

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

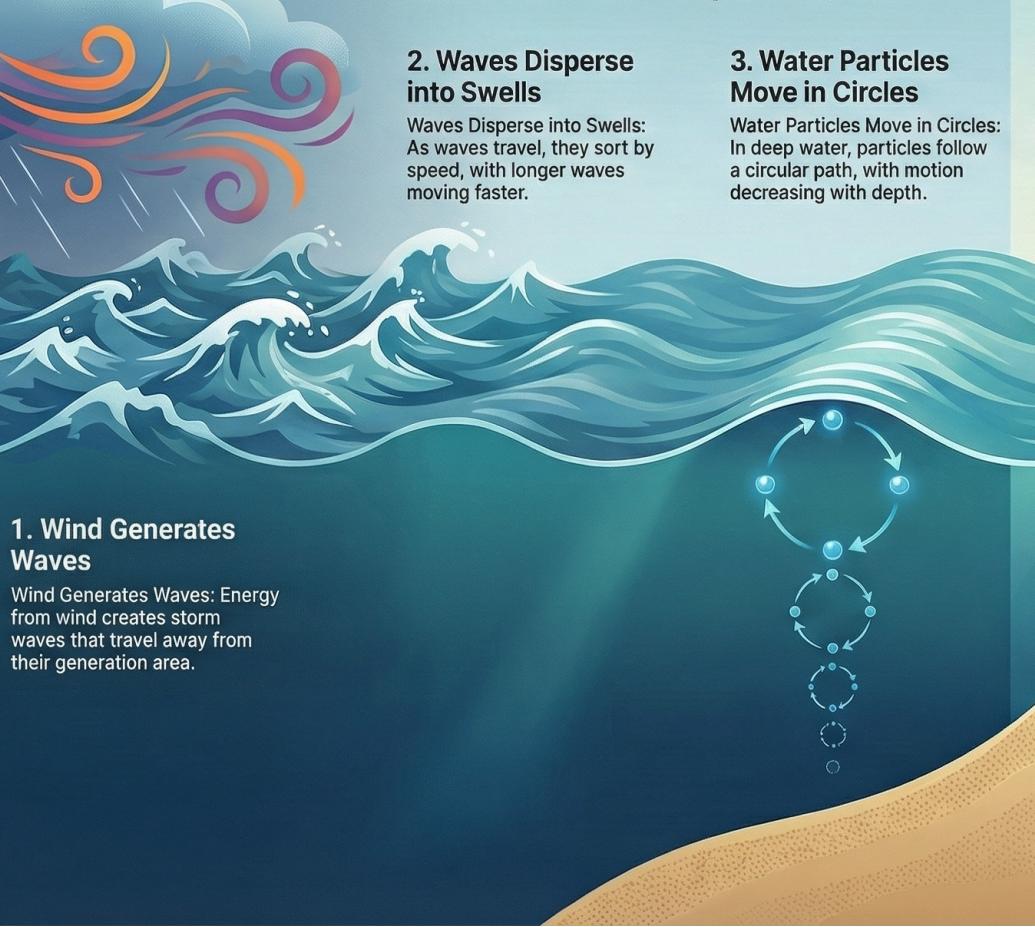
1. Wind Wind to Wave (Deep Ocean)

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.

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