The Journey of an Ocean Wave:
From Deep Water to the Shoreline

1. Wind to Wave (Deep Ocean)

2. Waves Disperse into Swells

Waves Disperse into Swells: As waves travel, they sort by speed, with longer waves moving faster.

3. Water Particles Move in Circles

Water Particles Move in Circles: In deep water, particles follow a circular path, with motion decreasing with depth.

Coastal Transformation (Approaching Shore)

Refraction: Waves Bend

As waves enter shallower water, they slow down and bend to become more parallel to the shore.

Shoaling: Waves Grow Taller

The wave's energy is compressed into less water, causing wave height to increase.

Breaking: Energy is Released

The wave becomes too steep and breaks, transferring its energy to the surf zone.

1. Wind Generates Waves

Wind Generates Waves: Energy from wind creates storm waves that travel away from their generation area.

Wave Property Changes in Shallow Water

Zone	Wave Speed	Wave Direction	Primary Effect
Offshore	Fast	Original direction →	-
Midshore	Slower	Bending ↱	Refraction begins
Nearshore	Slowest	Nearly parallel to coast ⇉	Shoaling & Breaking