Teacher Guide

Engineering Tomorrow

Software Engineering

Building an App Using MIT App Inventor

SUGGESTED LESSON PLAN - 50 minute periods	
Total Time ~75-100 minutes • 28 minutes to watch lab introduction video • 15-25 minutes for students to create and test their initial designs • 20-30 minutes to create and test their final designs • 10-15 minutes for a closing activity or discussion Optional Extensions: Accents; Male and Female Voices; Visual Appeal *(Note: An optional 30-45* minutes *can be scheduled to do a Wrap-Up and QA with an Engineer and College Mentor at Teacher's discretion).*	
Hook/Essential Question	What is your favorite app to use? What makes it user-friendly? Have you thought about how it is coded to provide this user-experience?
Supplies to Have in Class	Computer with Internet Connectivity This lab is completed online. There are no other supplies needed except for a working smart phone or computer device.
Optional Pre-Work	Have students watch the first ~19 minutes of the intro video providing the background for the challenge and answer the questions on through slide 22 of the student workbook.
Class #1 Introduction and Procedure	Watch the Engineering Tomorrow: Software Engineering Intro Recording on the Software Engineering webpage either as a class or assign background section as pre-work (see above). ➔ Have students answer the comprehension questions in the first 22 slides of the student workbook ➔ Watch the rest of the video that outlines the instructions for the challenge. Student teams begin to code a text-to-speech app in MIT App Inventor and answer related questions in their workbook or abbreviated worksheet *(1 workbook or worksheet per team suggested)*
Class #2 Work Time and Testing Possible Closing Activities	➔ Student teams continue with the coding aspect starting at slides 23 of the student workbook ➔ Student teams summarize and reflect on their final design and performance in the workbook or worksheet If time permits, student teams could continue to code enhancements to their app as discussed in their workbook on slide 55 and beyond.

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INTRODUCTION TO ENGINEERING TOMORROW:

- Click here to see an introduction of what Engineering Tomorrow can do for your students.

INTRODUCTION TO THE ENGINEERING DESIGN PROCESS:

- Students should complete the Engineering Design Process Introduction Activity before starting the lab
    - NOTE: This activity only needs to be completed before the student's **first** ET lab, not repeated for every lab.

TEACHER NOTES:

- Students will learn to build an app using MIT App Inventor.
- Students will work through the **Software Engineering** Student Workbook presentation or complete the Abbreviated Student Worksheet.
    - When assigning this lesson on Google Classroom, first make a copy of the slides to save within your Google Drive, then assign so that each student has their own copy.
    - The workbook and worksheet are designed to be interactive so that students can type directly into the files. It is suggested that the workbook or worksheet be completed over a few class periods (as the information is delivered to students).
    - Students may work individually or within groups (at the discretion of the instructor).

ASSESSMENT:

- Informal assessments can be completed by looking at the reflection slides within the Student Workbook and/or the discussion questions in the Abbreviated Worksheet.

- **Answer Keys** can be found here for:
    - Abbreviated Worksheet Answer Key
    - Student Workbook Answer Key

PRE WORK IDEAS:

- Re-familiarize students with block Coding

EXTENSION ACTIVITIES:

- Further explore MIT App Inventor through tutorials or by creating unique projects
- Explore Swift Coding for iOS Apps: https://developer.apple.com/swift/

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ADDITIONAL TEACHING RESOURCES:	
Curriculum Connections: • Coding Vocabulary • Coding Concepts • App Development	**Students will be able to:** • Analyze real-world problems and use critical thinking skills in order to solve them • Explore the variety of coding languages • Describe the difference between front-end and back-end design • Design and build an app in MIT App Inventor • Customize App • Explain the engineering process as it pertains to their app

STANDARDS:

- **NEXT GENERATION SCIENCE STANDARDS:**

  HS-ETS1-3. Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics as well as possible social, cultural, and environmental impacts.

- **COMPUTER SCIENCE STANDARDS:**

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

  3B-AP-08: Describe how artificial intelligence drives many software and physical systems.