

Algorithms & Programming: Program Development (3) Grade: 2

Standard 2.AP.PD.03

Develop and **debug programs** that include sequencing and repetition to accomplish a task, through the use of a **programming language** and/or **unplugged** activity.

Essential Skills

Develop an **algorithm** for a specific purpose and identify any **bugs** in the algorithm.

Implement a proposed fix for bugs in an algorithm and determine if the algorithm works as desired

Essential Questions

How do you identify an error in an **algorithm**?

What strategies can you use to correct an error in an algorithm?

Explanation

Students will try a variety of strategies to analyze, correct, and improve (**debug**) their **algorithms**, such as changing the sequence of steps, following the algorithm in a step-by-step manner, and trial and error. The algorithms should be a set of ordered steps that include at least one repeated sequence. Students should be able to describe what they are doing and why.

Think of this as similar to....

When you play a musical instrument, you have to keep practicing and correcting what does not sound right.

Implementation Examples—What would this look like in the classroom?

Title	Description	Link	Content Connection & Notes
Kidbot: Little Red Riding Hood	<p>Grade K--Using a grid with the symbols for Little Red Riding Hood and a house, students create algorithms to move Little Red Riding Hood to the house. When the students follow the algorithm, they will determine if the algorithm worked as expected and Little Red Riding Hood arrived home safely.</p> <p>Grade 1--For the algorithms that don't work as expected students analyze it step by step to find out why Little Red Riding Hood did not get home. They can fix the bug by trying a number of strategies, such as guess and check.</p> <p>Grade 2--Students identify where the algorithm is not working as desired and make the changes they feel are needed. They then test the new algorithm and make corrections as necessary. (a different story can be used as appropriate and relevant to what students are studying)</p>	Kidbot	This lesson also aligns with ELA.K.SL.6
Dancing Alone	<p>Grade K--Students are given a computer program in Scratch Jr. that programs the Scratch Cat to do a dance using motion blocks. The program has a ""bug"" and does not work as students are told that it will. Students identify if and where the cat does not do what they expected it to do.</p> <p>Grade 1--Students should identify the areas of code that did not work as expected and try to fix them.</p> <p>Grade 2: Students will create a computer program to make the Scratch Cat dance and identify anything that is not working as planned. They should determine what in the code is not working correctly and revise the code until it works as planned.</p>	Dancing Alone	This lesson also aligns with CS AP.V.01 , AP.C.01 , AP.PD.01 , and AP.PD.04 and is similar to Getting Loopy
Debugging in Maze	<p>Grade 2--Students are given code that does not work as intended. They have to identify the bugs, fix them and determine if the code works as desired. Students also look at code and predict if it will work as desired and have the opportunity to write and debug their own code.</p>	Debugging in Maze	

Standard: AP.PD.03 Grade: 2

These annotations are a collaboration between [Maryland Center for Computing Education](#) and the [Maryland State Department of Education](#).