Unit 1.5: We are rhythmic

Creating sound patterns in ScratchJr and GarageBand

Software: ScratchJr app and GarageBand (alternatives: Scratch, Audacity, LMMS, Soundtrap)
Hardware: iPads (alternatives: laptop/desktop/Chromebook computers)

Overview

In this unit, pupils use ScratchJr and GarageBand to create patterns of sounds. In:

- **Session 1** they record and playback **audio** in ScratchJr
- **Session 2** they program **sprites** to playback recorded audio in ScratchJr
- **Session 3** they create a simple program to playback recorded audio in a rhythmic pattern in ScratchJr
- **Session 4** they record audio in GarageBand and experiment with audio effects
- **Session 5** they create a repeating percussion pattern in GarageBand
- **Session 6** they experiment with playing some of GarageBand's built-in instruments.

Alternatives

The unit sessions give step-by-step guidance to using ScratchJr and GarageBand. GarageBand only works on iOS (Apple), but the ScratchJr app is available for iOS, Android and Chromebooks. This unit could also be carried out on laptops/desktop computers using other music editing software, such as Scratch, Audacity, LMMS (Linux Multimedia Studio) or Soundtrap.

Knowledge, skills and concepts

In this unit, the pupils will learn to:

- record **audio** on a digital device
- program **sprites** to playback recorded audio in ScratchJr
- program ScratchJr to create repeating rhythms
- explore different effects that can be applied to audio
- create a repeating percussion pattern using a **virtual** drum machine
- experiment with a range of virtual instruments.

Progression

In Key Stage 1:

- Pupils developed their programming skills in **Unit 1.1: We are treasure hunters**.
- Pupils will build further on their programming skills in **Unit 2.1: We are astronauts**.

In Key Stage 2:

- Pupils will build on their knowledge of using percussion instruments to create a rhythm in **Unit 3.3: We are presenters**.
- They will further develop their audio skills in **Unit 4.3: We are musicians**.

Assessment – by the end of the unit:

All pupils can:

- record **audio** on the iPad
- playback audio they have recorded
- program **sprites** in ScratchJr to play audio
- play a sequence of sounds in ScratchJr
- apply filters to audio they have recorded
- create a repeating sequence of drum or other percussion sounds.

Most pupils can:

- record good-quality audio on the iPad
- re-record unsatisfactory audio
- program a repeating sequence of sounds in ScratchJr
- create an effective percussion sequence
- record music using **virtual** instruments
- view the **piano roll** representation of music.

Some pupils can:

- understand how waveforms represent recorded audio
- program nested repetition in ScratchJr
- record pleasing or effective music using virtual instruments
- edit music in a piano roll view
- create music with multiple **tracks**.

Background information

- Much of the music we listen to is produced, stored and transmitted in **digital** formats.
- Digital **audio** recordings can be made by sampling the signal from a **microphone** to create a stream of numbers. Typically, a computer might record some 44,100 **samples** per second. These represent the sound pressure levels picked up by the microphone. The audio recorders in ScratchJr and GarageBand allow users to control the playback of these samples.
- Another approach to digital audio is a compact file (often in the **.midi** format) which includes instructions for playing back music. The instructions are applied using pre-recorded (or sometimes generated) samples of individual notes on different instruments.
- This is similar to the idea of a musical score, which provides instructions for a musician to perform the music, or a **piano roll** of Victorian times: a binary format of holes in paper which provided the 'program' for a pianola, showing when each key should be held down automatically.
- The key programming construct of **repetition** is introduced in this unit – computer programs can contain instructions which indicate that other instructions must be repeated a number of times, or until certain conditions are met.

