KS3/4/5

Maintaining classroom instruments

by Jane Werry

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INTRODUCTION

Music departments tend to be full of 'stuff' – chances are, the more music there is happening in the school, the more equipment there is. Looking after all of this equipment is likely to fall to teachers, unless you are in the enviable position of having a technician. You are probably operating on a tight budget, so will want to make the absolute most of what you already have.

The more tips and tricks you have for looking after your instruments, the better. In terms of getting the maximum number of notes for your buck, it pays to invest some time and effort in maintenance and effective storage of equipment. None of the things described in this resource requires a huge amount of technical or engineering skill – there may be some techniques to learn, but nothing that's beyond the potential of the average determined music teacher.

Don't feel that the buck necessarily stops with you, however. Help may be at hand from a number of sources, and there are people who actually like working on instrument repairs. If you have someone like this on hand, they are worth their weight in gold. Otherwise, you may have older students who you can train up to do repairs, or parents or caretaking staff who are capable and willing to help out.

As soon as something gets broken, it's a good idea to remove it from student view as soon as possible. Seeing broken equipment brings out the destructive element in some students, and gives them ideas.

BEGGING AND RECYCLING

Instruments, like pieces of fitness equipment, tend to be things that people buy when they're on a self-improvement drive, and often fall by the wayside after a few months. As a consequence, there are millions of unplayed instruments sitting around in people's spare rooms and lofts. With a little prompting, the families of your students may be persuaded to donate these to your department.

Put out a message in your school newsletter asking for any unwanted instruments or accessories such as music stands and amplifiers. Make the point that it doesn't matter if there are broken strings or small bits missing. If the worst comes to the worst, you can harvest spare parts from them and cobble together a Frankenstein instrument.

My policy has always been to say yes to absolutely everything, with the exception of acoustic pianos. These can be very difficult to get rid of, and you may have people contacting the school offering a piano donation when they've realised that they are otherwise going to have to pay to have it removed. If this happens to you, proceed with caution:

- Don't accept a piano without having seen it and played it to check that it's acceptable. A piano that's in a really bad state can cost hundreds or thousands to renovate. Some of the pianos that people are trying to offload are well past the point of recovery.
- Even if the donor is willing to let you have it for free, it's likely that you will have to pay to have it moved. If you want the piano and need to pay for removals, investigate 'man and van' services in your local area before you try big removal firms: 'man and van' is likely to be much cheaper, and they often have experience in piano moving.
- If your department already has enough pianos, consider whether there's space in your school for a 'public piano' like those found in railway stations. This can be a lovely way to get more music happening around

school. Preferably it needs to be somewhere that can be monitored easily to ensure the piano does not get damaged, and there need to be clearly displayed rules if there are times that are not appropriate for piano playing (such as during lesson time). You could even give the piano a funky paint job, and include text such as 'Play me (but not during lesson times)'.

If you have any instruments that are beyond repair, take the time to harvest whatever spare parts you can. Guitar and ukulele strings will always come in handy: just be sure to have a system in place so that you know what's what. A simple way to do this is to set up envelopes or labelled plastic pockets for each type of string – ukulele A strings, guitar top E strings, and so on. If all you have is a bunch of unidentified curly strings knotted together in a box, you're unlikely to have the time to sort them out and unravel them at the point when you actually need to use one.

Likewise, tuning gears from dead instruments may well come in handy and are worth keeping, as are saddles and bridges. Pick guards from electric guitars are also easily removable and worth saving.

Keyboards are less easy to recycle, but the keys themselves (which usually come in octave strips) are worth the effort it takes to extract them.

EQUIPMENT

If you're going to invest a little time and effort into making your classroom instruments last longer, you will need some basic equipment. These are some things that you will use regularly:

- **Pliers** – a hefty pair, and a fine pair with a pointy end. Wire cutting facility will also be useful.
- **Screwdrivers** – you will mostly need Phillips heads, both 'normal' size and the mini size (the size you might use to mend a pair of glasses).
- A **soldering iron** and a large supply of solder.
- **Superglue** and a strong glue such as No More Nails or Gorilla Glue, or an epoxy resin glue such as Araldite.
- **Sugru** (mouldable plastic glue).
- **Allen keys**.
- A **drum key**.
- **Gaffer/duct tape**.
- **Velcro tape** (the cheapest way of doing this is to buy rolls of it intended for garden use).

