

SEAWEED and KELP, SEAGRASSES and SPONGES



Australasian snapper under a kelp forest canopy Source: iStock

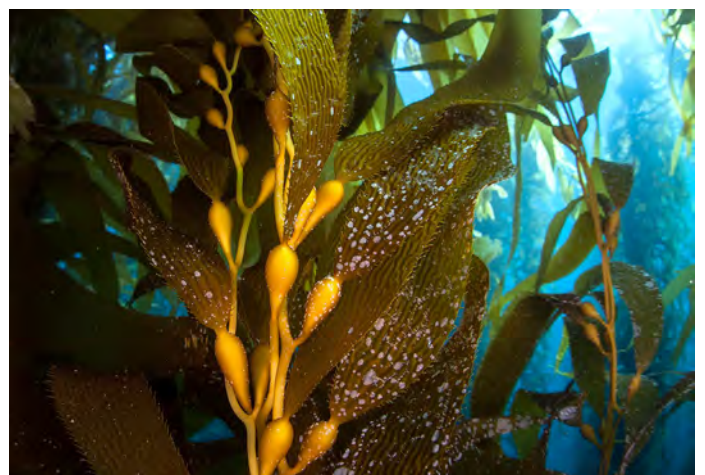
Seaweeds, kelp, seagrasses, and sponges are habitat forming species

A **seaweed** is a macroscopic (visible) form of red, brown, or green **algae**. Green algae can be seen on intertidal rock platforms and in rockpools. Red algae grow closer to the sea floor where there is less light. Brown algae are the largest macroalgae and commonly known as kelp. Seaweeds and kelp come in many shapes and sizes. They play an important role in marine ecosystems as a source of food and habitat for marine animals.

Kelp is **brown macroalgae** found on rocky coasts in temperate and subpolar regions with cool, nutrient rich water and ample light for photosynthesis. Pigments and chlorophyll in the kelp tissue create the brown colour. Accumulations of kelp transform rocky outcrops into complex 3D kelp forests with clearly recognisable layers such as canopy, understory, and forest floor.

Recognisable features of kelp include:

- *holdfast* attaches kelp to a rocky surface
- *stipe* (like a stem)
- *air bladder* – a gas-filled pod, on the blades or between the blades and stipe assists flotation.
- *blades* (like leaves)



Kelp blades and air bladders. Source: Shutterstock

Adaptations

Kelp is uniquely adapted to life below the surface.

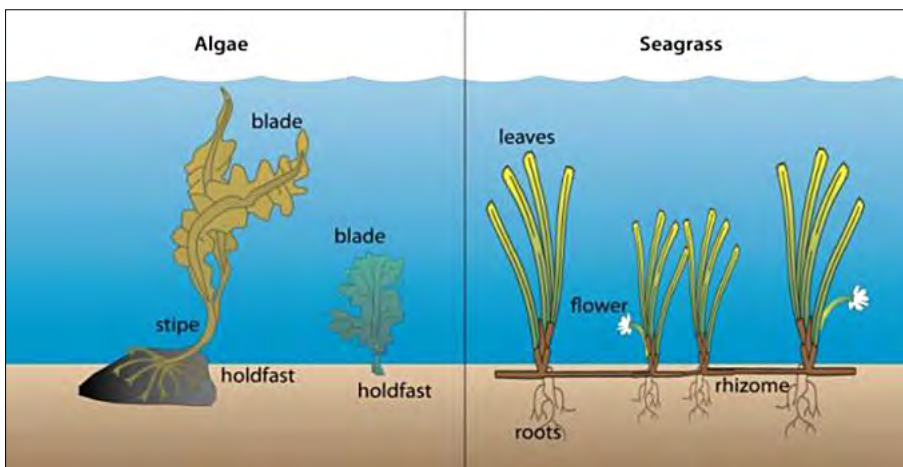
- The holdfast acts as an anchor, helping the kelp **withstand the ebb and flow of daily tides**
- A flexible stipe allows kelp to **sway and bend in moving coastal waters**
- Balloon shaped pneumatocysts (gas bladders) filled with waste gases keep the **kelp fronds upright, floating** and holding blades near the surface to **maximise light absorption**.

