**Sample Course Outline**

Integrated Science

General Year 11

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# Sample course outline

# Integrated Science – General Year 11

## Unit 1

#### Semester 1 – Unit 1

Science Inquiry Skills align with the Science Understanding and Science as a Human Endeavour content of the unit and are integrated into the learning experiences.

The use of scientific knowledge, as described in Science as a Human Endeavour, is integrated into the learning experiences and assessment of the unit.

| **Week** | **Key teaching points** |
| --- | --- |
| 1 | **Earth systems**   * The Earth’s spheres * hydrosphere * lithosphere * atmosphere * Natural resources for life processes * photosynthesis and respiration * synthesis of building blocks for life (carbohydrates, fats, proteins) |
| 2–4 | * Biogeochemical cycles * water cycle * carbon cycle * nitrogen cycle * Impacts on biogeochemical cycles * natural processes (drought, fire, volcanic activity) * human activities (deforestation, pollution)   **Commence Task 4:** Extended response – Eutrophication: An unintentional impact  **Task 1:** Test – Earth systems |
| 5–7 | **Biological systems**   * Cell structure and function * Hierarchical organisation of organisms * cells * tissues * organs * systems * Structure and function of 2–3 plant and/or animal systems   **Task 2:** Science Inquiry: Practical – Microscopy: Observing cells |
| 8–9 | * Dysfunction/disease (changes in systems) * susceptibility * resistance * Case study: Variation assists survival – vaccination and antibiotic resistance   Task 3: Test – Biological systems  Task 4: Extended response – Eutrophication: An unintentional impact |
| 10–11 | **Ecosystems and sustainability**   * Interrelations between organisms and biogeochemical cycles to obtain requirements for life * atmospheric gases * water * nitrogen * Interaction between communities and the physical environment * classifying ecosystems * Australian ecosystems   **Task 5:** Science Inquiry: Investigation – Monitoring a local ecosystem |
| 12–13 | **Continuity and change**   * Types of reproduction * asexual and sexual * advantages/disadvantages for survival * Variation * importance of variation * cause of variation   **Task 6:** Science Inquiry: Practical – The importance of variation |
| 14–15 | * Adaptations * types of adaptations (structural, physiological, behavioural) * examples of Australian plant and animal adaptations   **Task 7:** Test – Ecosystems and sustainability and continuity and change |

This course outline has be written without a context. Where content is similar in Year 11 and 12 a different context should be used to teach the content.

#### Semester 2 – Unit 2

Science Inquiry Skills align with the Science Understanding and Science as a Human Endeavour content of the unit and are integrated into the learning experiences.

The use of scientific knowledge, as described in Science as a Human Endeavour, is integrated into the learning experiences and assessment of the course.

| **Week** | **Key teaching points** |
| --- | --- |
| 1–2 | **Atomic structure**   * Atomic structure can be modelled * Models have changed over time as new experimental evidence is gathered * Subatomic particles * nucleus (protons and neutrons) * electron shells * calculate numbers of subatomic particles (mass number atomic number) * Elements, compounds and mixtures * chemical symbols * differences between elements, compounds and mixtures * Properties of materials * physical and chemical properties of substances determines use   **Task 8:** Science Inquiry: Practical – Properties of materials |
| 3–5 | **Chemical reactions**   * conservation of mass during a chemical reaction * chemical reactions can be represented using word equations * endothermic and exothermic reactions   **Task 9:** Test – Atomic structure and chemical reactions |
| 6–7 | **Mixtures and solutions**   * Types of mixtures * solutions * suspensions * colloids (e.g. emulsions, foams, sol/gels, aerosols) * Separating mixtures * mixtures can be separated by physical processes * separating insoluble substances (e.g. decantation, filtration, centrifuge) * separating soluble substances (e.g. evaporation, distillation, chromatography)   **Task 10:** Science Inquiry: Investigation – Investigating mixtures |
| 8 | **Motion and forces**   * Forces * contact and non-contact forces * measuring forces * balanced and unbalanced forces * free body diagrams showing the forces acting on objects |
| 9 | * Motion * vector and scalar quantities * distance/displacement * speed/velocity * acceleration |
| 10–12 | * Newton’s Laws of Motion * examples of each law in action   **Task 11:** Test – Motion and forces  **Task 12:** Extended response – Forces in action |
| 13 | **Energy**   * Kinetic * types of kinetic energy * examples of kinetic energy transfers * Potential * types of potential energy * identify when energy in an object changes between potential and kinetic   **Task 13:** Science Inquiry: Practical – Kinetic and potential energy |
| 14–15 | * Heat * kinetic theory of matter * heat energy transfer (conduction, convection, radiation)   **Task 14:** Test – Energy |

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