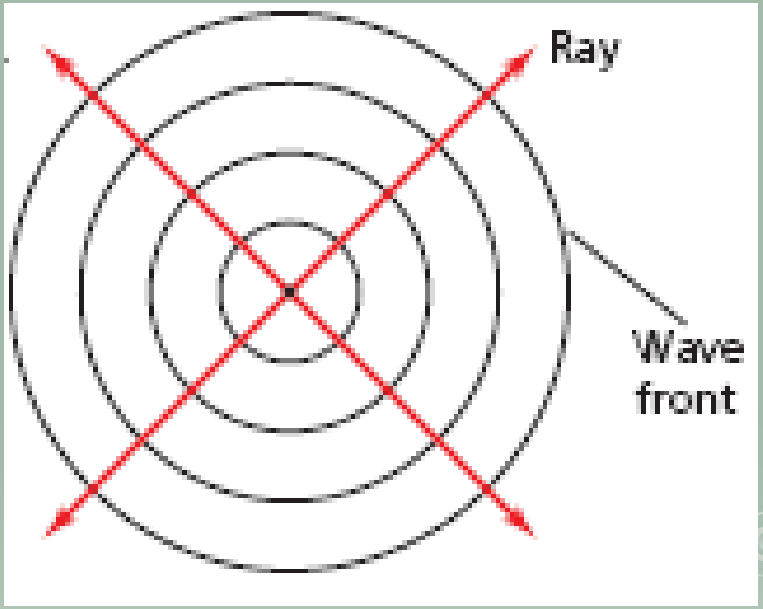
This is pages end 19 – 21.

Please EMAIL with any questions.

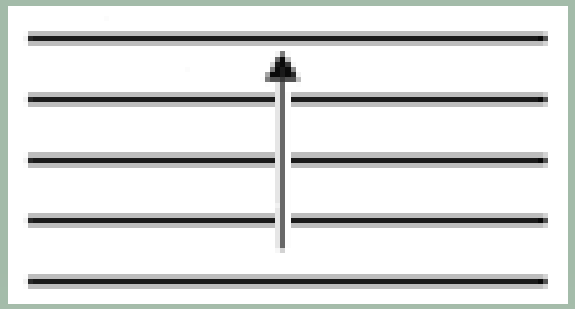
Circular Wavefronts

The disturbance is in the middle, the waves spread out, drawn like a target.



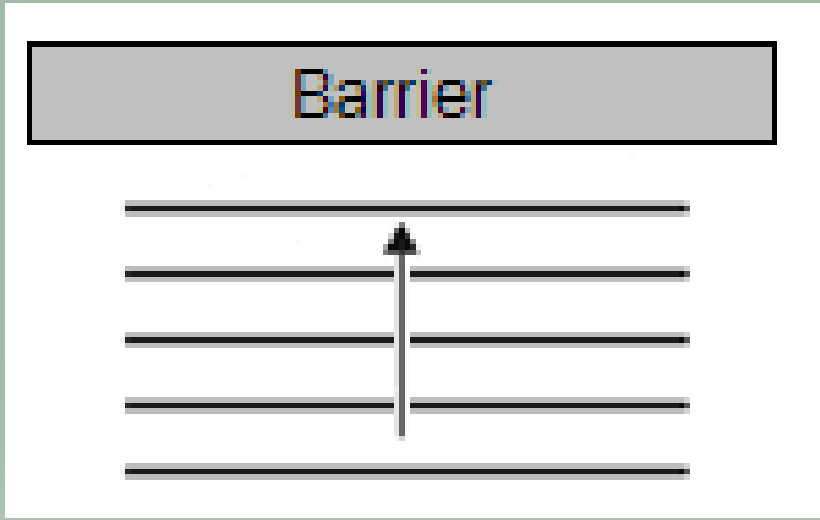
Plane Wavefronts

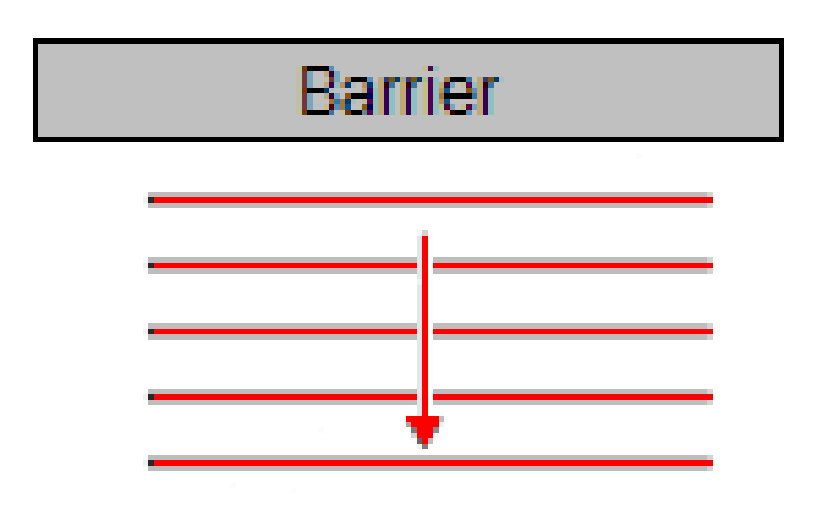
A flat piece dips in the water and makes parallel wave fronts, drawn as parallel lines. Plane means flat.



