Unit 9: Coding in the Wild

Content Area: **Technology**
Course(s):
Time Period: **Marking Period 4**
Length: **10 blocks**
Status: **Published**

Course Description & Instructional Notes

Course Description

Students learn coding as it relates to music, art, games, and sports.

Prior Knowledge:

Retained knowledge from previous units

Instructional Notes:

This unit is mostly student-driven. Students are given four fields to explore coding further: sports, art, music, and game design. Teachers are expected to have less-structured lessons during this unit, instead promoting peer cooperation and freedom for students to design solutions to given problems. Teachers are expected to act more as a facilitator and guide students through the problem solving process as they tackle unusual or unexpected coding challenges. This unit is a good medium for teaching design thinking and collaboration.

Technology Integration:

Computer Science naturally integrates technology on a daily basis.

Enduring Understandings

Computer science is a field with far-reaching applications, including those fields outside of science, technology, math, and engineering.

Incorporating multiple perspectives through collaboration improves computing innovations as they are developed.

Essential Questions

How does coding apply to fields outside of computer science?

How does working collaboratively with others improve an overall project?

Student Learning Objectives

Students will be able to:

- Explore unusual applications of computer science, such as in sports, art, and music.
- Design and implement a program that might solve a problem, enable innovation, explore personal interests, or express creativity, either individually or in small groups.
- Present their program to an audience.

Vocabulary & Learning Experiences

Essential Academic Vocabulary

Loop, Condition, Break Down (Decompose), Constant, Magic Number, Programming Style, Top Down Design, Canvas, Counter, Return, Global Variable, Local Variable, Timer, Event, Precondition, Postcondition, Coordinate system, Randomize, Return Value, Animation, Callback Function, Parameter, Beats, URL, Music Visualization, chord, chord progression, Artificial Intelligence (AI), Meme, Collage, Filter, Color saturation, Contrast, Brightness, Inversion, Pop Art, Abstract Expressionism, Face Tracking, event handler, Image Filter, GIF, Scene, Copyright

Planned Learning Experiences

Explorations in Coding Modules: Sports, Art, and Music

Students will choose one or more of these modules to see how coding could apply in other fields. These modules are intended to inspire students to think outside of the box. These explorations are student-paced and interactive. The teacher will facilitate student progress and encourage brainstorming of ideas for the CYOP Project.

Resources

CodeHS

Code.org

Blown to Bits

Assessments

Formative Assessments

Benchmark Check in Tasks

Students will be given questions each day as they work on their CYOP to inform the teacher of their progress, reflect on the collaboration process, and determine goals for the next class.

Collaboration Team Meetings

Small student design teams will meet with the teacher to learn about different techniques to facilitate their progress to implement their design.

Summative Assessments

Create Your Own Program (CYOP) and Presentation

Students are expected to create an original functioning program to solve a problem, enable innovation, explore personal interests, or express creativity, either individually or in small groups. The program must run as intended, and the presentation must include at least one example of the code functioning properly. Students will also need to describe the overall purpose of the program, describe the functionality of the program, explain how the program implements coding techniques that improves its efficiency, etc., etc.

NJSLS Standards

NJSLS Standards Copied and Pasted as well as linked.

NJSLS Computer Science and Design Thinking

8.2.12.ED.1: Use research to design and create a product or system that addresses a problem and make modifications based on input from potential consumers.

8.2.12.ED.2: Create scaled engineering drawings for a new product or system and make modification to increase optimization based on feedback.
8.2.12.ED.3: Evaluate several models of the same type of product and make recommendations for a new design based on a cost benefit analysis.

8.2.12.ED.4: Design a product or system that addresses a global problem and document decisions made based on research, constraints, trade-offs, and aesthetic and ethical considerations and share this information with an appropriate audience.

8.2.12.NT.1: Explain how different groups can contribute to the overall design of a product.

8.2.12.NT.2: Redesign an existing product to improve form or function.

Additional NJSLS Standards

NJSLS Standards Copied and Pasted as well as linked.

