Coasts
Coasts can be

• active or passive
• erosional or depositional
Parts of a beach

Off-shore

Fore-shore

Back-shore

High tide

Low tide

Beach face

Sand

Rock

Cliff

Berm
Wave refraction along a straight coast

Wave touches bottom here and slows down

Refracted

Wave

This part of wave stays in deep water and does not slow down

Beach

Longshore wave
current
The gentler the beach slope, the finer the beach sediments tend to be, as can be seen from these profiles of the Half Moon Bay, California.
Thermocline at the Carmel Beach is seasonal ...
... and so is the beach profile.
Seawater Temperature

Depth

Winter

Summer

Beach profile

Winter

Summer

Sea surface
Longshore current and littoral drift

- Path of sand grains
- Longshore current moves suspended sand in surf zone
These two pictures of Sandy Beach (shown by cross here), New Jersey, were taken in 1940 (left) and 1963 (right). Can we infer from these that...
These two pictures are of the same beach at Barnes Bay, Anguilla. The one on the left was taken in 1994 and the one on the right was taken sometime in 1995.
How baymouth bars and spits form

- Waves
- Sand movement
- Bay
- Baymouth bar
- Spit
- LAND
- SEA
Formation of a tambolo
Coastal straightening by wave-erosion

A. Headland
B. Deposition
C. Cliff retreat, Bay fills in, Stacks
D. Straight retreating cliff, Arch
The development of a wave-cut platform

1. Initial condition: A cliff with a wave-cut platform.
2. Process: The cliff retreats, causing the platform to widen.
3. Result: A wider wave-cut platform is formed.
Deltas can be:
1. tide-dominated, river dominated, and wave-dominated.
Continental shelf, slope, and submarine canyon
A submarine canyon is a collapsed river channel.
How construction modifies the shoreline:

- The constructing a groin or a pier, i.e., a structure perpendicular to the shoreline
How construction modifies the shoreline:

- Constructing a breakwater wall means sand pile-up right behind the breakwater wall and erosion downstream.
Santa Barbara Harbor