

Tackling the Technology Gender Gap Together: Mixing Beats and Making Music

Level - Third Level

**Subject area/s – Technologies - Computing
Science and Expressive Arts - Music**



Everyday Computing Science – Mixing Beats and Making Music- Repetition, Abstraction and Tinkering

Level - Third

Subject area/s – Expressive Arts – Music, Technologies-Computing Science

Experiences and Outcomes –

I can use my voice, musical instruments or music technology to improvise or compose with melody, rhythm, harmony, timbre and structure. **EXA 3-17a**

Understanding the world through computational thinking

I am developing my understanding of information and can use an information model to describe aspects of a real-world system **TCH 3-13b**

Understanding and analysing computing technology

I understand language constructs for representing structured information **TCH 3-14a**

Designing, building and testing computing solutions

I can select appropriate development tools to design, build, evaluate and refine computing solutions based on requirements **TCH 3-15a**

Benchmarks –

Music 3rd : Uses voice, instruments and technology to create music, showing understanding of musical structure, for example, creates in simple verse chorus form, creates short sequenced pieces using technology, creates short 16 bar music in binary form, experiments with voices/instruments to create sound effects.

Uses appropriate music performance plans, recording facilities and music notation to capture ideas, for example, uses treble clef notation or tablature or records using technology or creates a performance plan.

3rd: Understands that the same information could be represented in more than one representational system

3rd : Designs and builds a program using a visual language combining constructs and using multiple variables.

Duration of time – 7 x 50/55 mins

Computing Science Concepts and Approaches

Repetition – the use of loops to Repetition in programming means to repeat the execution of certain instructions. This can make a long sequence of instructions much shorter, and typically easier to understand

Abstraction - simplifying things; identifying what is important without worrying too much about the detail

Tinkering – changing things to see how they work out

Algorithm - sequence of instructions or a set of rules

Creating - planning, making and evaluating things in this case their own music piece based on loops and beats

Collaboration - working with others

Evaluation - making judgements about our and others work

Resources required

Intro video: <https://youtu.be/eM9fvS7rnCU>

Isle of Tune website: <http://www.isleoftune.com/>

Isle of tune trailer: <https://www.youtube.com/watch?v=37ozXwlKsBw>

Incredibox websites: <http://www.incredibox.com/v3/>

<http://www.incredibox.com/v2/>

<http://www.incredibox.com/v1/>

Incredibox video: <https://youtu.be/IHDSXxQzVK4>

Earsketch website: <https://earsketch.gatech.edu/>

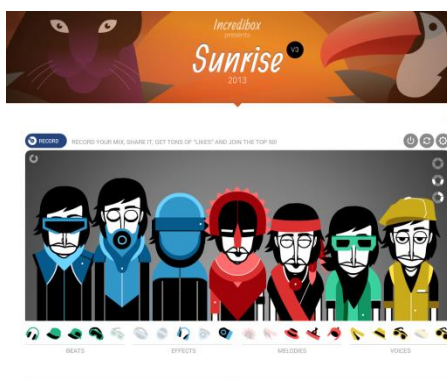
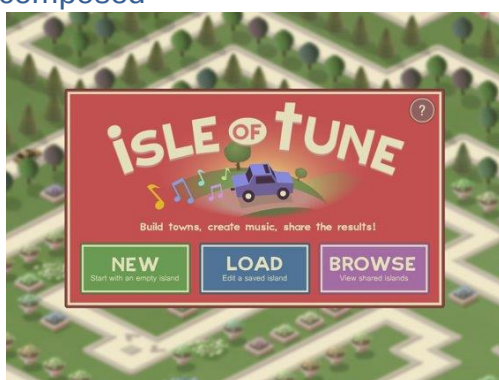
Earsketch video: <https://www.youtube.com/watch?v=h3H09Och-rY>

Earsketch Hour of Code intro: https://youtu.be/_EeP0Hpnn5g

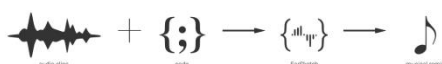
Looplabs intro: https://youtu.be/E_GYct4temc

