MODIFIED UBD LESSON PLAN

STEM 101

COURSE: Middle School		
UNIT: Electronics and Coding	**EXERCISE:** Programming a Friend	**TIME FRAME:** 1 Hour

---

🏛 **PREPARATION:** *Summary of "to do's" that the teacher should understand and prepare before bringing this lesson to the classroom.*

Teachers will need to ensure that the proper supplies are available for students.

Materials:

- Two cones or markers for start and end points
- Hula hoop or other obstacles to interact with
- Bandana or Blind fold
- Paper
- Pencil

Additional notes:
- Large room
- Obstacles

💻 **SAFETY:** *Summary of safety strategies in the lesson.*

Please use this space to describe safety procedures or highlights for this lesson.

S1 **DESIRED RESULTS:**

ESTABLISHED GOALS:

Problem Solving Techniques and Applications Standards:

Teachers should use the STEM Academy Standards Correlation System available in the STEM Connections area of a unit to extract specific standards and insert these standards here.

TRANSFER:
Students will be able to independently use their learning to…

- Accurately test and evaluate products through experimentation.

MEANING:

UNDERSTANDINGS
Students will understand that…

- The process and usefulness of experimentation
- Not all problems are technological, and not every problem can be solved using technology
- Technology cannot be used to provide successful solutions to all problems or to fulfill every human need or want
- The rudiments of programming

ESSENTIAL QUESTIONS
Students will keep considering…

- Why must problems be researched before they can be solved?
- How is following directions key?

ACQUISITION OF KNOWLEDGE AND SKILL:

Students will know...

- What the results of an experiment mean for the problem
- Information gathering
- Research and development

Students will be skilled at...

- Writing detailed instructions
- Breaking down a problem into simple steps
- Communicating with others to come to decisions

S2 EVIDENCE:

EVALUATIVE CRITERIA:	ASSESSMENT EVIDENCE:
• Graded Rubric	*Performance Task(s):* **Programming a Friend** Often, writing a program is less than straightforward. You have a task to accomplish, and the only way to tell a machine what you want is through a series of hard, unconditional commands. This system is very efficient once you get the hang of it though. A properly coded program for solving a maze, for example, could be used to solve any maze. Tedious tracing and retracing by hand become unnecessary, and computers are wickedly fast at performing tedious tasks. In this activity, you'll navigate a blindfolded friend through an obstacle course by using only simple commands. **Requirements:** 1. Use step by step instructions to lead a blindfolded friend through an obstacle course without hitting any obstacles (if possible) 2. Write down each step as your group decides it.
• Thoughtful, clear, thorough • Graded on accuracy, multiple choice questions • Completed on time	*Other Evidence:* • Online end of unit test • Self-reflection

S3 LEARNING PLAN: *Summary of Key Learning Events and Instruction*

Pre-Assessment:

Testing and Evaluating Pre-Test

Outline:

1. Introduce activity
   a. Have students listen as your discuss programming basics
   b. Stress importance of organization and teamwork
   c. Have students write down any additional directions you have about what they can use for obstacles
   d. Split students into groups of three

2. Brainstorm
   a. Supervise and assist in setting up obstacle course (nothing too difficult at the beginning)
   b. Have students discuss and write down ideas for their instructions

3. Test
   a. Students read the instructions out loud while the blindfolded student listens and navigates
   b. Students discuss and rewrite instructions until the blindfolded student can successfully make it through the obstacles
   c. Students should take turns being the speaker
   d. Allow more interesting setups and complex obstacles (step over, narrow regions, etc.)
   e. Let everyone have a turn being the blindfolded person
   f. Stop everyone and clean up the obstacle course

4. Communicate Results
   a. Have students read the reflections questions and write their answers in complete sentences

Student Procedure:

1. Once your teacher has divided you up into groups, decide which one of you will wear the blindfold, and have him or her put it on.
2. Then, set up the obstacle course with your desks, chairs, and anything else easily repositioned.
3. Send your chosen blindfolded friend through the maze as you give them instructions.
4. Repeat, changing the instructions until you make it through without hitting any obstacles (same blindfolded person).
5. Repeat the previous steps with a different blindfolded person and obstacle course until your teacher stops you.

After your teacher stops you, write down answers to the questions in Programming a Friend Design Brief in complete sentences.

Progress Monitoring:

The teacher will need to monitor student progress. Teachers should move throughout the classroom checking to see that students are keeping up with the lesson. After lecturing, the teacher should use students to help move students forward during the activity by sharing their expertise. Teacher may choose to post exemplars of student work for students to use who may have missed the lesson, missed some steps in the process, or may be struggling to keep pace with the class.

There's a lot of fear and intimidation surrounding technical coding, even for people who use computers day and night. Introducing it in a way people are familiar with is a great way for people to conquer that fear and embrace some of the more valuable strategies of breaking down problems and fixing them. Inventing new commands and innovating to refine them will be one of the core creative elements to this lesson. Make sure kids keep their voices down to avoid eavesdropping, as the learning happens for the inventors and innovators, not as much the copycats. Experimentation with different types of commands will be another focal point. Encourage diversity of thought and make sure both non blindfolded students are contributing during the main portion of this activity. If people are too enthusiastic about barking out orders, then they'll prevent themselves from learning about the importance of teamwork in finding solutions, as well as preventing their partner from trying out their own ideas. It may seem totally removed from actual programming, but this style of simple commands really is an accurate portrayal of what coding is. Make sure the reflection questions are answered honestly and sincerely.

DIFFERENTIATION: *Summary of Key Differentiation Techniques*

Please use this space to insert your differentiation techniques. Depending on the needs of students, various techniques might be needed in a classroom, therefore use the information below and experts in the area needed to design your plan for differentiation.

The ASCD Study Guide for Integrating Differentiated Instruction and Understating by Design: Connecting Content and Kids.
by Carol Ann Tomlinson, Jay McTighe

Integrating Differentiated Instruction and Understating by Design: Connecting Content and Kids.
by Carol Ann Tomlinson, Jay McTighe
ISBN-13: 978-1416602842
ISBN-10: 1416602844

Differentiating Reading Instruction
by Laura Robb.
ISBN13: 9780545022989

A Teacher's Guide to Differentiating Instruction
The Center for Comprehensive School Reform and Improvement

CAREER CONNECTIONS: *Summary of Career Opportunities Associated with this Lesson*

Please use this space to insert careers that might be connected to this lesson. This section will need continuous updating as new careers and emerging technologies change the opportunities available in the workforce.

Good sources for career connections:

Occupational Outlook Handbook
http://www.bls.gov/ooh

The National Career Clusters® Framework
http://www.careertech.org/career-clusters

🔑 KEYWORDS: *Please Insert Keywords from this Lesson with their Definitions*

Please use this space to insert keywords and their definitions
Use resources like dictionary.com to find definitions to your keywords