Algorithms & Programming: Algorithms Grade: 1

Standard: 01.AP.A.01
Model daily processes and follow basic **algorithms** (step-by-step lists of instructions) to complete tasks verbally, kinesthetically, via a programming language, or using a **computing device**.

Essential Skills
Complete a new task as detailed by an **algorithm**.

Essential Questions
How can you create an **algorithm** for a common task?
Why is the order of the steps important in an algorithm?
Why is it important to be precise and accurate when creating an algorithm?

Explanation
Students should be able to follow **algorithms** for familiar tasks such as preparing simple foods and brushing their teeth and progress to following algorithms for tasks or outcomes with which they are unfamiliar. By grade 2, students should be able to compose algorithms independently. Initially, algorithms can be in the form of simple lists and flow charts. As students gain comfort with the concept, they should create algorithms using pseudocode and **computer programs**.

Think of this as similar to….
When you get dressed for school you probably put your clothes on in a specific order--for example you put your shirt on, then your pants, then your socks and finally your shoes.

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

Title	Description	Link	Content Connection & Notes
The Very Hungry Bee-Bot	**Grade K**--Students as a class or group use a paper version of the robot to find a path from a starting point to a target they have chosen on a shape mat. Following the algorithm the group created, they program a robot to reach the target. Once they find one successful path, students can find other paths between the starting point and target. **Grade 1**--Students program their robot and report where the robot ends up when given different algorithms to follow. They can also give details about the path (such as the robot traveled on the orange circle to arrive at the red triangle). Students should note that different paths can take the robot to the same target.	The Very Hungry Bee-Bot	This lesson also aligns to **CS** K.AP.V.01 and can be used with any robot, despite the title.
Back-to-Back LEGOs	**Grade 1**--Students describe a simple algorithm for assembling a LEGO structure. Each student sets up a work area with a partner so they are sitting back-to-back and cannot see each other's workspace. Each partner gets a bag of Lego pieces (both partners have the same pieces). They take turns building a structure and giving directions to their partners to build the identical structure.	Back to Back Legos	
Ruby's Algorithms	**Grade 1**--Students receive directions to complete tasks, beginning with familiar tasks. They are then given the algorithm activity map and given a starting place and an algorithm. They should follow the algorithm and determine where it should take them and notice where they end up after they follow the steps. They can give additional details, such as if they went over the bridge and/or through the river. **Grade 2**--Students create algorithms to complete familiar tasks. They then create algorithms for Ruby to visit her friends using the algorithm activity map.	Ruby's Algorithms	

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These annotations are a collaboration between Maryland Center for Computing Education and the Maryland State Department of Education.