Head On Collision with a Complete Barrier

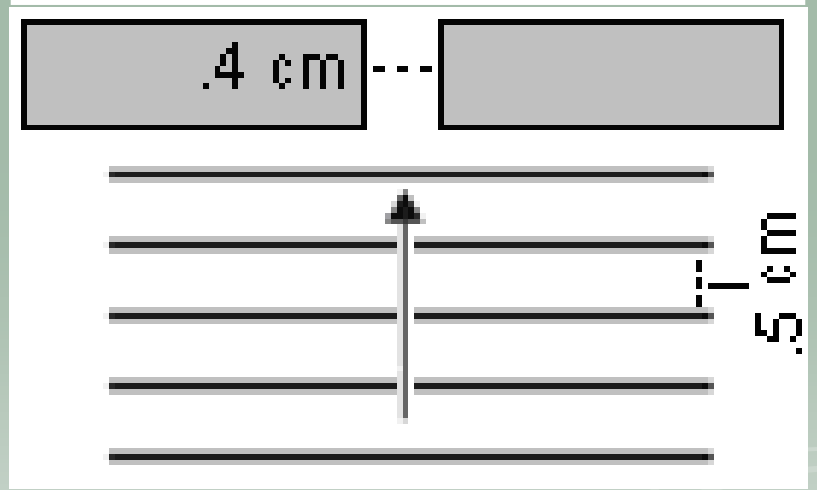
When hitting a barrier they reflect back – same size, amplitude, wavelength, and speed.

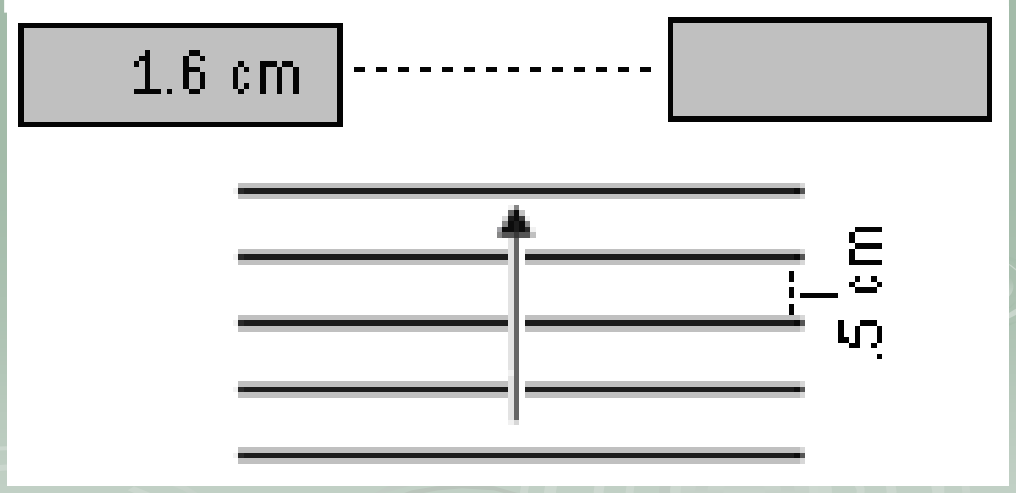




Head On Collision with an Incomplete Barrier

With an incomplete barrier the waves go through and come out in circles. A narrow opening bends more – very circular. A wider opening bends less – more oval shaped.