Key vocabulary

Audio: sound, such as spoken narration

Digital: storing, processing or transmitting information as numbers, such as sound pressure through a microphone

Message: a way for sub-programs such as sprites to pass information to other sub-programs, such as an instruction to start

Microphone: an input device converting sound pressure into data

MIDI: a computer audio format or standard in which the pitch, duration and volume of individual notes is specified

Piano roll: used now for a visual representation of music where the pitch and duration of each note is shown

Repetition: programming construct which allows a group of instructions to be repeated a number of times, or until a certain condition is met

Sample: snapshot of a sound pressure value

Sequencer: software for creating repeating patterns of sounds, typically drums and other percussion instruments

Speaker: output device converting data into sound pressure; similarly, for headphones and earphones

Sprite: graphical character in a program that can be given its own sequence of instructions

Track: recording of audio from one microphone, or the instructions for digital music to be played on one instrument or group of instruments

Virtual: representing some aspect of the real world in or through a computer

Differentiation

See each session (pages 53–58) for additional ways to increase support and add challenge to this unit.

Some pupils might already be accomplished musicians through opportunities outside school – make the most of this. Musical ability is not required for these activities however; make a point of encouraging all pupils to have a go and celebrate their engagement in the activities here.

Encourage pupils to explore the **virtual** instruments available in GarageBand for themselves. Help pupils to become more discerning by suggesting that they re-record **tracks** that they're not happy with or delete their less successful tracks.

Some pupils might find the GarageBand interface overwhelming at first. Consider restricting their attention to just one or two of the many tools, instrument groups and instruments available.

Cross-curricular opportunities

Music: Pupils could engage in the analogue equivalent of these sessions by playing musical instruments. They should listen for repeating patterns in music.

English: Pupils could record themselves speaking. They can look for repeating patterns in nursery rhymes or poems. Pupils might explore how phonemes can be recorded and blended.

History: Pupils could learn about the history of recording music, including piano rolls for the pianola.

Geography: There is opportunity here to explore non-western instruments and musical traditions.

Preparation for teaching the unit

Things to do

- Check you have access to ScratchJr and GarageBand (see *Alternatives* on page 50).
- Read pages 50–51 to get an overview of the unit.
- Read the steps in the unit sessions (pages 53–58) and look at the associated online resources, printing out the worksheets as required.
- Work through the unit yourself, so you know what is expected of the pupils.
- Think about the best way to manage the classroom so that pupils can record **audio** without too much background noise and listen back to their work – audio splitter cables and headphones would allow two pupils to listen to music and audio on one iPad. You could consider using these activities as part of a carousel of activities, or explore the possibility of some pairs/groups working in other spaces around the school.
- You might want to use musical instruments for some or all of these sessions.
- If pupils are going to share their work or save it online, make sure they have accounts set up, that necessary permissions have been obtained and are integrated with the iPads.

Resources needed

- **Software**: ScratchJr, GarageBand
- **Hardware**: iPads
- See *Alternatives* on page 50

Online resources provided

Session resources

- Worksheet 1.5a: Thinking about music
- Worksheet 1.5b: End-of-unit quiz
- Worksheet 1.5c: Pupil self-assessment
- Teaching slides 1.5a–1.5f
- Walkthrough videos 1.5a–1.5j
- Interactive end-of-unit quiz 1.5

Online safety

- ScratchJr and GarageBand are both offline apps, without the need for Internet access to operate.
- If pupils search for animal sounds, then the usual precautions such as safe search settings and Internet filters will need to be in place.
- If you choose to share pupils work online, ensure that you have their and their parents'/carers' permission to do so, and that pupils have not included any copyright protected music or other audio in their work.
- You can use this unit to discuss how easily **digital** music can be copied, and the need to respect the rights of the owner of the work and the original creator when doing so.
- Monitoring and management on the iPads should still be adhered to. One way this can be done is with an MDM and Apple Classroom. If not, there is an option called Guided Access which stops pupils from moving onto different apps.

Collaboration

These sessions are based on two pupils working together.

