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| **Making an Erhu** |
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| Making a traditional Chinese two-stringed instrument |
| **Subject(s):** Design and Technology, Engineering, Music**Approx time:** 55-75 minutes |  | **Key words / Topics:** * erhu
* culture
* cutting
* drilling
* hand tools
* joining
* pitch
* screws and nuts
* tuning
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| **Stay safe** Whether you are a scientist researching a new medicine or an engineer solving climate change, safety always comes first. An adult must always be around and supervising when doing this activity. You are responsible for:• ensuring that any equipment used for this activity is in good working condition• behaving sensibly and following any safety instructions so as not to hurt or injure yourself or others Please note that in the absence of any negligence or other breach of duty by us, this activity is carried out at your own risk. It is important to take extra care at the stages marked with this symbol: ⚠ |
| **Suggested Learning Outcomes**  |  |  |
| * To be able to make an Erhu (Chinese musical instrument)
* To know the different parts of an Erhu
* To understand the significance of the Erhu in Chinese culture
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| **Introduction** |  |  |
| This is one of a set of resources that use seasonal events or celebrations to allow learners to develop their knowledge and skills in design & technology, mathematics, and science. This resource uses the theme of the lunar new year and involves making a Chinese musical instrument called an Erhu. |
| **Purpose of this activity**In this activity learners will use the theme of the Chinese and Lunar New Year to learn about and make a Chinese two-stringed musical instrument called an Erhu. They will learn about the purpose of an Erhu and its main parts. They will then use hand tools and equipment to manufacture their own Erhu and test it.This activity could be used as a main lesson activity to develop learners’ practical skills or to teach learners about how cultural factors influence work within design and technology and engineering. |
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| **Activity** |  | **Teacher notes** |
| **Introduction, brief and safety (10-15 minutes)**Teacher to introduce the activity, making a traditional Chinese two-stringed instrument called and Erhu. Teacher to discuss the importance of the instrument and music in Chinese culture, and its use as part of Chinese festivals.Teacher to hand out the tools, equipment and materials required. Teacher to explain potential safety issues when using the tools and equipment.**Making the Erhu (45-60 minutes)**Teacher to demonstrate the steps shown on the presentation to make an Erhu. Learners to follow these to produce their own example.* Step 1 - For each machine screw, cut along the slot with a hacksaw until it goes through the head. Try not to cut too deeply as it will weaken the screw, and might break when tightening ⚠
* Step 2 - Mark two rectangular slots on the can the same size as the stick. Start about 15 mm from the end. Use a hacksaw or multi-tool to cut straight across until the stick fits. Cut the small ends carefully. ⚠
* Step 3 - Make two marks on one end of the stick as shown on the presentation – 15 mm from the end and 10 mm in from each side. Drill a 2 mm hole straight through each mark – these will be for the fixed end of the strings. ⚠
* Step 4 - Make two marks on the other end of the stick – 15 mm from the end and 10 mm in from each side. Drill a 5 mm hole straight through each mark – these will be for the tuners. Mark again 15 mm down from each of the first two holes. Drill a 2 mm hole straight through each mark – these will be for threading through the other end of the strings to aid with tuning. ⚠
* Step 5 – Get a small piece of wood about 10 mm tall and the same width as the stick. Cut two small grooves, about 3 mm in depth, 10 mm from each side. Glue the bridge to the can. ⚠
* Step 6 - Insert the tuners with the heads to the back of the Erhu. Tie fishing line to the bottom end of the stick and glue in place. Run it over the bridge, through the top holes and into the tuners. ⚠
 |  | **Making an Erhu activity sheet** Print the activity sheet and distribute to the learners**Making the Erhu and safety**This will be a challenging activity for some learners. It is recommended for safety reasons that learners are directly supervised whilst completing the activity. E.g. on a one-one basis. Take care around any sharp edges, such as on the tin can.If equipment is not available to make tuners then these could be purchased. For example – pack of 6 guitar tuners <https://www.amazon.co.uk/NATUCE-Acoustic-Wear-Resistant-Enclosed-Electric/dp/B07XCMJP7X/>. If using bought in tuners the diameter of the holes drilled in step 4 may need to be altered depending on the diameter of the tuners purchased. Take care when using cutting and drilling equipment and follow all safety precautions, including keeping hands away from the cutting tools. Be aware the metal will still be hot after cutting due to friction induced. Take care when using hot glue guns.For steps 3 and 4, only the holes need to be marked and drilled at this point. The strings themselves are to be attached in step 6.**Threading the tuners**Learners thread with fishing line, attach at the rear and glue in place, stretch across the bridge, through small holes and around the tuners. Tighten the screws which will stretch the line tighter to give a suitable pitch when plucked.**Example**A finished example is shown on slide 11 of the presentation. |

