SEAQUARIA
OCEAN EDUCATION

Seaquaria in Schools

Animal and Plant Guide

Your Seaquarium may not have all the listed animals or plants, nor is everything in your Seaquarium present in the guide. Supply depends on what is available during our collection trips, and some things volunteer unexpectedly.

Please contact us if you have any questions.

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Phylum Porifera

Poriferans are commonly called sponges. They are primitive multicellular organisms that have specialized cells but have not developed true tissues. Most species are sedentary and filter feeders. They are one of the oldest animals on the planet. Although they look relatively simple, they have a fascinating biology and play an important role in local ecosystems by filtering water, being prey for a variety of animals, and create habitats. The ancient glass sponge reefs on the BC coast are a unique relic of the age of dinosaurs, thought to have become globally extinct 40 million years ago. We don't have any of these in the Seaquaria, but generally bring in other local sponges. They don't live very long in the Seaquaria but are an interesting addition that is also valuable food for nudibranchs and snails.

Purple Volcano Sponge (*Hallclona permollis*)

Range: Alaska to southern California.
Habitat: Common in rocky mid-intertidal areas, particularly in areas of high current or wave action. Commonly found under rocks, where the receding waves create high mini currents.
Diet: Phytoplankton and bacteria - Filter Feeder with specialized collar cells (choanocytes)
Predators: Sea stars, nudibranchs
Description: A purple encrusting sponge with many volcano shaped pores (oscula) that shoot out the water. Water gets sucked in and filtered by small pores all over the body.

Fun Fact: If dispersed, cells of different sponge species are mixed together, they sort themselves out and start rebuilding new sponges!

http://www.european-marine-life.org/02/halichondria-panicea.php

Breadcrumb Sponge (*Halichondria bowerbankia*)

Range: BC to California.
Habitat: Common on floats and pilings.
Diet: Phytoplankton and bacteria - Filter Feeder with specialized collar cells (choanocytes)
Predators: Sea stars, nudibranchs
Description: This sponge is yellow or greenish, fairly massive or encrusting, with dispersed oscula. Once broken open, they have a distinctive smell of burnt wood and may have shown numerous orange embryos.

Fun Fact: This is a favored snack by the lemon nudibranch (sea lemon) which has a bright yellow body that blends in with the sponge.

Phylum Cnidaria

Cnidaria is also an ancient phylum. They have unique stinging cells called nematocyst used for capturing food and defense and are responsible for the sting to humans of some jellyfish. The phylum includes jellyfish, corals, and anemones. They have 2 body layers: the ectoderm and endoderm separated by a jelly-like layer called the mesoglea. Cnidarians also have a nerve net, a variety of sensory organs, and conducting non-nervous epithelia. Most jellyfish have 2 stages in their life cycle: a sessile "polyp" stage and a mobile "medusa" stage. We have primarily anemones in the Seaquaria that live for long time. They appreciate frozen zooplankton, and some also the frozen clams. At times they also gobble up straying crabs or fish. They are also able to draw dissolved organic material from the water. Fine colonial hydroids also are common on tubeworms in the aquaria. Though they don't look much like animals at first sight, these are the polyp stage of a small jellyfish. Occasionally, these jellyfish also show up on their own!

Plumose Anemone (*Metridium* spp.)

Range: North Alaska to south California.
Habitat: Common in subtidal rocks, mollusk shells, pilings, docks etc., including deep in the ocean.
Diet: Small zooplankton – captured by the nematocysts of the fine tentacles
Predators: Sea stars, nudibranchs
Description: A circular column and a crown of fine tentacles that can be retracted into their bodies. At times they resorb most of their tissues and stay as a flat sheet before sprouting up again. White, orange, or brown in colour.

Fun Fact: They can grow over 50cm in height in deeper water! In the aquaria, they move around quite a bit. An unusual protective catch tentacle was filmed in a Seaquarium in White Rock, with the film now being used in university classes.

Aggregating Anemone (*Anthropleura elegantissimia*)

Range: Alaska to Mexico.
Habitat: Common on at mid-tide, primarily in tidepools.
Diet: Mussels, crabs, isopods, snails, chitons, small shrimp – anything that collides with their tentacles or falls into the anemone is potential prey. They also get energy from symbiotic algae in their tissues (like corals). In the Seaquaria, they enjoy clam meat and frozen zooplankton.
Predators: Leather star, some nudibranchs
Description: A small bright green or olive green, stubby tentacles, and usually in dense groups. The colour fades in less light, such as in the Seaquaria.

Fun Fact: They can clone themselves by stretching out and splitting in two "fission," creating groups of related individuals.

Phylum Bryozoa

Bryozoans are colonies of tiny individual organism called zooid. They are often referred to as “moss animals”. Colonies are sessile and filter feed by using a crown of ciliated tentacles called lophophores. Colonies can form different shapes: encrusting, fans, branching etc.

Bryozoans (*Schizoporella* spp., *Begula* spp.)