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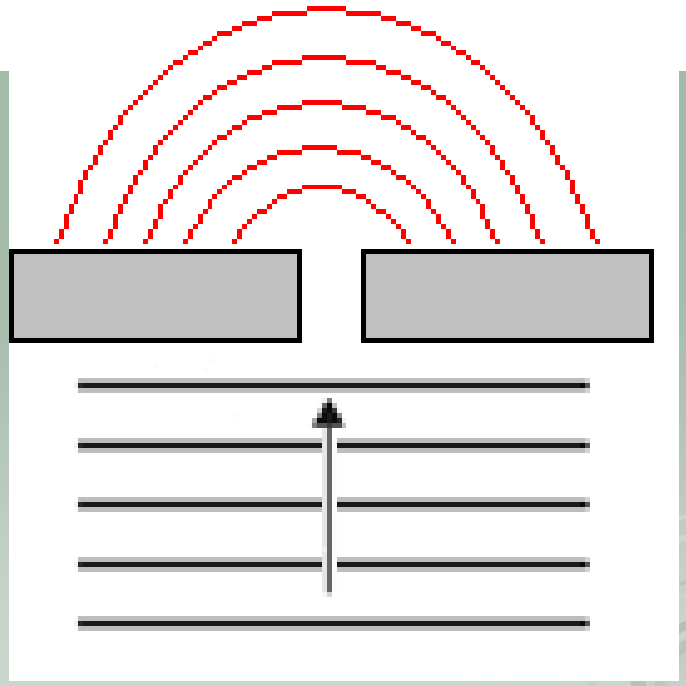
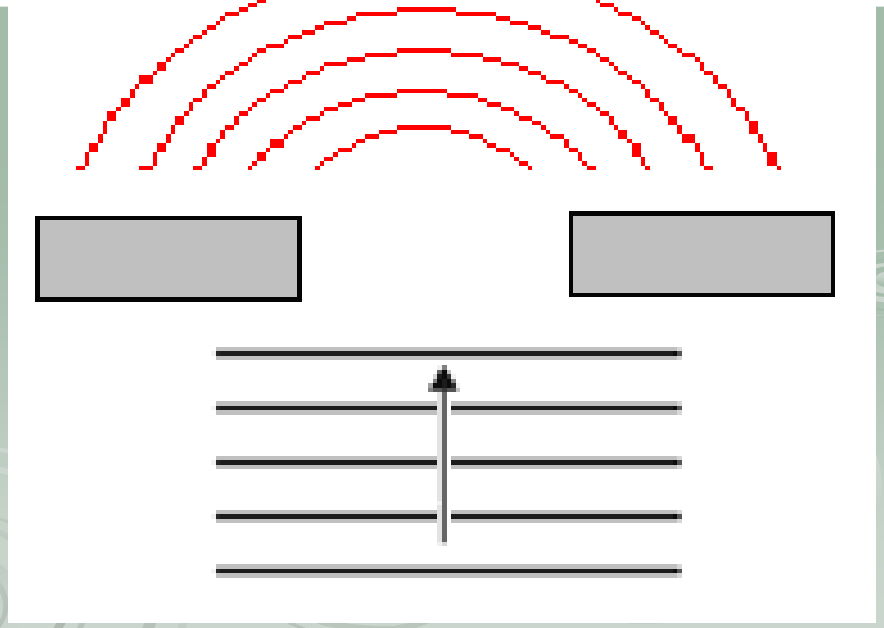
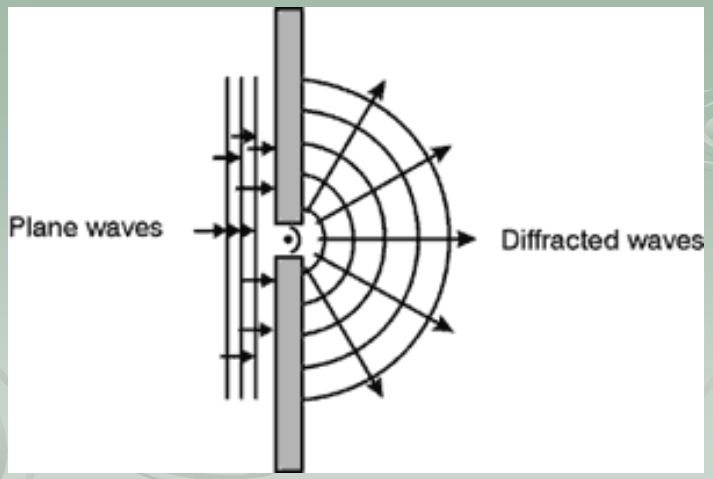




Diffraction

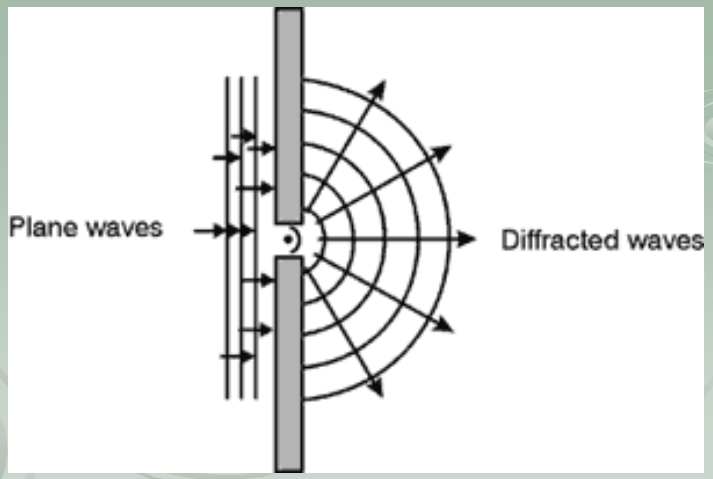
- Smaller slits cause waves to bend more than larger slits



