



Grade 4 - Unit 2 - Computational Thinking

Unit Focus

This unit is an introduction to the world of programming. This introduction places a heavy emphasis on understanding general concepts of computer programming that are universally applicable to any programming language. Students will learn about programming and its impact on society through a variety of hands-on activities. Through both unplugged and plugged type activities, students will have the opportunity to learn what constitutes a code, how to write code and test and debug code. In the PBA, students will be asked to write an effective algorithm in stacking solo cups.

Stage 1: Desired Results - Key Understandings

| Standard(s) | Transfer | |
|--|---|---|
| CSTA: Computer Science Standards (2017) 3-5 <ul style="list-style-type: none">Create programs that include sequences, events, loops, and conditionals. (1B-AP-10)Use an iterative process to plan the development of a program by including others' perspectives and considering user preferences. (1B-AP-13)Test and debug (identify and fix errors) a program or algorithm to ensure it runs as (1BAP-15) Connecticut Goals and Standards Computer Information Systems: 4 <ul style="list-style-type: none">Identify and explain programming structures. (CIS.6.1.B.1) NGSS/NSTA Science & Engineering Practices NGSS Science & Engineering Practices: 3-5 <ul style="list-style-type: none">Ask questions about what would happen if a variable is changed. (SE.3-5.1.1)Define a simple design problem that can be solved through the development of an object, tool, process, or system and includes several criteria for success and constraints on materials, time, or cost. (SE.3-5.1.5)Develop a diagram or simple physical prototype to convey a proposed object, tool, or process. (SE.3-5.2.5) Madison Public Schools Profile of a Graduate <ul style="list-style-type: none">Product Creation: Effectively use a medium to communicate important information. (POG.3.2)Self-Awareness: Examining current performance critically to identify steps/strategies to persist. (POG.4.1) | <i>Students will be able to independently use their learning to...</i> T1 Explore and hone techniques, skills, methods, and processes to create and innovate T2 Develop a product/solution that adheres to key parameters (e.g., cost, timeline, restrictions, available resources and audience). | |
| | Meaning | |
| | Understanding(s) | Essential Question(s) |
| | <i>Students will understand that...</i> U1 Algorithms are precise sequences of instructions for processes that can be executed by a computer or other operator, and are implemented using programming languages. U2 People write programs for computers to execute algorithms. U3 Programmers debug and revise their programs to improve the stability and efficiency of the program and end user experience. | <i>Students will keep considering...</i> Q1 How do I create a program? How can I make my program more efficient? Q2 How do I trace through the operation of my program to find out where the problem is? What is a possible fix? To what extent does that make the program/game run better? |
| | Acquisition of Knowledge and Skill | |
| | Knowledge | Skill(s) |
| | <i>Students will know...</i> K1 Vocabulary: Algorithm, program, bug, perseverance, debugging, | <i>Students will be skilled at...</i> S1 Write an algorithm. S2 Write basic code using a block language. |

Stage 1: Desired Results - Key Understandings

| | | |
|--|---|---|
| | frustrated, persistence, loop, repeat, iteration, conditionals, nesting | S3 Debug code using a variety of different strategies. S4 Use loops to code efficiently, using as few steps as possible to solve a problem. S5 Use conditional statements to provide flexible responses to events. |
|--|---|---|