Algorithms Unplugged

Latest Draft Version Submitted by Melanie Mullikin Kara Bowcutt Terri Flock Kylie Hiser Will Burns Heather Osterman on 7/14/2022 11:01:40

OVERVIEW

Activity Overview: Students will be learning how to create a algorithm/sequence by giving set directions to their "bot" (another student) to go to a specific location inside a room or out in the playground. They may work in groups and take turns giving directions to their "bot" and rotate bots as they reach their destination.

Target Grade Level: K-2, 3-5

Target Subject: Computer Science

Notes for Educators: Instructors should know what an algorithm is and how simple block coding works.

Materials:

Micro:bit

OVERVIEW

PRE-TEST

OBJECTIVES

CATCH/HOOK

ACTIVITY INSTRUCTIONS
- Supplemental Activity Document

REVIEW

POST-TEST

STANDARDS
- CROSS-DISCIPLINARY
- COMPUTER SCIENCE
  - Domains:
  - Practices:
  - Specific CS Standards:

PRE-TEST

Successfully guide their "bot" to destination with no bugs and using no more than 10 "blocks"/directions.

OBJECTIVES

Students will be able to create algorithms to successfully guide their "bot" to designated location. Students will be able to create an algorithm with no more than 10 "blocks"/directions to reach their destination. Students will be able to debug their bot by discussing what errors were made in their algorithm and how to fix it.

CATCH/HOOK

Stand at a different spot in a room and close your eyes. Tell students to guide you to grab a pen from your desk.

ACTIVITY INSTRUCTIONS

After the hook, explain to students that the directions they gave is call in the computer science world, an algorithm which is a plan and/or a set of step-by-step instructions to solve a problem). Algorithms are not just in the CS world but also in real life such as getting ready for school, baking a cake, building Legos, etc.

Explain that students today will be forming into groups of 3, creating algorithms to guide their "bot" (another student). They will take turns giving directions and rotate "bots" as each reaches their destination. Tell them that they will run into errors know as "bugs" and their goal is to create an algorithm with no bugs by taking away a direction or adding something to fix it or squash the bug. Depending on grade level, they can write down directions on a white board or piece of paper, collaborating with their group on how to guide their "bot". For the younger group, they can write down arrows and each arrow and represent that amount of steps to take in that direction. (Ex: Three left arrows means to turn left and take three steps)

Their next challenge after that is to create an algorithm using no more than 10 blocks/directions. This can be done outside at the playground or inside and they must write out their algorithm before their bot can move. If there's no algorithm, bot cannot do anything.

If groups are done quickly, give them an extension where once the bot reaches their destination, have them do some specific type of movement (clapping, dancing, jumping etc.)

Supplemental Activity Document

WySLICE Lesson B copy - Melanie Mullikin.docx

REVIEW

Bring the class back together and ask them what is an algorithm and what is its importance. What is a bug? Why is the sequence or order so important? They will need to know this once they move over to the next lesson using Micro bits.

POST-TEST

Successfully guide their "bot" to destination with no bugs and using no more than 10 "blocks"/directions.

STANDARDS

CROSS-DISCIPLINARY

3-5.AP.C.01, 3-5.AP.M.01, K-2.AP.A.01, K-2.AP.C.0, K-2.AP.M.01

COMPUTER SCIENCE

Domains:

Computing Systems, Algorithms and Programming

Practices:

Collaborating Around Computing, Recognizing and Defining Computational Problems, Communicating About Computing

Specific CS Standards:

[WY]

AP.A, AP.C, AP.M