Diffraction

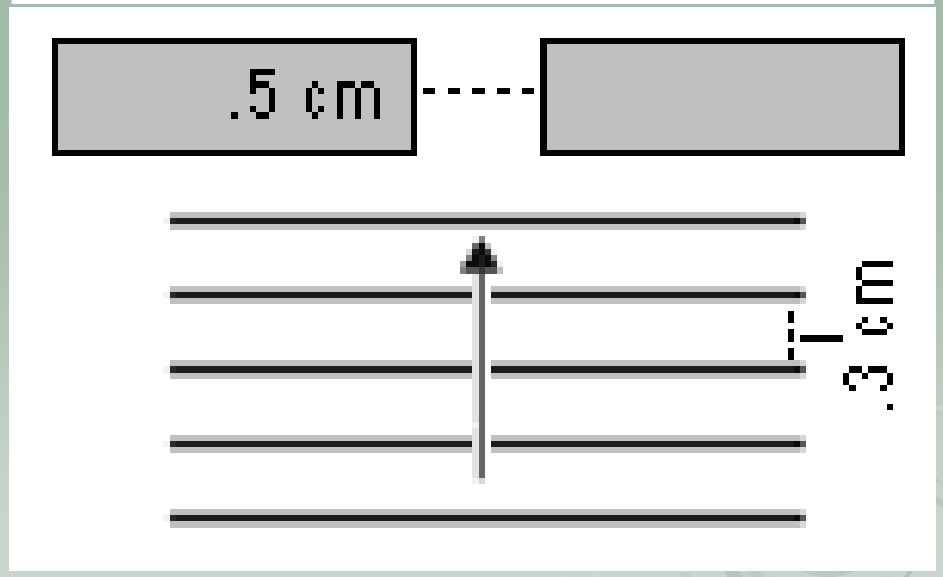
- Diffraction – is the production of circular waves that spread out from the edge of an obstruction or slit as waves pass by.

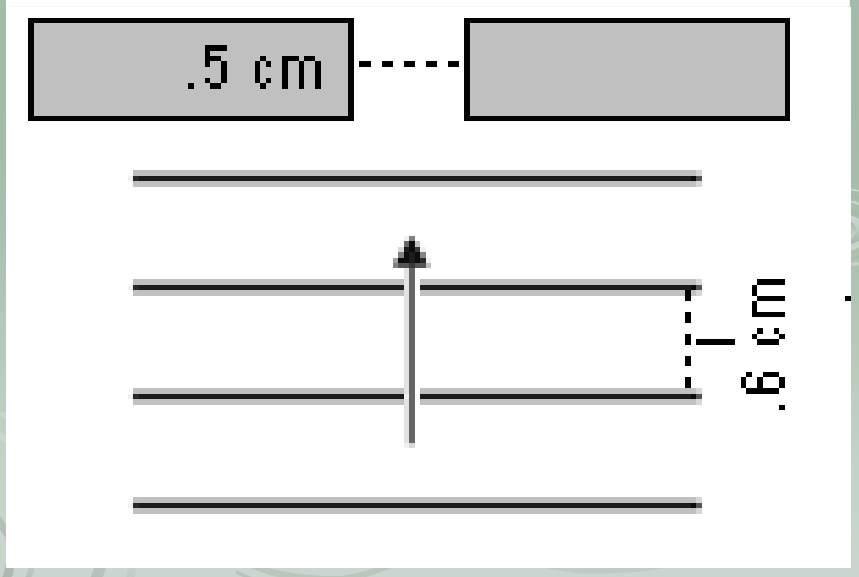
  - A change in the wavefront's direction results.



Effects of Wavelength on Diffraction

With an incomplete barrier the waves go through and come out in circles. A narrow wave bends less – comes our flatter. A wider wave bends more – comes out circular.





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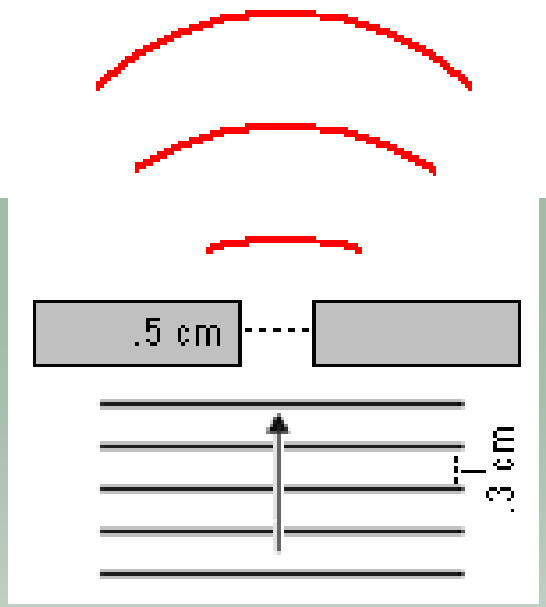

