

Echinodermata (Sea Stars, Brittle Stars, Sea Cucumbers and Urchins)

Echinoderms have endoskeletons (skeleton beneath skin) and tube feet for breathing, capturing prey, internal water circulation and locomotion (though brittle stars can move using only their arms). By the strong force of suction from these feet, sea stars are able to hang upside-down and to pull open bivalve shells. Echinoderms do not have brains. A severed sea star's arm can even regenerate a new body. To eat, sea stars engulf prey with their stomachs, digest it whole and pull their stomachs back into their bodies. Sea stars and urchins have pedicellariae (tiny pincers) in their skin for defense. Urchins use their spines and Aristotle's lantern (a toothy organ on their underside) to scrape perfectly-fitting depressions in rock. Using their tube feet to pass bits of kelp to their underside mouths, urchins may never need to leave their burrows. Sea cucumbers are elongate, soft-bodied creatures. They use tentacles for feeding. **Note:** Sea stars are measured tip to tip, across diameter.



leather star
Dermasterias imbricata
24cm. Thick, slippery skin. Channels, pools, lush rock fields. 3



bat star
Asterina miniata
12cm. Color varies, scaly skin. Pools, surf-Pools. 3 grass flats. 3



blood star
Henricia levisculata
9cm. Color varies.



red six-rayed star
Leptasterias hexactis
6cm. Reddish. Pools, rock fields. 2



equal-rayed six-rayed star
Leptasterias aequalis
6cm. Stubby, gray. Pools, rock fields. 2



slender six-rayed star
Leptasterias pusilla
4cm. Slender arms. Brownish with yellow blotches. Pools. 3 Pillar Point to Monterey.



Pacific sea star (ochre sea star, purple sea star)
Pisaster ochraceus
25cm. Most common sea star. Orange, purple or brown. 2, 3



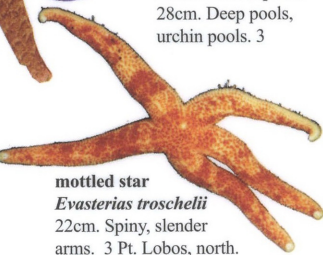
pink star (short-spined star)
Pisaster brevispinus
28cm. Deep pools, urchin pools. 3



giant-knobbed star
Pisaster giganteus
50cm. Pink spines turn white with maturity. Crevices, urchin pools. 3



giant sunflower star
Pycnopodia helianthoides
80cm. Purple or red. Soft, limp, highly voracious. Deep pools, urchin pools. 3



mottled star
Evasteria troschelii
22cm. Spiny, slender arms. 3 Pt. Lobos, north.



western spiny brittle star
Ophiothrix spiculata
15cm. Variable color. Rock fields with sand. 2, 3 Moss Beach, south.



dwarf brittle star
Amphipholis squamata
2cm. Rock fields, crevices, seaweed roots. 2, 3



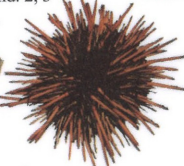
tar spot cucumber
Cucumaria pseudocurata
0.5cm. *Gastroclonium* flats, mussel beds, and in coralline algae. 2



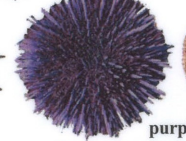
red sea cucumber
Cucumaria miniata
10-25cm. 3 Sonoma county, north.



white sea cucumber
Eupentacta quinqueemita
8cm. Crevices, rock fields. 3 More common farther north.



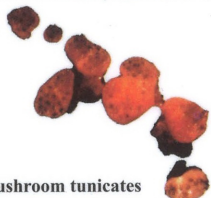
red sea urchin
Strongylocentrotus franciscanus
17cm. Solitary. Pools. 3



purple sea urchin
Strongylocentrotus purpuratus
10cm. Their egg-carton like burrows (urchin pools) create habitat for other organisms. 3 (Urchin test--or skeleton--on right.)

Urochordata (Tunicates)

Tunicates, commonly known as sea squirts and sea porks, are our closest invertebrate relatives. A larval tunicate resembles a tadpole. As it matures, it anchors itself to a rock by its head, and there it settles, metamorphoses, and spends the rest of its life. Tunicates pump water through openings in their outer skin, filtering out food. Our tunicates can live connected to one another as compound ascidians (colonies) or as simple ascidians (individuals) attached to rock, seaweed or other animals, or in protected places under rocks and mats of seaweed. Their bodies may be rubbery, lacy, or hard.



mushroom tunicates
Distaplia occidentalis
Individuals 0.5cm. Mushroom-shaped. Surfgrass flats, channels, pools. 3



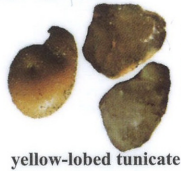
California sea pork
Aplidium californicum
15cm across. 1cm thick. Undefined globs or sheets. Under ledges. 2



red sea pork
Aplidium solidum
20cm across. 5cm thick. Glob-like. Under ledges. 2



paddle-fingered ascidian
Distaplia smithi
5cm. Slimy. Under ledges. 3 Monterey, north.



yellow-lobed tunicate
Eudistoma ritteri
0.5-2cm each. Slimy but firm. Blobs and lobes range from ledges. 3

Chordata (Fish, Birds, Mammals)

Vertebrates are represented on the intertidal rocky coast by marine mammals, birds and fish. Mammals and birds are top predators in the tidepools, while young and small fish are small-scale predators. When fish spawn in the spring, seabirds (which may live at sea part of the year) and pinnipeds (seals and sea lions) come closer to shore to feed, and also to breed. Shorebirds (which live and forage along the shoreline) are most common in winter. Birds are measured tip of tail to bill.



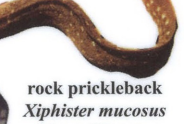
tidepool sculpin
Oligocottus maculosus
8cm. Pools. 1, 2



fluffy sculpin
Oligocottus snyderi
8cm. Pools. 1-3



northern clingfish
Gobiosox maenadicus
15cm. Uses fins as suction-cups to cling to rock. Rock fields. 3



rock prickleback
Xiphister mucosus
12cm. Slippery eel-like fish. Rock fields. 2, 3



cormorant
Phalacrocorax spp.
70-90 cm. Our three species nest on sea stacks and cliffs and commonly visit the intertidal zone.



harbor seal
Phoca vitulina
1.5m. Spotted, brown to white. On rocks or in water with only head exposed. 2, 3



California sea-otter
Enhydra lutris
1.4m. Floats on back in groups (called rafts) amongst kelp.



human being
Homo sapiens
170cm. Shape and size varies. Juveniles congregate noisily around large echinoderms.



great blue heron
Ardea herodias
130cm. Solitary, fishing tidepools or standing on floating kelp.



black oystercatcher
Haematopus bachmani
44 cm. Makes a high-pitched yap, like hysterical laughing. Wedge-shaped bill smashes mussel shell to extract meat.

great egret
Ardea alba
95cm. Stands still with neck bent forward to catch tidepool animals.



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Homo sapiens
170cm. Shape and size varies. Juveniles congregate noisily around large echinoderms.

California sea lion
Zalophus californianus
3m. Barks like a dog. On offshore rocks, and famously at San Francisco's Pier 39. 2, 3