

## Rock Pool Adaptations

### Teachers Notes

- An adaptation is change. An animal changes its body or its behaviour in order to better survive in its chosen habitat. Animals with some quite impressive adaptations are ones that we can see whenever we visit the beach. The rock pools are full of them!
- Rock pools can be harsh places to live. Animals that live here have to be able to deal with a number of stressors including temperature, salinity (both high and low), wave action and exposure. The temperature in rock pools can rise much higher than what it does in the open ocean, especially on a sunny day when the tide is out and there is no water coming from the ocean to moderate the temperature. Salinity can vary wildly in rock pools – on sunny day water can evaporate leaving the salt behind which raises the salinity levels, while on rainy days fresh water that enters as rain dilutes the amount of salt. Strong wave action constantly threatens to wash rock pool inhabitants out to sea. And finally, at low tide animals that live on rocky shores can find themselves with no water left to live in. They must be able to deal with exposure for up to 8 hours or more. They need to be able to survive these hazards but also adapt to varying conditions relatively quickly
- Sea stars are absolutely amazing and often under-estimated. One really interesting adaptation to their quite dangerous marine habitat is the ability to regenerate lost limbs. If a sea star loses a limb to a predator for example, it can simply regrow that limb so long as part of the central ring is intact. But even more than that, some sea stars can regrow their entire body from just a part of a severed limb with that central ring! They use this adaptation to survive but also to reproduce. They cannot move very far or fast, so if they need to reproduce but have no partner they can simply separate their body into 2 pieces – both will have a section of the central ring as so will create 2 individuals!
- Another adaptation is their tube feet. These animals have to be able to hang on tight to surfaces so that they don't just wash away. So they have developed tube feet that run along the entire underside of their bodies. These feet are designed for hanging on but also for prying open molluscs and bivalves.
- Sea stars have no heart, blood, or lungs. What they do have is a water vascular system. A series of tubes that run throughout the body and arms carrying sea water. From this they gain oxygen and nutrients – it is like a circulatory, respiratory and digestive system all rolled into one!
- Sea stars can eat food items of just about any size so long as the sea star can get on top of it. This is because the sea star doesn't have a mouth; instead it pushes its stomach out of its body to digest food on the outside. It then pulls the food back in after it is already mostly digested.
- Sea Anemones live in similar environments to sea stars. They also need to be able to hold on, but instead of having hundreds of tube feet they have just one foot called the pedal disc. They are more sedentary than sea stars – but they are not 100% stationary. If needs be they can detach themselves and “swim” by undulating their bodies.
- When they live in an area that can become exposed – for example in a rock pool – they have a behavioural adaptation that stops them from drying out. They can retract all their tentacles inside their bodies, which reduces surface area on which evaporation could occur. By doing this they prevent drying out.

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- A final adaptation by sea anemones is to have stinging cells as a more efficient way of capturing prey items. Within their tentacles they have nematocysts which contain a small cell filled with toxins. When activated by a prey item brushing past, the nematocysts will fire a small harpoon like mechanism which will inject the toxin into the prey item.
- For any soft bodied animals, there is a risk of becoming a meal quite easily. A simple adaptation to protect yourself is to have a shell. This can be both a physical and a behavioural adaptation. Sea snails for example create their own shell for protection – they even have an operculum that they can use to completely shut their shell. Hermit crabs also have a shell – however this isn't really a physical adaptation as they don't grow their own shells, they borrow them from snails. They rely on finding old empty shells to move into.
- Other animals that have a hard outer covering are crayfish – they have a very tough exoskeleton. As they grow they need to replace this exoskeleton with a bigger one; this is called moulting. They will leave the old one behind, often completely intact! This is a dangerous time for a crayfish as their soft bodies are temporarily exposed.