

Art & Humanities Music Standards (by grade 3)

CS Standards 1A(K-2) & 1B(3-5)

This document identifies cross-content connections in music and computer science instruction in grades K-2. Where possible, we have tried to identify opportunities for using CS to reinforce core concepts in music education, and for using music to reinforce key CS concepts.

For ease of use, these concepts have been organized into strands, aligned with PA music standards.

Strand #1: Production, Performance and Exhibition of Dance, Music, Theatre and Visual Arts

Emerging Theme: Music Production and Revision Process

How can CS support my students' understanding of creating and revising compositions? How do CS concepts like sequences, loops, and decomposition facilitate a deeper understanding of music composition?

9.1.3A

Know and use the elements and principles of each art form to create works in the arts and humanities.

Music: duration • intensity • pitch • timbre

Music: composition • form • genre • harmony • rhythm • texture

9.1.3B

Recognize, know, use and demonstrate a variety of appropriate arts elements and principles to produce, review and revise original works in the arts.

Music: sing • play an instrument • read and notate music • compose and arrange •improvise

9.1.3H

CS Concept: Algorithm & Programming

1A-AP-08 Model daily processes by creating and following algorithms (sets of step-by-step instructions) to complete tasks. (P4.4)

1A-AP-10 Develop programs with sequences and simple loops, to express ideas or address a problem. (P5.2)

1A-AP-11 Decompose (break down) the steps needed to solve a problem into a precise sequence of instructions. (P3.2)

1A-AP-14 Debug (identify and fix) errors in an algorithm or program that includes sequences and simple loops. (P6.2)

1A-AP-15 Using correct terminology, describe steps taken and choices made during the iterative process of program development. (P7.2)

1B-AP-11 Decompose (break down) problems into smaller, manageable subproblems to facilitate the program development process. (P3.2)

Demonstrate the ability to define objects, express emotions, illustrate an action or relate an experience through creation of works in the arts."	1B-AP-13 Use an iterative process to plan the development of a program by including others' perspectives and considering user preferences. (P1.1, P5.1)
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Emerging Theme: Material handling and safety	
<i>Concepts such as copyright and attribution, data privacy, and passwords and security can enhance student understanding of using safe practices in their work, including their use and handling of instruments and equipment.</i>	
9.1.3 H Handle materials, equipment and tools safely at work and performance spaces. • Identify materials used. • Identify issues of cleanliness related to the arts. • Recognize some mechanical/electrical equipment. • Recognize differences in selected physical space/environments. • Recognize the need to select safe props/stage equipment. • Identify methods for storing materials in the arts.	CS Concept: Impacts of Computing 1A-IC-18 Keep login information private, and log off of devices appropriately. (P7.3) CS Concept: Network & Internet 1A-NI-04 Explain what passwords are and why we use them, and use strong passwords to protect devices and information from unauthorized access. (P7.3) 1B-NI-05 Discuss real-world cybersecurity problems and how personal information can be protected. (P3.1) CS Concept: Algorithm & Programming 1B-AP-14 Observe intellectual property rights and give appropriate attribution when creating or remixing programs. (P7.3) CS Concept: Data & Analysis 1A-DA-05 Store, copy, search, retrieve, modify, and delete information using a computing device and define the information stored as data. (P4.2)

Emerging Theme: Utilizing Contemporary Technologies	
<i>Students use various traditional and contemporary technologies in both compositions and performance. CS teaches students how these technologies work, and how they can be effectively utilized.</i>	
9.1.3 J	CS Concept: Computing System

Know and use traditional and contemporary technologies for producing, performing and exhibiting works in the arts or the works of others. Know and use contemporary technologies (e.g., CDs/software, audio/sound equipment, polymers, clays, board-mixers, photographs, recorders).	1A-CS-01 Select and operate appropriate software to perform a variety of tasks, and recognize that users have different needs and preferences for the technology they use. (P1.1) 1B-CS-02 Model how computer hardware and software work together as a system to accomplish tasks. (P4.4) 1B-CS-01 Describe how internal and external parts of computing devices function to form a system. (P7.2)
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Strand #2: Historical and Cultural Contexts

Emerging Theme: New Technological development leading to New development in the arts and computing	
<i>Just like all technology, musical technology changes and develops with time. CS helps students explore how the adoption of new technologies has led to new developments in both computing and the arts.</i>	
9.2.3.C Relate works in the arts to varying styles and genre and to the periods in which they were created (e.g., Bronze Age, Ming Dynasty, Renaissance, Classical, Modern, Post-Modern, Contemporary, Futuristic, others). 9.2.3.E Analyze how historical events and culture impact forms, techniques and purposes of works in the arts (e.g., Gilbert and Sullivan operettas)	CS Concept: Impacts of Computing 1A-IC-16 Compare how people live and work before and after the implementation or adoption of new computing technology. (P7.0) 1B-IC-18 Discuss computing technologies that have changed the world, and express how those technologies influence, and are influenced by, cultural practices. (P7.1)

Strand #3: Critical Response

Emerging Theme: Utilizing Computing to collect, analyze and interpret data, evaluate and form judgments	
<i>How do we collect, organize, and present data to highlight relationships and support claims? CS gives students the tools to compare, analyze, and interpret data to form judgments.</i>	
9.3.3 A	CS Concept: Data & Analysis

Recognize critical processes used in the examination of works in the arts and humanities. • Compare and contrast • Analyze • Interpret • Form and test hypotheses • Evaluate/form judgments 9.3.3 F Know how to recognize and identify similar and different characteristics among works in the arts (e.g., Amish and Hawaiian quilts, Navaho weavings and Kente cloth from West Africa).	1A-DA-06 Collect and present the same data in various visual formats. (P7.1, P4.4) 1A-DA-07 Identify and describe patterns in data visualizations, such as charts or graphs, to make predictions. (P4.1) 1B-DA-06 Organize and present collected data visually to highlight relationships and support a claim. (P7.1)
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