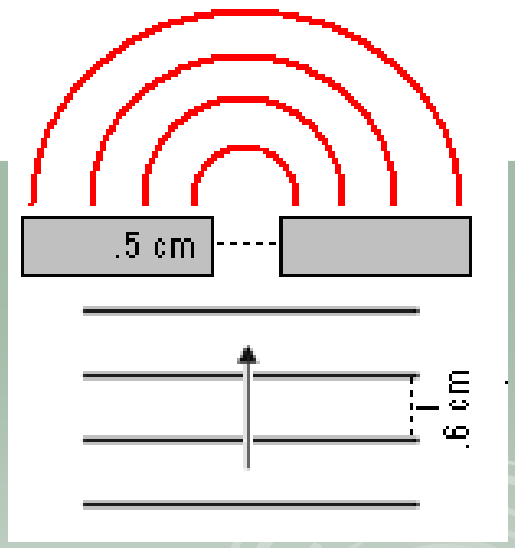

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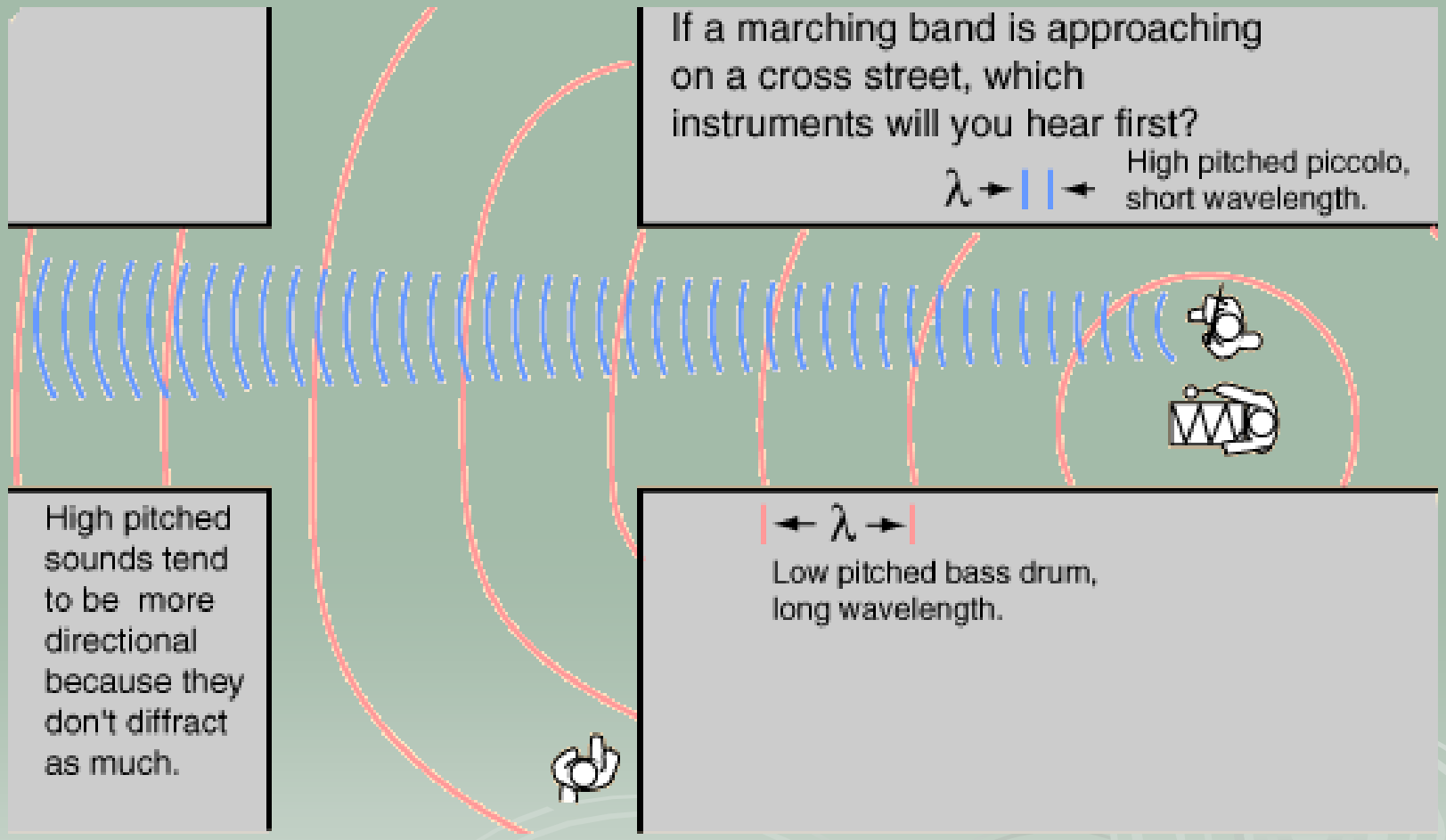
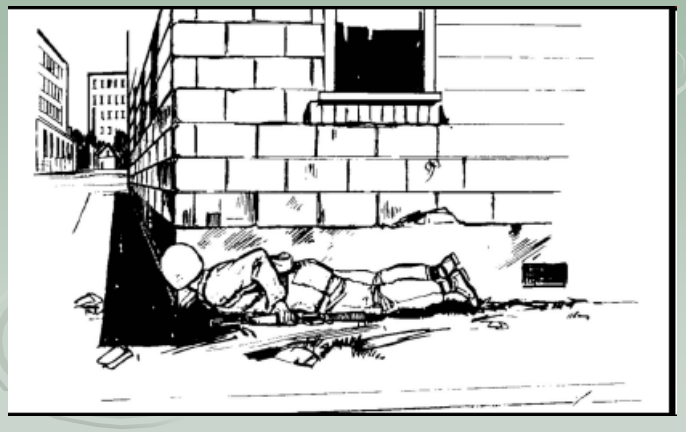


