Wave Erosion and Deposition

Unit 4, Lesson 2

12/4/2011

Getting Started

Take a look at how wave erosion has made an impact on just one coastline.

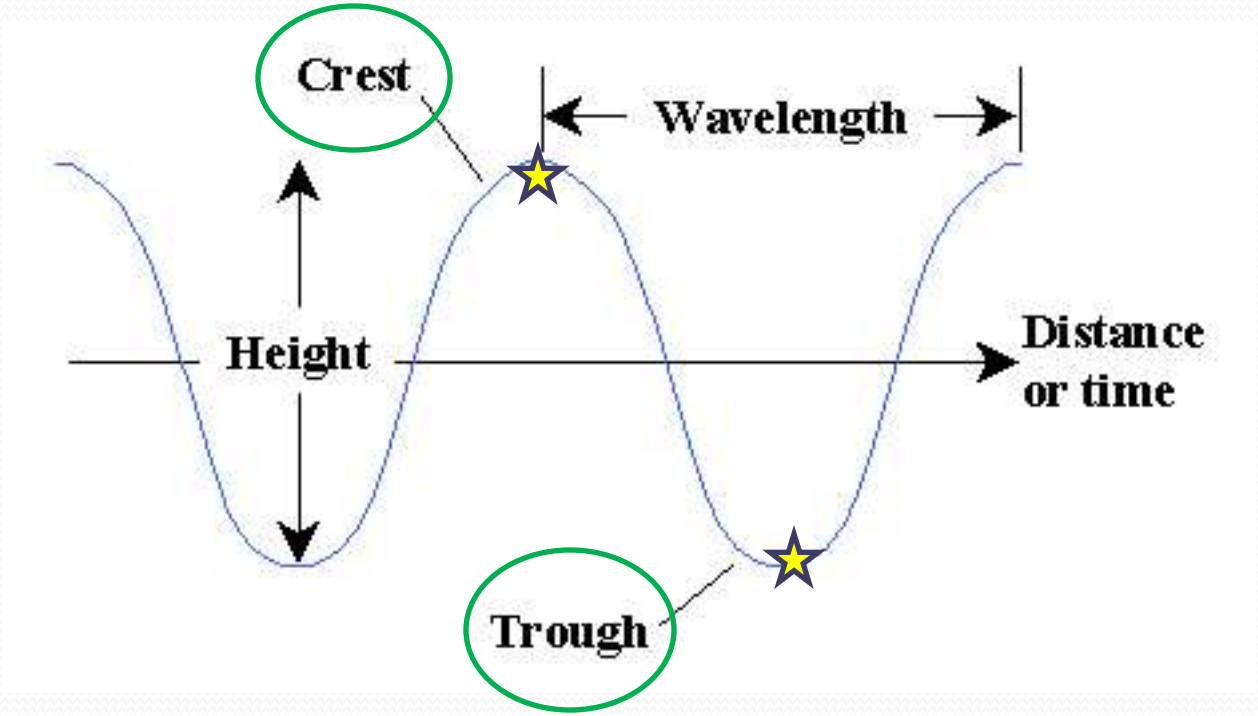
Pay particular attention to the flags!

What are waves?

