Government of **Western Australia**
School Curriculum and Standards Authority

SAMPLE COURSE OUTLINE

INTEGRATED SCIENCE
GENERAL YEAR 12

Sample course outline

Integrated Science – General Year 12

Unit 3 and Unit 4

Semester 1 – Unit 3 – Local ecosystems

Week	Key teaching points
1	• Characteristics of different ecosystems found in a local community • Features of natural, urban, agricultural, aquacultural, freshwater and marine ecosystems
2	• Abiotic factors of a local ecosystem • Impacts of temperature, pH, salinity, light, water and atmospheric gases on the survival of organisms living in that ecosystem **Task 1: Science inquiry (practical and investigation) – Measuring and comparing the abiotic factors of two aquatic ecosystems**
3	• Abiotic factors and their interaction with biotic factors • The sun as the original source of energy for ecosystems • Transfer of energy through food webs **Task 2: Science inquiry (investigation) – Monitoring a local ecosystem**
4–5	• Biogeochemical cycles as a natural circulation of essential elements • The flow of elements from the abiotic to the biotic components of the biosphere and back again • Examples of gaseous and sedimentary biogeochemical cycles, including carbon, nitrogen, water and phosphorus
6–7	• Role of producers, consumers and decomposers in ecosystems • Transfer of energy through ecosystems • Food chains and food webs • Pyramids of numbers and biomass • Trophic levels and diminishing energy transfer **Task 3: Test – Earth systems/cycles in nature and structure and function of biological systems**
8	• Competition, predation, symbiosis, mutualism, commensalism and parasitism **Task 2 excursion**
9	• Population density • Factors affecting population density • Factors affecting community structure and composition **Task 2: Science inquiry (investigation) – Monitoring a local ecosystem submission**
10	• Carrying capacity of an ecological population • Factors affecting carrying capacity **Task 4: Extended response (research and validation) – Climatic events impacting on the carrying capacity of a population**
11	• Comparison of biodiversity between endemic and urban ecosystems • Comparison of biodiversity between terrestrial and aquatic ecosystems
12–13	• Urban sprawl and the effects on ecosystems and biodiversity • Extinction of flora and fauna in built-up areas • Human impact in ecosystems and the effect on biodiversity **Task 5: Externally set task**
14–15	• Natural selection, including: variation, changes in the environment, selection pressures, survival and change in characteristics • Behavioural, functional and structural adaptations of endemic flora and fauna • Behavioural, functional and structural adaptations of invasive species (case study: cane toad) **Task 6: Test – Ecosystems, sustainability and species continuity and change**

Semester 2 – Unit 4 – Vehicles and drivers

Week	Key teaching points
1–3	• Physical and chemical properties of matter • Materials used in vehicle production • The different elements and chemicals that make up materials such as metal alloys, plastics and rubber • The use of materials depends on the physical and chemical properties of that material • Comparison of diesel and petrol fuels **Task 7: Extended response (research and validation) – Materials used in the manufacture of safety design features in vehicles**
4	• Concepts of chemical change and chemical reactions • Reactants and products • Simple word equations • The burning of petrol and the formation of rust on older vehicles as examples of chemical changes in vehicles
5–6	• Combustion reactions • Relate energy production or consumption to chemical reactions • Chemical reactions – fuel in combustion engines, acid in batteries and cellular respiration • The effect of drugs and alcohol on the central nervous system • The breakdown of drugs and alcohol by the human body **Task 8: Science inquiry (practical) – Chemical reactions**
7–8	• Mixtures and solutions • Types of mixtures found in cars – solids (alloys) and liquids (petrol) • Comparison of ethanol fuel mixtures • Separation techniques use to separate mixtures **Task 9: Test – Chemical reactions, mixtures and solutions**
9	• Motion (distance/speed/time graphs) • Speed and velocity • Velocity calculations **Task 10: Science inquiry (practical) – Objects in motion**
10–11	• Newton's laws of motion • The application of Newton's laws to vehicles and drivers • Practical exercises on Newton's laws
12	• Types of forces acting on contact and at a distance • Types of forces acting on a vehicle and the driver **Task 11: Science inquiry (investigation) – Factors affecting the severity of collisions**
13	• Kinetic, potential and heat energy • Techniques and equipment used to measure types of energy • Examples of kinetic, potential and heat energy in vehicles **Task 12: Extended response (research and validation) – Energy changes in vehicles**
14–15	• Law of conservation of energy • Energy transformations in vehicles **Task 13: Test – Motion, forces and energy**