Range: BC to South America; reported worldwide
Habitat: Encrusting bryozoans (e.g. *Schizoporlla* spp.) often form colonies on fouling organisms.
Diet: phytoplankton and zooplankton
Predators: nudibranchs, seastars, sea urchins, fish
Description: The common bryozoans found in Seaquaria form flat, encrusting colonies or spiral, algae like colonies. The spiral bryozoans resemble small ever green trees. Common Seaquaria bryozoans typically grow up to 5 cm (2 in) across for encrusting species and 7.5 cm tall (3 in) for bushy species.

Fun Fact: Bryozoans are often hitchhikers on different species such as tubeworms! Many bryozoan species are reported as being invasive globally because of their tendency to grow on ships.

Phylum Annelida

Annelids (“little ring”) are worms that have a long and segmented body. Each segment has the same set of basic organs with specialization in the different parts of the animal. This phylum is very large, with marine, freshwater, and terrestrial species!

https://soundwaterstewards.org/ezidweb/animals/Eudistylia3.htm

Featherduster Tube Worms (*Eudistylia vancouvrii and Eudistylia polymorpha*)

Range: Alaska to California
Habitat: In large clusters attached to boulders, bedrocks, floats, pilings. They are most common on docks but are also present among boulders at low intertidal. Absent in the fresher waters of the Salish Sea.
Diet: Phytoplankton and floating detritus – filter feeder with bright coloured tentacles that funnel selected food particles to the mouth through a ciliated canal.
Predators: Fish, birds and crabs
Description: These worms secretes a leathery tube and grow in intertwined bundles that get quite large. The tubes provide a protected habitat for all kinds of other animals and plants. Their brightly colored tentacles capture food particles as they float by, but a giant nerve cord allows them to retract instantaneously if disturbed. We often use these as a center-piece of the Seaquaria, as they provide nice habitat. They will eat juices of the frozen zooplankton, as well as muck that gets stirred up from the gravel. They can live a long time and grow in the aquarium, as indicated by the clear tubes they make, but we need to keep a close watch for any potential deaths.

Fun Fact: Their bright tentacles are multipurpose: they use them to get oxygen and to capture food.

Phylum Mollusca

Molluscs have a soft body with external calcium shell or shells. This includes slugs, snails, clams, octopuses, etc. They also have a “mantle”, which wraps the top of the body, lining and secreting the shell(s), and a muscular foot on the bottom. Many have a radula – a tongue-like ribbon with small, iron containing teeth, used for scraping up food (or drilling holes into shells).Generally these have planktonic veliger larvae, that have a distinctive velum – a ciliated (“hairy”) bilobed umbrella used for feeding and locomotion. This is the largest marine phylum and consist of species with very diverse morphology and behavior! We use a number of these in the Seaquaria.

https://en.wikipedia.org/wiki/Katharina_tunicata

Chiton (*Katharina tunicate, Mopalia* spp.)

Range: Alaska to southern California. Also found off the coast of the Kamchatka Peninsula in Russia
Habitat: Lives in the upper and middle intertidal zones, attached to rocky substrate
Diet –: Diatoms and biofilm – Herbivore, scraping their food off the rocks with their radula
Predators: Sea stars, birds, whelks, and humans
Description: This oval shaped chiton has 8 overlapping shells with a girdle (lower part of the mantle). The white of their shells are often exposed due to erosion of the periostracum (protein cover). A large foot is located on the underside, which they use to move around on rocks. Gills are tucked between the base of the mantle and the foot, running the full length of the animal. They have a radula inside their mouth, a rasping tongue that they used to scrape algae off rocks.

Fun Fact: Chitons have been around since dinosaurs were roaming the earth. That’s more than 500 million years ago, and long before humans showed up on the planet.

Top Snail (*Calliostoma ligatum*.)

Range: Northern BC to California
Habitat: Lives in the intertidal and subtidal zones. It is common in rocky areas and kelp beds to 30m and deeper, among algae and under rocks.
Diet: Hydroids, bryozoans, tunicates, sponges, dead animals, diatoms and biofilm – Omnivore, scraping up its food with the radula.
Predators: Birds, sea stars, octopus, otters,
Description: These snails have a two-toned outer shell with a brown and orange spiraling pattern. The shell's interior layer is a pearly blue color which is sometimes visible after the outer layer has worn away. The foot of this snail is a bright orange color while the head is black. Quite often there are one or more slipper shells (*Crepidula*) on these snails. They survive well in the Seaquaria, though they have been observed attacking Katy chitons.

Fun Fact: It has been reported that this top snail will use its radula to "bite" non-predatory sea stars when they come into contact.

Black Tegula Snail *(Tegula funebralis)*

Range: Northern BC to Mexico.
Habitat: A common rocky intertidal species, most often found in tide pools on open, exposed coasts, and rarely found in more protected areas such as the Salish Sea. Also, an important grazer in kelp beds.
Diet: Algae and biofilm – Herbivore – scrapes up food with the radula
Predators: Sea stars, crabs, octopuses, sea gulls and sea otters
Description: These snails have a thick purplish-black shell in a blunt, rounded cone shape, often with a white top in older individuals where the darker exterior has been worn away. The shell's interior is a pearly white, and the snail's foot and head are black. We have these in the Seaquaria at times, where they do quite well.

