

# Hillarys School Excursion: Science of Sampling

## Phase of learning

Senior Secondary (Years 11-12)

## WA Curriculum

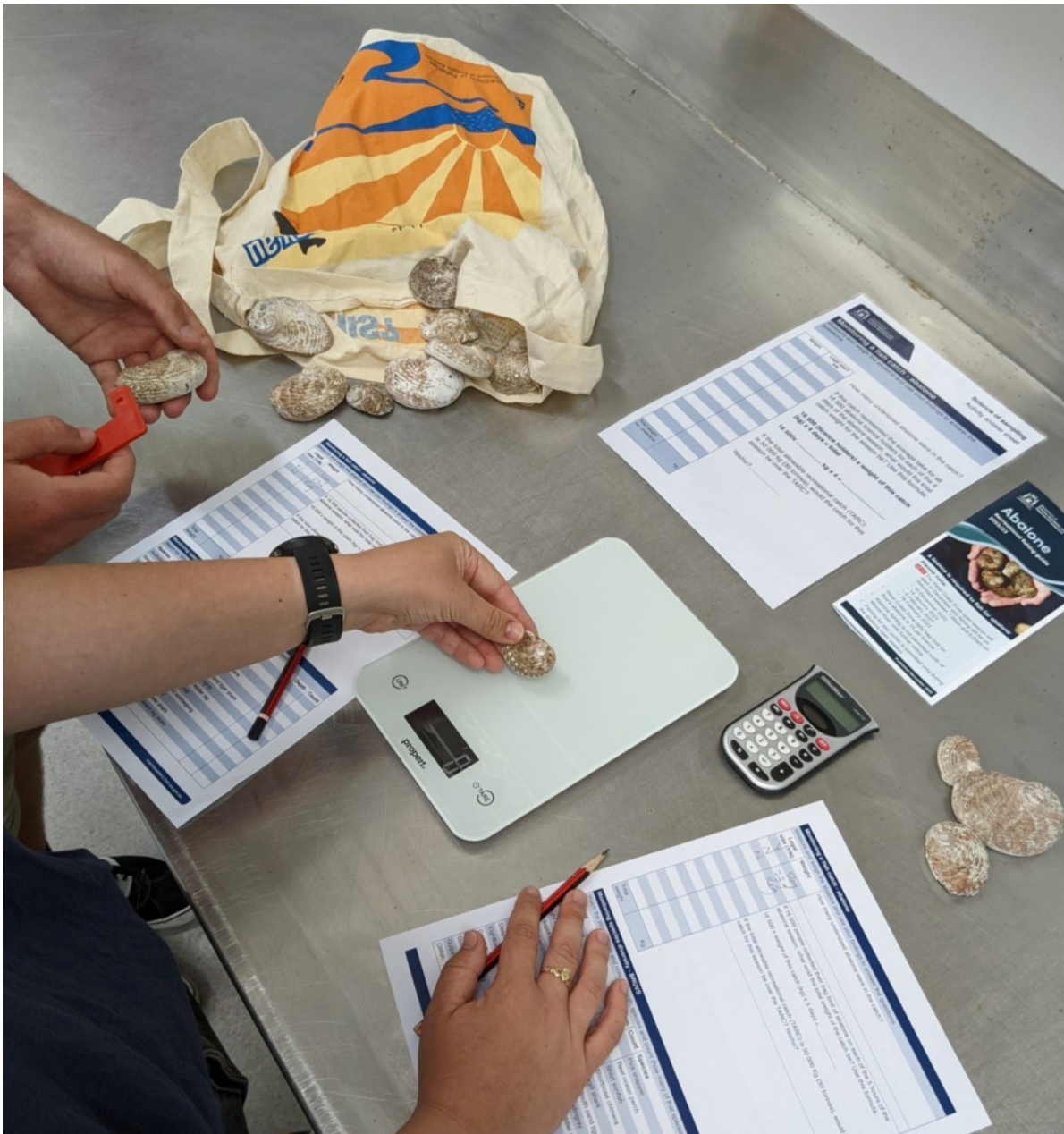
SS Biology – ATAR, SS Biology – General, SS Integrated Science – ATAR, SS Marine and Maritime Studies – ATAR, SS Marine and Maritime Studies – General

## Region

West Coast

## Summary

How many different types of plants, algae and animals are below the water's surface? How many different species of fish are out there to look at when you go diving, or to catch when you go fishing? How does a fisheries scientist determine how many fish are in the sea?



