Sounds harmonious

Pitch and time

JANICE
So basically it's changing vibrations that makes different notes isn't it.

ALAN
That's right, and you don't need a very complicated instrument to demonstrate that.

JANICE
You could even use this ruler.

ALAN
Well, you could. If I…we've all twanged rulers in our day, but if I hold the ruler against the edge of the table, [TWANGS RULER] it makes a note, and if I lengthen it, [TWANGS RULER] the note is lower, shorten it… [TWANGS RULER]…

JANICE
Oh very good.

ALAN
And the reason for that is, that the longer the ruler being vibrated the slower is the vibration, and therefore the lower the note, so that makes a low note.
[TWANGS RULER] Whereas a very short length of ruler [TWANGS RULER] makes a high note.

JANICE
Right, now when you're learning these Alan, do you learn it by ear, or do you actually read music.

ALAN
Well we do both. I prefer to learn by ear because once you've learnt a tune by ear it tends to stick. But quite often we do have to get music out and this is an example of the sort of thing we do. See, there's one we play - Geese in the Bog. And I don't know if you're familiar with…with musical notation, but basically these little dots represent the notes, and the higher up they are the higher the note you play. And I find it quite easy to work out in principle, because it's just like a mathematical graph. Musical stave moves to top of screen revealing pitch/time graph notes plot on graph as they highlight musical notes move down from stave & s/i over plot on graph Graphs have two dimensions, and here pitch is the vertical scale, so we're moving up and down in pitch on the Y axis. And along the X axis you've got time, so really it's nothing more than a pitch/time graph.

JANICE
So that's definitely a mathematician talking I think.

ALAN
I guess, yes.

ALAN
The musical stave can be compared to a mathematical graph. Here's a plot of pitch against time. The notes have their own particular pitch. As I play each note it's plotted on the pitch/time graph below the musical stave. So looked at mathematically, the stave notation used by musicians is basically a pitch/time graph.

JANICE
You mentioned earlier something about frequencies. Can you tell me more about that.

ALAN
Well to do that, what we really need is an oscilloscope, and luckily I've got one right next door.

JANICE
Really?