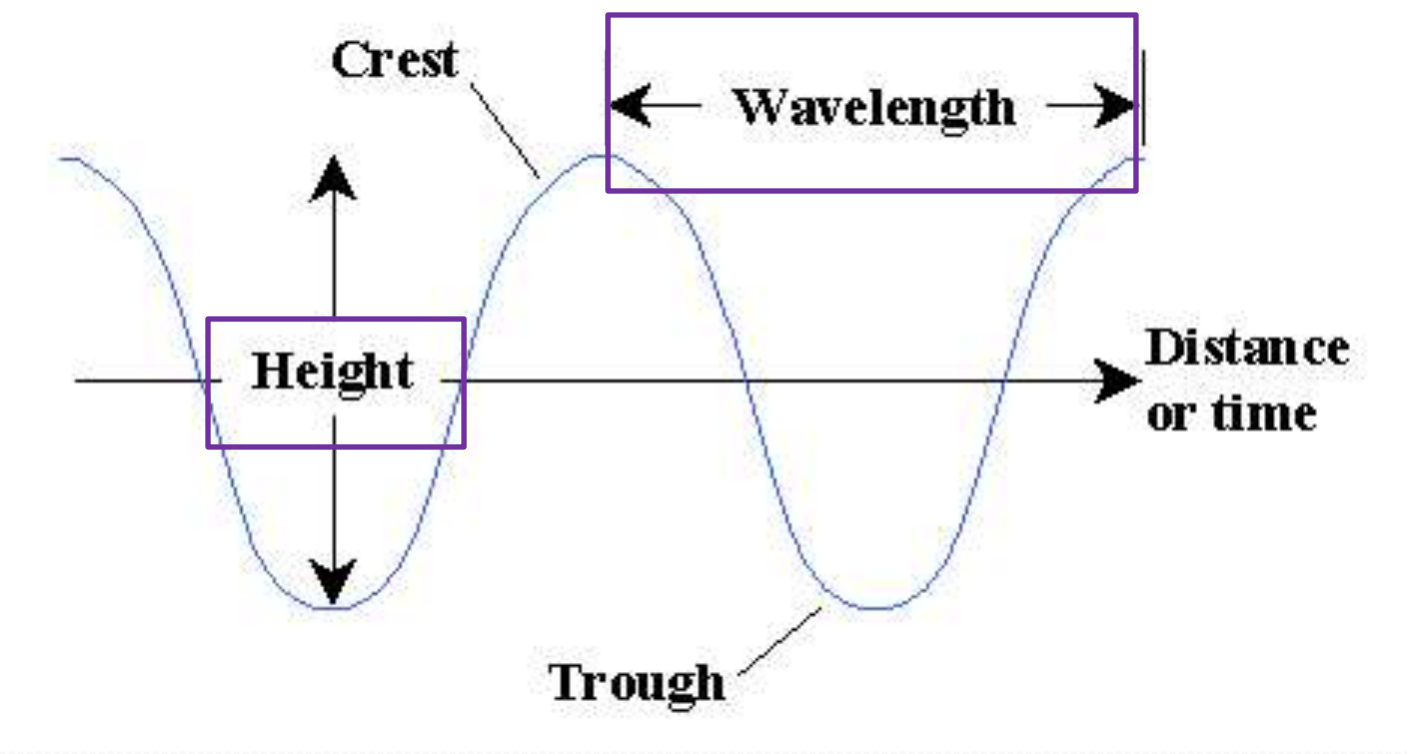
Waves are energy travelling through some sort of material.

THEY ARE CREATED FROM WIND BLOWING OVER THE WATER.

Parts of a wave



Measuring Waves



What do the pictures mean?

Wave height: *the vertical distance from the highest*

part of a wave to the lowest

Wavelength: *the horizontal distance between one wave crest and the next crest*

Waves in nature

What influences the size of a wave?

