**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**
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**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**
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| **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**