NUS National University of Singapore | Lee Kong Chian Natural History Museum

An Insider to the Comprehensive Marine Biodiversity Survey

Overview of Station Activities

Activity	Description
Activity 1: Motile and Sessile Organisms	Get up close with marine specimens to distinguish motile and sessile organisms and examine how organisms like corals play a vital role in the ecosystem.
Activity 2: Singapore's Coral Reef Diversity and Threats	Explore how Autonomous Reef Monitoring Structures (ARMS) are used to study hidden reef organisms, then analyse real coral-cover data to investigate how changes such as land reclamation may affect coral reefs and biodiversity.
Activity 3: DNA Analysis with BLAST	Learn how to run DNA sequences through NCBI's BLAST database to identify unknown organisms and evaluate how reliable the match is.
Activity 4: JellyfishWatch	Discover the diversity behind "jellyfish", distinguish sea jellies from comb jellies, and think like a researcher by exploring research questions and planning a research project.

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Secondary School Science Syllabus Links

Think and Work Like a Scientist

The activities in this Workshop incorporate the Practices of Science (POS) framework and provide opportunities for students to develop key scientific inquiry and reasoning skills:

- Demonstrating Ways of Thinking and Doing in Science
- Understanding the Nature of Scientific Knowledge
- Relating Science, Technology, Society and Environment

Activity	Lower Secondary Science	Upper Secondary Biology
Activity 1: Motile and Sessile Organisms	**Theme: Interactions** – Interactions within Ecosystems	**Theme: Living Together – Plants, Animals and Ecosystems** – Organisms and their Environment
Activity 2: Singapore's Coral Reef Diversity and Threats	**Theme: Interactions** – Interactions within Ecosystems – Evaluate the impact of human activities on the environment	**Theme: Living Together – Plants, Animals and Ecosystems** – Organisms and their Environment – (Pure Biology only) Conservation of species and sustainable use of natural resources in maintaining biodiversity
Activity 3: DNA Analysis with BLAST	**Theme: Models** – Model of Cells – the Basic Unit of Life	**Theme: Continuity of Life** – Molecular Genetics
Activity 4: JellyfishWatch	**Theme: Interactions** – Interactions within Ecosystems	**Theme: Living Together – Plants, Animals and Ecosystems** – Organisms and their Environment

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Secondary School Geography Syllabus Links

Activity	Lower Secondary Geography	Upper Secondary Geography
Activity 1: Motile and Sessile Organisms	**Theme: Sustainable Resource Use and Management** – Ecosystem services – Research-guided biodiversity conservation	**Cluster: Geography in Everyday Life** – Sustainable Development **Cluster: Singapore** – Small Island City State • Singapore's coastal ecosystems and biodiversity – Sustainable and Resilient Singapore • Nature's life-support systems and ecosystem services
Activity 2: Singapore's Coral Reef Diversity and Threats	**Theme: Sustainable Resource Use and Management** – Ecosystem services – Research-guided biodiversity conservation	**Cluster: Climate** – Climate Change • threats to coral reefs and aquatic ecosystems. **Cluster: Singapore** – Small Island City State • Singapore's coastal ecosystems and biodiversity – Challenges and Opportunities • Land reclamation, coastal management and threats to biodiversity
Activity 3: DNA Analysis with BLAST	**Theme: Sustainable Resource Use and Management** – Geographical Investigation – Geographical Data Skills	**Cluster: Geography in Everyday Life** – Geographical Methods – Geographical Data Skills and Techniques
Activity 4: JellyfishWatch	**Theme: Sustainable Resource Use and Management** – Geographical Investigation – Biodiversity conservation and public education	**Cluster: Geography in Everyday Life** – Sustainable Development • Environmental stewardship – Geographical Methods – Geographical Data Skills and Techniques **Cluster: Singapore** – Small Island City State • Singapore's coastal ecosystems and biodiversity

Junior College H1/H2/H3 Biology Syllabus Links

Think and Work Like a Scientist

The activities in this Workshop incorporate the Practices of Science (POS) framework and provide opportunities for students to develop key scientific inquiry and reasoning skills:

- Demonstrating Ways of Thinking and Doing in Science
- Understanding the Nature of Scientific Knowledge
- Relating Science, Technology, Society and Environment

Activity	Junior College Biology Syllabus
Activity 1: Motile and Sessile Organisms	**Core Idea: Biological Evolution** – Biological classification according to shared characteristics (H2 only) – The biological concept of the species (H1 & H2) – Natural selection and evolution (H1 & H2)
Activity 2: Singapore's Coral Reef Diversity and Threats	**Core Idea: Impact of Climate Change on Animals and Plants** – Effects of climate change including stress to coral reef, seagrass and mangrove ecosystems (H1 & H2) – How animal and plant species adjust and adapt to climate change (H3 only)
Activity 3: DNA Analysis with BLAST	**Core Idea: Genetics and Inheritance** – DNA structure, sequence and genetic information (H1 & H2) – Principles and procedures of molecular techniques (H2 only) **Core Idea: Biological Evolution** – The biological concept of the species (H1 & H2) – Importance of genome sequences in reconstructing phylogenetic relationships; advantages of molecular methods in classifying organisms (H2 only)
Activity 4: JellyfishWatch	**Core Idea: Biological Evolution** – The biological concept of the species (H1 & H2) – Classification and phylogeny: the organisation of species by shared characteristics and evolutionary relationships (H2 only)

Junior College H1/H2/H3 Geography Syllabus Links

Activity	Junior College Geography Syllabus
Activity 1: Motile and Sessile Organisms	**Cluster: Sustainable Future and Climate Change (H1, H2 & H3)** – The Future with Climate Change: • Effects of climate change **Cluster: Development, Economy and Environment (H2 & H3 only)** – Environment and Resources: • Ecosystem services • Impacts of human activities
Activity 2: Singapore's Coral Reef Diversity and Threats	**Cluster: Sustainable Future and Climate Change (H1, H2 & H3)** – The Future with Climate Change: • Effects of climate change **Cluster: Development, Economy and Environment (H2 & H3 only)** – Environment and Resources: • Ecosystem services • Impacts of human activities **Cluster: Geographical Enquiry and Fieldwork (H1/H2)** – Pre-fieldwork: Develop a focused question and data-collection plan – Fieldwork: Data collection – Post-fieldwork: Present and analyse data
Activity 3: DNA Analysis with BLAST	**Cluster: Geographical Enquiry and Fieldwork (H1/H2)** – Collect and interpret evidence from digital and secondary sources – Assess data quality, accuracy, reliability and limitations – Present an evidence-based conclusion **Cluster: Independent Research Component (H3)** – Apply similar evidence-evaluation and analytical reasoning skills
Activity 4: JellyfishWatch	**Cluster: Geographical Enquiry and Fieldwork (H1/H2)** – Pre-fieldwork: Develop a focused question and data-collection plan – Fieldwork: Data collection – Post-fieldwork: Present and analyse data **Cluster: Independent Research Component (H3)** Apply similar evidence-evaluation and analytical reasoning skills