Lesson: Algorithms & Computational Thinking

Big Picture

The purpose of this lesson is to define algorithms. Algorithms relate to the goals of this class in that they are a tool used for problem solving.

Objectives

Students will be able to:
- Define the term algorithm
- Identify steps in an algorithm
- Create a simple algorithm

Alabama Standards Alignment

5: Discuss the efficiency of an algorithm or technology used to solve complex problems.

Links to Resources

For Instructor:

Algorithm Definition - https://simple.wikipedia.org/wiki/Algorithm

Algorithm PowerPoint - lesson-5_slides.pptx

For Students:

Real life algorithms (1:57) - https://www.youtube.com/watch?v=FHsuEh1kJ18&feature=youtu.be

Intro to algorithms (5:27) - https://www.youtube.com/watch?v=CvSOaYi89B4&feature=youtu.be

What is an algorithm (4:35) - https://www.youtube.com/watch?v=e_WfC8HwVB8

Preparation

Review the Algorithm PowerPoint presentation and Algorithm Videos.

Materials Required

N/A

Vocabulary and Concepts
- Algorithm: a step-by-step procedure for solving a problem or accomplishing a task.

Teaching Guide

Getting started (10 mins)
  Start the lesson with the Algorithms PowerPoint (lesson-5_slides.pptx). The slides define algorithm and encourages students to think of daily activities that can be viewed as an algorithm. The last slide(s) has a mathematical algorithm to follow to determine the total price of an item considering a discount percentage and the tax rate. Encourage the students to work the problem out step-by-step before revealing the answer.

Videos (15 mins)
  Now, we will watch a few videos that will further explain how algorithms are used. Links to the videos can be found in the "Links to Resources" section above listed for students. The first video is a real-life algorithm video (1:57). The video shows students working through the process of planting a seed and shows the process of making chocolate in a factory. The second and third video shifts the tone to algorithms in computer science. The second video is the introduction to algorithms video (5:27), and the third video is the "what is an algorithm?" video (4:35). Both videos focus on algorithms used in technology.

Wrap Up (5 - 10 minutes)
  After watching the videos, encourage the students to think of other uses of algorithms in technology (e.g. mobile devices, gaming consoles, etc.). How might those algorithms work? How would you describe some of the steps that may go into these algorithms? The purpose behind this is to make students use critical thinking skills to apply this new concept of algorithms.