LESSON: CodeX Check-In Project

Time: 45 minutes

Overview:

This is an easy coding lesson that can be done near the beginning of the school year to introduce coding and the CodeX. The check-in program can be used for students' overall mental health or for how they are doing with the daily lesson.

This lesson will enable students to indicate their mental health, or their productive struggle, by filling the CodeX screen with a color. It can be a quick way to "check-in" with your students to see how they are doing, and a safe way for students to share their mental health. A check-in can be done at the beginning of class, at the end of class, or anytime during class.

Coding Objectives:

- I can import a library.
- I can use print statements to display text on the screen.
- I can fill the display screen with a pre-defined color.
- I can code a button press.
- I can use an infinite loop to wait for a button press.
- I can break out of a loop.

Grades 6-8 CS Standards:

2-CS-03 Systematically identify and fix problems with computing devices and their components.

2-AP-12 Design and iteratively develop programs that combine control structures, including nested loops and compound conditionals.

2-AP-19 Document programs in order to make them easier to follow, test and debug.

Grades 9-10 CS Standards:

3A-CS-03 Develop guidelines that convey systematic troubleshooting strategies that others can use to identify and fix errors.

3A-AP-13 Create prototypes that use algorithms to solve computational problems by leveraging prior student knowledge and personal interests.

3A-AP-16 Design and iteratively develop computational artifacts for practical intent, personal expression, or to address a societal issue by using events to initiate instructions.

3A-AP-21 Evaluate and refine computational artifacts to make them more usable and accessible.

Grades 11-12 CS Standards:

3B-AP-16 Demonstrate code reuse by creating programming solutions using libraries and APIs.

3B-AP-17 Plan and develop programs for broad audiences using a software life cycle process.

Preparation:

- Download slides
- Be familiar with the final code
- Read through the teaching guide

In the folder:

- CodeX Check-in project slides
- CodeX Check-in final code
- Radio: check-in code for teacher and student

Agenda:

- Warm-up (5-10 minutes)
- Complete program using slides (30 minutes)
- Optional: Wrap-up (5 minutes)

Teacher Notes:

- This lesson is designed as a class project, with students creating their own programs. As a class, you should make decisions on the moods to check for and the color of each mood. Alternatively, you can decide on the moods and colors and modify the slides for your specific class moods/colors.
- Almost all mistakes made by students are typing mistakes. If students get errors when they run their code, first look over the code for spelling, punctuation and indenting.

Note for teachers with a special needs student:

- A radio signal can be used for a student to send his/her mood directly to your CodeX. You can respond back to the student so he/she knows you received their signal.
- Code for the teacher CodeX and student CodeX are included (checkin_teacher and checkin_student).

Extensions:

- Make the starting menu more interesting.
- Make the starting menu a function and call it more frequently than just once at the beginning.
- Light up the 4 NeoPixels as well as the display.
- Add text to the display screen as well as a color.
- For color blind students, consider using shades of grays or text. The text can display larger on the screen using the scale keyword argument.
- The “while True:” loop can be nested inside another while True loop so students can pick a different mood without having to restart the code.
- Use bitmap images for the moods.
- After a lesson on Pixel Art, modify the bitmap images for the different moods and use them in the code.
- Learn about JPG images. Use some for the moods instead of colors.

Cross-curricular Connections:

- **LANGUAGE ARTS:** Have students write about their coding experience.
- **LANGUAGE ARTS:** Have students write about mental health or social-emotional learning. Students could also write about their learning styles and how they learn best.
- **SCIENCE:** The program uses red, green and blue lights to form colors. Have a lesson about light.
- **SEL / MATH:** Students can keep track of their daily emotions or how well they are doing with each lesson. They can graph the results, or look for cause and effect.

Teaching Guide

Warm-up (5-10 minutes)

This warm-up is to discuss mental health with students and let them decide on which emotions they want to share with the teacher, and assign a color for each one. (You can use slides 4-6 as part of the warm-up.)

💡 **Teaching tip – warm-up**

- Talk about feelings and/or mental health, as appropriate for your grade level and students.
- Make a list of emotions on the board.
- Have students pick five or six emotions they might have at school and want the teacher to know about.
- Tell the students that you will use the CodeX to communicate their mood. Assign each of the emotions a button on the CodeX. The buttons are Up, Down, Left, Right, A and B.
- The CodeX will communicate their emotion with a color. Assign each emotion a specific color.
  - The pre-defined colors for the CodeX all use CAPS
  - BLACK, BROWN, RED, ORANGE, YELLOW, GREEN, BLUE, PURPLE, GRAY, WHITE, CYAN, MAGENTA, PINK, LIGHT_GRAY, DARK_GREEN, DARK_BLUE
- These instructions are on slides 4 and 5.

Create/Run the Program (30 minutes)

💻 For this project, it is best if each student has his/her own CodeX. They will create their own program and can use it any time throughout the class period to communicate how they are doing.

💡 **Teaching tip:**

This project is not included in CodeSpace. Download and follow the slides. They include step-by-step instructions as well as code snippets to guide students through the program code creation.

You can have students complete the project one of two ways:

- Show the slides on a large screen or monitor and have the class work on each step together. This is a fairly short program, so keeping the class together and letting them help each other is preferred.
- Give the slides to the students and let them work through the instructions at their own pace.

Students should already have an account in CodeSpace.

💻 **Slides 1-2**

Students get into CodeSpace to create their program. They can click on the sandbox icon to complete the program. There are no instructions in CodeSpace.

💻 **Slide 3**

Students become familiar with the buttons on the CodeX. They need to know what they are called and how they are named in code.

💻 **Slide 4-6**

The emotions and colors are chosen. If you did the warm-up, you can just review. Or use the slides for the warm-up.

💻 **Slide 7-8**

Students log in to CodeSpace and go to the Sandbox. They begin their program by starting a new file and importing the codex library.

💻 **Slides 9-10: Step 1 and Step 2**

Students use display.print() statements to display a menu of emotions. They can add color for each emotion. This slide and step is optional if you don't think it is appropriate for your students.

💻 **Slides 11-12: Step 3 and Step 4**

Students use an infinite while loop to "wait" for a button press. They program one button press to see if it works correctly before moving on to the next step.

- The code involves a lot of indenting. Have the students be very careful with this. If they use a colon at the end of the while loop and if statement, pressing enter will go to the next line and indenting will be correct.

💻 **Slide 13**

Run the code and test for one button.

- This is the time to debug any typing errors.
- Once the code for a single button press is correct, students can copy and paste the code in the text editor and just make changes for the button and color.

💻 **Slides 14-15: Step 5**

Students add code for the remaining buttons.

- Students can copy and paste code in the text editor, and just change the button and color.
- Indenting is very important! Slide 15 shows finished code, with the proper indenting.

💻 **Slides 16: Finished!**

Students can test their code. Whenever you want to check in on your students (at the beginning, during or at the end of a lesson) ask students to run the program and press the button for their mood. They should put the CodeX in clear view of the teacher so you can do a quick scan of the room and see the mood for each student.

Wrap-up / Optional (5 minutes)

💻 You can wrap-up this project in a variety of ways, depending on your students and your classroom procedures.

- Students can fill out a journal entry about their experience or what they learned during the lesson.
- Students can share with each other or in small groups something they learned, or how they might apply what they learned to a different project.
- You can discuss when they should use the program, and discuss being sensitive to other students' feelings.