

IGCSE Co-ordinated Sciences 0654

Unit 6: Reproduction and Variation

Recommended Prior Knowledge

Students can come to this Unit with very little prior knowledge, except for an understanding of cell structure.

Context

This Unit covers Topics B12 and B13. There are links to Topic B14 and B15.

Outline

The Unit begins with an overview of asexual and sexual reproduction, which leads into coverage of reproduction in flowering plants. Human reproduction is then dealt with.

Topic	Learning outcomes	Suggested Teaching activities	Learning resources
B12	<p>Know that asexual reproduction produces offspring that are identical to the parent.</p> <p>Understand that sexual reproduction involves a mobile male gamete (e.g. sperm) fusing with a stationary female gamete (e.g. egg).</p> <p>Appreciate the significance of the differences between internal and external fertilisation in animals.</p>	<p>Students should see examples of asexually-reproducing organisms, for example <i>Bryophyllum</i> or spider plants. Ensure that they know that some animals can also reproduce asexually.</p> <p>A common error is to think that self-fertilisation is an example of asexual reproduction.</p>	<p><i>Biology for IGCSE and O Level</i>, CUP, Jones M and Jones G pages 72–73</p> <p>some images of various organisms undergoing asexual reproduction: http://www.tiscali.co.uk/reference/encyclopaedia/hutchinson/images/0008n068.jpg</p>
	<p>Know the reproductive parts of an insect-pollinated flower and understand their functioning.</p>	<p>Students should look closely at the structure of a simple, radially symmetrical insect-pollinated flower. They can dissect it to find all the different parts, and think about their functions. The</p>	<p><i>Biology for IGCSE and O Level</i>, CUP, Jones M and Jones G pages 82–84</p>

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	<p>flower parts can be stuck into their notebooks, and then labelled or annotated.</p>	<p>animations showing pollination: http://www.bbc.co.uk/scotland/education/bitesize/</p> <p><i>Biology for IGCSE and O Level</i>, CUP, Jones M and Jones G pages 83–84</p>	
	<p>Understand the differences in structure between insect-and wind-pollinated flowers.</p>	<p>Samples of insect-pollinated and wind-pollinated flowers (grasses and cereals are good examples of the latter) can be studied, and a comparison table built up. Students can be asked to suggest how the differences in structure relate to adaptations for different pollination mechanisms.</p>	<p><i>Biology for IGCSE and O Level</i>, CUP, Jones M and Jones G pages 83–86</p>
	<p>Understand the differences between pollination and fertilisation in flowering plants.</p>	<p>Students covering the core syllabus do not need to know any detail about the growth of pollen tube or how fertilisation takes place, but they should understand that the male gamete in the pollen grain fuses with a female gamete in the ovule.</p>	<p>A method for investigating the growth of pollen tubes. http://www.saps.plantsci.cam/</p> <p><i>Biology for IGCSE and O Level</i>, CUP, Jones M and Jones G page 85</p>
	<p>Be able to describe the growth of the pollen tube from style to ovule and the passage of the male nucleus along it before fusion with the female nucleus to form a zygote.</p>	<p>Students can try growing pollen tubes.</p>	<p><i>Biology for IGCSE and O Level</i>, CUP, Jones M and Jones G page 86</p>
	<p>Understand the formation of seed and fruit from ovule and ovary.</p>	<p>If possible, students should see flowers in various stages of development through pollination to seed and fruit development.</p>	<p><i>Biology for IGCSE and O Level</i>, CUP, Jones M and Jones G pages 86–87</p>
	<p>Understand the importance of seed dispersal and describe examples of animal- and wind-dispersed seeds or fruits.</p>	<p>A range of fruits should be looked at, and the ways in which they are dispersed considered. Students could draw two fruits and annotate them to explain how the fruits or the seeds inside them are dispersed.</p>	<p><i>Biology for IGCSE and O Level</i>, CUP, Jones M and Jones G page 87</p>
	<p>Know the structure of a bean seed (testa, micropyle, cotyledons, plumule and</p>	<p>A soaked bean seed can be observed, dissected and drawn.</p>	<p><i>Biology for IGCSE and O Level</i>, CUP, Jones M and Jones G page 87</p>

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	radicle only).		
	Understand the conditions needed for germination of seeds.	Students could be asked to design and carry out their own investigation to find out the conditions needed for germination. You could supply some seeds that require light for germination (some types of lettuce) and others that do not.	Investigating seed germination http://http://www.saps.plantsci.cam <i>Biology for IGCSE and O Level</i> , CUP, Jones M and Jones G page 89
B13	Know the structure and function of the male and female reproductive systems.	Provide large, unlabelled diagrams and sets of labels, and ask students to locate each of the named parts. Check answers as a class activity. If 3D models are available, use them to help students to understand the spatial relationships between the reproductive, urinary and digestive systems.	<i>Biology for IGCSE and O Level</i> , CUP, Jones M and Jones G page 75
	Know that adolescence is controlled by hormones produced by the testes or ovaries; that the male sex hormone is testosterone, while the female sex hormones are oestrogen and progesterone.		<i>Biology for IGCSE and O Level</i> , CUP, Jones M and Jones G page s 80 and101
	Appreciate the changes in the ovary and uterus throughout the menstrual cycle.	Provide students with one set of cards containing diagrams and short text showing the uterus at different stages of the menstrual cycle, and another similar set showing the ovary. Ask them to sort and match the cards in the correct sequence.	<i>Biology for IGCSE and O Level</i> , CUP, Jones M and Jones G page 80
	Understand the biological aspects of sexual intercourse, fertilisation and implantation.		<i>Biology for IGCSE and O Level</i> , CUP, Jones M and Jones G pages 76–77
	Appreciate the protection given to the embryo by the amnion and the role of the placenta in		<i>Biology for IGCSE and O Level</i> , CUP, Jones M and Jones G pages 77–78

Topic	Learning outcomes	Suggested Teaching activities	Learning resources
	<p>allowing transfer of materials to and from the foetus.</p>		
	<p>Understand the process of birth.</p>		<p><i>Biology for IGCSE and O Level</i>, CUP, Jones M and Jones G page 78</p>
	<p>Understand the methods of transmission of the HIV virus and how the spread of AIDS may be limited.</p>	<p>Groups of students can look at leaflets and articles in the media about the transmission of HIV/AIDS and ways of limiting its spread, and use these to produce their own short leaflet or poster summarising the correct scientific facts. This is also an opportunity for researching the internet for primary or secondary data about the incidence of HIV/AIDS in their own country and others, analysing the data and displaying it.</p>	<p><i>Biology for IGCSE and O Level</i>, CUP, Jones M and Jones G page 141–142</p> <p>A good place to start researching statistics about HIV/AIDS: http://www.avert.org/statindx.htm</p>
	<p>Appreciate that the world population of humans is growing rapidly and that birth control can help to limit this growth.</p>	<p>This is another opportunity for internet research, looking at population growth in the past, present and as it is predicted for the future.</p>	<p><i>Biology for IGCSE and O Level</i>, CUP, Jones M and Jones G page 168</p>