

## WHICH PLANTS GROW WHERE ON SHINGLE?

### 1. WHY ARE SOME PLANTS ABLE TO LIVE NEARER THE SEA THAN OTHERS?

If a **TRANSECT LINE** is followed across the shingle from the high water mark inland, a series of different plant **COMMUNITIES** (groups of plants that grow together in the same habitat) can be found in zones, which change with distance from the sea. If you are on fieldwork, the position of these plants can be marked on the transect section which you have made (**See Worksheet 8**).

These websites may help with this work:

<http://www.eastsussex.gov.uk/environment/conservation/shingleplants/default.htm>

<http://www.geog.sussex.ac.uk/BAR/Biodiversity/shingleplants.html>

### DIAGRAM OF TRANSECT

DIRECTION	ZONE	TRANSECT LINE
↑ To sea	Low Tide Level-----	Foreshore
	Normal High Tide Level-----	↓ Ephemeral community
	Storm Tide Level-----	↓ Pioneer community
		↓ Intermediate community
↓ To land		↓ Established community

### THE FOUR PLANT COMMUNITIES THAT MAY BE FOUND ON SHINGLE ON A TRANSECT EXTENDING INLAND FROM THE NORMAL HIGH TIDE LEVEL

**A. EPHEMERAL COMMUNITY** (not always present). Ephemeral means very short-lived and such plants are specialised **ANNUALS**, which means that they germinate, flower, produce seeds and die within a year.

The ephemeral community grows closest to the sea, forming a narrow zone just above the level of the highest winter tides. Often, only one species of plant is present, the low growing Orache, which has grey-green leaves, frosted with a whitish powder which helps reduce over-heating of the leaves and water loss.

All the plants of the ephemeral community are **OPPORTUNISTS**. They are adapted to seize the chance to flower and seed very quickly, before being washed away by winter storm waves.



**B. PIONEER COMMUNITY.** This forms a band or zone immediately landward of the ephemerals. The shingle is slightly more stable, but conditions are still difficult. Pioneer plants, just like human pioneers in a new area, have to be extremely tough to cope with difficult growing conditions. As well as resisting high winds, saltwater and spray, these plants have to cope with limited supplies of fresh water. Some have very long roots to reach the fresh water deep down in the shingle. To avoid water loss by evaporation, their leaves often have a thick outer layer or are covered in hairs. Many species die back in winter. Sea-kale, Yellow Horned-poppy, Sea Pea and many other pioneers tend to grow singly with large areas of bare shingle around them.

**C. INTERMEDIATE COMMUNITY.** This is a rather less harsh habitat on the landward side of the pioneers. There are clumps of vegetation and patches of bare shingle. The shingle is a little more stable and so soil particles can start to accumulate between the stones. The soil is partly formed by dead leaves, which decay into **HUMUS**, i.e. organic material in the soil, in the top layer of shingle. Animals add dung, which further aids humus and soil development. The humus absorbs water trickling through the shingle, storing it for the plants to use.

More diverse plants with their own ways of binding together the shingle, and avoiding water loss, grow in this community, sometimes in quite large mixed groups. Examples include Stonecrops, Sea Bindweed, tall grasses and Blackberry.

**D. ESTABLISHED COMMUNITY.** Further away from the sea the beach is more sheltered and more soil can build up. A rich, fairly continuous cover of mixed low and medium growing plants, mosses and lichens develop, and most pebbles are covered over with thin soil. If left to itself, this community may eventually develop into scrub or even woodland.

Communities B-D represents a **SUCCESSION**; each community may prepare the ground for the next.



a) Fill in the table to show how conditions may alter with distance from sea:

Vegetation Zones	Amounts of humus and soil	Water supply	Shelter	List key species in this zone
<b>Ephemeral zone</b> nearest the sea, just inland from high tide level				
<b>Pioneer zone</b> just inland from the ephemeral zone				
<b>Intermediate zone</b> , still further from sea				
<b>Established zone</b> on the landward edge of transect				Grasses, clovers, thistles mosses and lichens

**GUESS THE PLANTS**

b) On the plan of a vegetated shingle beach shown overleaf, you should by now be able to deduce which plants grow where.

Each species is shown by a different symbol

Each symbol indicates one plant of the species.

Some of the plants are named in the table of adaptations of shingle plants (**Worksheet 17**).

c) Fill in the key by writing the correct plant name next to each symbol in the key.

To help you deduce the plant, note how close it grows to the sea and whether it grows separately or in clumps. Shade the ephemeral zone, pioneer zone, intermediate zone and established community. Add a key to explain your shading.



# WORKSHEET 18: Which plants grow where on shingle?

Map of a vegetated shingle community

