**Sample Course Outline**

Integrated Science

General Year 12

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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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