



**Animal Information Manual  
2018**

## SEA GRASS (PHAEOPHYTA)

### *Macrocystis pyrifera*/ Lasanga Kelp

#### MAJOR BODY CHARACTERISTICS

1. Stalk is stiff, and holdfast is shaped like a claw
2. Can reach up to 2m in length

#### LIFESTYLE

1. Kelp forms large forests under the oceans and is very resistant to wave action
2. Eaten by Urchins

### *Ascophyllum nodosum*/ Knotted Wrack.

#### MAJOR BODY CHARACTERISTICS

1. Little air sacs are called air bladders are used to help the seaweed float when the water rises
2. A holdfast shaped like a claw at the base of the plant secures it to the rocks, however this is not in the tank
3. The balloon-shaped reproductive receptacles are yellow and brown.
4. They can reach up to 1.5m long!

### *Fucus vesiculosus*/ Rockweed or Bladder Wrack

#### MAJOR BODY CHARACTERISTICS

1. Has a series of pairs of air bladders, air bladders help to keep the rockweed stay vertical in the water column, allowing it to obtain as much sunlight as possible.
2. Reproductive receptacles are balloon shaped often with pointed extremities
3. Fronds can reach up to 90cm!

## ALGAE (RHODOPHYTA)

### *Lithothamnium sp./Coralline algae, encrusting pink algae.*

#### MAJOR BODY CHARACTERISTICS

1. Calcareous red algae
2. Covers the surface of our horse mussels, rocks, and shells.
3. Made up of Calcium Carbonate
4. Resistant to grazing from Urchins and Limpets.

## ANOMONES (CNIDARIAN)

### Metridium senile, aka Filled Sea Anemone

#### MAJOR BODY CHARACTERISTICS

1. True Gut (CARNIVORES): internal space where the process of digestion takes place
2. Nervous System: true bonified nerve cells. The arrangement of the nervous system is often in a nerve network
3. Nematocytes: a type of cnidae; stinging cells used to capture food. Ejected upon stimulation

#### BODY PLAN

1. Body includes the gut, circulatory system, and hydrostatic skeleton
2. Bottom of anemone is called a basal disk, and this is where the cnidarian attached itself to the substrate
3. The body stalk is the main part of a polyp cnidarian and on top is the mouth surrounded by a row of tentacles.

#### Inflation & Deflation of the Body & Hydrostatic Skeleton

- deflation: the longitudinal muscles contract, the mouth is open and water is expelled, which causes deflation

#### REPRODUCTION

##### Asexual Reproduction:

1. Fission: transverse or longitudinal (generally just divides into two)
2. Budding: A little bud appears, differentiates all the parts needed to be an animals, then is separates

3. Pedal laceration: common among sea anemones. A piece is just broken off the basal disc and that little bit grows into a new sea anemone

### **Sexual Reproduction:**

1. Broadcast Spawners (fertilization takes place externally)
2. Result: little free-swimming larval stage.

## **MOLLUSCS (MOLLUSCA)**

### **SPECIES IN TANK**

*Littorina littorea*, Common Periwinkle, Edible Periwinkle

*Lunatia heros*, Northern Moon Snail

*Thais lapillus*, *Nucella Lapillus*, Atlantic Dogwinkle, dog whelk

*Mytilus edulis*, Blue Mussel

*Modiolus modiolus*, Horse Mussel

*Placopecten magellanicus*, Deep-Sea Scallop

### **CHARACTERISTICS:**

1. Calcium Carbonate Shell: they have shell valves (or shell pieces) that are calcium carbonate, the dorsal shell plates are secreted by a tissue around the rim called the mantle
2. Mantle Cavity: a ring of tissues around the periphery; takes a different form in different types of molluscs but always houses the gills
3. Gills: are ciliated which brings in seawater into the mantle cavity and between the individual gill lamina so oxygen and carbon dioxide can be exchanged.
4. Shell-Attached Muscles: run from the shell on the dorsal side down into the foot. They are called dorso-ventral shell attached muscles.
5. Radula: a ribbon of curved chitinous teeth; Radula teeth have different shapes and size in different types of molluscs depending on what they feed on; primary use of radula is for feeding; BIVALVES DO NOT HAVE A RADULA

## **Gastropods (Gastropoda)**

### **BODY PLAN**

1. Tall cone; asymmetrical coiling: gradually elongates over time
2. Operculum: a hardened proteinaceous disk on the back of the foot which is sometimes calcified. When the foot gets pulled gets pulled into the shell the operculum is the last thing that goes in and seals off everything like a trap door.
3. Has tentacles, eyespots, mouth, and muscular food.

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## FEEDING

### Periwinkle

Feeding method is herbivorous using a radula, which is a ribbon of recurring teeth used to scrape algae off rocks and other substrates.

