

TEACHERS LESSON PLAN: Lesson Two – Wave Equation

(This lesson plan accompanies the INTERACTIVE section of the site)

The aim of this lesson is to understand that sound travels at different speeds through different materials.

You could start by writing the AIM of the lesson on the board at the beginning of the class.

- 1) Firstly, you could use pages 1- 5 of this section of the website to talk the class through the links between speed, frequency and wavelength – THE WAVE EQUATION.
- 2) When you reach page 6 of the website, it may be a good idea to recap the particle model (kinetic theory at A-level). Ask them what they remember about this – hopefully they come up with the answers! You could maybe ask them to draw pictures on board. This should take around 5 minutes
- 3) Ask them to think about how sound waves are transmitted – BY PARTICLES VIBRATING. At this point you could show them the animation of vibrating particles. This should take around 5 – 10 minutes
- 4) If particles are close together, they are able to pass on vibration to next particle more easily. **Therefore sounds travel fastest in solids** (they usually presume gas, which is why its good to remind them of particle model)
- 5) Use wave equation again with different materials (water, air, steel) – could link to refraction = Frequency remains the same, but if the speed changes the wavelength must change.

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*SUMMARY: The **Wave Equation** is: **Speed** (v) = **Frequency** (f) x **Wavelength** (λ)*

*Waves travel **quickly** through **solids***

*Waves travel **slowly** through **gas***

*The **Wave Equation** can be rearranged into:*

$$f = v / \lambda$$

$$\lambda = v / f$$



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