Overview of learning

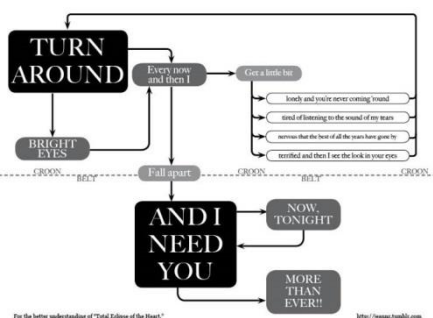
In this block of lessons, we will look at key Computing Science concepts of Repetition, Abstraction and Tinkering through the prism of Music, looking at how music is represented and how loops form a natural part of music. Pupils will have the opportunity to create pieces of music using three pieces of software – Incredibox, Isle of Tune and Ear Sketch(which uses the Python programming language as a method of creating music using loops). Isle of Tune and Incredibox instil the idea of abstraction as simulations and models of representing music, much as a musical score is. By attempting to create a music sequence in either incredibox or isle of Tune, pupils have to use a representational system to illustrate how the song is constructed and composed



EarSketch helps you learn coding through music. Use sounds from the EarSketch library or your own sounds, along with Python or JavaScript code, to produce studio quality music.



Key Features		
 Learn Python and JavaScript Learn one of the most popular programming languages in the world.	 Create & Share Music Create music in popular styles like dubstep and hip hop and share the songs with your friends.	 No Prior Experience Required You don't need to know anything about music or coding to get started.
 Remix sounds Create your own music from a library of sounds by Young Guru (Jay Z's audio engineer) and Richard Dwyer, or record or upload your own sounds.	 Free EarSketch is completely free to use.	 No software downloads EarSketch is web-based. There is nothing to download or install.



Pupil Objectives

- I can...describe different techniques to represent music and repeated loops of music loops
- I can...create a piece of music using digital tools that include repetition
- I can...use a programming language to create and manipulate loops and beats
- I can....explain the key computing concepts of Repetition, Decomposition and Abstraction

Introduction – 1 lessons – Using the Music Music 101 presentation

Slide 2 – show the intro video as we explain the connections between Computing Science and Music

Slides 3-13 looks at the concept of abstraction, particularly in music, with musical notation being a way of describing something complex, but removing the detail and focusing on what is important. This is a key concept in Computing Science

Main Activity

Slides 14-17 cover using the Isle of Tune Website or app – Pupils create their own loops and beats to produce an “Island”. Pupils can work in pairs or individually here – we focus on the idea of “Tinkering” here – messing about with what each of the objects can do and changing their properties to see what effect it has on their music. Pupils can spend 1 or 2 periods on this.

Slides 18-23 focus on Repetition and loops, ideas common in both programming and music. Pupils will be asked to experimnt with the loops in the Incredibox website after watching the initial video in the presentation. They’ll then have the chance to consider and plan their own notation for a piece oif music they create and will share and evaluate that with their peers.

Slides 23-28 cover the idea of Tinkering and pupils will complete the Earsketch Hour of code after watching the initial video about how it works and how girls have been using it to bring music and programming together. A link to a video on Looplabs, another loop based music creation site is also included here.

Plenary - 1 lesson

Using the presentation : Music Music 101 – Slide 29

Bringing it all together, pupils will share their experiences on using the range of software and the challenges they faced for examplein being asked to create a different notation, manipulating code or being restructed to someone elses loops.

You could set up a Padlet in www.padlet.com to gather in feedback from the class

Ask the class to discuss the Computing Science concepts andtheir understanding of them. Can they see how musicians could make great programmers?

Differentiation

The app versions of Isle of Tune and Incredibox are available for student work on independently in a less busy space.

In Isle of tune students can use the provided beats and loops rather than have to create their own.

Extension Activities include going beyond the Hour of Code in Earsketch and moving on to music programming course available on that site. Further cretative work can be completed in Looplabs

Assessment Opportunities

Any music created in Isle of Tune, Earsketch or Looplabs is worthy of use as an assessed piece of work for **EXA 3-17a**

Teaching Notes

ABSTRACTION: Abstraction is about simplifying things; identifying what is important without worrying too much about the detail. Abstraction allows us to manage complexity.

A musical score for example is a representational abstraction for describing a piece of music. Music doesn't sound like a piece of paper but the notes and markings focus on the important parts of how the music is constructed and to be played.

REPETITION: Repetition is the concept of repeating or iterating a sequence of steps a certain number of times or until some other condition has been met. We see the idea of repetition everywhere – from recipes that tell us how to make a cake mix – “Repeat until the mixture is thin and sticky” – to our gym trainer who demonstrates a series of movements we must repeat until he says stop or we collapse! In music, our notation has ways of instructing us to repeat parts of the music.

TINKERING: Tinkering is about playing about, experimenting, changing the inputs and seeing how it affects outputs. In music, we could view improvisation as a form of tinkering in the safe and sure knowledge that although tinkering is messy it sometimes reveals new things and produces insight or creates something entirely new.

Programmers tinker all the time, using other people's bits of code and changing them to solve a different problem.