

ES	TECHNOLOGY	Knowledge & understanding	Needs	Resources	Processes
	TECHNOLOGY	Skills in designing & making	Preparing	Carrying out	Reviewing
	SCIENCE	K & U - Energy and forces	Properties of energy <i>Sound vibrations</i> <i>Pitch & Volume</i>	Conversion of energy	Forces
	SCIENCE	K & U - Earth & space	Materials from Earth	<i>Changing materials</i>	

With the musical ‘testbed’ opposite it’s possible to try out a variety of sound box and string combinations. Some will give a better sound quality - note your findings for future reference. The instrument you make may well be capable of solo performance but it can’t become part of a group or ensemble because there is no provision for altering the tuning. So how can we do that?

STAGE ONE

Look at other stringed instruments. How are they tuned? In all cases you will find that some form of winder is fitted to each string. By turning the winder you alter the tension on the string and this alters the pitch.

What else affects the pitch - ie. makes the note higher or lower? Well, we know that if we press a finger onto the string we can create a higher note. So the length of the string is important as well as the tension.

Guitarists sometimes use a clamp (a capo) over the strings to shorten them all the same amount.

Stringed instruments have thicker strings to play the lower notes - does the thickness itself alter the pitch?

If we need to alter the tension, we need a mechanism to be able to do this. A screw has already been mentioned, but a lever might also be employed.

We should be able to increase the range of notes if we use more than one string. One string could play lower notes than the other, and together they could be used to play chords - notes of differing pitch sounded at the same time.

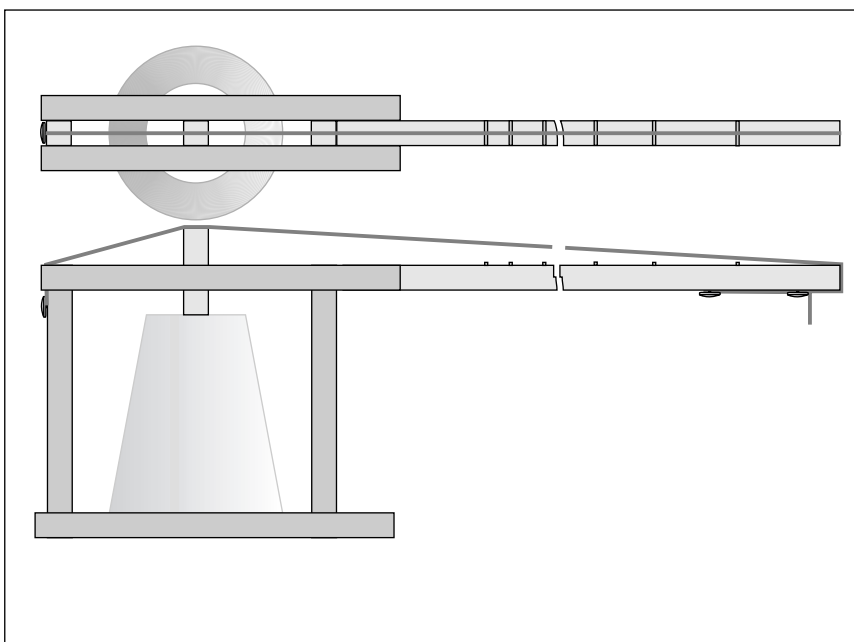
STAGE TWO

Design and make a stringed instrument that can be tuned to enable it to be played with other tuned instruments. Consider having more than one string to give a greater range, and to enable the playing of chords. Try different threads etc. for your strings. If you can use guitar strings, so much the better.

STAGE THREE

Test your instrument by playing it. If you know someone who can play a guitar or violin, ask them to evaluate your creation. Combine with classmates to compose a piece of music. Use microphones and sound recorders to amplify (make louder) the sound, if the instruments are too quiet.

Most stringed instruments have a sound box made from wood. If you have the tools, time and expertise you might like to make one. The sound quality is likely to be much better. A banjo makes an unusual sound, (probably rather like the sound of your instrument), because it does not have a wooden sound box. Perhaps you could find out what it uses instead.



For the instrument to play a proper musical scale the frets need to be in the correct place. It is possible, though not easy, to transfer the intervals from a guitar. The guitar will be longer than your fiddle, so you will have to use a method such as this.

Remember, the important measurement is the distance between the ends of the vibrating string, ie the end of the neck [the nut] and the bridge. Copy this full-size, together with some fret positions, onto a length of thick card or wood. Tape threads to each mark and weight with something convenient so they hang straight down. Hold this above your fiddle, and slope it until the end threads match the nut and bridge. Get someone to mark where each thread crosses the neck of your instrument. OK? This is where to position the frets.

