Edinburgh University Music Society Online Education Project 2020/21 Project Outline

Rationale and Aims

Last year Edinburgh University Music Society (EUMS) piloted its new expanded Education Project with three primary schools in Edinburgh. This year we would like to build on this success with the intention of reaching more young people and providing a deeper link with the schools already participating. Due to the Covid-19 pandemic, we believe more than ever in the importance of blended learning, and elements of the project have been adapted to suit an online learning environment.

Recent studies have shown the positive impact of musical tuition on children's educational attainment[1], as well as the contribution of the UK's music industry to the UK economy[2]. The Music Education Partnership Group recently published "What's Going On Now?", a short report into the current state of youth music in Scotland[3]. The authors praised the *Youth Music Initiative* run by *Creative Scotland* but argued that this alone is not enough to counteract the impact of cuts to musical provision made by local councils across Scotland.

EUMS wants to play a role in addressing this issue via our Education Project. We have the following aims which reflect our strong belief in the importance of the arts, in particular music, in cross-curricular learning:

1. Encourage children's interest in singing and playing musical instruments,
2. Widen children's knowledge and understanding of the voice and orchestral instruments,
3. Develop children's understanding of the science behind sound in the context of how the voice and musical instruments work.

We intend to achieve these aims through a combination of pre-recorded presentations, live video sessions run by volunteers from EUMS taking place over online conferencing platforms such as Skype or Zoom, and activities that can be done in class in response to the video material. The pre-recorded presentations, along with other materials, will be accessible via the EUMS website, `www.eums.org.uk`.

We hope that everybody taking part finds the project informative and fun!

After taking part, we would be grateful if the class teachers would fill in a brief online feedback form so that we can assess the impact of the project.

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[1] *The impact of instrumental music learning on attainment at age 16: a pilot study*, B. J. Music Ed. 2016

[2] *Measuring Music* 2017 Report, UK Music

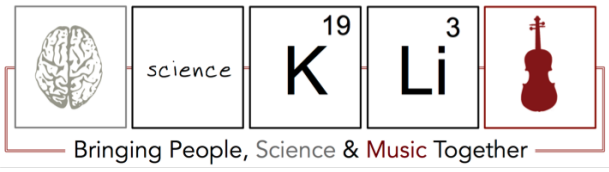
[3] Project formally commissioned and overseen by Creative Scotland, on behalf of MEPG and other funders

Pre-Recorded Presentations

The overall aim of this part of the project is to develop children's understanding of the science behind sound in the context of how musical instruments work, with reference to the concepts of vibration, amplitude and pitch. A secondary aim is to introduce the children to a selection of instruments with explanations of how they work based on these scientific concepts.

The project will take the form of two categories of video presentation available on the EUMS website, which will be produced by volunteers from EUMS over the course of the year. The first category, *The Science of Sound*, will contain videos explaining the science behind sound using examples from music, and the second category, *Making Music*, will contain videos with information on the voice and specific instruments, outlining how they work with reference to the science outlined in the previous category.

First Category: The Science of Sound



This part of project was inspired by workshops run by the organisation **Science Ceilidh**. Find out more about them from their website, `www.scienceceilidh.com`.

These will be a sequence of presentations introducing the key concepts of **vibrations**, **amplification** and **pitch**, and finally explaining how the human ear works. Each presentation will be split into connected 2-3 minute videos exploring different aspects of the theory, with opportunities to pause for class discussion or interactive activities. The presentations will contain approximately 10-15 minutes of video content, and the total session length for each presentation might be around 20 minutes including the breaks. Outlines of each of the presentations are as follows:

- Vibration - *What is sound made of?*

    1. Understand vibration in terms of "material objects wobbling", i.e. something moving backwards and forwards in a regular pattern. Use model of own vocal chords / mouth vibrating in speech and humming, and vibrating strings on a stringed instrument.

2. Understand that vibrations travel through objects and the air using the analogy of swinging sideways on a row of park swings. Extension: what would it sound like if I clapped my hands in space?
3. Extend this understanding to sound waves being initiated (started off) using a musical instrument and travelling through the air.

- Amplification - *How do we make sounds louder or quieter?*

1. Understand that amplitude relates to the volume of a sound. Greater amplitude indicates a louder sound and smaller amplitude indicates a quieter sound.
2. Relate amplitude to size of vibration. Model using a ruler on the edge of a desk.
3. Introduce the concept of increasing amplitude using a hollow space via the slinky-and-plastic-cup demonstration. Allow the children the opportunity to explore this effect using humming (pushing tongue against roof of mouth and down again while keeping voice steady).
4. Hollow spaces in musical instruments are a way of increasing amplitude. Model this using the instruments present in the room, indicating soundbox of violin or guitar, piano and drums.

