Experiments with Open and Closed Pipes

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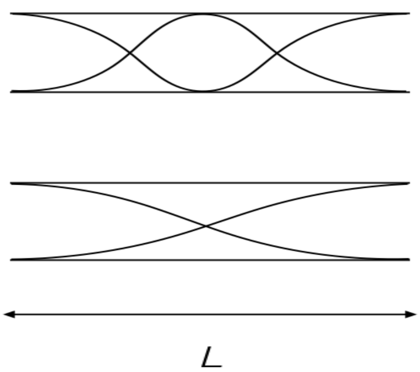
- Take the pipes and open both the ends. Take the tuning fork and try to listen at which length you can hear the maximum sound of the tuning fork. Note this length down.
- Repeat it for another case, so that you can get another length.

  (Some terminology: This phenomenon where we can hear the maximum sound is called the resonant condition.)
- Now take the pipes and close one end and keep the other end open. Repeat the first two steps. Note the lengths down.

Let's do some math!

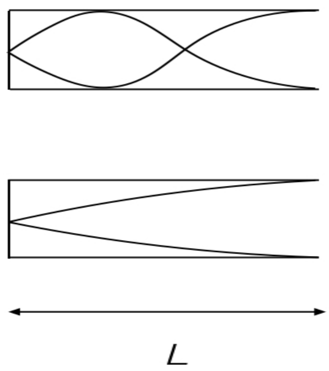
1. Consider the first case (both sides open pipe). If I want to represent the case as a simple models, the situation would look like the following. Here L is the length of the pipe (that you measured).



2. How is the length related to the wavelength, λ?
   Hint: Consider if there are nodes or anti-nodes at the end of the pipes. How many wavelengths are there in L? Represent the number of waves by n.

3. Write down the general relation between L and λ. What values of n?
   Hint: Use λ, L and n.

4. Now the second case (one side close and one side open). Again the figure below represents a simple version of what is happening.



5. How is the length related to the wavelength, λ?
   Hint: Similar as previous case, but what about n? (Take care about that)

6. Write down the general relation between L and λ. What values of n?
   Hint: Use λ, L and n.