Intertidal zonation: a combination of abiotic and biotic ‘forcing’ shape these communities. Many organisms here occupy a realized niche rather than a fundamental niche.

Genus *Nucella* - dog whelk/dog winkle

Description: *Nucella emarginata* is a snail which grows up to 2.5 cm long with strongly developed spiral ribs. The ribs are usually white with the furrows between being a yellow, orange, brown, gray, or black.

Biology/Natural History: This species unlike limpets and periwinkles is a carnivore—one of the predatory whelks known as "oyster drills". It hunts down intertidal barnacles and mussels and uses its radula to drill through their protective shell. After drilling, the whelk injects digestive enzymes into the barnacle’s body cavity and sucks out the dissolved tissue. This species is a formidable predator that aids in controlling the population of barnacles and mussels.

Genus *Nucella* - dog whelk/dog winkle

Periwinkles: *littorina*

These are smaller, dark (blackish) or light in color.

Tegula

These are larger, dark (blackish) and roundish. Algal grazer

California Mussel - *Mytilus Californianus/M. Edulis*
Mussel
Major contributors to zonation in Mussels is predation by *Nucella* and *Pisaster Ochraceous* (the ochre star), as well as abiotic tolerance limits (generally on the upper tide limit).

Ochre Star: *Pisaster Ochraceous*
Major predator of mussels, barnacles, limpets and other molluscs

Limpits: Molluscs (gastropods)
Description: Limpets come in many sizes and even colors
Biology/Natural History: Most limpets feed by grazing on algae which grows on the rock (or other surfaces) where they live. They scrape up films of algae with a radula, a ribbon-like tongue with rows of teeth. Limpets move by rippling the muscles of their foot in a wave-like motion. In some parts of the world, certain smaller species of true limpet are specialized to live on seagrasses and graze on the microscopic algae which grow there. Other species live on, and graze directly on, the stipes (stalks) of brown algae (kelp).

Chitons: mollusca/polyplacophora
8 Plates!
Biology/Natural History: Graze on algae, including coralline algae (*Tonicella*), and benthic diatoms

Limpits: Molluscs (gastropods)
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Anemones: Anthopleura

Biology/Natural History: Some will be solitary, some will be colonial. They tend to need more moisture and cooler conditions.

Barnacles: Arthropods, Cirripedia

Gooseneck barnacle: Pollicipes

Star barnacles: Chalimus sp.

Balanus G (white acorn Barnacle)