Fun Fact: These snails can live up to 25 years!

Photo: *https://en.wikipedia.org/wiki/Tegula_funebralis*

Dogwinkle Whelk *(Nucella* spp.*)*

Range: Aleutian Islands to south and central California.
Habitat: Rocky shores; most often found in mussel and barnacle beds at low to mid intertidal zone.
Diet: Mussels, barnacles and carrion– Carnivore, drilling into barnacles and bivalves with their radula and slurping up their prey with a proboscis.
Predators: Sea stars, otters, birds
Description: A small whelk, with a heavy but quite variable shells in terms of colour and patterns. Quite commonly used in the Seaquaria, where they sometimes lay egg cases.
Fun Fact: These snails aggregate seasonally in large numbers. They lay masse of egg cases, that hatch as small snails, rather than planktonic larvae, so tend to locally distinct populations.

Photo
https://en.wikipedia.org/wiki/Dog_whelk#/media/File:Nucella_lapillus.jpg

Monterey Sea Lemon (*Archidoris montereyenis*)

Range: Kachemak Bay, Alaska, to San Diego, California
Habitat: Rocky shores; low intertidal zone and shallow subtidal.
Diet: Sponges, hydroids and bryozoans – Carnivore, scraping up things with help of the radula
Predators: Unknown! Fishes that take a bite out of the sea lemon has been observed to spit them back out!
Description: Sea lemons are dorid nudibranchs - shell-less snails, with naked gills sticking out of their backs. The yellow with black spots on their tubercles (little bumps on their back) likely warns off predators. They have two rhinophores at the front to detect chemical signals. We often have these in the Seaquaria, where they may lay long coils of egg cases.

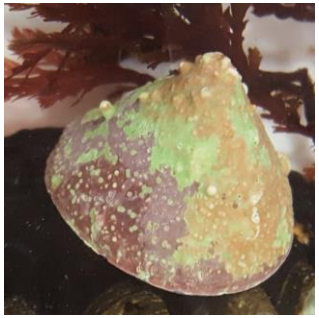
Fun Fact: The family sea lemons belong to is named after a Greek sea goddess, Doris. Doris was considered the fertility of the ocean and goddess of rich fishing grounds!

Keyhole Limpet (*Diodora aspera*)

Range: Coastal regions from Afognak, Alaska to Baja California
Habitat: Found primarily in low intertidal and shallow subtidal areas. Also found on docks, where they can grow very large. These are used commonly in the Seaquaria.
Diet: Bryozoans, sponges and algae – omnivore, grazing with the radula.
Predators: Sea stars
Description: Keyhole limpets have a small oval opening at the top of their short, conical shell. Unlike true limpets and other snails, these snails draw water into their mantle cavity from either side which runs over their gills before flowing out the keyhole opening at the top of the shell together with any excretory materials.

Fun Fact: Often contains a commensal scale worm, *Arctonoe vittata*, in its mantle cavity, which may bite attacking predatory sea stars. They are also not true limpets but a species that belongs to the snail family.

photo: *https://en.wikipedia.org/wiki/Diodora#/media/File:Keyhole_limpet_01.jpg*



Whitecap Limpet (*Acmaea mitra*)

Range: Bering Strait to central California
Habitat: low intertidal and mostly shallow subtidal; found wherever red coralline algae is present. Sometimes used in the Seaquaria.
Diet: Algae (predominantly coralline algae) – Herbivore, Grazes using the radula
Predators: Sea stars, birds
Description: An entirely white limpet, but often encrusted by a coralline red alga. Distinctly tall and cone shaped shell.

Fun Fact: Their shell is also often covered in coralline algae which is their main food source!

Limpets (*Lottia* spp *; Tectura* spp.)

Range: Japan, Siberia, north Alaska to north Mexico
Habitat: On and under rocks, upper intertidal into the subtidal, depending on the species
Diet: Algae – Herbivore, grazes with the radula
Predators: Seastars, fish, birds
Description: Their single shell is cone shaped and depending on species, can be relatively flat or a tall cone. They are usually brown to an off-white color with bands on their shell.

Fun Fact: Their bums are above their head! Like snails, the body has undergone a rotation during develop.

photo
https://en.wikipedia.org/wiki/Lottia_pelta#/media/File:Lottia_pelta_001.jpg

Swimming Scallop (*Chlamys* spp.)

Range: Gulf of Alaska to San Diego, California
Habitat: Found subtidally in sandy, shell-filled, and rocky areas to a depth of 150m.
Diet: Zooplankton – Filter Feeder
Predators: Sea stars, octopuses and sea otters
Description: This scallop has a rounded shell, which is variable in colour (shades of pink, orange, or red is common)

Fun Fact: To escape hungry predators, these scallops "swim away," by using their abductor muscle to open and close their shells very quickly. They also have 50-100 eyes (tiny black spots around the edges of both valves) that act like a compound lens!

