

CURRICULUM CONTENT

1. Reproduction

- Define *asexual reproduction* as the process resulting in the of genetically identical offspring from one parent
- Describe asexual reproduction in bacteria, spore production in fungi and tuber formation in potatoes
- Define *sexual reproduction* as the process involving the fusion of haploid nuclei to form a diploid zygote and the production of genetically dissimilar offspring
- Discuss the advantages and disadvantages to a species of sexual reproduction
- Identify and draw, using a hand lens if necessary, the sepals, petals, stamens, anthers, carpels, ovaries and stigmas of one, locally available, named, insect-pollinated, dicotyledonous flower, and examine the pollen grains under a light microscope or in photomicrographs
- State the functions of the sepals, petals, anthers, stigmas and ovaries
- Use a hand lens to identify and describe the anthers and stigmas of one, locally available, named, wind-pollinated flower, and examine the pollen grains under a light microscope or in photomicrographs
- Candidates should expect to apply their understanding of the flowers they have studied to unfamiliar flowers
- Define *pollination* as the transfer of pollen grains from the male part of the plant (anther of stamen) to the female part of the plant (stigma)
- Name the agents of pollination
- Compare the different structural adaptations of insect-pollinated and wind-pollinated flowers
- Describe the growth of the pollen tube and its entry into the ovule followed by fertilization (production of endosperm and details of development are **not** required)
- Investigate and describe the structure of a non-endospermic seed in terms of the embryo (radicle, plumule and cotyledons) and testa, protected by the fruit
- Outline the formation of a seed (limited to embryo, cotyledons, testa and role of mitosis) and fruit (produced from the ovary wall)
- State that seed and fruit dispersal by wind and by animals provides a means of colonizing new areas
- Describe, using named examples, seed and fruit dispersal by wind and by animals

2. Sexual reproduction in humans

- Identify on diagrams of the male reproductive system, the testes, scrotum, sperm ducts, prostate gland, urethra and penis, and state the functions of these parts
- Identify on diagrams of the female reproductive system, the ovaries, oviducts, uterus, cervix and vagina, and state the functions of these parts
- Describe the menstrual cycle in terms of changes in the uterus and ovaries
- Outline sexual intercourse and describe fertilization in terms of the joining of the nuclei of male gamete (sperm) and the female gamete (egg)
- Outline early development of the zygote simply in terms of the formation of a ball of cells that becomes implanted in the wall of the Uterus
- Outline the development of the fetus
- Describe the function of the placenta and umbilical cord in relation to exchange of dissolved nutrients, gases and excretory products (no structural details are required)
- Describe the ante-natal care of pregnant women including special dietary needs and maintaining good health
- Outline the processes involved in labor and birth
- Describe the roles of testosterone and estrogen in the development and regulation of secondary sexual characteristics at puberty

3. Inheritance

- Define *inheritance* as the transmission of genetic information from generation to generation

4. Population size

- Define *population* as a group of organisms of one species, living in the same area at the same time
- State the factors affecting the rate of population growth for a population of an organism (limited to food supply, predation and disease), and describe their importance
- Identify the lag, exponential (log), stationary and death phases in the sigmoid population growth curve for a population growing in an environment with limited resources
- Describe the increase in human population size and its social implications
- Interpret graphs and diagrams of human population growth
- Explain the factors that lead to the lag phase, exponential (log) phase and stationary phase in the sigmoid curve of population growth making reference, where appropriate, to the role of limiting factors

5. Variation

- State that continuous variation is influenced by genes and environment, resulting in a range of phenotypes between two extremes, e.g. height in humans
- State that discontinuous variation is caused by genes alone and results in a limited number of distinct phenotypes with no intermediates e.g.
- A, B, AB and O blood groups in humans
- Define *mutation* as a change in a gene or chromosome
- Describe mutation as a source of variation, as shown by Down's syndrome
- Outline the effects of ionizing radiation and chemicals on the rate of mutation

6. Human influences on the ecosystem

- Outline the effects of humans on ecosystems, with emphasis on examples of international importance (tropical rain forests, oceans and important rivers)
- List the undesirable effects of deforestation (to include extinction, loss of soil, flooding, carbon dioxide build up)
- Describe the undesirable effects of overuse of fertilizers (to include eutrophication of lakes and rivers)