KEYBOARDS

The longevity of your keyboards depends very much on your classroom setup. If your keyboards can be left out with everything plugged in in the way that you need it, then you can expect a decent few years' worth of use out of them. If, however, you have to put them away and get them out every time you use them, there are a few areas of weakness that are likely to be causes of keyboard death.

If any of these things happen, there are ways to fix it that you can learn quite easily:

- The input socket develops a loose connection, so it only works intermittently, or when held at a particular angle.
- One or more of the keys gets bent upwards (usually as a result of student interference).
- A key breaks off.
- One or more keys stops working.

Fixing a keyboard input socket

If you have to get keyboards out each time you use them, the input socket is likely to be the point that causes keyboard failure after a while. As a very temporary fix, you can tape the offending input plug at the right angle for it to work. Or invest in some rechargeable batteries – and chargers – and use them for keyboards with broken inputs.

Any more permanent fix is going to need some soldering. If you've never used a soldering iron before, it's a very useful skill to learn! Just be patient and very careful with the hot end. Do not be tempted to be stingy with the solder: you may get through more than you thought possible, but a bigger blob will last longer than a smaller one.

There are various ways that you can solder a keyboard with a wobbly input back to life:

1. Buy replacement PCB socket mounts (these are the actual bits where you plug the adaptor in). They only cost about 50p, but you need to know whether your model of keyboard has straight or right-angled mounts before you buy, so dismantle a keyboard first and have a look. Solder them in, and for good measure glue the socket to the circuit board with epoxy glue to hold it steady. This should make your repair stronger than what was there before.
2. Some types of keyboard have a different type of socket mount, one that is difficult to replace. A different type of fix involves bypassing the 12V socket entirely, and hardwiring the adaptor to the keyboard so they are permanently connected. This YouTube video shows you how to do this.
3. Another clever fix for this problem involves soldering a 'jumper' cable between two points just inside the input socket. This video explains how.

Bent, broken and 'dead' keys

Sometimes you will find a keyboard where one or more of the keys has been bent upwards – usually because a student has been fiddling with it or has deliberately pushed it out of place. It's possible to push these keys back into place, but you need to be careful not to break the key. Hold it at the top (where the plastic is thinnest) to protect this joint, and with your other hand, firmly press it down at the bottom end. You are aiming to get it past the point that it clicks back into position without breaking it at the top.

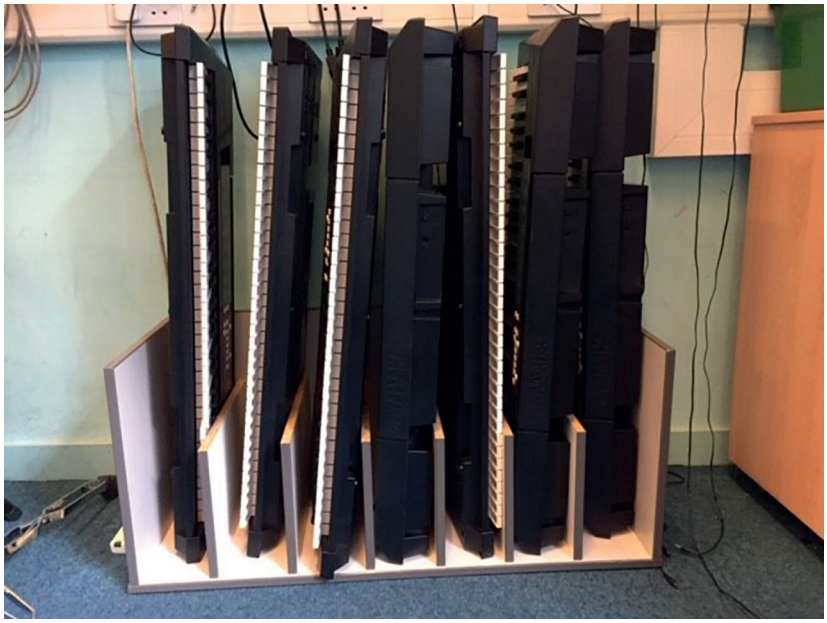
If you break the key by attempting this repair, or if a key has been completely ripped off, it's quite easy to take out a section of keys – they come in octave strips – and replace it with some keys harvested from a dead keyboard.

