Stage 1 Earth and Environmental Science Program 1

**Earth Resources**

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| Understandings | Teaching Strategies | Assessment |
| **Topic 1: Turbulent Earth**  Interactions of Earth systems may result in Earth Hazard.   * Describe different types of Earth hazards. * Describe how Earth hazards affect life, health, poverty, and the environment. * Explain how occurrence of Earth hazards in one sphere can affect Earth processes in other spheres. * Investigate how human activity influences the frequency and intensity of some hazards. * Discuss different strategies that have helped lessen the severity of Earth hazards.   Processes within the geosphere generate Earth hazards.   * Describe how plate tectonics generate earthquakes, volcanic eruptions, and tsunamis. * Discuss how earthquakes, volcanic eruptions, and tsunamis affect other Earth systems processes.   The impact of extra-terrestrial bodies can affect Earth systems.   * Describe an extra-terrestrial impact and how it affects Earth systems.   Earthquake and volcanic eruption data can be used to map hazardous zones and to predict future events.   * Describe how Earth hazards are monitored by measuring various factors. * Discuss how data can contribute to future predictions of Earth hazards. | SIS activities:  use the Quakecaster to investigate whether Earthquakes can be predicted or periodic in occurrence  use the Quakecaster to investigate the factors influencing earthquakes.  SHE focus:  Students could explore the construction of tsunami barriers in Japan, the design of earthquake resistant buildings, the monitoring of volcanic and seismic activity and evaluate different designs. | Formative SHE investigation |
| **Topic 2: Composition of the Geosphere**  Minerals are constituents of the geosphere and are classified according to their chemical composition   * Discuss the limitations of using criteria to categorise substances as minerals.   Minerals can be identified by their characteristic properties.   * Identify common rock-forming minerals by observing their properties. * Discuss how the uses of minerals are related to their properties.   Rocks are composed of characteristic assemblages of mineral crystals or grains that are formed through igneous, sedimentary, and metamorphic processes, as part of the rock cycle.   * Classify rocks as one of igneous, sedimentary, or metamorphic by identification of their characteristic minerals and texture. * Describe the processes that form igneous, sedimentary, and metamorphic rocks.   Interactions between the atmosphere, geosphere, hydrosphere, and biosphere lead to the formation of soil.   * Describe the composition of soil as rock and mineral particles, organic material, water, gases and living organisms * Discuss the relationship between a soil, its origin, and its possible uses. | SIS activities:  Use tools and knowledge to investigate the properties of minerals such as colour, streak, cleavage, hardness, lustre, density, magnetism and reaction to dilute hydrochloric acid  Students undertake a fieldtrip to develop observation and recording skills. Examples;  a fieldtrip to the cemetery to look at different rocks used for headstones as well as observing chemical weathering of limestone  a fieldtrip to Granite Island to observe examples of physical and chemical weathering  a fieldtrip to a local site to identify rocks and minerals  Test soil samples from students’ backyards and predict the suitability of these sites for various activities such as construction of houses or growing plants  SHE focus:  Student could explore how the use of minerals such has diamonds, have improved the efficiency of industrial processes. | **AT2: SAT 1**  Mineral and rock identification |
| **Topic 5: Importance of the Hydrosphere**  Water is present on the Earth as a result of volcanic outgassing and the impact of icy extra-terrestrial bodies.   * Discuss theories of the origin of the Earth’s water.   Water occurs in three phases on the Earth, solid, liquid, and gas.   * Describe examples of the occurrence of the three phases of water in each of the Earth’s spheres. * Describe the hydrological cycle. * Explain why evaporation from large bodies of water, e.g. the ocean and rivers, is important for atmospheric moisture. * Explain how changes to the hydrological cycle impact on ecosystems and people’s use of resources. * Discuss global water distribution. * Explain the importance of water’s unique properties in sustaining life on Earth and in shaping Earth processes. |  | **AT1: SHE**  Water Sustainability |
| **Topic 6: Biosphere**  In any one location, the characteristics and interactions of the atmosphere, geosphere, hydrosphere, and biosphere give rise to unique and dynamic communities.   * Describe the difference between biotic and abiotic features of an ecosystem. * Explain how a change in these features can create different environments. * Identify, measure, and record the appropriate characteristics in a field location. * Describe how these factors may affect the distribution and abundance of organisms found in a particular location.   Scientists recognise six waves of extinction in the past half billion years.   * Explain how past mass extinctions were caused by events like asteroid strikes, volcanic eruptions, and natural climate shifts. * Explain why current biodiversity loss is almost entirely caused by humans.   Processes occurring in ecosystems that achieve major transformations of resources that benefit humans are known as ecosystem services.   * Discuss the benefits of ecosystem services. | Choose one example to describe the interaction between humans and natural ecosystems services.  Explore the importance of biodiversity in the provision of ecosystem services. | **AT1: Field Investigation**  Brukunga mine  **AT2: SAT 2**  Explore how increased scientific understanding of ecosystem services influences decisions made in agricultural production. |