Investigate the variation in discrimination between different temperatures and in perception of touch by different areas of the skin of the hand and forearm.</p>	<p>Students should explore different senses. E.g. close eyes and; feel objects chosen for texture, or feel them inside a bag/place distinct tastes on the tongue/listen to sounds and determine the direction. This should lead to a table of the different senses and which stimuli to which they respond.</p> <p>Students should carry out investigation into the detection of heat and touch by the skin</p>	<p>http://student.biology.arizona.edu/sciconn/Neuroscience/sensation.html Protocol for temperature experiment</p> <p>http://biology.wsc.ma.edu/biology/courses/hoag/humbio/labs/senses/ Protocol for touch experiment</p>	<p>P. Gadd pg. 124 summary table</p> <p>D. Mackean pg 129</p> <p>P. Gadd pg. 122 practical section 13.5</p> <p>D. Mackean pg 143</p>
	<p>9 (c) Describe and identify from a drawing a horizontal section through the eye and optic nerve. Examine the structure of a mammalian eye (e.g. cow, sheep or goat).</p>	<p>Students should be given a diagram of the eye in cross section to label and annotate, from text/OHT/animation/film/internet.</p> <p>Students should be given the opportunity to dissect a mammalian eye/ or watch a demonstration and/or see a virtual dissection</p>	<p>http://www.exploratorium.edu/learning_studio/cow_eye/ Virtual cow eye dissection</p> <p>http://www.bausch.com/us/vision/concerns/eyeworks.jsp Rollover eye diagram</p>	<p>P. Gadd pg. 114 fig 13.2</p> <p>Pg 116 summary table</p> <p>D. Mackean pg 134 fig 18.8</p> <p>P. Gadd pg. 115</p>
	<p>9 (d) Describe the action of the components of the eye in forming inverted images on the retina.</p> <p>9 (e) Describe the mechanism of focusing.</p>	<p>Students should draw out the rays of light as they are focused by a lens on to the retina to produce an inverted image. Both shallow and steep rays (far and near objects) should be used to show the need for a thinner and fatter lens, respectively.</p> <p>Explanations of accommodation should be explained and written up by students showing how the ciliary body brings about stretching and thickening of the lens.</p> <p>The use of a piece of rubber pipe in a circle shows how circular muscle contraction decreases the perimeter of a circle.</p>	<p>http://www.1800contacts.com/vision101/ Excellent FLASH movie about eye structure/function. Go to above link and click on Enter</p> <p>http://www.bbc.co.uk/science/humanbody/body/factfiles/sight/sight_animation.shtml The conversion of an object into an image in the brain</p>	<p>P. Gadd pg. 117-118 fig 13.6 and fig 13.7</p> <p>D. Mackean pg 136 fig 18.12 and fig 18.14</p>
	<p>7(k) Explain the role of circular muscles in the movement in the iris of the eye.</p>	<p>The use of the rubber pipe model will explain the increase and decrease of the</p>	ditto	<p>P. Gadd pg. 117 fig 13.5</p> <p>D. Mackean pg 135</p>