Pacific Oyster (*Crassostrea gigas*)

Range: Siberia to Pakistan. These oysters were introduced to BC from Japan and are now found from Alaska to California.
Habitat: Settles on hard surfaces such as rocks or adult oyster shells in the intertidal and subtidal zones.
Diet: Plankton – Filter Feeder
Predators: Sea snail, sea stars, crabs, benthic fish, and birds
Description: can reach up to 10 inches in length; shell is elongated, think, rough and sometimes sharp; the inside of the shell is white to off-white with purple streaks; shell has a "cupped" shape to it, giving rise to the alternate name of "Pacific cupped oyster"

Fun Fact: This non-native species was introduced from Japan in the early 1900s. It has also been introduced to Europe and Australia!

photo *https://en.wikipedia.org/wiki/Oyster*

Northwest Ugly Clam (*Entodesma navicula*)

Range: Alaska to California
Habitat: Rock crevices, under rocks, mid-intertidal zone
Diet: Plankton – Filter Feeders
Predators: predatory gastropods
Description: Shells grow into a pear-shape unless their rocky habitats modify their shape which is often the case! Their shells are usually covered in a brown-orange periostracum (an organic covering or "skin").

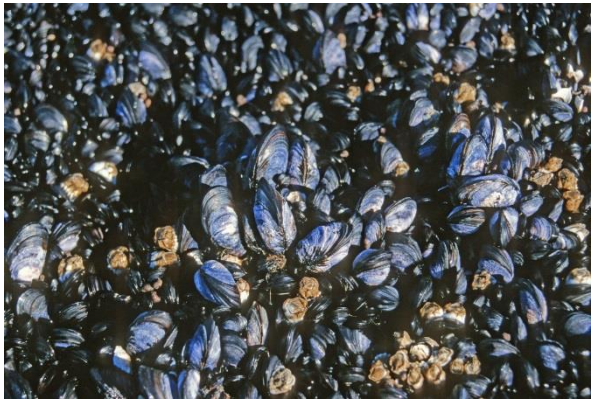
Fun Fact: Their siphon can be easily misidentified as tunicates due to the bright blue tinge!

Photo
https://inverts.wallawalla.edu/Mollusca/Bivalvia/Pholadomyoida/Entodesma_navicula.html

Olympia Oyster (*Ostrea lurida*)

Range: South Alaska to Panama
Habitat: Found in the very low intertidal and high subtidal zones of estuaries, lagoons, bays and channels. They are often found attached to other shells, rocks, docks or pilings.
Diet: Plankton – Filter Feeder
Predators: Crabs, sea stars, predatory sea snails and birds. Non-indigenous predators include the Japanese oyster drill and the Japanese oyster leech.
Description: This species of oyster is quite small, growing at most to 9 cm in length over the course of their 10-year lifespan. They have two shells, on valves, ranging in colour from white to purplish-black.

Fun Fact: Olympia oysters first mature as males and after a year can switch and become female. They then spend their entire life switching back and forth annually. They are also the only native oyster species on our coast!



Mussel (*Mytilus galloprovincialis*, *M. trossulus*)

Range: *M. trossulus*: Alaska to Mexico; introduced to Europe; *M. galloprovincialis* introduced from Europe to California, now found up the Pacific Northwest Coast
Habitat: exposed rocky coasts
Diet: phytoplankton, zooplankton – Filter Feeder
Predators: humans, birds, seastars, marine mammals and more
Description: Bay mussels (*M. trossulus*) grow up to 11 cm (4.5 in) and have a smooth, blue-black shell. Mediterranean blue mussels (*M. galloprovincialis*) grow up to 15 cm (6 in) with shells of similar texture and colour to the bay mussels.

Fun Fact: Mussels in Seaquaria are often a hybrid between the smaller, native *M. trossulus* (bay mussels) and the invasive, *M. galloprovincialis* (Mediterranean blue mussel).

Photo *© Dennis Paulson; https://www.pugetsound.edu/academics/academic-resources/slater-museum/exhibits/marine-panel/pacific-blue*-mussel/

Phylum Echinodermata

Echinoderms (“hedgehog skin”) can regenerate their limbs and their body surface is covered with calcareous spicules. They have tube feet for locomotion and respiration. Respiration also occurs through the gills. Species from this phylum occurs at almost every depth in the ocean – from the intertidal to the abyssal.

California Sea Cucumber (*Parastichopus californicus*)

Range: Central Alaska to Northern Mexico
Habitat: Lives in a variety of intertidal and subtidal habitats: sandy, muddy, rocky, gravelly substrates on exposed and sheltered shorelines; up to 250m in depth
Diet: Plankton, detritus – Detritivore, Filter Feeder
Predators: Sea stars, such as the sunflower star, sea otters, some fish species, humans
Description: The California sea cucumber is the biggest sea cucumber species in the Pacific Northwest. They can grow up to 50 cm and are generally dark red to reddish-brown or mottled brown. They are covered in cone-shaped papillae (projections) of varying sizes along its length, with feeding tentacles at one end. One their underside they have numerous tube feet.

Fun Fact: The California sea cucumber breathe (gas exchange) from their rear ends and their tube feet.