- Pitch - *Why are some sounds higher or lower than others*

1. Understand that pitch means how high or low a sound is. Model using voice. Allow time for the children to experiment with the lowest and highest hums they can produce.
2. Relate pitch to speed of vibration. Demonstrate this using a clip of an audio speaker which can be seen to vibrate at different speeds according to the pitch.
3. Another way of changing pitch is to change the size of the instrument. Demonstrate this using boomwhackers by arranging them in order of length and showing that this relates to their pitch. Extension: can you think of any other instances where the size of something affects the pitch is produces? E.g. blowing across the top of a bottle produces different pitches depending on how much liquid it contains, cellos are much bigger and lower than violins. This last point may also be linked to amplification in that cellos are usually much louder than violins too.

- The Human Ear - *How do we hear sound?*

    1. Understand how the shape of the ear is specially adapted to catch sound waves travelling through the air. Use examples of covering or cupping ears to demonstrate the effects of this shape.
    2. Understand the roles of different components of the ear with reference to the keywords vibration, amplification and pitch: the eardrum captures the vibrations; the hammer, anvil and stirrup amplify the sound and the cochlea detects different pitches. Model each of these steps as a mechanical process. Extension: discuss another important but surprising role of the ear, which is our sense of balance.
    3. Understand that the vibrations are finally turned into electrical signals which travel to the brain through the auditory nerve. Extension: Some people may suffer from hearing impairment for various reasons. The class could discuss some of the causes of hearing loss and how different kinds of hearing aids may be used to remedy this in the context of the science just learnt.

Second Category: Making Music

As a follow-on from the presentations on the science of sound, members of EUMS will produce a series of short videos talking in more detail about the voice, and various musical instruments. These will include demonstrations of the range, timbre and other aspects that make each instrument unique. The process of how each works will be broken down into simple steps. Below are examples of the "four steps" for various instruments.

⊗ Violin/Viola

1. The player makes the strings vibrate
2. The vibrations of the string travel to the body of the violin through the bridge
3. The body amplifies the vibrations and makes the surrounding air vibrate
4. The sound wave travels through the air to our ears

⊗ Flute

1. The player blows air across the mouthpiece
2. The air in the mouthpiece begins to vibrate back and forth

3. The vibrating air travels down the tube where it is amplified
4. The air escapes and the sound wave travels through the air to our ears

⊗ Clarinet

1. The player blows air into the mouthpiece
2. The reed makes the air in the mouthpiece vibrate
3. The vibrating air travels down the tube where it is amplified
4. The air escapes through the bell and the sound wave travels through the air to our ears

⊗ Percussion

1. The player uses their hands or sticks to make the skin vibrate
2. The vibrations of the skin are transferred to the air inside the drum
3. The big hollow space inside the drum amplifies the sound
4. The air escapes from the drum and travels as a sound wave to our ears

Live Online Sessions

As well as showing the pre-recorded presentations, there is an option of running live sessions over video conferencing software run by volunteers from EUMS. These will take the form of interactive performances given by small ensembles made up from members of EUMS. The sessions will follow on from the pre-recorded presentations on *The Science of Sound*, but there will be significant crossover with the material in the *Making Music*. Therefore, we recommend that classes taking part in the live sessions watch the *Science of Sound* videos prior to participating in the live session, but there is no need to watch the *Making Music* videos beforehand.

The overall aim of this part of the project is to allow children to learn more about music and instruments based on the concepts introduced in the pre-recorded videos. Children will be encouraged to consider how music may impact upon their daily lives, for instance how it may convey a variety of emotions. Each session will be run in an interactive manner, including music-based games and further activities for the class to continue with the teacher afterwards.

