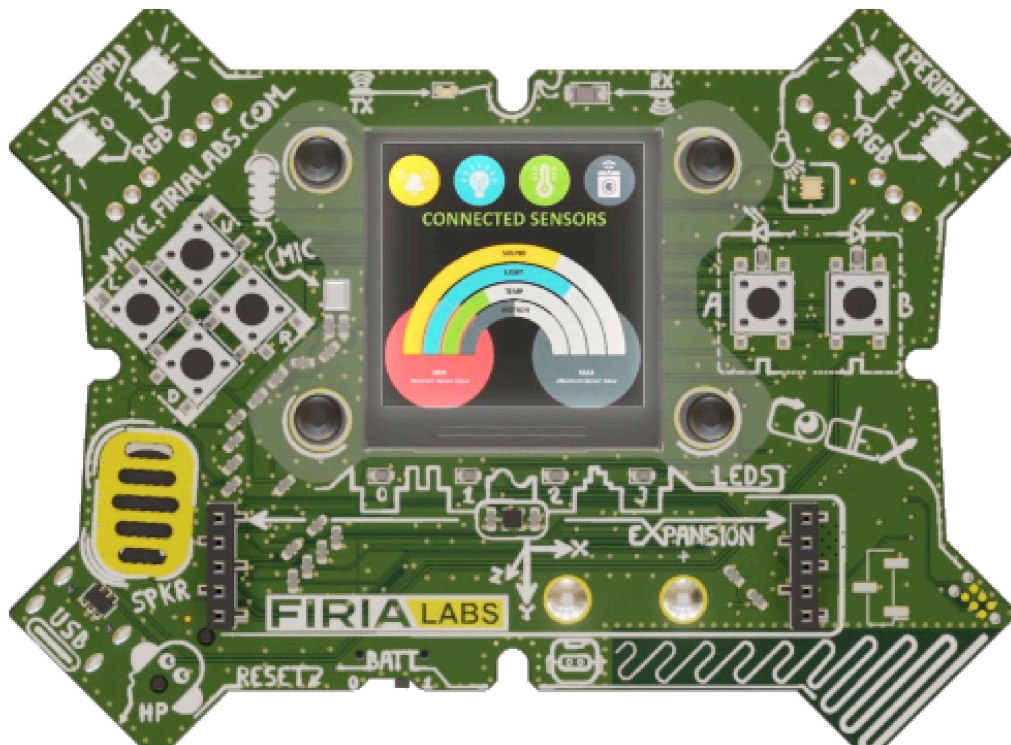# FIRIA LABS

# Curriculum Guide
## *PREVIEW*



# Mission Pack:
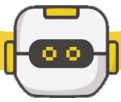# Python *with* CodeX

**CodeX™ Python CodeSpace Course**

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# Python with CodeX Overview

Introducing CodeX, an entry-level physical computing device for a gentle introduction to Python programming. CodeX features built-in graphics, sensors, sound and more in a rugged, expandable one-piece design. Compatible with Chromebook, PC and Mac, this curriculum offers missions for elementary, middle and high school students that can drop-in to elective courses, Computer Science 1, CTE and AP Computer Science Principles.
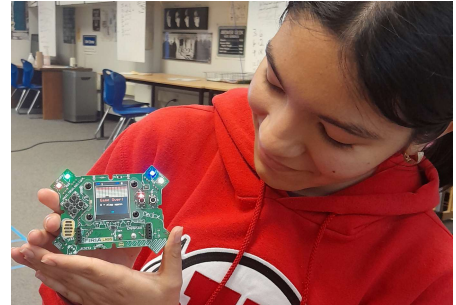
The Python with CodeX curriculum is easily adaptable for elementary students starting in fourth grade up through high school and beyond. The missions can be completed as part of a unit in an elective, during an after-school club, or as a one- or two-semester elective course in middle or high school. The mission pack course covers the fundamentals of Python programming as students apply each new coding skill and concept to engaging projects with **CodeX**.

The time required, or pacing calendar, is up to you! You can spend as little as a few weeks just completing a subset of the missions. Or for a more complete experience, include remix projects and additional lessons for students to apply their knowledge and newly gained skills that can last a semester or full school year. No prior coding experience is required! CodeX puts the focus on coding, with built-in sensors and  programmable controls for *endless* projects and learning opportunities.

### Pre-Mission Work (1 - 5 hours)

Build a foundation for programming by utilizing some unplugged activities. If your students come with no Computer Science background, it is important to start by building a foundation of computational thinking. Dedicate some time for students to learn basic terms, such as algorithm, program, and debug. See the Firia Labs collection of Unplugged Activities at https://learn.firialabs.com/curricula/cs-unplugged.

### Getting Started (Mission 0)

When you are ready for your students to start the CodeX missions, you will need to set up a class for them in CodeSpace and give them a join code.