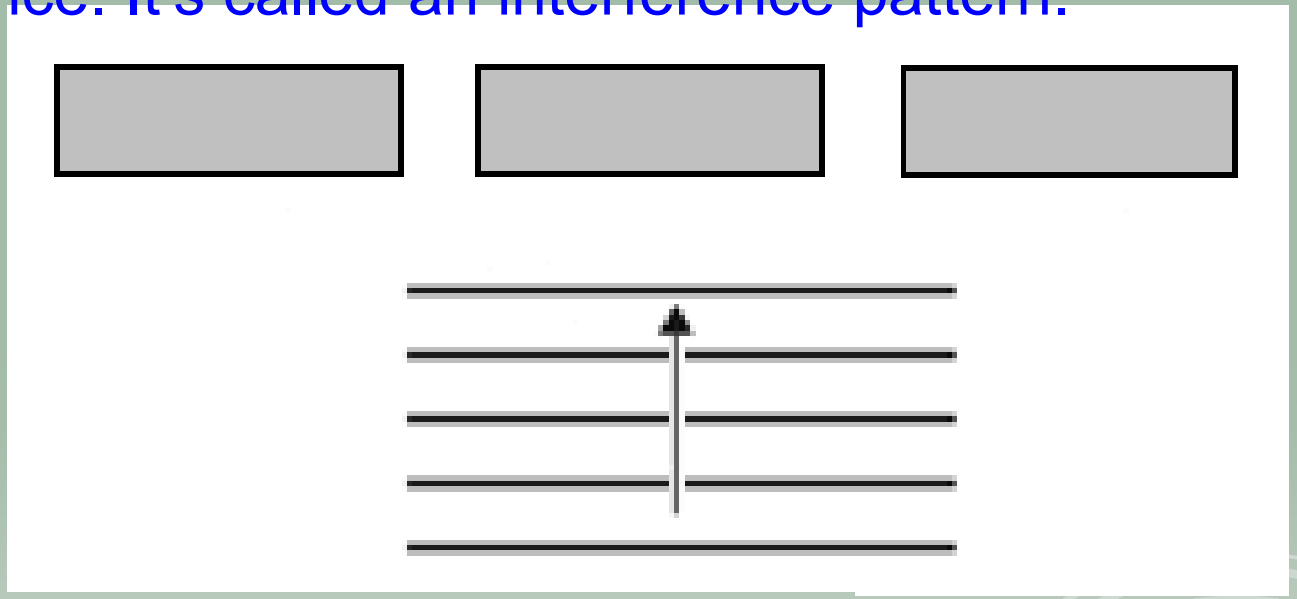
Effects of Wavelength on Diffraction

- When the wavelength of the incident wave is **larger** than the slit opening, the amount of diffraction **increases**.
  - **This is the reason why you can hear sounds around a corner, but not see the object producing the sound.**
    - **Sound λ > Light λ**