A rough outline of the session is as follows:

1. Introductions - who we are, where we're from and what we're going to be doing
2. "Warm-up" games[4], for instance Don't Clap It Back
3. Recap of the science learnt in the pre-recorded videos with opportunities to ask questions on the material
4. Instrumental introductions[5] with reference to the science learnt
5. Exploration of ways music may be played to convey different emotions, for instance by varying dynamics, pitch major/minor tonality, tempo or timbre in relation to different instruments.
6. Volunteers lead the class in some more musical games focusing on the elements just learnt, including "The Ice Cream Game"
7. Final summary of what we've learnt, and setting of one or two small consolidation tasks to be completed with the help of the class teacher at some point after the session

[4]Details of games may be found on the *Resources for Helpers* sheet

[5]See below for ensemble-dependent examples of how this part may be run

Example Ensemble: String Quartet

- Instruments introduced: Violin, Viola and Cello.
- Each instrument gives an individual demonstration, focusing primarily on the different **sizes and pitches** of the instrument. This could also include a demonstration of the folk fiddle style. Don't forget about pizzicato and col legno too!
- The whole group plays some examples of string quartet repertoire, ranging from classical to modern.

Example Ensemble: Wind Quintet

- Instruments introduced: Flute, Oboe, Clarinet, Bassoon and French Horn.
- Each instrument gives an individual demonstration, focusing primarily on the different **timbres** of the instruments.
- The whole group plays some examples of wind quintet repertoire, exhibiting the contrasting timbres just introduced.

Example Ensemble: Small Choir

- "Instruments" introduced: The voice types of Soprano, Alto, Tenor and Bass.
- Each voice type gives a demonstration of its **range**, including features such as **falsetto**.
- The group sings some examples of choral repertoire ranging from classical to modern songs, and leads the children in some breathing and stretching warm-ups.

If Restrictions are Lifted Sufficiently...

At present it is unclear to what extent Covid-19 restrictions may be lifted over the course of the coming year. However, in the spirit of optimism, we outline plans for sessions EUMS would run if social distancing rules and the opening of University buildings allow.

There are two strands that may be run: Vocal and Orchestral. The overall aim is to widen children's knowledge and understanding of the voice and of orchestral instruments, and to cover the scientific concepts of vibrations, amplitude and pitch already mentioned in this document.

Vocal Strand

We invite classes to the Reid Concert Hall in Bristo Square for an interactive choral concert lasting around 1 hour and 15 minutes. A rough schedule for the event is as follows:

1. Classes arrive at the Reid Concert Hall and the choir welcomes them by singing a well-known piece.

2. Short introduction to the science of sound and the voice, including short demonstrations of concepts such as vibrations, amplitude, pitch and sound waves.

3. The leader introduces the different voice types of soprano, alto, tenor and bass. Singers from each voice type demonstrate some of the similarities and differences, as well as other interesting features such as falsetto and vibrato.

4. The leader and choir play some warm-up games with the children such as stretching, tongue twisters, vowels and consonants (e.g. ma, fe, ti, go, pu), and 1 1-2-1 1-2-3-2-1.

5. The concept of a **round** is introduced and the children are split into groups, each led by a different section of the choir. The round is used to allow the children to experiment with the concepts introduced so far. For instance groups could be encouraged to sing as high/low as possible, or with lots of vibrato.

6. The **conductor** introduces themself and explains their role as part of the choir. The conductor teaches all the children the basic pattern for conducting. There is an opportunity for volunteers to come up to the stage and conduct a short piece.

7. All the children take part in a short quiz about what they have learnt.
8. Sing Along! The choir leads sing alongs of well-known film songs with all the children.
9. The choir sings one final piece as the children leave to go back to school.

Orchestral Strand

We invite classes to the Reid Concert Hall in Bristo Square for an interactive orchestral concert lasting around 1 hour and 15 minutes. A rough schedule for the event is as follows:

1. Classes arrive at the Reid Concert Hall and the orchestra welcomes them by playing a well-known piece.
2. Short introduction to the science of sound, including short demonstrations of concepts such as vibrations, amplitude, pitch and sound waves.
3. The leader introduces the different groups of instruments that make up the orchestra, and the players showcase each instrument individually, focusing on the aspects that make each unique.
    - Strings, ending with all the strings playing together.
    - Woodwind, ending with all the woodwind playing together.
    - Brass, ending with all the brass playing together.
    - Percussion, ending with the choosing of volunteers to play some of the percussion.
4. The orchestra plays another piece all together, with the volunteers on percussion. There is the option of running this several times to allow more children to join in.
5. The **conductor** introduces themself and explains their role as part of the orchestra. The conductor teaches all the children the basic pattern for conducting. There is an opportunity for volunteers to come up to the stage and conduct a short piece.
6. All the children take part in a short quiz about what they have learnt.
7. Sing Along! The orchestra leads a sing along of a well-known song with all the children.
8. The orchestra plays one final piece as the children leave to go back to school.