STRONG WINDS FOR AN EXTENDED (LONG) PERIOD OF TIME

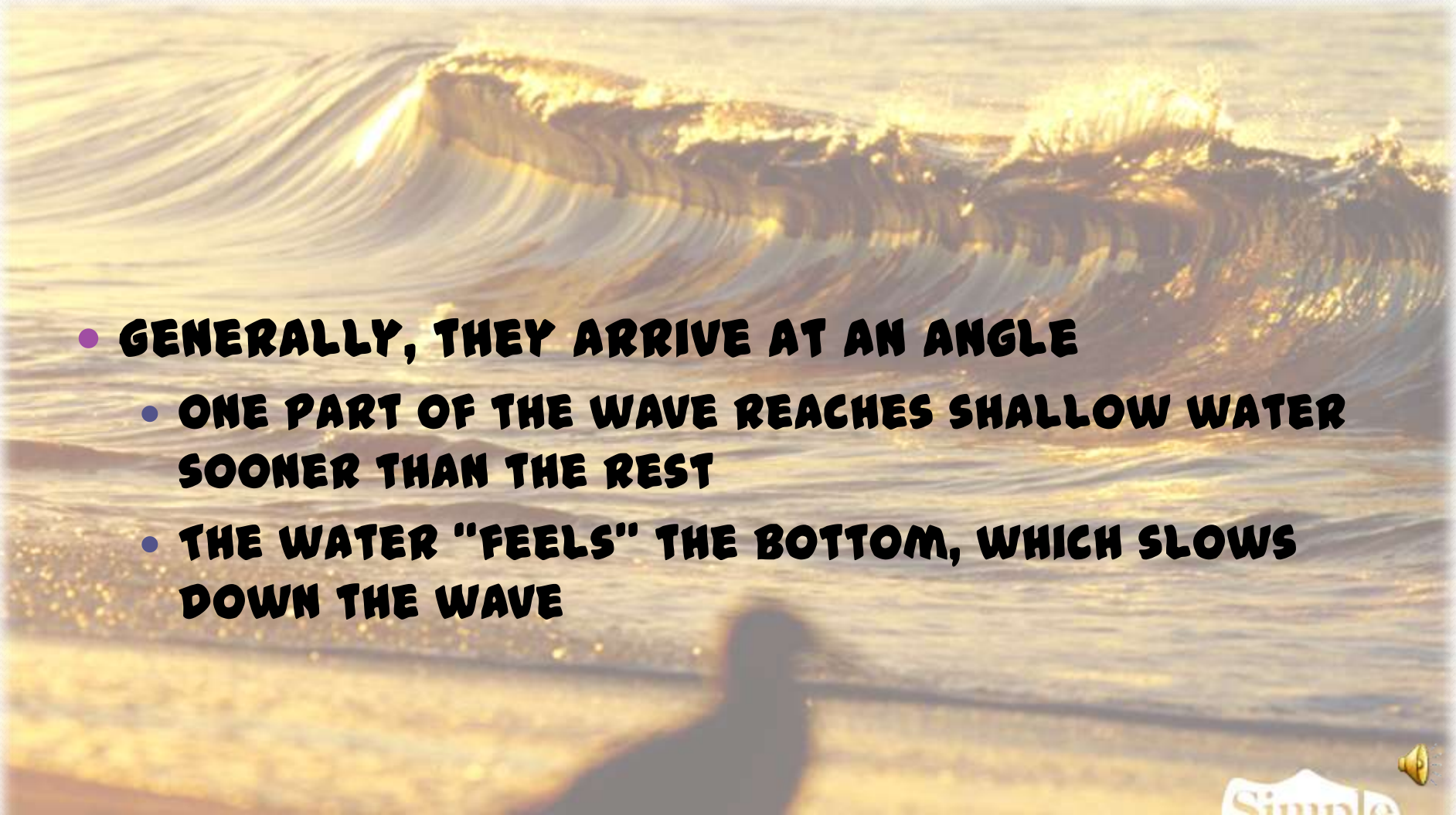
-VS-

STRONG WINDS FOR A SHORT PERIOD OF TIME

BIG WAVES!

BIG STORM, BUT DON'T WORRY...IT ALL FIZZLES OUT BY MORNING

How do waves reach the shore?



- Generally, they arrive at an angle
  - One part of the wave reaches shallow water sooner than the rest
  - The water "feels" the bottom, which slows down the wave

Wave Refraction

- Makes the wave "bend"
- Can change the energy of the wave:
  - Concentrate it
  - Disperse it

Wave Erosion

How do waves erode the shoreline?

AS THE WAVES BREAK OVER TIME, THEY STEADILY ERODE AWAY A LITTLE BIT OF THE SHORELINE

Formations caused by wave erosion

Wave-Cut Cliffs

Waves that cut into the bottom part of a cliff, eroding away the soil and rocks there

Arch

A CLIFF ERODED FROM TWO SIDES, WHICH PRODUCES AN OPEN AREA

Sea Stack

A piece of tall rock that remains after the material above the arch eventually erodes away

So… a sea stack is the “grown-up” of the arch.

Wave Deposition

Beaches= Deposition

Beaches can also be made of...

