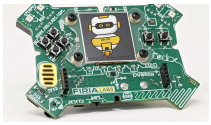

Python with CodeX
AP CSP Curriculum

Unit 2 Overview

Time Required: 2 ½ to 3 weeks

This unit covers Mission 6, Mission 7 and Mission 8. It includes five supplementary lessons, which extend learning and prepare for the Create Performance Task and AP Exam.

Unit Outline

Lesson: Design Process and Flowcharts

This lesson gives a quick overview of the design process, which they used for the first remix. It then expands on the planning phase with flowcharts. Basic symbols are introduced, and students practice creating a flowchart from an everyday activity. This is an unplugged lesson that can be done with or without computers. It is an excellent lesson for collaborative groups.

Lesson: From Code to Flowcharts

This lesson continues the previous lesson, this time with Python code. A couple of examples with Python are given that can be used for instruction and discussion. Then students are given Python programs and asked to create flowcharts for them. This is an unplugged activity, which is excellent for collaborative groups.

Mission 6: Heartbeat

This mission is divided into two lessons. During this mission students animate a beating heart and learn the power of loops. They also learn about updating variables (incrementing and decrementing) and getting input from button presses. The last objective ends the code with a possible runtime error. Part two of the mission resolves the possible runtime error and adds functions to the program.

Mission 7: Personal Billboard

This mission is divided into two lessons. During this mission students will display pre-loaded bitmap images, colors and text while learning about lists. They will use button presses to scroll through the list and avoid an index out of range error. Part 2 includes extensions to the mission for adding functions and other options to the code.

Lesson: Lists

This lesson has two parts. Mission 7 introduces a list in Python. These unplugged lessons let students practice tracing code that includes lists. They practice appending elements, accessing elements, and removing elements from a list. Each activity guide ends with wrap up questions that will check their understanding of lists and give them individual practice. These lessons are unplugged and do not require a computer. They are excellent lessons for collaborative groups.

Mission 8: Answer Bot

This mission also uses a list to display text. Students import and use the random library to select a random number for the index, and select a random element from a list. The assignment includes extensions to the mission for adding functions and other options to the code.

Lesson: Lists with Images

This is an optional lesson, but one that is engaging to students and recommended. Students learn how to add their own JPG images to the CodeX and then write code to display them on the screen. First students need to prepare the images to the right size and compression. Then upload them to the CodeX. Finally, create a list of the image names and write code to display them, similar to the Answer Bot program.

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.

Assessment

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

- Each mission lesson comes with an assignment and program for students to complete.
- Each supplemental lesson comes with an activity guide for students to complete.
- The mission lessons also have Kahoot! Reviews available.
- 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 the missions in CodeSpace only. Additional questions have been added to the Unit 2 Question Bank that cover topics from the supplemental lessons.

Materials / Preparation

- The assignments and most activity guides 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 CodeX, AAA batteries and cables for the students. Two students can share a CodeX and work in pairs, or you can have 1 to 1 CodeX devices.
- The “Design Process and Flowcharts”, “From Code to Flowcharts”, and “Lists” lessons all have problem sets for printing that collaborative groups can use. Plan in advance to have them printed if students are working collaboratively without their computers.
- The “Lists with Images” lesson requires students to format their images. A free online photo editor is recommended. If you plan to use it, make sure it is not blocked at your school. Practice with the photo editor in advance, and with uploading images on the CodeX, before giving this lesson.