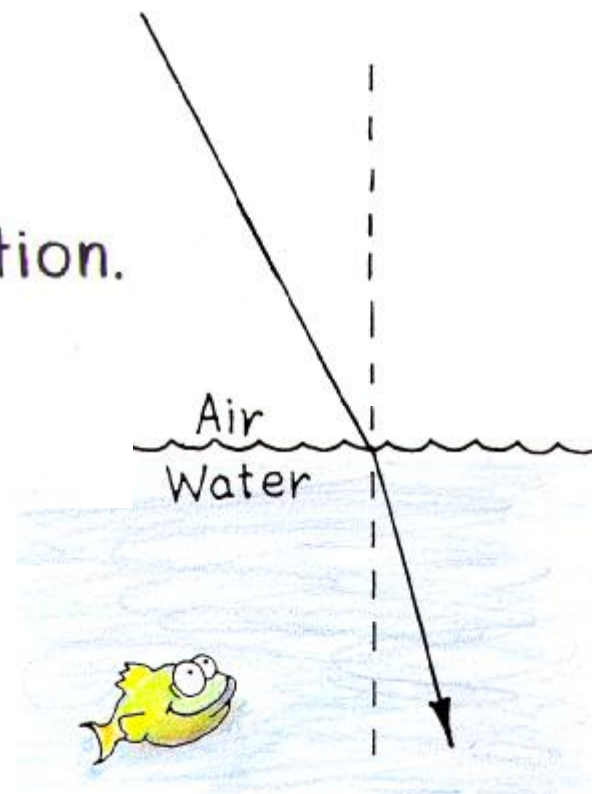


NEXT-TIME QUESTION

Light rays bend as they pass from air into water at a non-90 degree angle. This is refraction. Which quantity doesn't change when light refracts?

- a) average speed of light.
- b) material's index of refraction.
- c) frequency of light.
- d) wavelength of light.

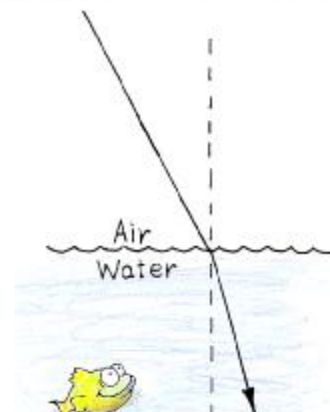


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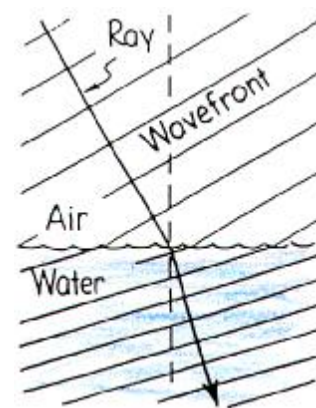
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Answer: c, frequency of light

The average speed of light in water is less than in air. Index of refraction is a quantity that changes when wave speed changes (higher index for lower speed). So we see the index of refraction is greater for water than for air.

The wave just outside the surface "drives" the wave just inside the surface, so their rates of vibration match. Hence, what doesn't change is frequency. Same frequency and reduced speed means a shorter wavelength in water—as seen by the "compressed" wavefronts in the sketch.



The key to refraction is *changes in wave speed*.



Hewitt
Drewitt!