Coral

Shells

Quartz

Volcanic rock

That beach was most likely made from a mixture of coral and shells

Difference between Winter and Summer

- During the summer, waves of lower energy bring sand up on to the beach and leave it there-makes soft sand
- Communities sometimes truck in loads of sand for the summer, as it is carried away by the waves because of its density
- During the winter, waves and storms of higher energy bring the sand back offshore-makes a steeper and rockier beach

Deposition Formations

SPIT:

Ridges of sand that extend away from the shore

Barrier Islands

LAND
FORMED
BY SAND

(MIAMI BEACH)

Issues with Urbanization on Barrier Islands

A BARRIER ISLAND IS THE FIRST LINE OF DEFENSE AGAINST HURRICANES-IF THERE ARE HOUSES/BUSINESSES INSTEAD, IT WILL HIT THEM FIRST

Groin

TRAPS SAND ON ONE SIDE OF STRUCTURE, INSTEAD OF ALLOWING SAND TO ROLL DOWN THE COASTLINE

Issues with Constructing Groins

- The other side of the groin no longer has sand (it is collected by the wall)
- Often, another groin will be built to catch sand

Figure Groin field, wood groins, Washington state.


Man-Made Structures to Help Combat
Wave Erosion and Deposition

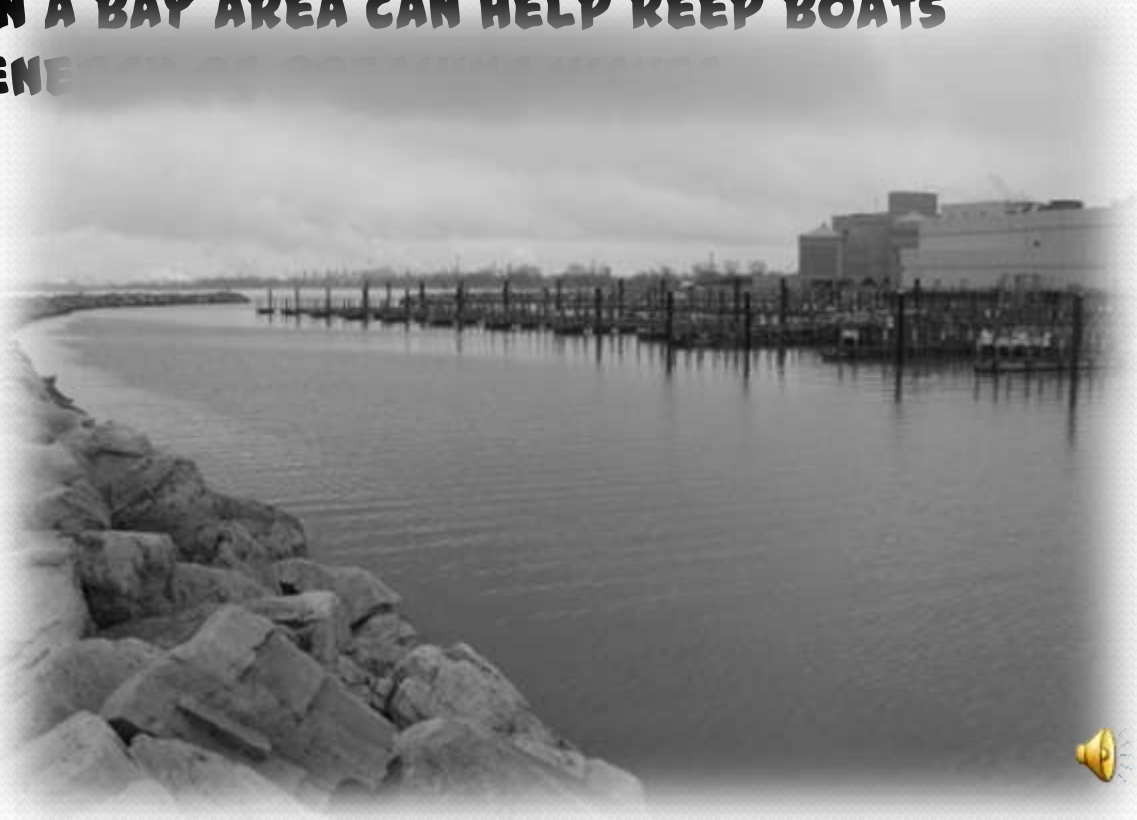
Structures built parallel to the shoreline

- BREAKWATER
- SEAWALL

Differences?

Breakwater: Built away from the shore in the water

- A breakwater in a bay area can help keep boats safe from the ene



Sea Wall

- BUILT RIGHT ALONG THE SHORE

Final Activity

PLEASE REFER TO THE "INTERACTIVE ACTIVITY"