Odd notes that do not play might be caused by a build-up of dust under the keys. This video shows how a good internal clean might solve this problem. Sometimes a more extensive internal rejuvenation is required, including some soldering, in order to get all the notes working.

Keyboard and adaptor storage

If you have to put your keyboards away between each use, having a safe and workable storage solution is essential. One of the key things to bear in mind is that, due to their shape, keyboards simply do not stack on top of each other. If you can get a flexible shelving unit with lots of shelves, so that each keyboard has its own shelf, that could work very well.

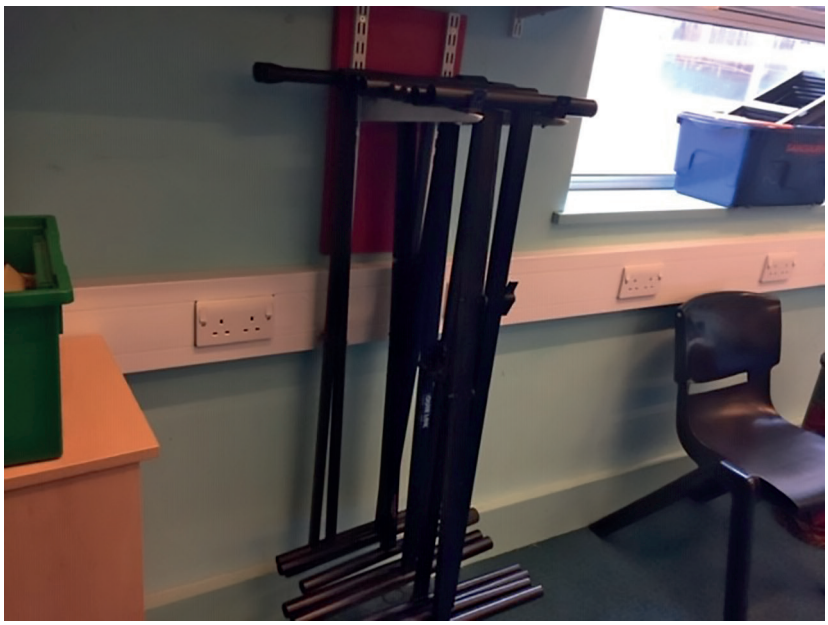
However, if this is not possible, then a vertical arrangement might be the solution. The potential problem here, again, is the shape of the keyboard. If keyboards are lined up vertically into an appropriately shaped space, that can work very well until you take some of the keyboards out – at which point the rest may fall over. The most student-proof solution that I have found is to create individual vertical slots for keyboards. These might be full-height, or half-height like these, made by our school caretaker out of old tabletops:



If you use single plug adaptors for your keyboards and do not leave them permanently set up, the storage for these can also be a problem, with great potential for tangled wire spaghetti. The best solution I have found is to set up dummy sockets that the adaptors can simply be plugged into with their wires dangling:

These were old sockets that were being discarded after some electrical work at school. It should be easy enough to come by some of these, either through school maintenance or by asking parents to donate old sockets when they have electrical work done at home. They were mounted on panels of wood that were then attached to the wall, and painted red to make it clear that they are different from the real, functioning sockets.

