Integrated Science – General Year 11

Task 1 – Unit 1

**Assessment type:** Extended response

**Conditions**

Time for the task:

* Three lessons to research the topic and complete notes (Part 1) and

present a PowerPoint presentation

**Task weighting**

8% of the school mark for this pair of units

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**Marine ecosystems in Western Australia**

Australia has a combined mainland and surrounding island coastline of approximately 36,000km in length. As an island nation, our coastline plays an important role in our environment. The Australian coastline is spread through tropical and sub-tropical climate zones and contains many estuaries, bays, inlets, rocky shores, mangroves, beaches, reefs and other fascinating ecosystems.

**Part 1: Research notes (70 marks)**

Use library and internet resources to research and make notes on the following **five (5)** marine ecosystems from around Western Australia:

* Swan-Canning or Peel-Harvey estuaries
* Ningaloo (coral) reef
* Shark Bay seagrass beds
* inter-tidal zones
* mangroves
* rocky shore.

For each of the marine ecosystems above, your notes should include the following:

* location (1 mark)
* description of the ecosystem (5 marks)
* types of flora and fauna that inhabit the ecosystem (3 marks)
* abiotic factors present (3 marks)
* importance of the ecosystem to humans (2 marks)

\*Note: all research should be based on Australian information

**Part 2: Presentation**

With the information you have collected through your research, produce a PowerPoint presentation on one of the marine ecosystems you have researched.

