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| **Topic/Duration** | The age of invention and the birth of recording sound / 1 Class Period / 50 minutes |
| **Priority Standards** | **Georgia Music Technology Standards**   1. [**MSMT**](https://case.georgiastandards.org/f3b94c72-9c0d-11e8-b85c-3b1a3079ae6e/c21b7f6a-fc09-11ea-8551-0242ac150004/1904)   **Georgia Computer Science Standards**   1. [**MS-CS-FCP-5**](https://case.georgiastandards.org/00fcf0e2-b9c3-11e7-a4ad-47f36833e889/4dc276d9-8539-43bf-8c78-a64012dd9276/579)Explore the relationship between computer hardware and software. |
| **Supporting Standards** | Georgia Music Technology Standards:   1. [**MSMTC6.CR.1**](https://case.georgiastandards.org/f3b94c72-9c0d-11e8-b85c-3b1a3079ae6e/0b28edda-fc39-11ea-a8d1-0242ac150004/1932) Generate musical ideas for various purposes and contexts.   Georgia Computer Science Standards   1. [**MS-CS-FCP-5.3**](https://case.georgiastandards.org/00fcf0e2-b9c3-11e7-a4ad-47f36833e889/a9d48c67-0ed0-4913-a20d-54c51ce4b4d8/582) Analyze and explain how computers communicate information with simple hardware inputs and outputs. |
| **Student Facing Goals** | Students will be able to...   * explain the difference between analog and digital recording as well as determine the benefits and restrictions of using both methods. * use digital media and resources to explore and gather information about how music technology evolved in the 20th century. |
| **Essential Question & Enduring Understanding** | **What sort of advances in music technology have occurred over the last century and what is their impact on music today?**  *The way that music is recorded, stored, shared, played, etc. has changed drastically over time.*  ***How* do Analog and Digital recording differ?**  *Analog recording uses methods that replicate the original sound waves, while digital recording takes samples of the original sound source at a specified rate.* |
| **Evidence of Learning** | **Formative:** Students will complete a worksheet that shows their understanding of different impactful music technology innovations throughout history. |
| **Materials** | Student worksheet |
| **Vocabulary** | * **Analog Recording:** Methods of recording that replicate the original sound waves. Methods of storing such as vinyl records or cassette tapes have the signal directly imprinted on them. * **Digital Recording:** Recording method that takes samples of the original sound source at a specified rate. This digital representation of the sound source can be stored on CDs or streamed online. * **Sampling:** Process of transforming a sound into a digital file. * **Sample Rate:** The number of samples of a sound that are taken per second for a digital recording in order to reconstruct the sound. |

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| **Resources** | |
| Student worksheet  Link 1: [Video](https://www.youtube.com/watch?v=hbEp1tavQH4&t=165s) (@ 2:45) comparing the sound of analog tape recording and digital recording (embedded in PowerPoint) |  |

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| **Teacher Preparation** |
| Familiarization with analog vs digital recording techniques if necessary ([example video](https://www.youtube.com/watch?v=844LQegRV-A) to use as primer). |

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| Lesson Implementation |

Lesson

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| **Engage / Explore: Making Connections Time: 5 Minutes  *Slide 4*** | |
| **Section Goal:** Discuss innovations in music technology that students have heard of or use daily. | |
| **Student Activities**   * Consider which parts of daily life have more to do with music technology than students may have originally considered. | **Teacher Activities**   * Lead a class discussion about instances of music technology present in daily life. If students are aware of any music technology innovations that have an impact on their life, allow them to share with their peers. Are students aware of the use of technology in their everyday lives? Do they feel that they benefit from the use of technology? Why/why not? |
| **Coding Connections: N/A** | |

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| **Explain: Understanding Time: 15 Minutes *Slides 5-12*** | |
| **Section Goal:** Students will learn about the difference between analog and digital recording. | |
| **Student Activities**   * Understand why analog mediums have been phased out in favor of digital recording. | **Teacher Activities**   * Discuss digital recording techniques. Highlight the following analog signal to digital recording pipeline: analog audio is input into the computer from a microphone (by being sampled at a specific rate), which then populates the DAW’s timeline as a waveform. * Show the video on slide 12 ([Link](https://www.youtube.com/watch?v=hbEp1tavQH4&t=165s) 1) to show the difference (or lack thereof) between the sound of digital and analog recording. Are students able to hear a difference between the two recording techniques? Which do they prefer? Can they think of any reasons why contemporary musicians and producers may be interested in analog recording technology? * Explain the pros and cons of analog and digital recording – consider the price of analog vs. digital recording equipment, the physical footprint of analog equipment (cassette recorder/reel to reel, mixer, microphone, etc.) vs. digital (a laptop, audio interface, microphone, etc.), maintenance of digital and analog equipment, as well as the overall sound quality of each technique. |
| **Coding Connections: N/A** | |

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| **Elaborate: Apply your Skills Time: 25 Minutes  *Slides 13-14*** | |
| **Section Goal:** Students will further their knowledge of music technology by investigating innovations from the last century. | |
| **Student Activities**   * Students will complete the worksheet provided (U1L2W) by researching the terms/innovations and determining whether they were hardware or software innovations (or both). | **Teacher Activities**   * Introduce the innovators and innovations independent activity. Allow students time to research music technology innovations and innovators and instruct them to fill out the supplied worksheet with relevant information; aid students in researching and finding sources if necessary. |
| **Coding Connections: N/A** | |

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| **Evaluate:** Assessment / Wrapping Up  **Time: 5 Minutes  *Slide 15*** | |
| **Section Goal:** Class discussion about findings. | |
| **Student Activities**   * Submit completed worksheet. * Participate in discussion about findings on music tech innovations. | **Teacher Activities**   * Guide class discussion on student findings. Offer topics such as which innovations are familiar to students and which are unfamiliar, which innovations led to more widespread impact in the music industry, etc. |
| **Coding Connections: N/A** | |