**Lesson plan (# )**

| **Adopted from:**  **Authors: (Lee, Lauren, Barry, Scott)** | **Grade: 9-12** | **Lesson duration:** |
| --- | --- | --- |
| **Topic/Title of lesson:** | | |

| [**STANDARD(s) ADDRESSED**](https://www.nj.gov/education/cccs/2020/2020%20NJSLS-CSDT.pdf)  *(Include the performance expectation number and text of each standard.)* | **8.1.12.AP.3** |
| --- | --- |
| **CS PRACTICE(s)** *that students will engage in throughout the lesson.* P [13-15](https://www.nj.gov/education/cccs/2020/2020%20NJSLS-CSDT.pdf) of NJSLS |  |
| **CS CORE IDEA(s) or**  **SUB-CONCEPT(s)** *related to the performance expectation(s).* P [20-34,](https://www.nj.gov/education/cccs/2020/2020%20NJSLS-CSDT.pdf) includes core idea and performance expectations which are useful for designing general goals, specific objectives, and learning criteria down below | **Conditional structures allow algorithms to select different paths for instructions to accomplish their goals** |
| **CENTRAL FOCUS** *(The central focus is an overarching goal of the lesson or big idea for student learning.)* | *Using a robot problems to introduce, revisit, apply “if” statements to control the movement of a “robot” (real, virtual, paper-based)* |
| **EU/EQ** (*The enduring understanding(s) and/or essential question(s) that guide the lesson.)*  *Here are some useful examples from math:* [*https://jaymctighe.com/downloads/Essential-Questions-in-Mathematics.pdf*](https://jaymctighe.com/downloads/Essential-Questions-in-Mathematics.pdf) | **How can algorithms be used to improve accuracy, efficiency, and speed of task completion?** |
| **PRIOR KNOWLEDGE AND CONCEPTIONS** *(What prior knowledge, skills and/or academic language do these students need to have that will help them be successful with this lesson? Any misconceptions you may anticipate?)* | **Assumption/pre-condition**   * **understanding of what algorithms are** * **basic coding structures: variables, assignment instructions** * **basic understanding of if statements, conditionals, logic expressions possibly and, or, not** * **basic debugging skills / problem solving skills** |

**UDL/PLANNED SUPPORT**

*(Discuss the universally designed decisions guided by learner diversity and/or individualized adaptations for the variety of learners in your class/group who may require different strategies/support (e.g., children with IEPs or 504 plans, English language learners, children at different points in the developmental continuum, struggling readers, and/or gifted children).*

| **UDL:**  *How are you universally designing your lesson with all your learners in mind? What other characteristics of diverse learners should be considered?* | **Multiple means of** [**representation**](https://udlguidelines.cast.org/representation) | **Multiple means of** [**action and expression**](https://udlguidelines.cast.org/action-expression) | **Multiple Means of** [**engagement**](https://udlguidelines.cast.org/engagement/?utm_source=castsite&utm_medium=web&utm_campaign=none&utm_content=aboutudl) |
| --- | --- | --- | --- |
|  |  |  |
| **Additional ADAPTATIONS, MODIFICATIONS, and SUPPORTS for individual learners (IEPs, 504s, ELLs)** *If you were not able to meet your focus learners needs through UDL, what individual adaptations will you use to meet your focus learners needs (especially ELLS)* |  | | |

| **ACADEMIC VOCABULARY/**  **LANGUAGE (including different coding languages)/**  **SYNTAX (rules of how to combine symbols to make “correct” statements)** | *Vocabulary:*  *Language:*  *Syntax:* | *Describe the additional supports for each language demand in this lesson. Address both the whole class and individual needs.* |
| --- | --- | --- |
| **LEARNING OBJECTIVES** | **LEARNING CRITERIA** *(How will you know that students have met and/or are moving toward meeting that LO?)*  ***Students will be able to:***   * ***write “if” statements*** * ***write a collection of statements to accomplish the task*** * ***complete an algorithm to move the robot*** * ***Apply the skills to a new problem*** * ***Compare and evaluate different solutions*** * ***Demonstrate trouble-shooting/debugging skills*** * ***Apply in interactive development process*** | **ASSESSMENT** *(What will be the pre assessment, formative, or summative assessment(s) in this lesson?)*   * *Observation of code running(Project Performance)* * *Submission of code* * *Portfolio of work (process of troubleshooting)* * *Student created video (artifact)* |
| **Should include both core ideas and concepts, and practices** |  |  |

**MATERIALS, RESOURCES, and INSTRUCTIONAL TECHNOLOGY**

| **What resources and technology do you need to teach the lesson:** | **What materials, technology will students need?** |
| --- | --- |
|  | **Should reflect the UDL planned supports identified above** |

**INSTRUCTIONAL STRATEGIES AND LEARNING ACTIVITIES**

*(Describe explicitly what the teacher and the students will do to meet learning outcomes. Use bulleted or numbered list)*

|  | **What is the teacher doing?** | **What are students doing? (including adaptations)** |
| --- | --- | --- |
| **LAUNCH/**  **Beginning ( mins)**  *How will you engage students and capture their interest? 3-7 minutes* | **Present the Activity/Problem**   * **A “maze” is presented** * **The goal established** * **The available inputs identified** * **Demo of problem** | **Practice moving a robot**   * **Unplugged (on paper)** * **App** * **Student/Robot interactive pair** |
| **LEARNING ACTIVITIES/**  **Middle ( mins)**  *“I do” “We do” “You do” How will you explain/ demonstrate knowledge /skills required of each objective? How will you ensure that students have multiple opportunities to practice? How will you address the academic language demands?* | **Organizing Teams**   * depending on situation this activity could be cooperative (pair, team-based) or individual (introductory, unplugged)   **Research:** (Building Up Knowledge to Solve the Problem)   * Presenting students with a variety of sensors to detect the environment.   + IR sensor   + Touch Sensor   + Ultrasonic Sensor   **Planning:**  -Modeling making a flowchart and writing pseudocode  **Building:**  Directing students to alternate ideas when they need to troubleshoot  **Testing:**  **Improvements:** | **Research:**  ***For robotic applications***  -Students are testing sensors and the type of data/values that is being collected  -Students are practicing moving their robot at a wall and responding to the wall.  **Brainstorm:**  -Creating a [Morphological Chart](https://files.eric.ed.gov/fulltext/EJ1196286.pdf) of choices to sense walls, floor colors, shapes, Options of structures to use in code.  **Planning:**  -Creating a flowchart/pseudocode  **Building:**  -Converting the flowchart into text based code.  -Applying foreknowledge of algorithms.  -Pre-testing subsystems of the robot  **Testing:**  -Documenting Qualitative results of Performance  -Identifying Problems  **Improvements:**  -Applying changes in code to create an improved algorithm. |
| **CLOSURE/**  **End ( mins)**  *How will students summarize and state the significance of what they learned? 3-7 minutes* | **Present:**  -listening to students. providing feedback | **Present:**  -using technical terms  -explaining the logic of their system |
| **Extension/Reinforcement/Homework:** | | |
| **Family/Community Engagement—** | | |

**\* Please attach copies of assessments and/or handouts to be used**