### **Duration 1.5 hours**

This activity simulates a range of scientific sampling techniques used by scientists at the Department of Primary Industries and Regional Development (DPIRD) to help better understand and sustainably manage Western Australia’s aquatic resources and environments. Students use real data collected themselves and/or by DPIRD researchers to determine the health of iconic Western Australian fisheries.

The ever-changing and vast nature of Western Australia’s aquatic environments make sustainable aquatic natural resource management a challenge. The species that inhabit these environments are diverse in their biology, movement patterns and distributions. Some species

are also more susceptible to anthropogenic impacts than other species. Managing the species that contribute to WA's natural resources requires a range of effective and efficient sampling methods. Well-designed and well-executed sampling ensures our scientists know as much as possible about the populations of marine organisms, how healthy they are, and the state of their environments.

New technologies and scientific methods are continuously enhancing our ability to find and document marine life and are changing the way marine scientists operate. Some of these techniques are more traditional, such as snorkel or SCUBA diving surveys and transects, seine or trawl netting, and analysing commercial catch returns and surveying recreational fishers.

Other more modern methods use satellite imagery, sonar and drones to survey populations of fish and other marine animals, as well as provide more information about the physical environment. Baited Remote Underwater Video Systems (BRUVS) are another method developed in the early 2000s, which use an underwater video camera and a bag of bait to explore the marine environment without a high level of disturbance.

In this activity, students learn about the modern methods fisheries and marine research scientists use across a range of vertebrate and invertebrate species. Students will listen to a brief presentation, then complete five activities that introduce the sampling and data collection methods behind the following areas of resource management in DPIRD:

- **Macroinvertebrate sampling:** Students will complete counts of juvenile rock lobsters, or puerulus, simulating the technique as DPIRD fisheries scientists. They will compare this to data from previous years and use their observations to predict the forecasted catch of Western rock lobster.
- **Marine biosecurity:** Students will examine a biofouling sample from Hillarys Boat Harbour in the laboratory and assess it for the presence of invasive species using marine pest identification guides. Students will also use a guide to determine whether their sample includes common biofoul species across the following groups: algae, porifera, polychaetes, molluscs, crustaceans, echinoderms, and chordates.
- **Finfish ageing and population structure:** Students examine the otoliths (ear bones) from black bream under microscopes and determine the age of the fish. Students will work in pairs and use the same validation technique DPIRD fisheries scientists to ensure accurate data collection.
- **Evaluating recreational abalone catch:** Students will measure and weigh a 'catch' of abalone and use this information to estimate the total recreational catch for a fishing season. They will compare this to the Total Allowable Recreational Catch (TARC), a management measure for the recreational fishery, and determine whether the estimated catch will exceed the TARC of abalone for that fishing season.
- **Explore species diversity using Baited Remote Underwater Video Systems**

**(BRUVS):** Students will view vision (footage) from BRUVS in the Perth Canyon. They will observe the variety of habitats and organisms present and record the depth and count of the species identified.

**Cost \$5.00 per student**

### **Pre-excursion and post-excursion resources:**

While we briefly cover the life cycle of Western rock lobster in our presentation, you may wish to familiarise students with this prior to their excursion using [Poster: Western Rock Lobster Life Cycle](#) and [Fact Sheet: Western Rock Lobster](#). This will help maximise their understanding of why our puerulus sampling method is effective for this species.

You can also use the related resources below to further explore the topics of this excursion with students prior to or after your visit.

### **Related resources**

[Hillarys School Excursion: Aquatic Natural Resource Management](#)

[Poster: Abalone Life Cycle](#)

[Poster: Western Rock Lobster Life Cycle](#)

[Fact Sheet: Abalone](#)

[Fact Sheet: Western Rock Lobster](#)

[Fact Sheet: Fish ageing](#)

[Lesson: Ageing fish](#)

[Poster: Fish Ageing](#)

[Lesson: Timeline](#)

[Student Worksheet: How old is a fish?](#)

[Lesson: Fishing for abalone](#)

[Student worksheet: Abalone fishing rules](#)

[Fact Sheet: Introduced Marine Species](#)

### **Linked External Resources**

[State of the Fisheries and Aquatic Resources Report](#)