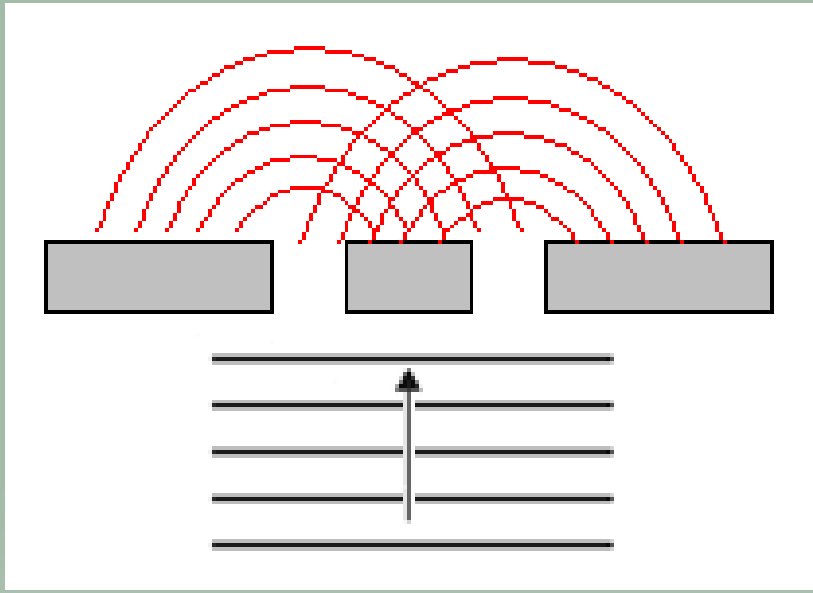


Double Slit Diffraction

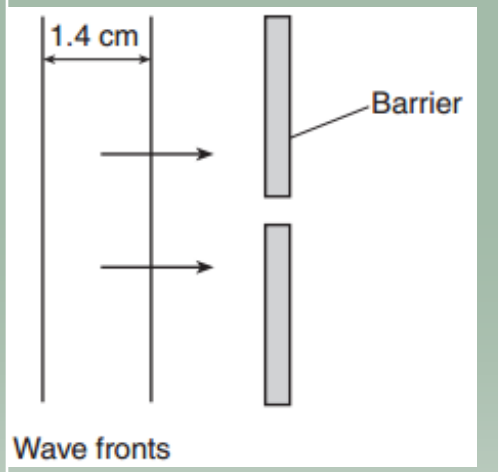
Double slit diffraction, each opening produces two sets of circular waves. Those waves overlap and do interference. There's regions of constructive and regions of destructive interference. It's called an interference pattern.



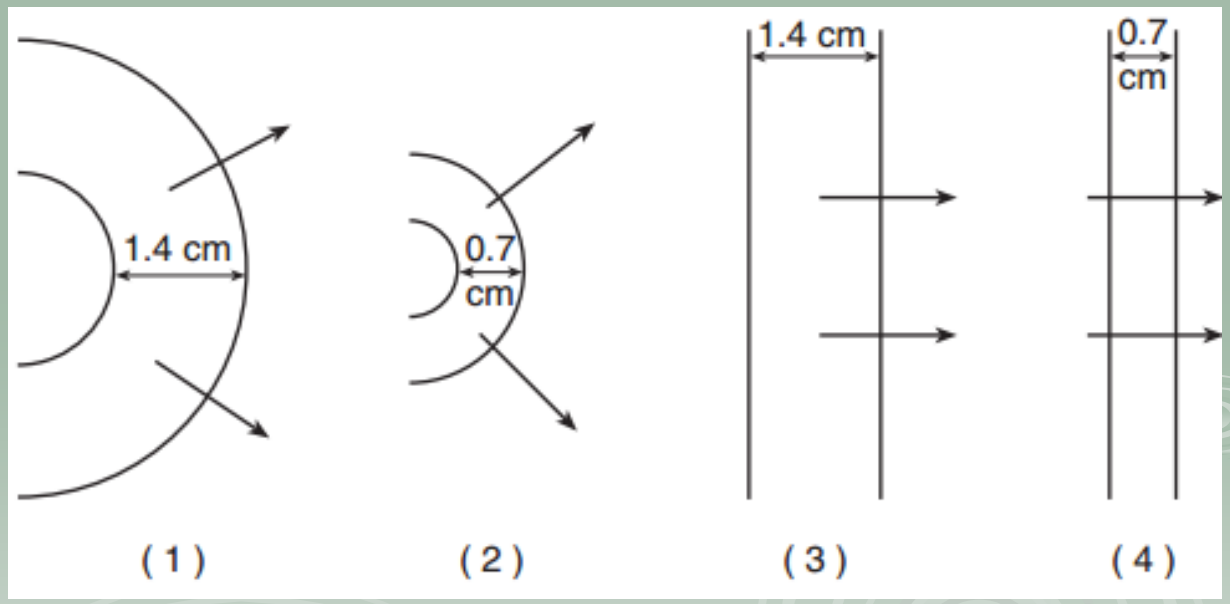
Double Slit Diffraction



The diagram below shows a series of straight wave fronts produced in a shallow tank of water approaching a small opening in a barrier.