White or Stiff-Footed Sea Cucumber (*Eupentacta quinquesemita*)

Range: South Alaska to North America; also found in Japan.
Habitat: Lives in the lower intertidal and shallow subtidal zones and can be found on rocky substrates
Diet: Plankton, detritus – Detritivore, Filter Feeder
Predators: Sea stars, fish
Description: Stiff footed sea cucumbers are white or cream colored and can grow to be 8 centimeters (3 inches) long. They also have yellowish, non-retractable tube feet arranged in four longitudinal rows around their bodies. This arrangement of their tube feet results in a spiny appearance. Their bodies are covered with calcareous ossicles making them stiff feeling.

Fun Fact: This sea cucumber expels its guts in the autumn and grows a new set in the spring.

Leather Star (*Dermasterias imbricata*)

Range: Southern Alaska to southern California
Habitat: Rocky shore, low intertidal and shallow subtidal to depths of up to 302 m
Diet: Sea cucumbers, swimming scallop, sponges, bryozoans, barnacles, limpets – Predator, Carnivore
Predators: Seagulls, sea stars, fish
Description: Mottled, leathery, slick upper surface. Generally grey with patches of red, brown and purple. Has smooth and slimy feeling skin, not spiny like other sea stars. Can grow up to 30 centimeters.

Fun Fact: They seem to be immune to the seastar wasting disease.

Blood Star (*Henricia* spp.)

Range: Alaska, south to California and Mexico. Also found in the eastern Pacific on the coasts of Siberia and Japan
Habitat: Rocky shores; low intertidal to depths of 435 m
Diet: Primarily sponges and biofilm – Predator, Filter Feeder
Predators: Birds, fish, seastars
Description: A vivid orange to brick-red or sometimes a paler yellow or beige. Its central disc may have grey patches.

Fun Fact: A blood star's tube feet not only help them to hang onto rocks – they also enable them to "smell" what is around them! Besides eating biofilm, the blood star are filter feeders with mucous threads that it strings from its arms. They sit on sponges and make use of the current they create to gather food.

Vermillion Star (*Mediaster aequalis*)

Range: Northern Alaska to northern Mexico
Habitat: Rocky substrates, low intertidal, to depths of 500 meters
Diet: Biofilm and detritus, bryozoans, sponges and sea squirts – Predator
Predators: Morning sun star, fish, birds
Description: This sea star has a striking vermillion colour on top, and a lighter orange underneath. They have a distinct pattern of ossicles. They are also called the medallion star.

Fun Fact: These sea stars can move 40 centimeters (16 inches) per minute, making them one of the fastest animals in their class.

Six-Rayed Star (*Leptasterias spp.*)

Range: Alaska to California
Habitat: Exposed locations in the intertidal zone and shallow subtidal zone, sometimes under boulders and among seaweed
Diet: Barnacles – Predator, Carnivore
Predators: Sea and shore birds, sometimes otters
Description: They have 6 small but distinct arms and can be found in different mottled colours of red, oranges, and brown. They grow up to approximately 7 cm (3 inches) across.
Fun Fact: These sea stars are sometimes called "brooding stars" because females will shelter their developing eggs under their bodies for up to three months. During the brooding period, they won't eat anything!

Sea Urchin (*Strongylocentrotus* spp., *Mesocentrotus franciscanus*)

Range: Central Alaska to northern Mexico
Habitat: Exposed rocky shore, kelp forests, low intertidal zone
Diet: Algae, detritus – Herbivore, Grazer, Detritivore
Predators: Sea otters, sea stars, seagulls, crabs, humans
Description: Sphere with long spines all over and five paired rows of tube feet visible between spines. We often put either purple sea urchins (left), green urchins (middle), or red urchins (right) into the Seaquaria.
Fun Fact: A sea urchin's teeth are located on the bottom of their bodies and their jaw is called "Aristotle's lantern. They leave a star shaped bit mark on kelp. In locations where few of their predators remain, urchins are capable of completely overtaking their algal food sources, resulting in bare, overgrazed areas called urchin barrens.

Phylum Arthropoda

Arthropods have jointed limbs and their body is segmented into 3 regions: head, thorax, and abdomen. Each segment has a pair of appendages. They also have a hard exoskeleton that needs to be molted for them to grow. Phylum Arthropoda includes insects, making it the largest and most diverse phylum on the planet!

Hermit Crab (*Pagurus* spp.)

Range: Alaska to Mexico
Habitat: Intertidal zone, sandy or muddy bottom of marine waters
Diet: Various, detritus – Omnivorous, Detritivore
Predators: Fish, octopus, squid, crabs
Description: Hermit crabs typically have 10 legs and 2 larger claws at the front of their body. They are red, orange or brown, or sometimes have purple patches on their bodies. These animals are distinct from other crabs because they have a soft abdomen which they twirl around the spire in a gastropod shell. Hermit crabs cannot produce their own shell, so they must look for vacant shells (usually sea snail shells) to protect themselves.

Fun Fact: As hermit crabs grow, they get too big for their shells and need a larger one – just like we outgrow clothes!

Kelp Crab (*Pugettia* spp.)

