Lesson Plan: Human Robot Lego Building	Instructor: Kathryn Sutton
Is this a new topic? YES NO	Delivery Method: + In-Person Sync. Async.
Is this part of a series? YES + NO	Potential Delivery: Hybrid All Applicable
Duration:	Target Audience: K-2 Students

Description:
Students will be working in pairs and separated by a partition so that they cannot see their partner's structure. The students will be given identical sets of Lego blocks. The student who is the "programmer" will create a structure with their Lego blocks. They will then have to give directions to the "robot" student to replicate their structure. Once the student has completed the run of directions, they will remove the partition and compare buildings. Students will determine whether the directions worked or not. Students will then switch roles and try the activity from the other perspective.

Standards:
8.1.2.AP.1: Model daily processes by creating and following algorithms to complete tasks.

Objective:
-Students will be able to follow algorithms to fulfill the role of "robot" by following basic directions from the "programmer" literally just as a computer would to recreate a structure built using Legos.
-Students will be able to create algorithms to fulfill the role of "programmer" by giving the "robot" instructions on how to recreate a structure built using Legos.

Essential Question(s)
-How do computers know what to do?
-What is code?
-Why is it important to test your code and make sure that it is working properly?

Materials/Resources/Tech Requirements:
-Lego bricks, sorted into identical sets
-Poster boards or something to use as a partition

Session Outline:
-This activity is meant to be a beginner exercise in sequencing for students. At this point, students will have been taught that code is the set of directions that computers have to follow to function. They will be introduced to the activity and instructed on how to do it. Then, they will complete the activity. Once the activity is completed, the teacher will use their experience to teach students about how computers use algorithms to carry out tasks and the importance of accuracy in those algorithms.
Ground Rules:
-The goal is to have structures match brick-to-brick—including color
-They should refer to the Legos as "bricks" and remember to identify color and size (ie 2x4, 1x6)
-They cannot discuss with their partner, they may only use directions
Intro/Warm-Up:
-The teacher will have students discuss the question, "How do computers know what to do"
-This will pull any prior knowledge from the students on code and sequencing
Supported Practice:
-Students will be placed into pairs and be assigned either the role of "robot" or "programmer" to start.
-The students will sit opposite their partner, separated by the poster board
-The "programmers" will be given three minutes to come up with their Lego design (for older grade bands, more time could be given)

-Once the "programmers" have their designs set, they will begin giving their directions to the "robots". The "robots" will follow the directions of the "programmers" to the best of their ability.

-The building should take 10-15 minutes. The teacher will give a warning when students have about five minutes left, and again when they have about one more.

Explicit Instruction:

-The teacher will first take a few minutes to discuss the experiences of the students. The teacher will ask students if their Lego structures matched and what challenges they might have faced along the way.

-The teacher will talk about how computers follow algorithms–or sets of directions–in order to complete tasks and function. The teacher will use the students' experiences to discuss how errors in code can affect the overall outcomes

Conclusion/Action Items:

-Review student experiences and the ways that errors impacted the outcome

-Connect this to real life instances of errors in code

Interactive Activities:

-Building of the Legos

-This same principle could also be iterated using any building materials. This could be foam blocks, cups, furniture in a dollhouse, beads, or any physical manipulative.

Expected Outcome(s):

-Students will understand code as a set of directions and develop a set of directions on their own. This practice in delivering these directions will lead to their acknowledgement of errors in code as affecting the overall outcomes.