

STEAMIntegration for Computer Science - Programming for 4-90 Year Olds

LearningOutcomes:

Programming languages

Popular databases

Popular frameworks

STEAMIntegration Activities for 4-90 Year Olds:

Science:

Hands-OnActivity:Build a computer out of cardboard and recycled materials, exploring the basic components and how they interact.

Real-WorldExample:Show learners how computers are used in scientific research, such as analyzing data from experiments or modeling complex systems.

Technology:

Hands-OnActivity:Use a block-based programming language (e.g., Scratch, Blockly) to create interactive stories or animations.

Real-WorldExample:Demonstrate how programming is used to develop mobile apps, video games, and websites.

Engineering:

Hands-OnActivity:Design and build a physical contraption that can perform a specific task, using principles of computer science (e.g., sensors, actuators).

Real-WorldExample:Show learners how programming is used in robotics, automation, and space exploration.

Arts:

Hands-OnActivity:Create digital artwork using programming tools, exploring concepts such as color theory and geometric patterns.

Real-WorldExample:Discuss how programming is used in digital art, film production, and graphic design.

Mathematics:

Hands-OnActivity:Use a programming language to solve math problems, such as finding the area of a triangle or calculating the probability of an event.

Real-World Example: Demonstrate how programming is used in financial modeling, data analysis, and cryptography.

Interdisciplinary Projects:

4-7 Year Olds: Create a storybook that combines programming elements (e.g., interactive characters, sound effects) with creative writing.

8-12 Year Olds: Design and build a smart city model that uses programming to control lights, traffic, and other systems.

13-18 Year Olds: Develop a mobile app that solves a real-world problem, incorporating programming skills, design principles, and user research.

19-90 Year Olds: Contribute to an open-source project that uses programming to address social or environmental issues.

Thought-Provoking Discussions:

Discuss the ethical implications of programming, such as privacy concerns and the potential for bias in algorithms.

Explore the future of programming and how it will impact various industries and aspects of society.

Discuss the interconnections between STEAM disciplines and how they contribute to the development of innovative solutions.