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| **Differentiation** |  |  |
| **Basic** |  | **Extension** |
| * Allow students to use a pre-marked template for measuring hole locations.
* Give students a jig for cutting the hole in the can.
* Use pre-purchased tuners.
 |  | * Design a new musical instrument for the Lunar new year festivities, based on what they have learnt about Chinese culture.
* Use their Erhu to perform a number of different pieces of music.
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| **Resources** |  | **Required files** icon-docicon-pdficon-ppt |
| * Tin can
* Piece of wood
* 2 x M5 screw, 4 x M5 nuts
* Fishing line
* Hacksaw/multi-tool
* Drill and drill bits
* Hot glue gun
* Wood saw
* Violin bows (if available)
 |  |  Making an Erhu presentationicon-doc Making an Erhu handout |
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| **Additional websites** |
| * **YouTube video of an Erhu being played:** <https://www.youtube.com/watch?v=thqUc1bf8IU>
* **Wikihow - How to play the Erhu in 11 steps:** <https://www.wikihow.com/Play-the-Erhu>
* **YouTube - How to hold Erhu bow:** <https://www.youtube.com/watch?v=59sMiDgR_0o>
* **History of Erhu:** <https://study.com/learn/lesson/erhu-instrument-music.html>
* **Facts about Chinese New Year 2023:** <https://chinesenewyear.net/>
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| **Related activities (to build a full lesson)** |  |  |
| **Starters** (Options) * Show the YouTube video of an Erhu being played <https://www.youtube.com/watch?v=thqUc1bf8IU>.
* Discuss the importance of the Erhu in Chinese culture.
 | **Plenary*** Play different pieces of music on the Erhu - check it stays in tune, what sounds it can make etc.
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| **The Engineering Context** film |
| * All musical instruments that are created are engineered by somebody and they all have different designs. The design of an instrument depends a lot on what sound it produces, and to change the sound you need knowledge of engineering and its underlying physics.
* Manufacturing engineers must be able to competently and safely uses a range of hand tools, processes, and equipment to manufacture products and prototypes.
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| **Curriculum links** |
| **England: National Curriculum**Design & Technology * KS3 2a, 2b

**Music** * KS3 - Read simple phrases using pitch and rhythmic notation on the treble clef containing melodies that move mostly in step
* KS3 - Read and play short rhythmic phrases at sight, using conventional symbols for known rhythms and note durations
 | **Northern Ireland Curriculum**Technology & Design* KS3 Manufacturing - selecting and using materials fit for purpose; safe use of a range of tools and processes appropriate to materials, demonstrating accuracy and quality of outcome
* KS3 Objective 1 - Abide by health and safety rules when using tools, machines and equipment
* KS3 Learning outcomes - demonstrate practical skills in the safe use of a range of tools, machines and equipment

The Arts* KS3 - demonstrate self-management by working independently and systematically, persisting with tasks.
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| **Scotland: Curriculum for Excellence**Technologies* TCH 3-09a TCH 3-12a
* TCH 4-12a

Expressive Arts* I can sing and/or play music from a range of styles and cultures and perform my chosen music confidently using performance directions, musical notation and/or playing by ear.
* EXA 3-16a
 | **Wales: National Curriculum** Design and Technology* KS3 Skills: Making 1, 2, 3, 4
* KS3 - design and make images and artefacts using a variety of materials, processes and ideas
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| **Assessment opportunities** |
| * Informal teacher assessment of practical skills through observation of learners.
* Formal teacher assessment of the completed Erhu.
* Self/peer assessment of the completed Erhu.
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