



# tuned percussion

Tuned percussion instruments are precisely made from carefully chosen materials. Classroom instruments offer many opportunities for making links between science and music. Depending on the range of instruments available, this unit could enrich the multi-cultural dimension of the pupils' experiences. Examining the origins of the woods that make the body of a tuned percussion instrument could lead to a discussion, or consideration, of responsible use of rainforest resources.

This unit is in four parts.

Part **A** – Looking at percussion instruments

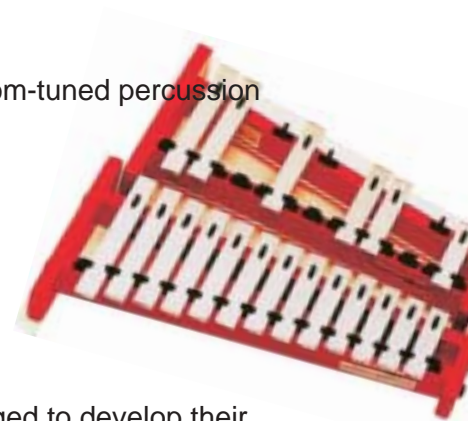
Part **B** – Making a sound

Part **C** – The sound box

Part **D** – Percussion materials

By using the unit pupils will:

- identify the different types and materials of classroom-tuned percussion instruments
- explore vibration, pitch and volume
- explore amplification
- discuss the responsible use of tropical timber.



Teaching focus

In working through this unit, pupils should be encouraged to develop their investigative skills and understanding of science through activities which help them to develop and use their existing science knowledge and general knowledge. It should also encourage them to raise their own questions and find ways of answering them.

Pupils will be given the opportunity of exploring the origins of a range of materials in order to appreciate that some occur naturally while many are made from raw materials. They will also explore the properties of this range of materials, and link them to their uses.

Pupils should be taught that sounds are heard because they travel to the ear, and that they do so via a variety of materials. They investigate how sounds are made when objects vibrate and how sounds are changed in pitch, loudness and timbre, by changing the characteristics of the vibrating objects; for

example, by changing the length, tension, thickness of the vibrating object or the way in which it is made to vibrate, as shown by using musical instruments.

### Managing the unit

You will need a range of tuned percussion instruments with wood or metal sound bars, for example, a xylophone and a selection of beaters.

## Part A Looking at percussion instruments

This part asks pupils to identify and explore the school's percussion instruments. Many of these, such as drums, cymbals and the triangle, will be 'untuned'. The three main kinds of classroom-tuned percussion instruments are the glockenspiel, the metallophone and xylophone (NOT xylophoneS).

- The glockenspiel has bright chrome sound bars.
- The metallophone has satin finish alloy sound bars.
- The xylophone has wood, or wood-look sound bars.

Each is made in various sizes, small ones – soprano instruments; medium – alto or tenor instruments; and large – bass instruments.

A **diatonic** instrument has the notes which are on the white keys of the piano. A **chromatic** instrument has black key notes as well. The chromatic instrument makes it possible to play in any key.

The activity that goes with this section is teacher led and is described below.

### Activities for pupils

Talk with the children about the range of instruments you have collected. Help them to notice differences and similarities in appearance and sound they produce. Ask them to sort the instruments by criteria that you set, e.g. those that produce different notes, and those that don't. According to their age and experience, ask them to sort by their own criteria. Can the other children guess the criteria for that sort?

Describe the three main kinds of tuned percussion instruments and see if the children can place each under the correct name, written on a card. What are the characteristics of each?



## Part B Making a sound

This part asks pupils to explore and record the school's beaters. Most classroom beaters have wood or plastic shafts and wood, plastic, rubber or felt heads.

Hard heads are not usually used on big instruments because the bars can get dented if they are struck hard. You could see what happens if you try to play the sound bars with a violin bow.

Scraps of paper on a sound bar will show vibration.

### Length of the sound bars

The longer bars make a lower note. Make sure pupils are confident with the use of the words 'high' and 'low' with regard to pitch. Many younger pupils confuse them with 'soft' and 'loud' until they are explained, and they experience each.

There is a direct relationship between the size of the bar and the pitch of the note. This is the *total* size, not just its length, and this is not easy to investigate with classroom instruments. It is much easier to show with a string.

If you hold the bar in your hand, the sound is damped and the bar does not ring, because it cannot vibrate. Damping is used as a playing technique to shorten notes. If you suspend the bar by a thread, it will sound quieter and 'thinner' than on the instrument as it does not have a sound box to amplify the sound.

The holes on the sound bar are to locate it on the instrument. Big bars are more likely to have holes than small bars. They are placed where they have the least effect on the sound. Bars on larger instruments are scooped or scalloped underneath, to help them vibrate freely. The 'scoop' must be symmetrical, because if it is not, the vibration will be uneven and the sound unsatisfactory. Tuning is done by grinding away material in the scooped out section. Too much grinding of the bar would make the sound too high, or 'sharp'. For this reason, bars are made slightly oversize as material cannot be added to get the right sound.

In this section pupils investigate sound bars

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## Part C The sound box

Most instruments, apart from very small ones, will have a sound box divided into sections by thin walls, which must be very carefully fitted or they will 'buzz'. This provides a sound box roughly tuned to the notes above it. A professional instrument has a tubular sound box for every note. You can see them hanging down, like organ pipes, under an orchestral xylophone.

The purpose of the sound box or tube is to amplify the sound of the vibrating bar by introducing sympathetic vibration in a body or column of air. In exactly the same way, a wind instrument uses a tube filled with air to amplify the vibrations of the mouthpiece.

There is one activity for pupils in this section.

## Part D Percussion materials

The body of a tuned percussion instrument will normally be made of wood. The sound bars will be metal (glockenspiel and metallophone) or wood (xylophone). Classroom xylophone may have bars made of dense artificial fibre material which looks, and sounds, like wood. The artificial material does not splinter or dent and is cheaper than wood. A professional xylophone will always have rosewood bars.

The pegs and other supports will be rubber or plastic. Screws will usually be brass or other rust-free material. The whole instrument should be carefully and safely made with no sharp edges.

### **Tropical woods**

Xylophone and glockenspiel bodies are made of mahogany. Professional xylophone sound bars are made of Honduras rosewood and are beautiful objects to handle, with a lovely silky texture and a straight grain. School xylophone have fibreglass sound bars because they are cheaper and more resistant to abuse. Glockenspiel sound bars are aluminium.

Tropical hardwood is used in the manufacture of many musical instruments. It is dense and has the right sort of resonant qualities. Manufacturers are often asked whether they are contributing to the destruction of the rainforests. Responsible education manufacturers normally use wood from managed, replanted forests in the East Indies. The effect on the rain forests of musical instrument manufacture is relatively minute, but this is a practical context in which to discuss environmental and ecological issues.

There is one activity for pupils in this section. It is designed to focus their attention on the materials the instruments are made of, and their properties.

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