Use these resources in the Teacher Resources materials on the learning portal.

- A - Lesson Prep Getting Started
- Getting Started Slides
- Getting Started Workbook
- Teacher Dashboard in CodeSpace

# Unit 1: Getting Started  (8-20 hours)

Students will learn about the programming environment, the CodeX, and basic commands for programming the CodeX using Python. Students start by turning on the RGB pixels, then displaying images on the LCD and finally by playing mp3 files.

### Mission 1 Welcome:

Take a tour of the CodeSpace Development Environment. Students create an account and join the class to access the curriculum. The mission will let them become familiar with CodeSpace.

### Mission 2 Introducing CodeX:

An introduction to CodeX where you get your device connected and run some code! Students first learn about CodeX in the simulation. Then they connect the device and right some code.

### Mission 3 Light Show:

This project introduces the CodeX pixel LEDs, variables and the sleep function. Students will learn about built-in colors and turn on the pixels in different colors and in different patterns. An optional extension is to create your own colors using RGB values. If time permits, a remix is provided.

### Mission 4 Display Games:

Learn some CodeX display basics and create your first game. Students learn how to display built-in bitmap images, as well as text. They will convert integers to strings. Students will also learn about the buttons on CodeX and how to program them to do something, like input for a game.

### Mission 5 Micro Musician:

Play music and sounds with the CodeX and learn about code readability. Students learn how to play a built-in mp3 file. They also learn about using comments and blank lines to enhance code readability.


**Preparation and Materials:**

- Create a class on the teacher dashboard.
- Students need a computer / laptop with the Chrome web browser.
- Make sure the students can successfully login to http://make.firialabs.com,
- Students create a student account and join the class with the code.
- Each student (or pair) needs a CodeX and connecting USB cable.
- Headphones are optional if you don't want to hear all the music files.


**Assessment:**

| | | | |
|---|---|---|---|
| Mission 1-3 Review Kahoot | Mission 4 Review Kahoot | Mission 5 Review Kahoot | |
| U1 Vocab Review Kahoot | U1 Coding Review Kahoot | U1 Vocab Test (MS Form) | U1 Coding Test (MS Form) |

**Standards addressed in this unit:**

| CSTA Standards Grades 6-8 | CSTA Standards Grades 9-10 | CSTA Standards Grades 11-12 |
|---|---|---|
| <ul><li>2-CS-03</li><li>2-AP-10</li><li>2-AP-11</li><li>2-AP-13</li><li>2-AP-15</li><li>2-AP-16</li><li>2-AP-19</li><li>2-IC-20</li></ul> | <ul><li>3A-CS-03</li><li>3A-AP-13</li><li>3A-AP-16</li><li>3A-AP-19</li><li>3A-AP-21</li></ul> | <ul><li>3B-AP-16</li><li>3B-AP-17</li><li>3B-AP-21</li><li>3B-AP-22</li><li>3B-AP-23</li></ul> |

| Mission 1: Welcome | Time Frame: 30-60 minutes |
|---|---|

| **Project Goal:** Students will learn about the CodeSpace learning environment. <br><br> **Learning Targets** <br> ● I can **navigate CodeSpace**. <br> ● Identify major parts of the Codespace interface: Mission Bar, Objective Panel, text editor, CodeTrek, Toolbox, and Lesson Navigation Controls | **Key Concepts** <br> ● **Follow instructions** in the Lesson Panel carefully. There is a lot of important reading! <br> ● Look for "**tool icons**" to collect tools in your Toolbox as you go. |
|---|---|
| **Assessment Opportunities** <br> ● Quiz after Objective 4. <br> ● Print a picture of CodeSpace and have students label the parts. | **Success Criteria** <br> ☐ Navigate CodeSpace <br> ☐ Identify major features of the CodeSpace interface: Editor panel, Lesson panel, Toolbox, CodeTrek, Hints |

**Teacher Resources**
- Use the Mission 1 Lesson Prep for a planning guide, more ideas, suggestions, and teacher notes.
- Teacher resources include student assignment Log, Slides, Workbook, and solutions

**Vocabulary**
- **Browser**: Software that displays web pages
- **Cloud:** A place to save files and data through the Internet
- **Objective:** The steps in the mission; has a goal to accomplish
- **Text editor:** Where you type the code
- **Code:** Instructions to the computer
- **Toolbox:** A place in CodeSpace to keep information you learn about programming concepts so you can use it later when you need the information
- **Debugging:** The process of understanding what the computer is actually doing and then changing the code to do what you want it to do

**Real World Applications**
Programmers need to use some type of text editor to create their code. CodeSpace is an IDE, or integrated development environment. It is patterned after other popular IDEs.

**Teacher Note:**
- This lesson is the first lesson in all the mission packs. If your students have completed other mission packs with other physical devices, they will already know the information. You can choose to have them complete the mission as a review and refresher, or you can unlock the next mission.