Marking key for assessment task — Unit 1

| **Description** | **Marks** |
| --- | --- |
| Swan-Canning OR Peel-Harvey estuaries or Wilson Inlet   * Location * Swan-Canning estuary, Perth, Western Australia * Peel-Harvey estuary, Mandurah, Western Australia * Wilson Inlet, Denmark Westeren Australia | 1 |
| * Description * partially enclosed body of water formed by the mixing of freshwater with saline marine water from the ocean   **Swan-Canning estuary**   * Swan­­-Canning estuary protected partially from ocean waves by a barrier island (Rottnest) and rocky reef * freshwater drains from the Avon, Canning and Helena rivers * flows through the Perth CBD * meanders from the Darling Range to Fremantle * consists of many differing habitats, including shallow waters, sandy beaches, rocky cliffs and mud flats   **Peel-Harvey estuary**   * protected from ocean waves by strip of land * consists of Peel inlet and Harvey estuary * covers an area of 136km2 and a volume of 111 megalitres * Dawesville cut connects Peel-Harvey estuary to ocean * subject to tides * consists of many differing habitats, including shallow waters, sandy beaches and mud flats | 1–5 |
| * Types of flora and fauna that inhabit the ecosystem   Fauna   * water birds such as black swan, pelican, duck, seagull, tern, ibis, heron, egret, black and pied cormorant, striped grunter, blowfish, flathead, herring, hardy head, black bream, mulloway, crab, prawn, mussel, bloodworm, marine worm, jellyfish, dolphin, bull shark   Flora   * green algae, sea grass, brown algae, macro algae, macrophytes and filamentous algae | 1–3 |
| * Abiotic factors present * nutrients, toxins, heavy metals, light, temperature, turbidity, pH, water depth, dissolved oxygen, salinity | 1–3 |
| * Importance of the ecosystem to humans * provides a variety of habitat for many aquatic plants and animals * provides nurseries for species which are important for commercial fisheries * provides areas for recreational activities, including fishing, boating, sailing, kayaking | 1–2 |
| Ningaloo (coral) reef   * Location * North-west of Western Australia, north of Perth | 1 |
| * Description * fringing coral reef, 260km long * largest fringing coral reef and largest coral reef close to a land mass * one of two coral reef systems formed on the western coast of a continent * back of reef forms a protected lagoon * reef is formed 5–100m off shore * coral reef is made up of calcium carbonate which is secreted by coral polyps * the hard exoskeleton of the colony of coral polyps forms the reef * many different species of coral polyps produce a colourful and varied structure that makes the reef * provides protection and habitat for other marine organisms | 1–5 |
| * Types of flora and fauna that inhabit the ecosystem   Fauna   * migratory marine species such as whale sharks, dolphins, dugongs, manta rays, humpback whales, loggerhead, hawksbill and green turtles * other marine vertebrates, including approximately 500 different species of fish, including several species of emperor, snapper, trevally, groper, cod, trout, mackerel, tuna and shark * invertebrates, including several species of crab, crayfish, jellyfish, prawn, sea star, sea urchin, mollusc (snail, abalone, mussel, clam), coral polyp, sea anemone and others   Flora   * many varieties of seagrasses, seaweed, algae (green, red, brown), diatoms and phytoplankton | 1–3 |
| * Abiotic factors present: * nutrients, light, temperature, turbidity, pH, water depth, dissolved oxygen, salinity, light penetration, habitat | 1–3 |
| * Importance of the ecosystem to humans * the Ningaloo reef supports a large variety of species providing a biodiversity hotspot which is important for all living things * important feeding and nursery area for migratory species such as whale sharks, humpback whales, manta rays and dugongs, all of which are of great interest to people * reef is a source of recreation/tourism * nursery area for key species that are important for commercial fisheries | 1–2 |
| Shark Bay seagrass beds   * Location * located in Shark Bay marine park 740km north of Perth | 1 |
| * Description: * large areas where seagrasses grow in an underwater meadow * sea grasses are flowering plants and have the same basic structure as land-based flowering plants – produce flowers, have leaves and roots * grow in sandy or mud bottom, shallow seas * area of low-wave action * grow in lines parallel to water currents | 1–5 |
| * Types of flora and fauna that inhabit the ecosystem:   Fauna   * dugongs, sharks, rays, bottlenose dolphins, and a variety of fish, including emperors, wrasse, snapper whiting and other appropriate vertebrate species * invertebrates include stromatolites, bivalves (clams, oysters and mussels), jellyfish, sea stars and other appropriate invertebrates   Flora   * twelve types of sea grasses, the most common being wire weed, ribbon weed and paddle weed | 1–3 |
| * Abiotic factors present: * nutrients, light, temperature, turbidity, pH, water depth, dissolved oxygen, salinity, light penetration, habitat | 1–3 |
| * Importance of the ecosystem to humans: * satisfies 4/10 criteria for World Heritage listing * significant natural values like stromatolites, dugongs and largest seagrass meadows * tourism value * provides nursery area for some key species for commercial fisheries | 1–2 |
| Inter-tidal zone – Mangroves   * Location * located in coastal regions in all mainland states of Australia; mainly in the north of Western Australia/Kimberley | 1 |
| * Description * found in tropical and sub-tropical tidal areas * areas where there is a lot of fine sediment/silt deposited * protected from wave-action * various types of salt tolerant trees and shrubs that can grow in inter-tidal conditions * provides habitat for a diverse range of aquatic and terrestrial animals * plants and animals are exposed to a broad range of salinity, temperature, moisture and other key environmental conditions | 1–5 |
| * Types of flora and fauna that inhabit the ecosystem   Fauna   * saltwater crocodiles, shellfish (mussels, snails), polychaetes (mud worms, burrowing worms), fish (mud skipper, mangrove jack, threadfin salmon, barramundi), mud crabs, mud lobster, prawns, insects, sea snakes, pythons, snakes, birds, monitor lizards   Flora   * common mangrove (yellow, Milky, Grey, Red, Orange, River), salt marsh, salt-tolerant herbs and shrubs | 1–3 |
| * Abiotic factors present * in-coming tides bring salt, flooding, oxygen in sediment, nutrients, sediments, high turbidity * outgoing tides remove organic carbon/organic matter, sulphur compounds | 1–3 |
| * Importance of the ecosystem to humans * provides breeding ground for key fisheries species – barramundi, banana prawn, mud crab, mussel * protect shorelines from erosion * carbon sink and sequestration * habitat for migratory birds and fish | 1–2 |
| Inter-tidal zone – Rocky shore   * Location * found where sea meets rocky coastland along the coasts of all states in Australia, where limestone or granite make up shoreline | 1 |
| * Description * consists of some form of rock (limestone, granite, basalt) * weathered by wave action to produce rock pools, crevices, platforms, boulder fields * provides a fairly permanent coastal feature * subject to being under water at high tide * can be separated into * high-tide zone: submerged only during high tide, dries out when not high tide, highly saline * middle-tide zone: submerged for approximately equal amounts of time between tide changes * low-tide zone: mostly submerged by water | 1–5 |
| * Types of flora and fauna that inhabit the ecosystem * high-tide zone: anemones, barnacles, chitons, crabs, green algae, isopods, limpets, snails, whelks and mussels. In rock pools in high-tide zone – small fish, octopus and larger seaweed * middle-tide zone: anemones, barnacles, chitons, crabs, green algae, sea lettuce, sea palms, sea stars, snails, sponges, mussels and whelks. Rock pools in middle-tide zone provide habitat for small fish, shrimp, krill, sea urchins and zooplankton * low-tide zone: more marine vegetation like seaweeds, brown seaweed, surf grass, sea lettuce, green algae, sponges, abalone, anemones, mussels, crabs, sea cucumbers, prawns, shrimp, hydroids, tube worms and whelks and a wide variety of fish like tailor, bream and herring | 1–3 |
| * Abiotic factors present * high salinity, high turbidity, lack of water (high-tide zone), wave action, high temperatures (high-tide zone), sunlight | 1–3 |
| * Importance of the ecosystem to humans * provides habitat for desirable species such as abalone, mussels and sea urchin * provides nursery areas for many marine animal species * provides food source for commercially important species such as bream, snapper, yellowtail, samson fish, Australian salmon * at low tide, provides food source for many marine birds | 1–2 |
| **Total** | **/70** |