Range: Southern Alaska to northern Mexico
Habitat: Low rocky intertidal zone to a depth of 75 meters and in dense kelp beds
Diet: Seasonally omnivorous, will eat algae or small mussels and barnacles, bryozoans and hydroids
Predators: Sea otters, birds, fish
Description: Roughly square-shaped carapace with a pointed front and long legs. They are often olive-green, red or brown in color.

Fun Fact: They have two rows of curved setae (fine hairs) behind their rostrum where they can attach algae to camouflage.

photo *https://www.pugetsound.edu/academics/academic-resources/slater-museum/exhibits/marine-panel/kelp-crab/*

Decorator Crab (*Oregonia gracilis)*

Range: Bering Sea to Monterey, California; Japan.
Habitat: Found in shallow subtidal zone
Diet: Soft organisms and dead or decaying animals – Detritivore
Predators: Fish, octopus, sea otters
Description: The heart -shaped or triangular carapace of a decorator crab is covered in thin hooked setae (stiff structures resembling hair or bristles) to which the crab attached materials from its environment (including other organisms!) These setae are also found on the crab's long, slender walking legs.

Fun Fact: When a decorator crab moves to a new area it will dress up with new items to make sure it blends into its new environment.

Acorn Barnacles (*Balanus glandula)*

Range: Northern Alaska to northern Mexico
Habitat: Upper to mid intertidal, on rocks and on hard-shelled animals like mussels or oysters
Diet: Plankton – Filter Feeder
Predators: Snails, limpets, sea stars
Description: Barnacles attach themselves to a substrate and are surrounded by a shell made up of six plate-like structures which are fused together. There is an opening at the top of the shell where the barnacle feeds and breathes by using its cirri – the long and feathery "legs" that can be seen gently swiping through the water.

Fun Fact: Barnacle larvae are free swimming and will cement their heads onto a suitable substrate before building their shell around their bodies! Essentially, barnacles live their lives upside down!

photo
https://en.wikipedia.org/wiki/Barnacle#/media/File:Chthamalus_stellatus.jpg

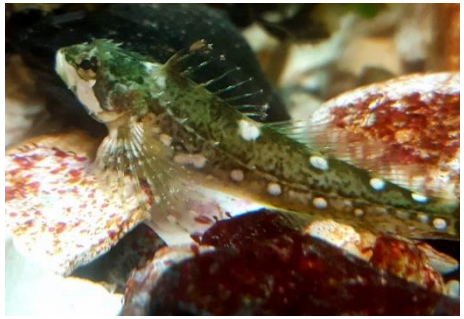
Giant Barnacle (*Balanus nubilus*)

Range: Southern Alaska to northern Mexico
Habitat: low tidal zones to depth of 90 meters
Diet: Plankton – Filter Feeder
Predators: Sea otters, sea stars, crabs, humans
Description: Conical shell with an opening on the top where the barnacle feeds using its cirri. Bright yellow or orange color can be seen when this barnacle opens. These barnacles can grow up to 6 inches in diameter and 12 inches tall.

Fun Fact: An empty giant barnacle shell is large enough to be a shelter for other animals such as the grunt sculpin. A 'not safe for work' fact: barnacles have proportionally, the largest penis in the animal kingdom

Phylum Chordata

Chordates all have a notochord (primitive form of a backbone), dorsal nerve cord, pharyngeal slits, a post-natal tail, and an endostyle at some point of their life stage. Chordates are most commonly known for having a spine/backbone, what most called vertebrate.



Tidepool Sculpin (*Oliogocottus maculosus*)

Range: Alaska to California
Habitat: Tidepools, under exposed seaweed covered rocks
Diet: Small invertebrates (isopods, amphipods, gastropod mollusks, barnacles) – Predator
Predators: Predatory fish, birds, otter, snakes
Description: Tidepool sculpins have a large head and a tapering body. Their colouring includes marble grey, brown, white, reddish or greenish.

Fun Fact: This species can survive out of water for quite a while as long as they are moist!

Grunt Sculpin (*Rhamphcottus richardsonii)*

Range: Japan, central Alaska to central California
Habitat: subtidal amongst rocks
Diet: Copepod, amphipods, zooplankton, crustaceans – Predator
Predators: Predatory fish
Description: They have a large head that takes up most of their body length and a long-tapered snout. Their bodies are mottled in shades of brown, orange, cream. They have small plates with small spines instead of scales. Their fins are bright orange-red.

Fun Fact: They use their spiny pectoral fins to crawl on the sea floor. They can often be seen taking shelter in giant barnacle shells. A female grunt sculpin will chase a male into a barnacle shell, trapping him there until she lays her eggs.

Shiner Perch (*Cymatogaster aggregata)*

Range: Southeaster Alaska to Baja California, Mexico
Habitat: Shallow waters around eelgrass beds, piers, pilings, calm water. Often found schooling during the day.
Diet – Feeding Mechanism: Small crustaceans, mollusks, worms, amphipods, fish eggs - Predators
Predators: Larger fish, larger carnivores, otters, birds
Description: Oval shaped body that is compressed on the side with vertical yellow bars. Overall, they have a silver-y body.