Useful links

Software and tools

- ScratchJr: **www.scratchjr.org**
- ScratchJr is also available on the App Store, the Google Play Store and the Chrome Web Store
- GarageBand: **www.apple.com/uk/ios/garageband**

Online tutorials

- ScratchJr: **www.scratchjr.org/teach**
- GarageBand: **www.support.apple.com/en-gb/garageband**

Information and ideas

- Sam Aaron: programming as performance: **www.youtube.com/watch?v=ENfyOndcvP0**
- Apple Books: GarageBand for Schools
- Using GarageBand loops to teach music: **blogs.glowscotland.org.uk/gc/mrfeistsblog/2018/11/04/using-garageband-loops-to-teach-music/**

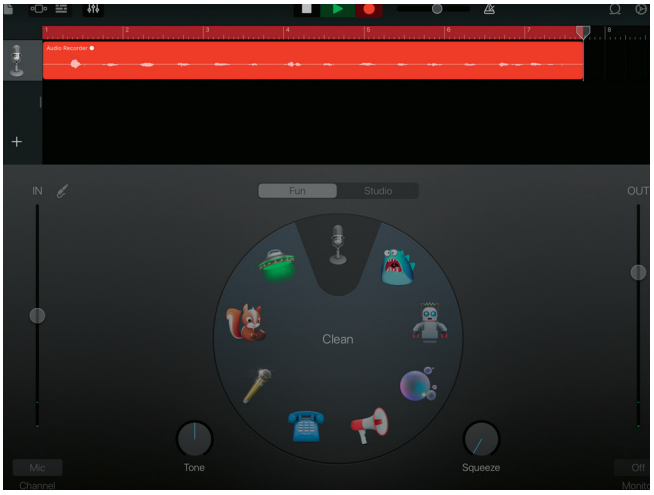
Unit outcomes

Below are some examples of the outcomes you could expect from this unit.

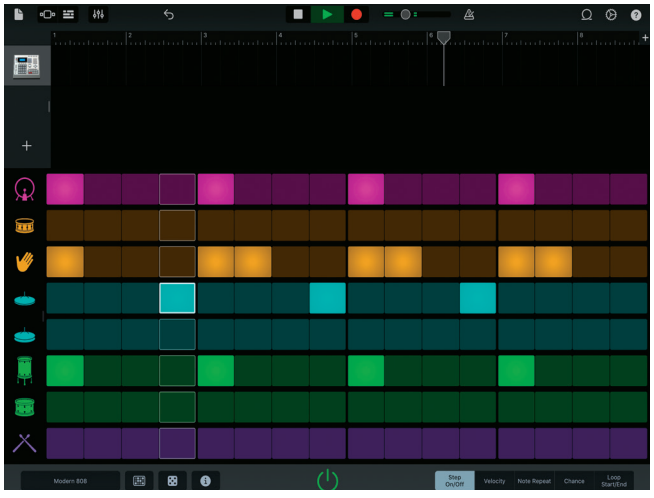
Session 1: Recording five sounds for the cat sprite in ScratchJr

Session 2: Recording audio for different animal sounds

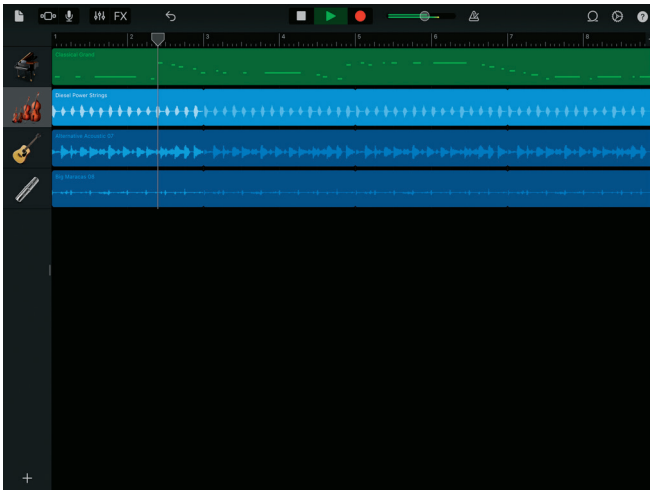
Session 3: Programming the sprite to repeat meowing four times



Session 4: Making a recording in GarageBand



Session 5: Creating a percussion pattern in GarageBand



Session 6: Creating a multi-track recording in GarageBand