MODES OF LIFE AND ASSEMBLAGES

MODE OF LIFE

Organism live in the environment which they have evolved to become best adapted to. Marine organisms may only survive in certain parts of the water column (depths in the ocean) and terrestrial organisms may only survive under certain climates or terrains.

As well as the environment an organism is found in, ode f life also describes how the organism lived and fed there. They can be scavengers or predators (which usually involves movement) or filter feeders (which usually are fixed to one place or drift by currents).

There are technical terms to describe modes of life…

Benthonic| Organisms live in or on the sea floor sediment (called a substrate)

Position

Infaunal | Organism lives in the sediment, usually in a burrow. Many will filter feed. E.g. **Turitella gastropod**

Epifaunal | Organism lives on the sediment substrate. E.g. Ostrea type bivalve or Gryphaea type bivalve

Movement

Vagrant | The organism moves around on the sediment, it is mobile. Most will be scavengers or predators. E.g. **Regular Echinoids or Trilobite Calymene.**

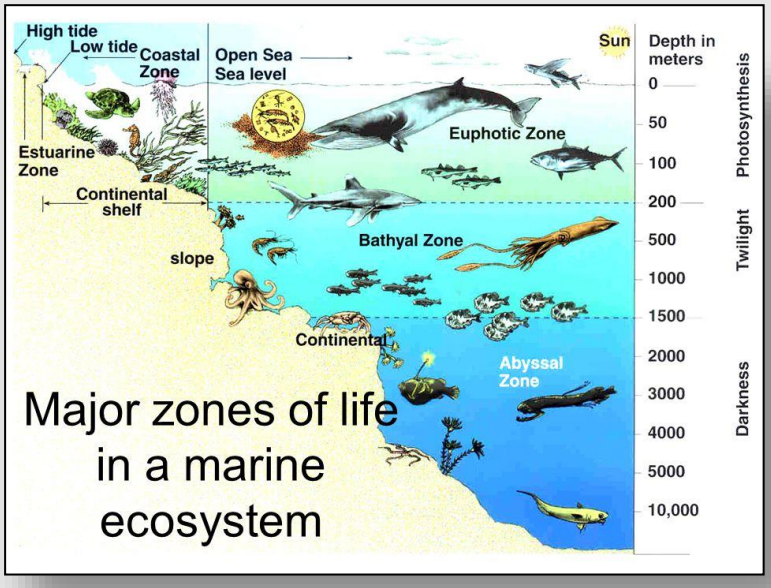
Sessile | The organism does not move around on the sediment, it is immobile. Some are attached to the sea floor while others lay on the sea floor. Most will be filter feeders. E.g. **Bivalve Mytilus**

Pelagic| Organisms live in the water column, typically in surface layers.

Movement

Planktonic| Organisms float in the water column and are taken wherever the currents drift them. Usually a filter feeder. E.g. graptolites.

Nektonic | Organism actively swims in the water column. Most are scavengers or predators. E.g. Ammonites.



ASSEMBLAGES

- **An assemblage** = a collection of different organisms/fossils preserved together.
- **Life assemblage** = A collection of fossils found preserved in their living positions.
- **Death assemblage** = An accumulation of fossils preserved in positions they did not live in. Organisms are **transported, mixed, partly broken** and **deposited as a mass of shells**.

Fossils found in assemblages give clues to the mode of life and palaeo-environment. Death assemblages are recognised by:

1. **Broken, fragmented or abraded fossils**
2. **Sorting of shells by size**
3. **Alignment of shells by current (but still random orientations compared to life positions)**
4. **Mixtures of organisms that could not have lived together in the same environment, such as calm water and high-energy water bivalves.**

Life assemblages are rare compared to death assemblages. They tend to need **low energy environments**. Organisms are found in their **life position**, **un fragmented/broken**, **untransported** and **complete**. Life assemblages may be in a fine sediment (like clay or mudstone) indicating the low energy environment.

Thick-shelled organisms were **robust** enough to withstand high-energy conditions compared to thin-shelled organisms. However, some thin shelled organisms lived in burrows that provided protection against high-energy waters.

The hypothesis can be backed up by **pockets of broken shells concentrated** in layers and the type of sediment itself. Times of low energy result in fine grained sediment such as **micrite mud**. On the other hand, times of high-energy result in coarser sediment like **silt and sand layers**.

Environment	Possible assemblage	Description
High-energy continental shelf	Thick-shelled brachiopods and bivalves. Fragments of trilobites and other broken fossils such as corals. Microfossils.	Fragmentation suggests high energy. This is supported by the thick shelled fauna.
High-energy shallow marine	Thin shelled burrowing bivalves. Thick-shelled bivalves or those which show methods to attach to the substrate. Broken fossil remains. Microfossils.	Fragmentation suggests high energy. Burrows do not need thick shells but it does indicate soft sediment. May be littoral zone or shallow marine.
Low-energy shallow marine	Brachiopods or epifaunal bivalves with wide shells, mostly articulated. These do not show any method to attach to the substrate. Irregular echinoids. Burrowing bivalves. Microfossils.	Wide sells suggest the need to spread weight out on the substrate. Burrowers also need a soft sediment.
Low-energy deep marine	Complete specimens of graptolites or cephalopods. May have many microfossils.	No bottom dwellers (not benthonic but pelagic). This could suggest an anoxic sea floor. Complete specimens sink to the bottom and are preserved wholly.
Low-energy deltaic / terrestrial	Plant stems, leaves and spores. Insects and gastropods.	Presence of plant stems and spores symbolises close proximity to the land – terrestrial or deltaic conditions.

THE PROBLEM WITH DERIVED FOSSILS

When an organism is preserved as a fossil in one sediment which is then **eroded away**. The fossil is t**ransported** and **redeposited in a younger** sediment. The fossil may **become abraded** by this process.

The derived fossil is older than the strata it is found in. This causes problems for **biostratigraphy** and dating of rock sequences.

Derived fossils may make paleoenvironment identification hard as the fossil can be redeposited in a **new environment** where the original organism would not have survived.