Python with Robotics
AP CSP Curriculum

Unit 2 Overview

Time Required: 2 ½ to 3 weeks

This unit covers Mission 4 and Mission 5. It includes three supplemental lessons to extend learning and prepare for the AP Exam and Create Performance Task.

Unit Outline

Lesson: Design Process and Flowcharts

This lesson goes over the software design process, using the remix project as an example. It then introduces common flowchart symbols and has students create flowchart for everyday activities.

Mission 4: Animatronics

This mission has 12 objectives and covers a lot of material. It is divided into 2 lessons. Each lesson has an assignment and Kahoot! Review. Students use lights, button presses, sound and movement into a real-world project. They will be guided to follow an algorithm and use functions during code creation.

Lesson: Algorithms #1

Algorithms and evaluating code segments is an integral part of AP CSP. One way students are asked to evaluate code is by moving a robot on a grid. This lesson introduces “robot code” and gives students practice with basic sequential algorithms.

Mission 5: Fence Patrol

This mission has 9 objectives, and they are divided into 2 lessons. The mission has 2 assignments and one Kahoot! Review. This mission introduces the CodeBot’s line sensors: how to read them and use the data to control the CodeBot. Additional materials are needed for this mission. For the first lesson, students use the test surfaces document to read the sensor values on different shades of gray. For the second lesson, students will want a flat white surface, like poster board, with a clear black line as a border. Electrical tape works well for a black line.

This mission includes the presentation “Analog and Digital”

Presentation: Analog and Digital

This presentation gives basic information on the difference between analog and digital data and how it can be represented with a computer. It does not have an activity guide, but is used at the beginning of the first Mission 5 assignment.

Algorithms #2

This lesson gives students more practice with robot code, using algorithms that include selection.

Unit 2: Review and Remix

A remix is an opportunity for students to create their own program from what they learned in the previous missions. A remix can be treated like a practice Create PT. They start from scratch and will not have CodeTrek to guide them. Students can use the planning guide to help them plan and organize their project. During the remix time, you can also review vocabulary and programming concepts from the unit.

Unit Resources

Use these resources throughout the unit. You can add to the documents as needed.

- Unit 2 CodeBot Python Code (by mission)
- Unit 2 Vocabulary (by mission)
- Unit 2 Review and Test Questions
- Test surfaces document

Assessment

Student mastery can be assessed formatively and/or summatively in many ways during Unit 2.

- Use journal entries, daily reflections, or exit tickets as formative assessment.
- Each mission lesson comes with an assignment for students to complete.
- Each supplemental lesson comes with an activity guide for students to complete.
- Mission 4 has two Kahoot! Reviews available, and Mission 5 has one Kahoot! Review.
- Mission 4 and Mission 5 each have a finished program that can be used for assessment.
- The Unit 2 Remix project can be used for assessment.
- AP CSP Create Performance Task written response prompts can be assigned as part of the remix assignment for additional practice and/or assessment.
- Unit 2 Kahoot! Reviews for vocabulary and coding questions are available.
- Microsoft Forms tests for Unit 2 vocabulary and coding questions are available.
- The reviews and tests cover Missions 4-5 only. Additional questions have been added to the questions resource document that cover topics from the supplemental lessons.

Materials / Preparation

- The assignments are best distributed and completed digitally. Prepare the assignments in the digital format that works best for your classroom.
- The slides for the lessons are downloadable as PowerPoint slides. Reformat into the digital format that works best for your classroom.
- Make sure you have CodeBots, AA batteries and cables for the students. Two students can share a CodeBot and work in pairs, or you can have 1 to 1 CodeBots.
- For Mission 5, students need the test surfaces paper and a white poster board with black electrical tape to use as a fence.