The Superposition Principle:

Two or more waves can move through each other.

Interference is the result of two or more waves meeting at a particular point in space at the same time.

The new wave which forms at the point of interference has an amplitude that is equal to the sum of all the wave amplitudes that come together at that point.

This concept of adding up the amplitudes is called the **principle of superposition.**

Constructive interference
Results in a greater amplitude.

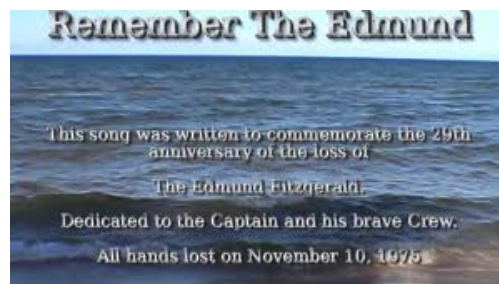**Destructive interference**
 Results in a smaller amplitude

Sketch destructive and constructive interference.

If two waves are exactly the same and they meet, the result is sometimes called **total destructive interference**, because the two waves totally cancel each other out. However, they pass through each other and continue travelling in the original direction.

http://www.youtube.com/watch?v=hgI8bta-7aw

http://www.smithsonianchannel.com/sc/web/series/798/dive-detectives/137519/edmund-fitzgerald

http://www.kettering.edu/~drussell/Demos/superposition/superposition.html

http://www.phy.ntnu.edu.tw/java/waveSuperposition/waveSuperposition.html

http://www.msu.edu/user/brechtjo/physics/interference/interference.html
Interference from 2 point sources

Waves and Matter:

When waves meet a different kind of matter they can be either **absorbed**, **transmitted**, or **reflected**.

Absorbed: the waves energy is dissipated or turned into other kinds of energy.
(Sound waves and sound proof rooms, water waves and breakwaters)

Transmitted: the wave travels on through the new substance.
(light waves through glass, microwaves through paper, x-rays through skin)
* some energy may be absorbed in the process
* change in wavelength because the speed of the wave changes

Reflected: the wave rebounds off the surface.
(light waves off a mirror, sound waves off a canyon wall)
* see pulses reflect differently from **free ends** and **fixed ends**