

Grade 8 checklist

28 skills. Tick each one when you can do it. For grade 8 you need the skills for the grades below it too.

Cell biology

- ☐ **Give real sizes in standard form** e.g. a real size of 0.000012 m is 1.2×10^{-5} m. (Microscopy)
- ☐ **Give population sizes in standard form** e.g. $300 \times 2^6 = 19\,200 = 1.92 \times 10^4$ bacteria. (Culturing microorganisms)

Infection and response

- ☐ **Evaluate the benefits and drawbacks of vaccination** Weigh the protection of individuals and populations against the fact that vaccines do not always work and can cause mild side effects. (Vaccination)
- ☐ **Explain how specificity lets antibodies target cells** Each antibody binds only to one binding site on one antigen, so it attaches only to the chemical or cells carrying that antigen. (Producing monoclonal antibodies)
- ☐ **Evaluate the use of monoclonal antibodies** Weigh their specificity and reduced harm to healthy cells against unexpected side effects, cost and the use of mice. (Uses of monoclonal antibodies)
- ☐ **Use symptoms to suggest a likely cause** Link the evidence to a cause, e.g. purple or black spots suggest black spot, then say how to confirm it. (Detection and identification of plant diseases)

Bioenergetics

- ☐ **Evaluate greenhouse costs against extra yield (HT)** Use data to decide whether the value of the extra crop from adding heat, light or carbon dioxide is more than the extra cost. (Rate of photosynthesis)
- ☐ **Explain fast breathing after exercise (HT)** Breathing and heart rate stay high to supply the extra oxygen needed to repay the oxygen debt. (Response to exercise)

Homeostasis and response

- ☐ **Explain insulin and glucagon in negative feedback** The two hormones act in opposite directions, returning glucose to normal whenever it rises or falls. (Control of blood glucose concentration)
- ☐ **Interpret osmosis diagrams of animal cells** Explain why animal cells swell and may burst, or shrink, in solutions of different concentration. (Maintaining water and nitrogen balance)
- ☐ **Explain why the cycle restarts without pregnancy** Progesterone falls, the lining breaks down, and FSH is no longer inhibited, so another egg matures. (Hormones in human reproduction)
- ☐ **Evaluate IVF from different points of view** Weigh benefits against risks for patients and doctors, including ethical issues such as unused embryos. (Hormones to treat infertility)
- ☐ **Interpret simple negative feedback diagrams** Follow the arrows to predict and explain what happens when a hormone level rises or falls. (Negative feedback)
- ☐ **Analyse data on plant hormone use** Calculate changes from trial data and weigh up benefits against costs. (Use of plant hormones)

Inheritance, variation and evolution

- ☐ **Evaluate reproduction methods for an unfamiliar organism** Weigh the speed and efficiency of asexual reproduction against the variation from sexual reproduction, using the information given. (Pros and cons of sexual and asexual reproduction)

- ☐ **Explain how a mutation can change a protein** A changed base sequence can change the amino acid sequence, so the protein has a different shape and may not work. (DNA structure)

- ☐ **Deduce genotypes from family tree evidence** For example, two unaffected parents with an affected child must both be heterozygous. (Genetic inheritance)

- ☐ **Evaluate embryo screening with a justified conclusion** Weigh the benefits against the costs and concerns, and make a judgement supported by the information. (Inherited disorders)

- ☐ **Apply natural selection to unfamiliar examples** Use the details given (predators, climate, food) in a logical chain of cause and effect. (Evolution)

- ☐ **Evaluate genetic engineering in agriculture and medicine** Weigh the benefits against the risks and objections to reach a justified conclusion. (Genetic engineering)

- ☐ **Evaluate cloning in agriculture and medicine** Weigh the benefits of many identical, useful organisms against reduced variation, possible health problems and ethical objections. (Cloning)

- ☐ **Explain why Lamarck's theory is rejected** Changes during an organism's life do not change the genes passed on in its gametes, so in the vast majority of cases they cannot be inherited. (Theory of evolution)

- ☐ **Apply speciation to an unfamiliar example** Use the barrier and the different conditions described in the question in each step. (Speciation)

- ☐ **Explain how scientific theories develop over time** New evidence and methods from many scientists built up the gene theory step by step. (The understanding of genetics)

Ecology

- ☐ **Explain unfamiliar adaptations from given information** Use the description or data to link each feature to a specific survival problem in that habitat. (Adaptations)

- ☐ **Evaluate data on distribution changes** Say what the data shows, whether it supports the claim, and what other factors or limitations there are. (Impact of environmental change)

- ☐ **Evaluate a conservation method using given data** Weigh the evidence of success against costs and limitations, then reach a justified conclusion. (Maintaining biodiversity)

- ☐ **Explain why respiration causes large biomass losses** Much of the absorbed glucose is respired to release energy for movement and keeping warm, so it never becomes new biomass. (Transfer of biomass)

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