Keyboard stands are another type of item that needs planned storage if they are not permanently out. They have a tendency to fall over noisily if left propped up against a wall, and need something to hold them up. A rack can be made out of two shelving brackets, preferably with something angled attached to the ends to stop the stands slipping off:



UKULELES AND ACOUSTIC GUITARS

The first thing to get to grips with here is how to change strings. This is very simple, and something that every music teacher should be able to do. It only takes a couple of minutes to put on a spare string, and you can keep an instrument in use that might otherwise sit unplayed, waiting for a more qualified person to come and fix it.

Although a serious guitarist will regularly change all their strings, you're a lucky music teacher if you can afford this luxury: chances are that you will only replace strings when they break.

New nylon strings stretch a lot and take a while to bed in. Particularly with a set of new instruments, you'll need to tune them several times a day for about a week until they settle. You can speed up the process by tuning them slightly sharp.

There are so many sources of instructions online – such as this pictorial guide and this video – that I will not go into a step-by-step guide here. However, I will give you some tips that I have picked up over years of replacing strings:

- You do not necessarily need any specialist tools to change guitar strings, although a string winder can speed things up.
- When buying steel strings for an acoustic guitar, avoid light- or extra-light-gauge strings: the heavier ones are more durable.
- The bridge pegs on an acoustic guitar can be removed with pliers, or even a spoon if you don't have anything else.
- For acoustic guitars and ukuleles, make sure that you are winding the string the right way around the tuning pegs: the string should be going down to the bridge on the *inside* of the peg. If you get this wrong, you will need to turn the peg the 'wrong' way to tune the string. While this isn't the end of the world, it's quite annoying!
- Go gently with winding thinner steel strings. Over-enthusiastic tuning of a top E string can result in breakages before you've finished putting on the new string.
- When tying strings onto the bridge of a classical guitar, leave a little extra length. Sometimes when winding the string, it pulls up the bottom end so much it pulls the knot out, and you have to start again. You can always cut off any excess later.

Gluing a broken ukulele back together

Ukuleles vary in build quality, and depending on the brand you've bought, it's not uncommon for them to break where the neck joins the body. Although this looks terminal, a uke that is broken in this way is actually salvageable, as long as the break is clean. You just need some really strong glue and (unless you have access to appropriate clamps) a bit of time. At the time of the breakage, make sure that any detachable parts of the ukulele (particularly the bridge, which is likely to be loose) are saved. Sometimes there are white plastic rings, like Polo mints, that go around the tuning pegs: these might also fall off. They're only there for appearance, but save them if possible.

Any kind of epoxy glue (in two tubes that you mix together) is ideal for this, although No More Nails works too. Slacken the strings right off, or detach them at the head end, before you start your fixing job. You don't want any tension in the strings at all while you reattach the neck. Apply a really good amount of glue to the whole joining area.

The next bit is crucial: make sure the neck is lined up absolutely precisely how it used to be. If it isn't, the strings will cross the frets in such a way as to mess up the intonation – you will tune the open strings perfectly and then find that fretted chords are out of tune. Get the positioning correct before the glue starts to set, and then hold it in position until it doesn't move. This is the part that takes time: it can be good to do this at home, so you can watch television while holding everything in place. Expect to hold it for 20 to 30 minutes.

Once the glue has hardened enough to stay in place, wipe off any excess glue and put the ukulele down carefully somewhere that it will be undisturbed until the following morning. Even if you have some excess glue around the joint, the ukulele will be ready for action once the strings are back on, and you will have saved an instrument that would otherwise have been thrown away.