FACT SHEET

Kelp are ALGAE: Sponges are ANIMALS: Seagrasses are PLANTS. All play a role in kelp forest ecosystem functioning

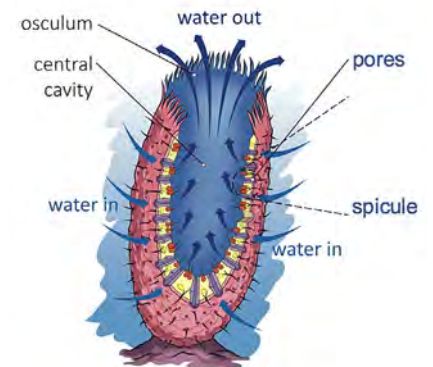
| KELP (MACROALGAE) | SPONGES (ANIMAL) | SEAGRASSES (PLANT) |
|--|--|---|
| Holdfast, blades, and a stipe | Silica or Calcium carbonate rods | Roots, stems, leaves and flowers |
| Produce food by photosynthesis and absorb nutrients from water Holdfast does not absorb nutrients | Filter food and oxygen from water pumped through pores and channels No photosynthesis | Produce food by photosynthesis Nutrients are absorbed by the roots and transferred through veins |
| Reproduce via spores and buds | Reproduce via sperm and eggs | Reproduce by seed or rhizome |

Seagrasses are commonly found in shallower water adjacent to Kelp forests. **Sponge gardens** can be found in shaded rock crevices and on the floor of kelp forests.



Smithsonian <https://ocean.si.edu/ocean-life/plants-algae/seagrass-and-seagrass-beds>

'Algae or "seaweeds" (left) differ from seagrasses (right) in several ways. Algae on the seafloor have a holdfast and transport nutrients through the body by diffusion, while seagrasses are flowering vascular plants with roots and an internal transport system.'



Sponges are colonial animals with hard, multi-pointed rods (spicules) permanently attached to substrate. Sponges consume organic particles, plankton and oxygen from water pumped through pores and channels – this water also removes wastes. They produce larvae that colonise new areas or reproduce from broken fragments (buds). Sponge gardens can grow in shaded locations and provide habitat for a diversity of marine creatures.

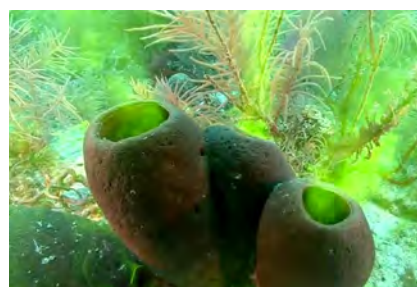
Connected habitats and ecosystems

Rocky reef habitats are connected through ecological processes such as food chains, energy flows and nutrient cycles. **Kelp** produces food through photosynthesis and directly and indirectly feeds primary consumers such as zooplankton across multiple habitats. **Sponges** filter food and nutrients from the water, keeping the water clear for kelp to photosynthesise. Kelp and seagrass ecosystems are connected and mutually beneficial in supporting marine biodiversity.

Learn more about Kelp <https://www.youtube.com/watch?v=GcbU4bfkDA4>

Swim through kelp and seaweed here <https://www.youtube.com/watch?v=Ps5gq1wCzXY>

Watch sponges pumping water here <https://www.youtube.com/watch?v=pTZ211cljX8>



ABOVE: Sponge Garden. Ocean Imaging. Great Southern Reef

LEFT: Blue World: Sponges pumping water – <https://www.youtube.com/watch?v=pTZ211cljX8>

AUSTRALIA'S GREAT SOUTHERN REEF

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GTA NSW & ACT is providing **ONE TIME** access to selected presentations recorded at the 2021 GTA Annual Conference to schools unable to attend due to factors unique to 2020–2021. Some recordings, particularly workshop sessions are condensed versions of the live events.

