**Sample Course Outline**

Integrated Science

General Year 12

**Acknowledgement of Country**

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# Sample course outline

# Integrated Science – General Year 12

## Unit 3 and Unit 4

#### Semester 1 – Unit 3

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.

| **Week** | **Key teaching points** |
| --- | --- |
| 1 | **Earth systems/cycles in nature**   * Ecosystem diversity * Biosphere * Biomes * Australian ecosystems |
| 2–3 | * Abiotic and biotic factors * Abiotic factors (e.g. temperature, pH, salinity, light, water, atmospheric gases) * Biotic factors (e.g. competition, habitat, disease, producers, consumers, decomposers)   **Commence Task 1:** Science Inquiry: Investigation – Abiotic and biotic factors in a local ecosystem |
| 4 | * Interaction between biotic and abiotic factors * Biogeochemical cycling (e.g. transpiration, photosynthesis, respiration) |
| 5 | * Energy transfer and transformation * Producers, consumers, decomposers * Food chains * Trophic levels * Food webs   **Complete Task 1:** Science Inquiry: Investigation – Abiotic and biotic factors in a local ecosystem |
| 6–8 | **Structure and function of biological systems**   * Modes of interaction between species * Competition * Predations * Symbiosis * Factors affecting population density, community structure and composition * Predator-prey relationships * Competition * Abundance * Distribution   **Task 2:** Test – Earth systems/cycles in nature, structure and function of biological systems  **Commence Task** 3**:** Extended response – Bushfires: The beneficial, harmful and unintended consequences |
| 9–10 | **Ecosystems and sustainability**   * Population ecology * Carrying capacity * Population growth * Population regulation (density dependent and density independent factors) |
| 11–13 | * Biodiversity * Genetic * Species * Ecosystem * Changes in biodiversity due to * Succession (natural changes over time) * Location * Human impacts (habitat loss, degradation and fragmentation, species exploitation and introduced species) * Social, economic, cultural and ethical considerations * Beneficial/harmful/unintended consequences   Complete Task 3: Extended response – Bushfires: The beneficial, harmful and unintended consequences  **Task 4:** Externally Set Task |
| 14–15 | **Species continuity and change**   * Natural selection * Change in environment * Variation in the population * Survival of the fittest * Adaptation   **Task 5:** Science Inquiry: Practical – Modelling natural selection |

Note: this course outline has been written without a context. Where content is similar in Years 11 and 12 a different context should be used to teach the content.

#### Semester 2 – Unit 4

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.

| **Week** | **Key teaching points** |
| --- | --- |
| 1–3 | **Chemical reactions**   * Properties of materials * Physical and chemical properties of substances determine use * Chemical reactions can be represented using word equations * Conservation of mass during a chemical reaction   **Commence Task 6:** Extended response – Properties of materials |
| 4–6 | * Types of chemical reactions * Combustion reactions * Reactions with acids * Reactions taking in energy (endothermic) * Reactions giving out energy (exothermic)   **Task 7:** Science Inquiry: Investigation – Exothermic reactions |
| 7–8 | **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 8:** Test – Chemical reactions, mixtures and solutions  **Complete Task 6:** Extended response – Properties of materials |
| 9–10 | **Motion and forces**   * Forces * Contact and non-contact forces * Measuring forces * Motion * Vector and scalar quantities * Distance/displacement * Speed/velocity * Acceleration |
| 11 | * Newton’s Laws of Motion * Examples of each law in action |
| 12–13 | **Energy**   * Heat * Kinetic theory of matter * Heat energy transfer (conduction, convection, radiation)   **Task 9:** Science Inquiry: Investigation – Energy transfer |
| 14–15 | * 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 10:** Test – Motion, forces and energy |

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