Fun Fact: Females are viviparous, meaning they bear live young rather than laying eggs!

https://wdfw.wa.gov/species-habitats/species/cymatogaster-aggregata

Ronquil (*Bathymasteridae* spp.)

Range: Eastern Pacific; Bering Sea to California
Habitat: Benthic fish (bottom dweller), rocky bottoms, sandy bottoms
Diet: Small benthic crustaceans and mollusks – Predator
Predators: fish, birds
Description: Greatly elongated body. They have large eyes and mouth. Their dorsal fin is elongated, and they have large pectoral fins. They often come in drab colors such as shades of olive and orange.

Fun Fact: It's been reported that males guard their brood of eggs.

photo *https://en.wikipedia.org/wiki/Ronquil#/media/File:Searcher_ronquil.jpg*

Gunnels (*Pholis* spp.)

Range: Baja California to East China
Habitat: Intertidal, tide pools; sandy mud bottoms and rocky reefs; eelgrass
Diet: Small crustaceans and molluscs – Predators
Predators: marine birds (e.g. heron), large fish, mammals (e.g. river otters)
Description: Gunnels have an elongated eel-like body about 20 – 30 cm (8 – 12"). Their dorsal fin extends to their tail and they have a pair of small pectoral fins.

Fun Fact: Gunnels are popular as a fried fish dish in Tokyo (and neighboring areas) during the spring months.

photo *https://en.wikipedia.org/wiki/Penpoint_gunnel*

Subphylum Tunicata

Tunicates are surprisingly part of Phylum Chordata. During their mobile larval stage, these animals have characteristics of a chordate: a dorsal nerve cord, notochord, pharyngeal slits (gill slits), and a post-anal tail. As they grow, they metamorphose into their sessile adult form and attaches to a hard substrate. They lose many chordate characteristics such as their post-anal tail. The adult forms resemble a water filled sac with two siphons to draw in and expel water for feeding and respiration. Tunicates can live as a solitary individual or form colonies by budding.

Solitary Tunicate: Transparent Tunicate (*Corella inflata*)

Range: BC to Washington
Habitat: rocky intertidal, docks and marina,
Diet: phytoplankton, zooplankton – Filter Feeder
Predators: Flatworms, seastars (notably vermillion stars)
Description: Their bodies are cube shaped and transparent. If you look closely, you may even see their embryos brooding inside their brood chamber.

Fun Fact: Solitary tunicates are hermaphrodites. Some species may even self-fertilize!

Photo by Derek Holzapfel
http://naturediver.com/Gallery/Chordata/Brooding-Transparent-Tunicate-Corella-inflata

Social Tunicates: Yellow Social Tunicates (*Perophora annectens*)

Range: Alaska to California
rocky intertidal, docks and marina,
Diet: phytoplankton, zooplankton – Filter Feeder
Predators: Flatworms, seastars (notably vermillion stars)
Description: This tunicate species resembles tiny yellow grapes.

Fun Fact: These individuals are connected by a yellow strand that is reportedly used for communication via electrical signals. The signals are received in the epithelium, not with nerve cells.

Photo by Derek Holzapfel
http://naturediver.com/Gallery/Chordata/Yellow-Social-Tunicate-Perophora-annectens

Marine Vascular Plants

These are flowering plants that have adapted to living in a high salinity ecosystem. They have a standard root system unlike marine algae.

Eelgrass (*Zostera marina*)

Range: Alaska to Mexica; E. North America, Greenland, Europe, E. Asia, N. Africa
Habitat: forms meadows in sandy shores; intertidal to subtidal (up to 6 m); protected shorelines, estuaries, tidal pools, subtidal flats
Phylum: Vascular marine plant
Size: blades grow up to 1.2 m long and 12 mm wide
Description: Eelgrass is a perennial, vascular marine plant that has adapted to living in water. They have roots rather than holdfasts. Eelgrass meadows are an extremely important ecosystem that hosts diverse set of animals – many who rear their young within the meadow.

Fun Fact: Eelgrass was harvested by the Salish, Nuu-chah-nulth, Haida, and Kwakwaka'wakw peoples as a food and material for paper fiber, weaving, and insulation.

photo *Copyright © 2018 Max Castorani*
https://twitter.com/maxcastorani/status/999305805420613632

Surfgrass (*Phyllospadix* spp.)

Range: Alaska to Mexico
Habitat: mid intertidal to shallow subtidal; exposed coast
Phylum: Vascular marine plant
Size: 1 to 2 m long
Description: Surfgrass has long, narrow blades with rhizomes anchoring the blades on the substrate. The rhizomes have fine, hair like roots.

Fun Fact: The root system can collect sand which creates habitat for many species. Surfgrass can form beds scattered along the coast.

photo *https://marine.ucsc.edu/target/target-species-phyllospadix.html*

Algae

Algae is a loose term that refers to photosynthetic, eukaryotic (cells have a nucleus enclosed in a membrane) organisms that resembles plants. These organisms can range from the unicellular microalgae (e.g. diatom) to multicellular macroalgae (e.g. kelp). Marine macroalgae (also known as seaweeds) are diverse and encompasses many different species with different life stages. Your Seaquarium will be stocked with macroalgae from 3 phyla: Chlorophyta (green), Ochrophyta (brown), and Rhodophyta (red). Often, they have a holdfast, a stipe, and blades which often looks like leaves or stems of plants but are quite different in structure.