Interdisciplinary Connections

NJSLS Career Readiness, Life Literacies, and Key Skills

NJSLS Companion Standards Grades 9-12 (Reading & Writing in Science & Technical Subjects)

9.4.12.CI.1: Demonstrate the ability to reflect, analyze, and use creative skills and ideas

9.4.12.CI.2: Identify career pathways that highlight personal talents, skills, and abilities (e.g., 1.4.12prof.CR2b, 2.2.12.LF.8).
9.4.12.CI.3: Investigate new challenges and opportunities for personal growth, advancement, and transition

9.4.12.CT.1: Identify problem-solving strategies used in the development of an innovative product or practice

9.4.12.CT.2: Explain the potential benefits of collaborating to enhance critical thinking and problem solving (e.g., 1.3E.12profCR3.a).
9.4.12.CT.3: Enlist input from a variety of stakeholders (e.g., community members, experts in the field) to design a service learning activity that addresses a local or global issue (e.g., environmental justice).
9.4.12.CT.4: Participate in online strategy and planning sessions for course-based, school-based, or other project and determine the strategies that contribute to effective outcomes.

9.4.12.DC.7: Evaluate the influence of digital communities on the nature, content and responsibilities of careers, and other aspects of society

Modifications/Accommodations

GENERAL CONSIDERATIONS FOR DIVERSE LEARNERS

English Language Learners	Students Receiving Special Education Services	Advanced Learners
- Personal glossary	- Small group/One to one	- Use of high level

- Text-to-speech

- Extended time

- Simplified / verbal instructions

- Frequent breaks

[WIDA Can Do Descriptors for Grade 9-12]

[WIDA Essential Actions Handbook]

[FABRIC Paradigm]

[Wall Township ESL Grading Protocol]

*Use WIDA Can Do Descriptors in coordination with Student Language Portraits (SLPs).

- Additional time

- Review of directions

- Student restates information

- Space for movement or breaks

- Extra visual and verbal cues and prompts

- Preferential seating

- Follow a routine/schedule

- Rest breaks

- Verbal and visual cues regarding directions and staying on task

- Checklists

- Immediate feedback

Students receiving Special Education programming have specific goals and objectives, as well as accommodations and modifications outlined within their Individualized Education Plans (IEP) due to an identified disability and/or diagnosis. In addition to exposure to the general education curriculum, instruction is differentiated based upon the student's needs. The IEP acts as a supplemental curriculum guide inclusive of instructional strategies that support each learner.

[Considerations for Special Education Students 6-12]

[National Center on Universal Design for Learning - About UDL]

[UDL Checklist]

[UDL Key Terms]

academic vocabulary/texts

- Problem-based learning

- Pre assess to condense curriculum

- Interest-based research

- Authentic problem-solving

- Homogeneous grouping opportunities

[Knowledge and Skill Standards in Gifted Education for All Teachers]

[Pre-K-Grade 12 Gifted Programming Standards]

[Gifted Programming Glossary of Terms]

Students with 504 Plan

Teachers are responsible for implementing designated services and strategies identified on a student's 504 Plan.

At Risk Learners / Differentiation Strategies

Alternative Assessments Independent Research & Projects Jigsaw

Choice Boards

Games and Tournaments

Group Investigations

Learning Contracts

Leveled Rubrics

Literature Circles

Multiple Texts

Personal Agendas

Homogeneous Grouping

Multiple Intelligence Options

Project-Based Learning

Varied Supplemental Activities

Varied Journal Prompts

Tiered Activities/Assignments

Tiered Products

Graphic Organizers

Choice of Activities

Mini-Workshops to Reteach or Extend

Think-Pair-Share by readiness or interest

Use of Collaboration of Various Activities

Think-Tac-Toe

Cubing Activities

Exploration by Interest

Flexible Grouping

Goal-Setting with Students

Homework Options

Open-Ended Activities

Varied Product Choices

Stations/Centers

Work Alone/Together