DETAILS

- Presentations in the package focus on the following Professional Teaching Standards
 - Standard 2: Know the content and how to teach it; and Standard 6. Undertake Professional Learning
 - **classroom practice**
 - deep learning about **environmental processes, change** and **management**
 - integrating **geospatial technologies**
 - identifying **careers** that draw on Geography
- Access is continuous until 30 October 2021 (Week 4, Term 4)
- Accessible at any time via a weblink with a passcode – not downloadable
- PPTs and support materials for each presentation as provided at the conference

HOW TO USE THE PACKAGE

- **Whole faculty /department/ team** viewing at team or staff meetings/ professional development days
- **Individual** viewing and discussion at team or faculty level
- For workshop sessions, stop and complete the activities as if you were at a conference.
- Elective PL Hours – reflection using the identified Teaching Standards
<https://etams.nesa.nsw.edu.au/help/how-to-log-teacher-identified-pd-index/>

COST

- **Member schools** – \$330 per school (inc. GST)
- **Non-member schools** – \$440 per school (inc. GST)

Registration until 14 August 2021 to allow adequate time to make use of the materials in the package.

**ORDER & PAY
HERE**

ACCESS THE INFORMATION FLYER OUTLINING THE PACKAGE CONTENT

GEOGRAPHY 2021 HSC EXAM PREPARATION FOR YEAR 12 STUDENTS & TEACHERS

GTA NSW & ACT has traditionally organised revision lectures for HSC Geography students and their teachers. In 2021 schools will be offered a repeat of the Digital Package produced in 2020 (minor revisions made) with a 2021 Supplement of new and updated materials.

The package consists of pre-recorded videos and support materials. Teachers can use the materials with their HSC classes, irrespective of the number of enrolled students.

- Recommended for tutorial and in class revision / teacher led revision.
- Transfer key ideas from illustrative examples and case studies to your own studies*
- Not to be used for private tutoring purposes.
- Streamed directly from Vimeo and not downloadable.
- Support materials downloadable from a Google Drive Folder.

CONTENTS:

| MAIN PACKAGE | 2021 SUPPLEMENT |
|--|---|
| Ecosystems at Risk – EAR Part 1 & Part 2 using illustrative examples. Lorraine Chaffer | EAR: Know your case studies – through the lens of a study of the Great Barrier Reef. Matt Carroll HSC Question Drop EAR / EAR Matt Carroll |
| People and Economic Activity with a focus on Global Tourism. Dr Grant Kleeman | PEA: Investigating an Economic Enterprise – through the lens of a study of Tamburlaine winery Matt Carroll |
| People and Economic Activity – General syllabus overview and advice. Lorraine Chaffer | Economic Activity Update: Global Tourism in the age of COVID-19 Dr Grant Kleeman |
| Urban Places Karen Bowden | Section III – Hitting the band descriptors Alexandria Warnock |
| HSC Geographic Tools and Skills Sharon McLean | Effective use of fieldwork. Making your fieldwork count. Grace Larobina |
| | Know your fieldwork tools and skills cards Lorraine Chaffer |
| Student workbooks for: – EAR, PEA, Urban Places – Skills and tools. | Checklist: On the road to the Trail HSC Extended response templates Catherine Donnelly |

ACCESS:

The package will be available from Friday 11 June until Tuesday 2 November – the day of the HSC Geography Exam. The teacher(s) who completes the registration will be provided with the download details once payment has been received.

NOTE: ACCESS INFORMATION IS NOT TO BE SHARED WITH STUDENTS.

COST:

Main Package plus 2021 Supplement –

- **\$250** plus GST – **Members** (school or personal)
- **\$350** plus GST – **Non-members**

2021 Supplement ONLY –

- **\$60** plus GST – **Member schools**
- **\$120** plus GST – **Non-members**

NOTE: the supplement is for those schools who were able to download the 2020 package to their school network for students to access independently; this feature is not offered in 2021.

BENEFIT:

Although created for students in Year 12, teachers new to teaching Stage 6 and currently teaching Year 11 could benefit from a good overview of the Year 12 topics and the advice from presenters covered in this package.

ORDER AND PAY HERE