

Standard: AP.A.01 Grade Band: K-2

Grade	Standard
K	Model daily processes and follow basic algorithms (step-by-step lists of instructions) to complete tasks.
1	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 .
2	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.

Grade	Essential Skills
K	Follow a sequence of instructions to complete a familiar task
1	Complete a new task as detailed by an algorithm .
2	Create an algorithm by describing or programming the steps to complete a task.

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.

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?

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

Grade(s)	Title	Description	Link	Content Connection & Notes
K	Fitness Unplugged	Grade K- Students are given or create 4 cards with different fitness exercises on them, along with a Go card and a card that tells them how to finish. They arrange the cards with the Go card first, the Finish card last and the exercises in any order. They then follow the sequence. They move over to the cards set out by a different group and follow those cards in sequence.	Fitness Unplugged	This lesson also aligns with Physical Education S1.G1.1
K	Little Red Hen	Grade K- Students listen to and/or watch a video of The Little Red Hen. Students then put the sequencing picture cards in the correct order to retell the story. (This can be adapted to a story of your choice)	Little Red Hen	
K-1	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 BeeBot	This lesson also aligns to CS K.AP.V.01 and can be used with any robot, despite the title.
1	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	

Grade(s)	Title	Description	Link	Content Connection & Notes
1-2	Ruby's Algorithms	<p>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.</p> <p>Grade 2--Students create algorithms to complete familiar tasks. They then create algorithms for Ruby to visit her friends using the algorithm activity map.</p>	Ruby's Algorithms	
2	Solve Problems	<p>Grade 2-- Write algorithms to solve addition and/or subtraction problems within 100. Different algorithms should be written to solve different types of problems (e.g., Add to/Result unknown and Add to/Change unknown). Students should be able to choose the appropriate algorithm for a given problem as well as to explain what strategy or strategies the algorithm uses arrive at the solution. It should be clear that we are looking for students to focus on a solution path for a story problem and not how to write an algorithm for basic addition and subtraction within 100.</p>		Math 2.NBT.B.5
2	Ninja Maze Challenge	<p>Grade 2--Students will write algorithms using motion blocks to move a character through four different maze challenges that focus on a combination of vertical and horizontal movement. Students then can create mazes that peers will solve. The lesson is written for use with Scratch Jr. but can be adapted to be done without a device.</p>	Ninja Maze Challenge	

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