Sea Lettuce (*Ulva* spp.)

Range: Alaska to California; *Ulva lacuca* is world-wide
Habitat: Intertidal
Phylum: Green
Size: Typically < 30 cm (11 in) but can grow up to 60 cm (24 in)
Edibility: Edible; good in salads
Description: Bright green and thin blades attached in tufts (but are often unattached) with a small holdfast. The blades of some species are peppered with holes.

Fun(-ish) Fact: Sea lettuce thrives in areas with high nutrient – which could occur due to sewage leak or agricultural run offs. A big bloom of sea lettuce (or algae in general), can be problematic because when they start to decompose, they use up oxygen. Oxygen depletion leads to 'dead zones' causing massive die-offs of marine animals.

Photo *Copyright © M.D. Guiry*
http://www.seaweed.ie/algae/ulva.php

Turkish Towel (*Chondracanthus exasperatus*)

Range: Alaska to Mexico
Habitat: Low intertidal to subtidal
Phylum: Red
Size: Up to 50 cm long and 20 cm wide (20 in long and 8 in wide)
Edibility: Used to make carrageenan, an emulsifying agent found in many food products (e.g. chocolate milk)
Description: Short stipes with flat, broad blades. The blades are irregular and bumpy.

Fun Fact: The bumpy texture makes this alga a great exfoliator when used as a scrub brush!

photo *Copyright @ icosahedron*
https://inaturalist.ca/taxa/127153-Chondracanthus-exasperatus

Red Spaghetti (*Gracilaria* spp.)

Range: Japan, Alaska, Mexico
Habitat: low intertidal to shallow subtidal
Phylum: Red
Size: up to 1.5 m (5ft) long
Edibility: Edible
Description: Long stipes with multiple fronds branching off into a bushy bunch. Stipes are attached to a disc holdfast.

Fun Fact: Gracilaria is grown commercially for a compound called carrageenan. Carrageenan is a common emulsifier found in food, pharmaceuticals etc.

Photo *https://en.wikipedia.org/wiki/Gracilaria#Aquarium_trade*

Encrusting Corraline Algae (*Clathromorphum* spp., *Lithothamnion* spp., *Melobesia* spp., *Mesophyllum* spp.)

Range: Throughout North Pacific
Habitat: Low intertidal and subtidal; on rocks and shells
Phylum: Red
Size: Irregular; crust is 1-5mm thick
Edibility: Used in medicine
Description: Rock crust algae (crustose algae) grow in a thin layer on rock surfaces. They are often pink-red and have a hard thallus.

Fun Fact: Coralline algae has an excellent fossil record (dates to Early Cretaceous era) because they contain calcium carbonate.

Photo *http://www.seaweedsofalaska.com/species.asp?SeaweedID=122*

Wireweed (*Sargassum muticum*)

Range: Alaska to Mexico
Habitat: Intertidal to subtidal
Phylum: Brown
Size: Up to 183 cm (6 ft)
Edibility: Edible
Description: Long thin stipes with many tiny blades dotted with small, beady gas bladders. They have a bushy texture and can often be found floating.

Fun Fact: This is an aggressive invasive species introduced from Japan with oyster shipments. This species is now well-established and provides valuable habitat for many animals. Wireweed also provides spawning substrate for herring.

Photo *https://en.wikipedia.org/wiki/Sargassum_muticum*

DID YOU KNOW?

Why do we stock your Seaquarium with mostly invertebrates and not just fish?
Invertebrates tend to be hardier and can withstand environmental and physical stress better. Intertidal invertebrates are built to withstand changing habitat conditions – twice a day, they are exposed to air. Also, marine invertebrates make up most of the Salish Sea ecosystem, representing a huge part of biodiversity in our ocean., which is not often recognized. Many species we put into your Seaquarium can be spotted during a low tide!

First critters that move in:
Plumose anemones are one of the first animal we put into a Seaquarium! Hermit crabs, barnacles, and mussels are also put in first because they are very hardy.

What's so special about red algae?
Red algae can be found in many common items such as: food, medicine and nutrient supplements, and even makeup! They have compounds called **carrageenan** and **agar** that is used as an emulsifier and gelatin-like substrate. Even our toothpaste has carrageenan!

Why don't we have larger seastars like the purple ochre star?
Seastars are predators and by putting a large one like the purple ochre star, we are essentially giving it a buffet! Predation happens naturally in your Seaquarium but a large seastar will eat everything in a very short time – not very sustainable! This is also why we don't put octopus in your Seaquarium.

Why don't we put in other large animals?
A typical Seaquarium is 75 gallons and can only support so much life. If we overload the ecosystem, we will start to see the health of the animals decline, which may lead to death.

I see a lot of small green and red algae, where are the kelp?
We tend to stock Seaquaria with red and green algae because they last longer. Large brown algae such as kelp decomposes faster and will fill the water with mucous.