

# The Animal Who Wears Many Hats

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In the human world, “wearing many hats” refers to someone who plays many roles. Green sea urchins, *Strongylocentrotus droebachiensis*, also quite literally wear “hats”. They are one of several species that are known to pick up shells, pieces of seaweed, rocks, or marine debris and cover themselves with it! So why do they do this? Are they trying to impress a mate? Use shells as a parasol to protect themselves from UV rays? Shield themselves to protect them in battle against hungry predators? And how do they do it? Sea urchins have rows and rows of tube feet all around their bodies. These tube feet act like little suction cups that allow them to walk around, move themselves to an upright position if they get knocked over, carry food to their mouths, and to hold items. But why do they hold items to cover themselves? In green sea urchins, it seems to depend most on the species, size, and wave action more than the presence of predators or sunlight exposure. The green sea urchins seem to shield to protect themselves in areas of high flow, strong waves, and more so when they are younger and smaller. Their spines are sharp but easily broken if they are tossed around by turbulent waters, so perhaps they get more protection if they are covered by harder objects. It also might help to weigh them down enough to stay put. By gripping onto rocks and shells with their tube feet, they aren’t able to move around or feed as freely, so there is a bit of a trade-off, stay safe or stay fed. Although sometimes they carry bits of macroalgae, so it may be a “save for later snack-pack” kind of thing. I know I always carry snacks, so that seems pretty smart to me. It’s strange to think of an urchin being smart; how does an animal with no brain decide whether or not to cover itself? Some scientists think that it is a decision that the urchin makes, and that it is functional; it prefers a certain weight and size and type of covering material, while others think it is a reflexive behaviour based on the mechanics of their locomotion where as the animal moves, it naturally picks things up.

As for their role in the ecosystem, sea urchins are a very important recycler of nutrients, and at times they are grazers. Most often sea urchins catch stray blades of kelp that may have otherwise just washed ashore, but if there isn’t enough food drifting around then they will march off with their little tube feet to go find some. Much like sheep and goats graze on the grasses of fields, urchins graze on algae growing on rocks and other surfaces. They are messier eaters than a two-year old eating a bowl of spaghetti, and as they chew through large pieces of algae with their incredibly sharp teeth, they leave behind smaller bits that can then be consumed by other species. In this sense, they are an important detritivore. Detritivores are the recycling heroes of the ocean, because they take material and break it down for the decomposers, who turn that “waste” into important minerals such as nitrogen and phosphorus. Nitrogen and phosphorus (in the correct amounts) are then used to support the growth of more algae and aquatic plants. Having too much of these nutrients (eutrophication) or even having too many urchins has a negative impact though, because the ecosystems are in a fine balance. But I digress. Our urchin friends love to eat algae, and when they graze on algae that covers rock, their messy eating benefits the ocean again by creating sand! They only have 5 teeth but they are so strong and sharp that they are able to gnaw through rock. They ingest some of the rock but as they chew through, the grinding also creates sand. Their ability to pulverise rock also allows them to create perfect little pits that provide them with much more surface area to attach their tube feet to to keep them safe. We affectionately refer to these pits as “urchin apartments”. You can view some urchin apartments in some tidepools around Tofino and Ucluelet, and it tends to be the purple urchins, *Strongylocentrotus purpuratus*, that reside in them!

To view some of the hats the green urchins like to wear, you can come to the Ucluelet Aquarium and see if you are team “functional” or team “reflexive”, enjoy their fashion sense, or simply stare in awe at one of the amazing creatures our ocean houses.