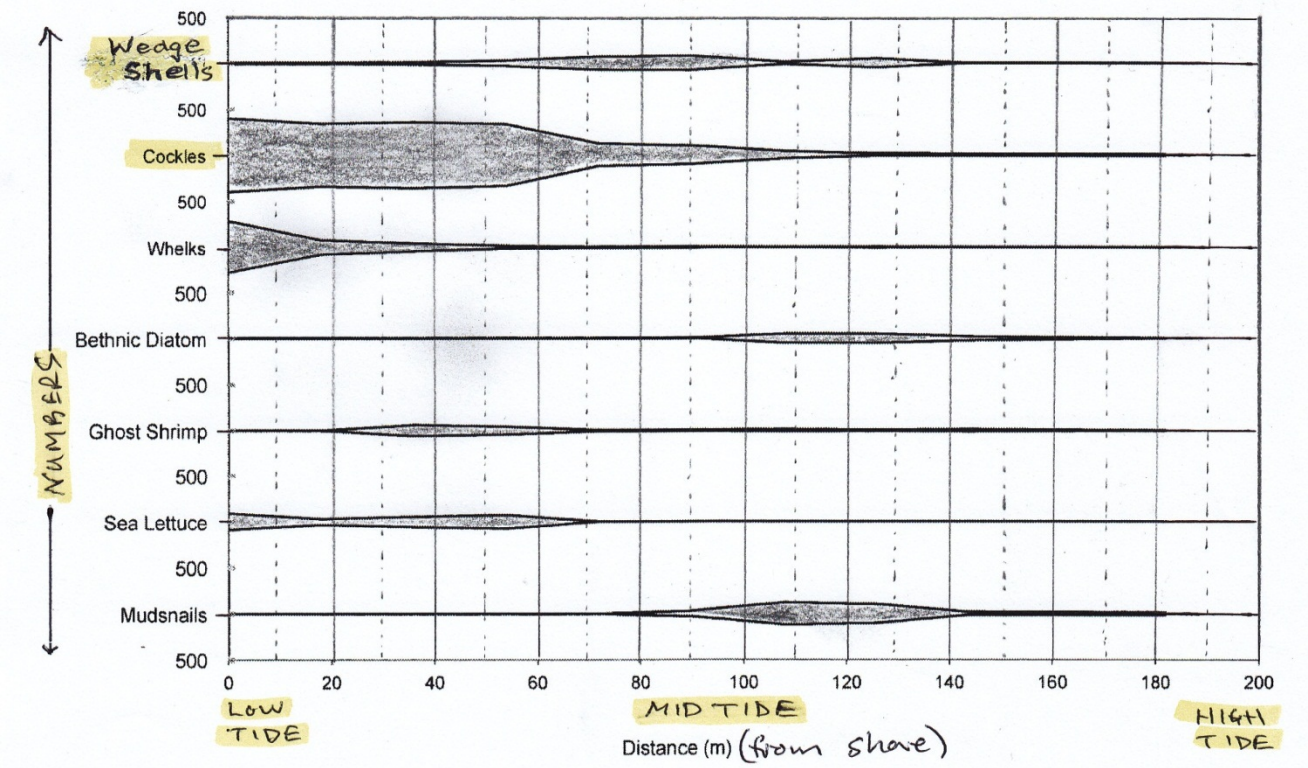
Please note – These are extracts from one student's response

Class Results: Kite graphs showing distribution of species from low tide water mark at Mahara Bay Estuary on 26 February 2014



The collated class results came from field work done by 10 groups at Mahara Bay estuary. Transect lines were placed at right angles to the low tide and samples taken at stations every 20m using a 0.5m x 0.5m quadrat. At each station, all organisms on the surface were identified and counted, before digging up the whole quadrat to a depth of 0.1m and counting organisms found in that. We recorded substrate and habitat type at each station.

My investigation focus was to study the community pattern in the Mahara Bay. We observed a variety of life there, including predatory birds like oyster catchers.

2

Mahara Bay is an estuary affected by the tides and consists of mudflats that are covered and uncovered by the tide twice a day. The main abiotic environmental factor affecting organisms found there is this tidal movement and exposure to air when the tide is out as a result.

In the mudflats there were a variety of patterns that I observed from the organisms in this community.

1

The obvious pattern shown by the living things is zonation. This is because there are distinct horizontal bands of living things as go from the low to the high tide. Things such as tidal movement, aerial exposure, mud/sand composition and temperature all influence the mudflat and organisms that live in it. There are also biotic factors such as competition for food and space, and predation.

2

While there were lots of other species, the two species that I chose to study in this community were cockles (*Austrovenus stuchburyi)* and wedge shells (*Macomona liliana*).

Other interesting species that showed the zonation were mud snails, sea lettuce and whelks. All the organisms were related in some way in a food web. They are interrelated as they need each other to live.

In general, as you get closer to the low tide the number of organisms and different species increase. Cockles were found in the low and mid tidal zones, up to 120 m as this area is covered by sea water longer than the other zones. They can be found mostly in the area from 0 m – 60 m, just below the mud/sand surface. They live just below the surface in muds of fine sand at the low tide, and sandy silts in the mid tide. The deepest we found them was 10 cm.

1

2

Cockles need food and oxygen to carry out their life processes to survive. They have adaptations to carry out gas exchange and feed. They are adapted by having gills that carry out gas exchange underwater when the tide is in. The gills do two jobs – take in oxygen and filter out fine food particles. Tiny hairs wave the water containing oxygen and direct food particles towards the mouth. Like most organisms in the estuary, cockles need water all the time which is why they are found in the low tide area.

4

3

Cockles are filter feeders, found just below the surface of the mud with siphons opening just above. The Oyster catchers prey on cockles for their food. To stay away from predators the cockle has a muscular foot which it uses to bury downwards in the mud.

4

5

Wedge shells were found from 40 m – 140 m in the mid tide zone, mainly between 60 m – 100 m. They are surface deposit feeders (and filter feeders like cockles) as they feed on the organic matter on the mud beds as well. Their distribution overlaps with cockles, so there is competition between them.

1

5

Wedge shells have a wider range of tolerance to physiological stress from drying out than cockles, as they were found in higher numbers in the mid-tide zone. They are better adapted to live and carry out feeding in this zone, which is covered by seawater less of the time than for those organisms in the low tide.

3

Gause's principle states that no two species can co-exist for long in the same place. At the Mahara Bay estuary, cockles and wedge shells can live together because they have different ecological niches.

5

Overall my group concluded that there was a zonation community pattern present at Mahara Bay. The two animals we chose to study were prime examples of this occurring on the mudflat. The cockle used a variety of adaptive features and interrelationships to live in its zone at the estuary. It needs enough water to filter feed and that is why it is found in the low tide area. The cockle has to compete for space and food with other species like the edge shells, so that is why some cockles were found in the mid tide area as well.

3

This distribution pattern occurs because of the tides combined with abiotic factors such as aerial exposure, sunlight, salinity, sediment composition and temperature. Biotic factors also affect the zonation pattern. These include competition for space, predators and parasites. Zones are created because organisms can only live in a range that they can tolerate.

4