Making your own guitar and ukulele plectrums

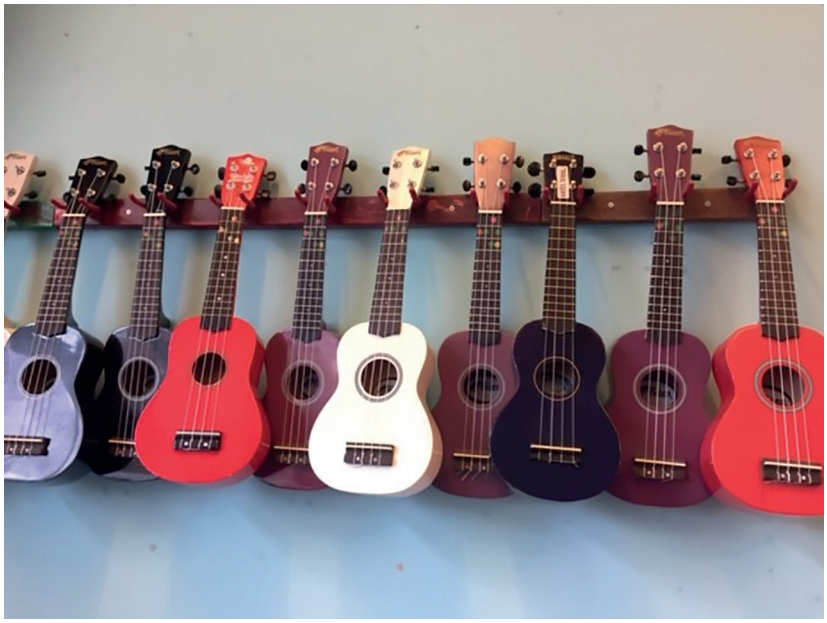
Picks and plectrums inevitably get lost, and it's unlikely that you will want to spend your department budget buying new ones all the time. A plectrum cutter is a great investment: they are available online for less than £15 and will give you a lifetime of free recycled picks. Old gift cards – ask students to bring these in – make ideal guitar picks, and milk bottles and butter/margarine tubs are formed from a thinner plastic that's great for ukulele picks. You could, of course, draw round a plectrum and cut out the shape with scissors, but a cutter will save you a lot of time and is very satisfying to use.

Guitar and ukulele storage

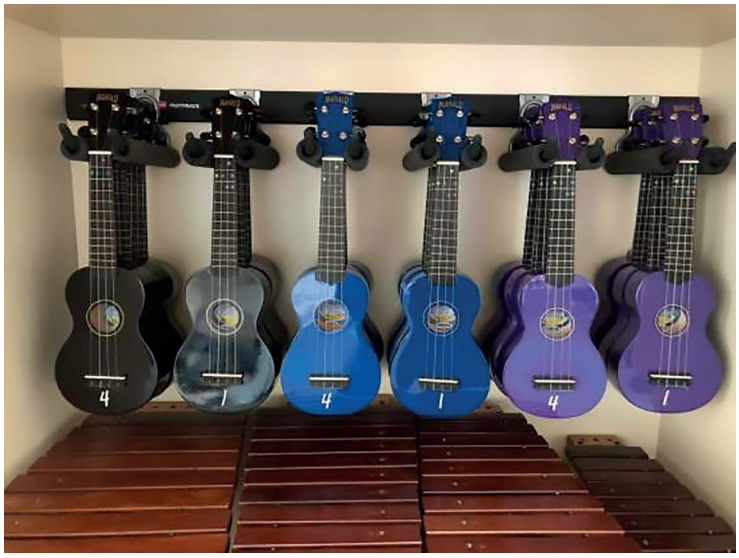
The 'slot' system previously described for keyboard storage can be easily adapted for guitars if you're looking for a cheap DIY solution to guitar storage. Otherwise, if you have wall space, what better interactive display than a collection of guitars hanging on hooks? Guitar hooks are relatively inexpensive, and keep instruments out of the way and yet accessible.

Using guitar hooks for ukuleles seems like overkill, however: you don't need anything that big. If you'd like to hang your ukuleles on the wall, tool hooks are a great solution. These are the sort of hooks that you would hang a spade from in your shed: they are cheap, especially if you buy in bulk, and are exactly the right size for ukuleles. Screw the tool hooks onto a length of wood, and then attach it to the wall:

Ensure that you measure the distance between hooks so that the ukuleles hang easily. A more compact system can be achieved by putting the hooks closer together, and going for a forward/back alternating pattern of hanging:

