Lesson 3: Order Is Key

Powerful Ideas of Computer Science	Algorithms, Hardware/Software, Representation, Debugging
Powerful Ideas of Literacy	Sequencing, Alphabet and Letter-Sound Correspondence, Editing and Audience Awareness
PTD	Communication
Palette of Virtues	Curiosity, Patience
Children will be able to…	• Identify the importance of precision and order in step-by-step instructions
Vocabulary	• Algorithm: instructions for a computer to solve a problem in a particular order • Program: to give a computer a set of instructions • Programmer: A person who writes instructions for computers to tell them what to do • Programming languages: language used by computers
Teacher Preparation	☐ Read lesson plan. ☐ Print one copy per child of the Cut Out Words file and cut each word. Make sure to shuffle the sets but not mix them. ☐ Print Lesson 3 Design Journal for each child or have children's Full Design Journals on hand.

Warm Up

- **Did that Sentence Make Sense?** *(Suggested Time: 5 minutes)*
    - This activity is designed to demonstrate the need for order in languages.
        - Use cut out words of the sentence ("She sat the robot on the mat."), scramble them, and read out/have someone read the scrambled sentence (e.g, "The mat robot she sat on the.").
        - Ask children if this makes sense. Why or why not?
        - Ask children to put the words into the correct order. This means that each word should be after the one that should be before it.

        - Discuss that language needs to be in the right order to be understood.

Opening Tech Circle

- **What is an Algorithm?** *(Suggested Time: 5 minutes)*
    - Explain that with computers, language is used to tell it what to do.
        - Remind children about your discussion of human and robot languages in an earlier lesson.
        - Ask children to give an example of a question, a sentence, and an instruction in a language of their choosing.
        - When we give a list of instructions to a computer, we call this **programming.** This is why computer languages are known as **programming languages**.
        - We call the people who write these instructions **programmers.**
        - The list of steps that the computer follows is called an **algorithm.**
    - Collect examples of activities that need to be done in a certain order.
        - E.g., brushing your teeth, putting on socks and shoes.

Unplugged Time

- **Program the Teacher** *(Suggested Time: 10 minutes)*
    - Tell children that the teacher will now be the computer and they will get to program them! Remind them that they need to say all the steps in the right order!
    - Children will be responsible for verbally directing their teacher to special locations in the classroom (e.g., to a bookcase or a closet) or doing a task (e.g., making a sandwich).
    - The instructions the children give to the teacher must be specific. For example, children should not simply say, “Move forward.” They should instead say, “Move forward ____ steps.” Or “Put the peanut butter on the bread” should be “Open the peanut butter jar and use your knife to scoop the peanut butter onto the bread.”
    - When sequences of instructions do not work (perhaps because the number of steps taken were incorrect), children should alter their instructions.
    - Discuss how important it is to be specific and how important order is in programming.

KIBO Time

- **Order Matters** *(Suggested Time: 10 minutes)*
    - Show children the Begin, Forward, and End Blocks, and ask what they notice about the shapes of the blocks.
        - Talk about how the Begin and End Blocks can only be at the beginning and end of a program because they have either only a peg or hole.
        - Explain that if we give KIBO a program with these blocks in the wrong order, KIBO will be confused and not read the program.

- Show children the following two programs: “Begin, Forward, Shake, End” and “Begin, Shake, Forward, End.” Ask what they think the two programs will do differently.
  - Remind children of the importance of order within the steps of the program to explain to KIBO what to do.

Word Time

- **How-To-Book Design Journal** *(Suggested Time: 10 minutes)*
  - In the Lesson 3 Design Journal, children will write instructions for a younger sibling or friend who needs help getting ready to go to bed at night. Remind them they need to be specific and put all the steps in the right order, just like when they were programming the teacher!

Closing Tech Circle

- **Different How-Tos!** *(Suggested Time: 5 minutes)*
  - Ask for a few volunteers to share what they wrote in their Design Journal.
  - Discuss the differences between how-to-books as everyone gets ready to go to bed in different ways.