**AP CSP CodeX**

| **LESSON: Algorithms #3** | | **Time: 45 minutes** |
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| **Project Goal:** Students will determine the result of code segments that have sequence, selection and iteration.  **Learning Targets**   * I can follow code with selection to control a robot. * I can evaluate multiple algorithms to determine which one leads to the correct result. * I can evaluate multiple algorithms to determine if they yield the same result. | **Key Concepts**   * The AP CSP multiple choice exam will have questions that involve robot code. This lesson builds on the previous algorithms lesson by introducing code segments with selection. * The selection will be CAN\_MOVE statements with a direction. This is a “yes” or “no” question. If yes, continue, if no, skip. * Students can make a little paper robot and label left and right to help them evaluate the code. | |
| **Assessment Opportunities**   * Algorithms #3 Activity Guide | **Success Criteria**   * Evaluate selection segments of robot code * Select algorithms that accomplish the task | |
| **AP CSP Framework**  **AAP-2.F** Evaluate expressions that use logic operators.  **AAP-2.H** Determine the result of conditional statements.  **AAP-2.I** Determine the result of nested conditional statements.  **AAP-2.K** Determine the result or side effect of iteration statements.  **Computational Thinking Practice 1.D** Evaluate solution options. | **Materials**   * Algorithms #3 slides * Algorithms #3 Activity Guide / Answers * Extra practice: Delta Math – Pseudocode Exercises Robot 1 and Robot 2 * Unit 4 Review and Test Questions | |
| **Teacher Notes**   * This lesson is best with partners or in groups of three. * This lesson is better on paper than digitally. I suggest printing the assignment for each group. * This lesson continues with robot code and adds iteration and iteration with selection to the algorithms. The AP CSP exam will have several questions with robot code. * With the selection, the robot has to make a choice. When a question is posed in the form of an if statement, the question is answered, but no action is taken. You may need to remind students of this. * The robot problems will also have iteration. It will be with a REPEAT loop, which is just slightly different than a WHILE loop. Some loops are infinite, and some have a specific number of times to repeat, like a FOR loop. * Students can easily confuse the robot left and right. Have them create a little paper robot and label the left and right on the robot. Then when it is time to turn, they will turn in the correct direction. It isn’t the student’s left or right, but the robot’s left and right. * Help students remember that turning left or right doesn’t mean moving. The robot just turns in the square. * An alternative to doing this activity on paper is to give students sheets of paper to use as squares on a grid. Lay out the squares on the floor and have one student be the robot and another student read the code. Physical activity is an excellent way to engage students and stimulate learning. | | |