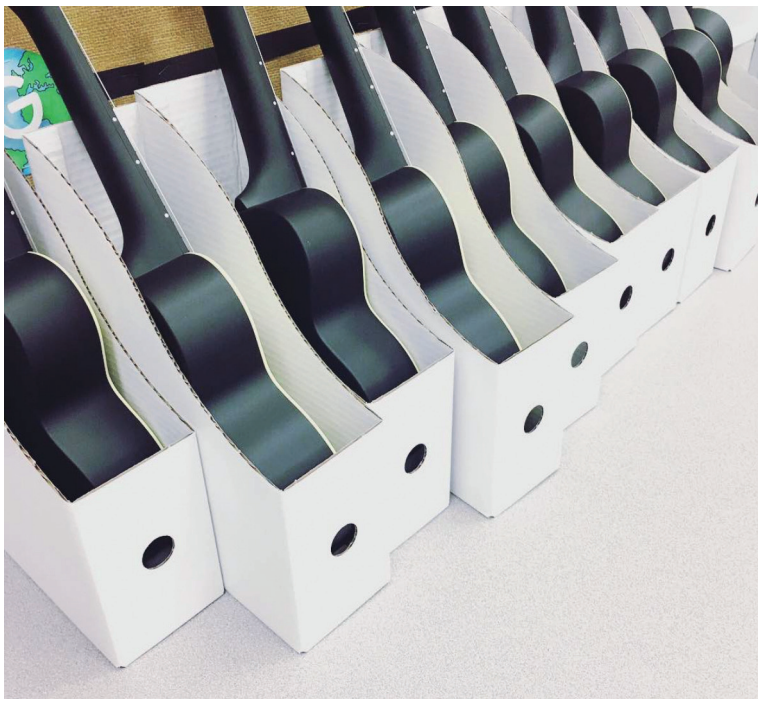


An even more compact option is to hang your ukes three or four deep, using slots cut into a shelf, or longer hanging arms as shown here:



Here, pipe foam has been used to cushion the hanging arms. Pipe foam is inexpensive and can be used for padding in all sorts of home-made instrument storage.

Another really simple option is to use magazine storage boxes to hold your ukuleles:



This might be prone to instability, so avoid that by gluing the boxes together to make a firmer unit.

ELECTRIC GUITARS AND BASS GUITARS

There's a whole array of things that can be adjusted on an electric guitar. The things I will tackle here are the basics that frequently go wrong. Unless you're a guitarist yourself, I wouldn't go adjusting the truss rod or string height unless something is drastically awry: these things are not hard to do, but you might want to seek some expert advice.

The most common reason for electric guitars to stop working is breakage of the connection inside the jack input. This is relatively easily fixed with some solder. On the outside of the jack input there is a hexagonal nut: if this becomes loose, the temptation is to spin it to tighten. However, this will cause breakage of the electrical connections inside.

First of all, work out how to get inside the jack input. This is usually quite easy: around the jack input there's a plate with two or three screws. Unscrew these, and you're into where you need to do your repairs. Occasionally, the part of the input that makes contact with the jack lead is loose, so bending this inwards slightly is the only fix you need. More often, though, one or both of the small wires on the socket will have become detached, and need to be soldered back on.

Although it's unorthodox, I add a little glue (not a super-strong epoxy glue, but something along the lines of standard UHU, which is less permanent) around the hex nut on the outside to stop it becoming loose. This will make your repair last longer.

If, when you open up the jack input, everything is intact, the problem may lie deeper inside the guitar. To fix this, you will need to take off the access panel on the back of the guitar (if there is one) or take off the pick guard. This may entail taking off the strings to get full access to the inside. Finding the loose or broken connection may be easy to spot visually: if it is not, you will need a multimeter to test the connections and find out where the weakness is.

LEADS, CABLES AND HEADPHONES

Guitar jack leads and mic cables can be seen as consumables within a music department: heavy use means they often don't last long. Usually they die because the connections inside the cable have been broken. The most common cause for this is incorrect coiling. This video shows really clearly how to coil cables correctly.