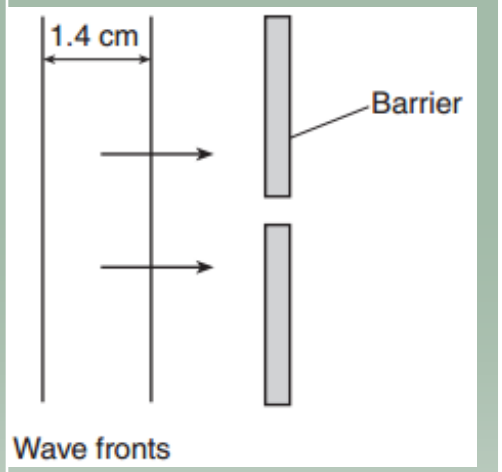
Which diagram represents the appearance of the wave fronts after passing through the opening in the barrier?



The diagram below shows a series of straight wave fronts produced in a shallow tank of water approaching a small opening in a barrier.

The speed and wavelength stay the same because the material is the same. Only the direction changes.

Choice 1!



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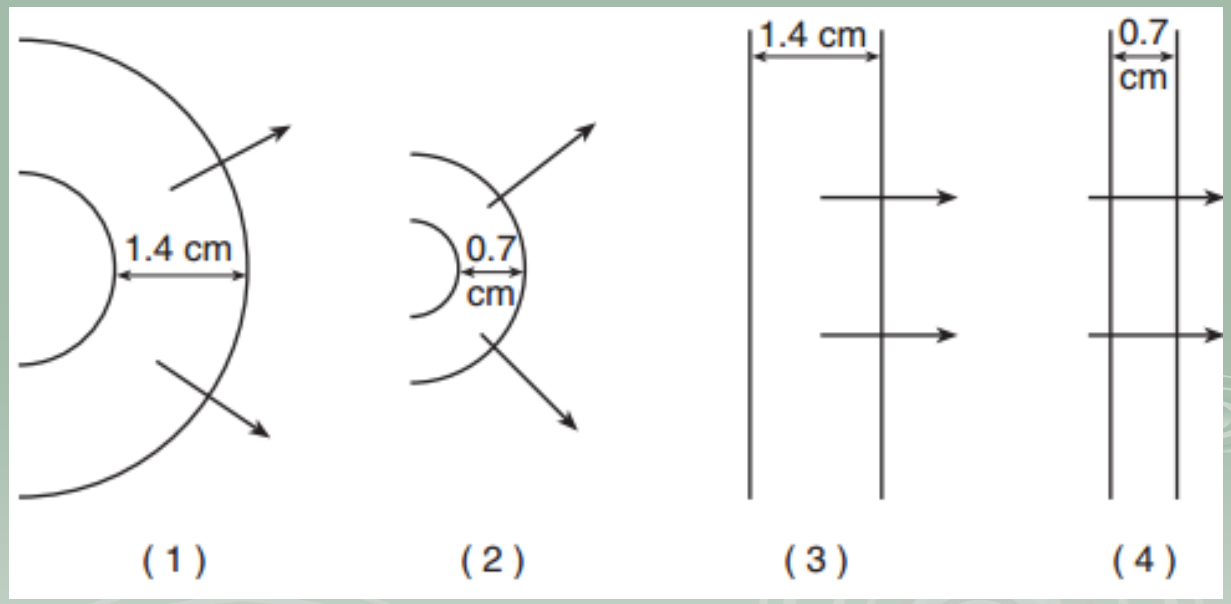
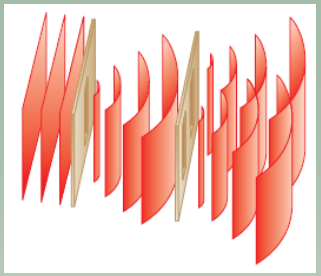


Thomas Young's Double Slit Experiment

In 1801, Young developed an experiment that allowed him to

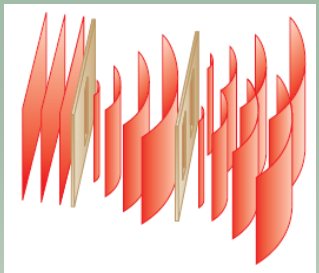
To prove light was a wave, Young sent light through a double slit diffraction grating – looking to see if it made a diffraction pattern or just two blobs of light.
Turns out it was a diffraction pattern – completely changed the world of light physics.



Thomas Young's Double Slit Experiment

In 1801, Young developed an experiment that allowed him to

- Make a precise measurement of light's wavelength using diffraction.
- Provide evidence of the wave nature of light.



Thomas Young's Double Slit Experiment

Using a laser we get dots. Using a bright light source we get fringes.