<p>9 (g) Describe the reflex action of the circular muscles of the iris in regulating the amount of light reaching the retina. Investigate pupil reflex, blind spot and stereoscopic vision.</p>	<p>pupil by the iris' circular muscles.</p> <p>Students should investigate</p> <ul style="list-style-type: none"> • the pupil reflex by shining light into a partners eyes. • The blind spot using a cross and dot on paper • Stereoscopic vision by trying to get two pencils to meet horizontally, using separate hands and with both eyes then only one eye open. 		<p>P. Gadd pg. 117 P. Gadd pg. 115 P. Gadd pg. 118 D. Mackean pg 144</p>
<p>9 (f) State the function of rods and cones in the retina in transforming units of light energy into nerve impulses.</p>	<p>Students should see a diagram of the retina showing the presence of rods and comes and explain how light energy is converted into chemical and then electrical energy and so on into the optic nerve.</p>	<p>http://webvision.med.utah.edu/movies/3Drod.mov 3D rod model, fly past http://www.udel.edu/Biology/Wags/histopage/modelspage/rodcone.GIF 3D pics. Rods and cones</p>	<p>P. Gadd pg. 116 fig 13.4 D. Mackean pg 134 fig 18.10</p>
<p>9 (h) State the main divisions of the nervous system: central nervous system (CNS) comprising brain and spinal cord and peripheral nervous system (spinal nerves). 9 (i) Distinguish between a neurone and a nerve.</p>	<p>Students should be given a diagram showing the CNS and a drawing of a nerve made up of neurones</p>	<p>http://faculty.washington.edu/chudler/cells.html Lots about neurones</p>	<p>P. Gadd pg. 126 fig 14.1 and 14.2 D. Mackean pg 145 fig 19.1, Pg 148 fig 19.8</p>
<p>9 (n) Carry out experiments to measure reaction time and to demonstrate reflex actions. Relate the control of movement at the elbow in withdrawing the hand from a painful stimulus to reflex action. 9 (j) Define a reflex action. 9 (l) Describe and recognise from a drawing a simple spinal reflex arc.</p>	<p>Students should investigate reaction times using a ruler and reflex action, using the knee jerk spinal reflex. Students should discuss the function of reflexes and compare them with voluntary actions. Producing a table of comparison.</p> <p>Students should be given a diagram of a reflex arc to label and annotate from</p>	<p>http://www.iit.edu/~smile/ph92rc.html Protocol using a ruler http://student.biology.arizona.edu/sciconn/Neuroscience/rxntime.html Another http://www.biosci.uqa.edu/al</p>	<p>P. Gadd pg. 132 P. Gadd pg. 131 P. Gadd pg. 132 summary table P. Gadd pg. 130 fig 14.12 D. Mackean pg 148-149 fig</p>

<p>9 (m) Explain the function of the sensory, intermediate and motor neurones. 9 (k) Explain chemical transmission at synapses.</p>	<p>OHT/internet/textbook/video animation</p>	<p>manac/archive/1998/winter_98/cb_380/anatomy/Two-neuron-reflex.JPG Reflex diagram (knee jerk) http://www.mhhe.com/socscience/intro/ibank/ibank/0022.jpg Ditto, hot object http://www.brainviews.com/abFiles/AniPatellar.htm Animation of knee jerk reflex http://www.tvdsb.on.ca/westmin/science/sbioac/homeo/synapse.htm Synapse animation http://camel2.conncoll.edu/academics/zoology/courses/zo202/Nervous/synapse.html Another http://www.blackwellpublishing.com/matthews/nmj.html and another!</p>	<p>19.9 and 19.10</p>
<p>9 (o) Define hormone. 9 (q) Distinguish between quick-acting hormones (insulin) and slow-acting hormones (oestrogen) (ref to 8m n and o unit 6). 9 (r) Distinguish between the hormonal and nervous control systems (chemical substance or impulse, speed of response, widespread or localised response, long-term or short-lived response).</p>	<p>Students should be directed to remember work done on the control of sugar and the role of insulin and glucagon and the knowledge that women's menstrual cycle is driven by hormones. Students should engage in discussion about the differences between hormonal and nervous transmission and construct a table showing the major points</p>		<p>P. Gadd pg. 134 summary table</p>
<p>9 (s) Define drug dependence. 9 (t) Describe the short-term effects of alcohol on reaction time (rate of transmission of impulses), coordination and the ability to make rational decisions.</p>	<p>Students should be given an information sheet on drug dependency and the effects of alcohol and heroin. If possible literature should be obtained from any local drug rehabilitation initiatives.</p>	<p>http://www.girlpower.gov/girlare/bodyfx/alcohol.htm</p>	<p>P. Gadd pg. 210-212 alcohol Pg 209 heroin D. Mackean pg 271-272 alcohol</p>

	<p>9 (u) State the short-term and long-term effects on the brain and liver of the excessive intake of alcohol.</p> <p>9(v) State the physical and social effects of heroin.</p>	<p>Maybe a speaker can be invited in to give a talk about the effects of drugs</p>	<p>Summary of alcohol effects http://www.bbc.co.uk/science/hottopics/alcohol/game.shtm nice alcohol consumption 'game' http://www.at-bristol.org.uk/alcohol/default.html All sorts about alcohol http://www.well.com/user/woa/fsheroi.htm Heroin factsheet http://faculty.washington.edu/chudler/hero.html Another, more pictures</p>	<p>D. Mackean pg 273 heroin</p>
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