

Unit 2: Loops: Programming and Video Game Design

Content Area: **Computer Science**

Course(s):

Time Period: **Marking Period 1**

Length: **11 days**

Status: **Published**

BRIEF SUMMARY OF UNIT

In this unit, students will learn what a loop is and what loops can be used for within a computer program. Students will identify how loops are used in computer programs that they presently use and how we can use loops in real life. Students will practice creating and using loops in programs

STANDARDS

MA.9-12.1.2.12prof.Cr	Creating
MA.9-12.1.2.12prof.Cr2	Organizing and developing ideas.
MA.9-12.1.2.12prof.Cr3	Refining and completing products.
MA.9-12.1.2.12prof.Pr	Producing
MA.9-12.1.2.12prof.Re	Responding
MA.9-12.1.2.12prof.Re9	Applying criteria to evaluate products.
MA.9-12.1.2.12prof.Cn10	Synthesizing and relating knowledge and personal experiences to create products.
MA.9-12.1.2.12prof.Cn11	Relating artistic ideas and works within societal, cultural and historical contexts to deepen understanding.
SCI.MS.ETS1.B	Developing Possible Solutions
SCI.MS-ETS1-3	Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.
SCI.MS.ETS1.B	Developing Possible Solutions
CS.6-8.8.1.8.AP.2	Create clearly named variables that represent different data types and perform operations on their values.
CS.6-8.8.1.8.AP.3	Design and iteratively develop programs that combine control structures, including nested loops and compound conditionals.
CS.6-8.8.1.8.AP.4	Decompose problems and sub-problems into parts to facilitate the design, implementation, and review of programs.
CS.6-8.8.1.8.AP.5	Create procedures with parameters to organize code and make it easier to reuse.
CS.6-8.AP	Algorithms & Programming
WRK.K-12.P.4	Demonstrate creativity and innovation.
WRK.K-12.P.8	Use technology to enhance productivity increase collaboration and communicate effectively.
TECH.9.4.8.CI.2	Repurpose an existing resource in an innovative way (e.g., 8.2.8.NT.3).
TECH.9.4.8.CI.3	Examine challenges that may exist in the adoption of new ideas (e.g., 2.1.8.SSH, 6.1.8.CivicsPD.2).

TECH.9.4.8.TL.6

Collaborate to develop and publish work that provides perspectives on a real-world problem.

Programmers create variables to store data values of different types and perform appropriate operations on their values.

Multiple solutions often exist to solve a problem.

Programs use procedures to organize code and hide implementation details. Procedures can be repurposed in new programs. Defining parameters for procedures can generalize behavior and increase reusability.

Gathering and evaluating knowledge and information from a variety of sources, including global perspectives, fosters creativity and innovative thinking.

TRANSFER

- Write code for loops in various computer programming languages.
- Write different types of loops such as for, while and nested.

ESSENTIAL QUESTIONS

- How will the loop be designed (coded) to meet its purpose?
- Is a loop needed for the program?
- Does the loop serve its purpose?
- How can the loop be debugged?
- What is the purpose of different types of loops?
- What is the purpose of the loop?

ESSENTIAL UNDERSTANDINGS

- Loops are one of the basic logical structures of computer programming.
- We use loops in everyday life.
- Different types of loops have different functions.
- In the real world, almost everything is cyclical, and therefore runs in a loop.

STUDENTS WILL KNOW

- A loop is a way of making a program do something repetitive.
- Loops can be combined.
- Loops simplify programming instructions.
- There are different types of loops.
- There are loops that are coded to run continually.

STUDENTS WILL BE SKILLED AT

- Debugging loops.
- Determining a need for a loop.
- Writing the code for loops in various computer coding programs.

EVIDENCE/PERFORMANCE TASKS

Assessments

- Formative: Daily assessments using examples from class notes and CodeHS.com
- Summative: Teacher-created assessments/projects and CodeHS Computer Science Projects
- Benchmark: Check for understanding benchmark assessments on CodeHS
- Alternative Assessments: Student-centered activities such as a doorbell coding project, game design projects, and other activities involving real world applications
- [Activities/Assessments Folder](#)

Core instructional materials: [Core Book List](#)

Supplemental materials: Khan Academy

- Extend programs from the previous unit by adding loops.
- Using loops create programs to complete desired tasks.
- Students will complete coding exercises/projects in Khan Academy, Codehs, Scratch and other coding platforms.

LEARNING PLAN

- Create geometrical patterns using loops.
- Use a conditional loop in a program.
- Create a for, while, nested loop to draw an object.

MATERIALS

Core instructional materials: [Core Book List](#)

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Supplemental materials: CodeHS

<https://codehs.com/>

<https://codehs.com/uploads/4f269865fb15b6c2019aca33391b7464>

<https://www.khanacademy.org/computing/computer-programming>

- Codehs.com

SUGGESTED STRATEGIES FOR MODIFICATIONS

<https://docs.google.com/spreadsheets/d/1vYMnvzfcj-MbasIiUC38xuHWiyDFxOFXTBcccADZy8/edit?usp=sharing>