However, with guitar leads constantly used in the classroom you may decide to bypass the whole idea of coiling your cables, and create hanging storage instead. All you need is something to hang them on, but a picture that makes the process fun can encourage students to keep things tidy. Bob Marlead, shown below, was created by printing and laminating an A3 photo of Bob Marley, gluing it to a board, and attaching two lengths of protruding dowel. You could, of course, substitute a picture of any long-haired musician to achieve the same effect.

Mic cables need to be coiled because they are often a lot longer than jack leads. Either do this yourself or make it something that only qualified mic cable monitors in each class are allowed to do. These need to be students who can show that they understand and can execute correct coiling technique.

Labelling and colour-coding sets of equipment can work brilliantly with some setups. Label guitars, amplifiers and leads, and colour code them so that it's simple to see what goes with what: the yellow guitar plugs into the yellow amplifier using the yellow jack lead, and so on.

A top tip for making headphones last is to superglue the ear pads on as soon as you buy them. Buying robustly built headphones is a must. Many schools swear by **Music Village MV-44 headphones** which have recently returned to stock in a mark II model with great bulk deals.

UNTUNED PERCUSSION

Drumkits, by their very nature, have lots of bits that can come loose, fall off or get lost. Keep any spare parts from old or donated kits, as you never know when they might come in handy. Cymbal felts, sleeves and wing nuts can be bought separately, and it's always useful to have some spare ones.

Putting on replacement cymbal felts is very straightforward. The other most likely things that need doing to a drumkit are sorting out the hi-hat clutch and adjusting or replacing drum skins. This video has step-by-step instructions for fixing a hi-hat clutch, and makes the valuable point that cymbals should never touch metal on metal.

To replace a broken drum skin, you will need a drum key. Always keep a drum key near your drum kit, as you're likely to need it frequently. Replacing skins is very straightforward and logical, but if you're not a drummer yourself, you may not feel confident about tuning the kit. Tighten the lugs by working round each drum going to opposite sides each time: from 12 o'clock to 6 o'clock, then 2 o'clock to 8 o'clock, and so on. First of all, just tighten so that there are no wrinkles in the skin. Then check the tension by playing around the edge of the skin an inch or two from the rim. You will be able to hear when the tension matches all around the skin.

Most professional drummers replace their skins very frequently. From a school perspective, however, there is a lot of wear left in their rejects! If you can befriend a pro drummer who is willing to donate their 'old' drum skins to your school, you may be able to save a lot of money.

If you do chair drumming as a classroom activity (and if you don't, I would thoroughly recommend it as a way of teaching a whole class to play drum kit patterns at the same time), you may want to investigate home-made alternatives to buying class sets of drumsticks. Chopsticks are lighter than drumsticks, and therefore quieter. You can buy them in bulk online or from Chinese supermarkets. Other DIY drumstick solutions include wooden dowel or rigid plastic/silicone plumbing pipes cut to an appropriate length. These are only to be used on chairs, however, and kept away from the drum kit, as their blunt ends will dent the skins. Chairs can be protected – and noise kept down – by using foam mats on the seats, and pipe foam or hollow pool noodles on the backs.

TUNED PERCUSSION

If you have xylophones in your classroom, they may be relics from a bygone, more lavishly funded, age. A lot of these old instruments are of excellent quality, however, and with a little bit of maintenance can be rejuvenated.

The most common area that will require attention is the cushioning underneath the bars, and the pins that hold the bars in place. It's getting more difficult to buy spare parts for Sonor and Percussion Plus instruments, because a few suppliers have recently gone out of business: try LMS Music Supplies who still stock these in the UK. Otherwise, it's possible to import spare parts from the USA, as Orff instruments are still very popular over there.

You can do some more DIY repairs to pins and cushioning, however. For cushioning bars, you can use thick round elastic winding through the pins like a slalom and attached securely at each end using heavy-duty staples. Alternatively, you can use thin rubber tubing. For the pins, you can use thick nails: to make these less sharp and more cushioned for the bars, you can coat them in heat-shrink tubing designed for electrical use.