### Moon Snail

1. They have an accessory boring tip and during feeding they extend their proboscis which rasps on the surface of bivalve prey and then they apply the boring organ which secretes a digestive enzyme, then they return to rasping, and secretion etc.
2. Once they've cut a hole in the shell they extend their proboscis in the hole and have access to the soft tissues of the prey.

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## BIVALVES

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### BODY CHARACTERISTICS

1. The bivalve body is adapted to burrowing in soft substrates
2. Hinge and Adductor Muscles: proteinaceous hinge that holds the 2 shell valves together.
3. Two adductor and a hinge ligament makes up the outside of a bivalve
4. Contraction of adductor muscles pulls the two shell valves together and the opening is due entirely to the hinge ligament.
5. Shell Secretion: shell is in the form of two shell valves that are hinged dorsally. The mantle secretes the shell.
6. There are sensory structures around the edge of the mantle margin
7. Has two siphons (excurrent and incurrent), and a foot that projects out
8. NO RADULA

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## FEEDING

### Scallop

1. Suspension feeding using ctenidia.
2. Lateral Cilia: create water current that brings water into the mantle cavity and between gill filaments
3. Laterofrontal cilia: intercept floating particles and capture food in water

### Mussels, clams and oysters

1. Suction for prey capture. They are predators with a large incurrent siphon that generates suction to suck in zooplankton.

## ARTHROPODS (ARTHROPODA)

### Hermit Crab

- Mostly lives in empty gastropod shells
- Very thin exoskeleton on abdomen
- Abdomen of hermit crab shows asymmetrical coil, to fit in the asymmetric coiling of a gastropod shell
- They have uropods. Uropods have little grippers to hold onto the columella so nothing can easily pull it out of its shell.

### True Crab

- Broad, flat cephalothorax, covered by the carapace
- Chelipeds (1<sup>st</sup> pair of pereopods) then 4 pairs of walking legs so 5 pairs of pereopods in total
- Closed gill chambers- facilitates that these animals are good at burrowing into substrates (prevents sand and stuff from getting packed into the gill chambers.

## ECHINODERMS (ECHINODERMA)

### SPECIES IN TANK:

*Strongylocentrotus droebachiensis*, Green Sea Urchin

*Echinarachnius parma*, Sand dollar

*Henrici* sp. Bloodstar

*Asterias vulgaris*, *Asterias rubens*, aka Common Sea Star

### MAJOR CHARACTERISTICS:

1. Water Vascular System: system of interconnected water-filled tubules. External component is manifested as these tube feet.
2. Calcareous Endoskeleton
3. Radial Symmetry: body is organized around central axis around the mouth

## SEASTARS (ADTEROIDEA-SUBPHYLUM OF ECHINODERMA)

### BODY CHARACTERISTICS

1. Endoskeleton
2. Watervascular system
  1. Ring canal and 5 radials canals
  2. Has pouches called polian vesicles that help extend tube feet
  3. Madreporites take in sea water

4. Masses on the ring canal called Tiedemann's body that will produce phagocytes to phagocytizes things coming into the water vascular system

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## FEEDING

1. All Sea Stars in the tank are carnivorous
2. Portion of their stomach can be everted out their mouth to begin digestion of their prey

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## REPRODUCTION

1. Great powers of regeneration. Can regenerate an arm that is lost or damaged.
2. Regeneration is very dependent on environmental factors such as temperature, available food source, etc. If environmental factors are not ideal then regeneration will not occur.

### **Asexual Reproduction.**

- Fission and regeneration
- Comet stage is when one large arm has 4 little arms that are regenerating

### **Sexual Reproduction**

- Male or female
- Broadcast spawn

## SEA URCHINS AND SANDOLLARS (SUBCLASS OF ECHINOIDEA)

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## BODY FORM & ENDOSKELETON

1. No arms, body is globe shaped
2. Endoskeleton in the form of flat plates
3. Test is the cleaned shell of an echinoderm

### **Sea Urchins**

- Live on solid substrates (rocks)
- Move by means of tube feet, and long spines can be used as well in stilt like fashion
- Feeding: scrape off algae with tube feet

### **Aristotle's Lantern**

- Device to move teeth
- 5 triangular teeth protruding from mouth. Used to scrape off algae and shred kelp
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### **Sand Dollars**

- Live on sand/mud substrates
- Move by spines only

- Feeding by deposit feeding: tube feet
- High density short spines
- Petaloid tube feet specialized for gas exchange

## Glossary

**Broadcast Spawners:** Species like limpets, clams, and sea anemones reproduce externally by releasing their sperm and eggs to be fertilized by their neighbours. When broadcast spawning occurs the surrounding waters become cloudy with the tiny gametes. Broadcast spawning is often critically timed when conditions are ideal to increase the success rate of reproduction.

**Deposit Feeders:** These animals catch their food by sifting through soil and obtaining food particles.

**Filter Feeders:** Animals that feed by straining suspended matter and food particles from water, typically by passing the water over a specialized filtering structure.