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| **Species** | **External**  **Structure/ Function** | **Internal Structure/**  **Function** | **Sensory Receptors/**  **Perceives** | **Behavioral Response** |
| **CNIDARIANS** | | | | |
| Anemones | Tentacle/capture prey and move it into the mouth | Nematocysts/stun & poison prey when triggered | In tentacles/  pressure or touch | Close up the tentacles around the mouth |
| **WORMS** | | | | |
| Polychaete or bristle worms | Parapodia on each segment with bristles/ movement | Blood vessels in parapodia/ respiration through skin  Proboscis with jaws extends out to stab and poison prey |  |  |
| Marine segmented worms (polychaetes)  Clam worms.  Sand worms, Scaleworms |  | Each segment is a fluid-filled box surrounded by muscles, acts as a hydrostatic skeleton when contracted.  Setae (bristles) push against the substrate for traction. | Brain coordinates the shape of each box and the setae. | The worm can move quickly and flexibly over surfaces.  Secrete mucus |
| Tubeworms  Featherduster worms  Serpulids  Calcareous Tubeworms | Crown of tentacles/feeding by slurping up mucus  Operculum “trap door”/closes to keep animal from drying out | Body secretes the substance that becomes the tube | Light receptors | Retract tentacles into tube |
|  | | | | |
| **MOLLUSKS** | | | | |
| **Species** | **External**  **Structure/ Function** | **Internal Structure/**  **Function** | **Sensory Receptors/**  **Perceives** | **Behavioral Response** |
| Abalone |  |  | Chemosensory | Abalones twist violently to dislodge their foot, lift up and gallop from sunflowers |
| Plate Limpet |  |  | Chemosensory | Rises off the bottom and gallops away when an approaching sea star is detected. |
| Chitons, snails, limpets | Shells/protection | Radula/scraping “tongue,”belt of hard teeth to graze on animals on rocks. | Light-sensitive cells on back (chitons) | Curl up (chitons and limpets), retreat into their shell (snails) |
| Barnacles | Shells/protection and prevention drying out  Cirri/feathery “feet”-like feeding structures “comb” through the water |  | Receptors on top of head/  chemosensory “smell” | Barnacle larva settles on its head and glues itself down into an old barnacle scar |
| Limpets |  |  | Light-sensitive cells/some wavelengths of light  Smell/chemo-sensory? | Negative response: back up and move sideways  Homing on mucous trails or topographical memory |
|  | | | | |
| **Species** | **External**  **Structure/ Function** | **Internal Structure/**  **Function** | **Sensory Receptors/**  **Perceives** | **Behavioral Response** |
| Mussels | Byssal threads/ attach shells to the substrate | Gland inside foot/secretes byssal threads | Smell/chemo- sensory detecton | Can detect presence of whelk predators and produce more byssal threads to trap and suspend a whelk above the mussel bed so it starves. Also grow more compactly (i.e., shorter) as a defense. |
| Snails and sea slugs (nudibranchs) |  |  | Large pair of tentacles with eye spots/vision  Smaller pair of tentacles/sense of smell | Find food, follow mucus trails |
| Snails | Operculum “trap door”/ to seal off the shell from predators or from drying out when the tide is out |  |  |  |
| Whelks (snails; includes dogwinkles) |  | (Accessory) Boring structure/drills holes in mussel, clam, and barnacle shells |  |  |
| Cockle |  |  | Smell/chemo- sensory detection | Pogo-stick escape with foot from approaching sea star |
| Clams | Siphons/take in water to pump through body and filter feed, then pump waste water out. (one or two siphons) |  | Vibration, noise, shadow | Siphons retract |
| **Species** | **External**  **Structure/ Function** | **Internal Structure/**  **Function** | **Sensory Receptors/**  **Perceives** | **Behavioral Response** |
| Scallops |  |  | Smell/chemo-sensory detection | Clap valves together to swim away from an approaching sea star |
| Nudibranchs | Tentacles/capture prey | Stomach lined with chiton, don’t trigger nematocysts that are moved internally into the tentacles to stun and poison prey |  |  |
| Octopus and squid | Arms/capture prey  Suckers/hold prey in place until moved into the mouth | Mantle cavity circulation of water – can swim by jet propulsion, skin has no structure (cells) so can be squeezed so octopi can escape | Chromatophores (pigment-rich, light-reflecting cells) under the skin expand and contract; the pigment sacks become more or less visible. Controlled by nerve cells. | Change color to mimic the background for camouflage or to warn predators when disturbed  Shoot out a cloud of ink and escape when disturbed |
| **CRUSTACEANS** | | | | |
| Crustaceans | Appendages/ walking, swimming, and modified to seize prey |  |  |  |
| Isopods |  |  | Touch | Curl up |
| Amphipods/beach hoppers |  |  | Magnetic map; can navigate in response to magnetic or celestial cues or landmarks | Return “home” when displaced 100 feet away in 15-20 minutes |
| **Species** | **External**  **Structure/ Function** | **Internal Structure/**  **Function** | **Sensory Receptors/**  **Perceives** | **Behavioral Response** |
| Crabs | Claws and pincers/ tcan crush mollusk shells  “Apron” on underside/ rounded in females to hold eggs next to belly and brood them. |  |  | Burrowing |
| Hermit Crab |  |  | Sensory receptors in claws and tentacles?/touch | Finds a bigger shell when needed and switch (video) |
| **ECHINODERMS** | | | | |
| Sea cucumbers | Tentacles and mucus/capture detritus as it “licks its fingers” | Internal organs/can be ejected and left behind to entangle a predator, then regenerate | Skin/touch  Touch | Can change their skin from liquid to solid or solid t to liquid as defenses against predators  Retracts tentacles when disturbed, swimming response to sea stars on contact |
| Sea stars | Pedicellariae - pinching cells/defense and keep things from settling  Tube Feet/ locomotion and pulling bivalve shells apart, also capture detritus with mucous (blood stars) and pass it to foot to foot | Stomach inside or exposed and can turn inside-out to digest bivalves (true stars, blood stars, ochre stars) | Touch | Pinch the predator, keep anything from settling or growing on the top of the sea star |
| **Species** | **External**  **Structure/ Function** | **Internal Structure/**  **Function** | **Sensory Receptors/**  **Perceives** | **Behavioral Response** |
| Sea Stars (continued) | Nerve ring around the mouth with extension into each arm | Coordinates movement of tube feet. A sunflower star coordinates thousands of tube fee to turn itself over when it’s upside-down and to move as fast as 5-10 feet/minute to outrun prey. |  |  |
| Leather Star | Mouth/feeding | Swallows prey whole |  |  |
| Sea Urchins | Spines/ protection, locomotion, burrowing into soft rock | Tube feet with suckers at end protrude out through holes in test for locomotion  Aristotle’s lantern/5 teeth to scrape rocks, nibble on algae | Touch receptors | Pedicellariae pinch |
| **MAMMALS** | | | | |
| Sea otters | Rocks/used to break open urchins, knock abalones and limpets off rocks |  |  |  |
| **FISH** | | | | |
| Tidepool sculpins |  |  | Smell and sight | Homing if displaced from a tide pool, up to 335 feet |