

Name:

Date:

Class:

Project Worksheet **Example Answer Key**

Engineering Design Thinking

Who is the user?

My friend Amina, a 14-year-old who lives in Egypt

The Problem Statement: My user [user name/group] needs a way to [specific need] because [observation/frustration].

My friend Amina, a 14-year-old who lives in Egypt, needs a way to [remember to turn off the lights when leaving a room] because [recurring power outages are frustrating, and wasting electricity compounds the local energy crisis].

The Constraint: List one limitation you face (e.g., time, only 1 micro:bit, or specific materials).

Limited physical materials (only 1 micro:bit available) and a restricted session time to program the project.

Seeking Solutions & Prototyping

Brainstorm: List three quick ways to solve the problem using a micro:bit.

Idea 1: Create a smart text reminder that continuously loops a scrolling message telling people to turn off the lights when leaving.

Idea 2: Use the micro:bit's built-in light sensor to detect whether a light is left on in an empty room and trigger a loud buzzing sound.

Idea 3: Program the micro:bit buttons so that when someone leaves the room, they press Button A, which sets a countdown timer to remind them to double-check the appliances.

The Chosen Idea: Which idea will you build, and why?

Idea 1: Create a smart text reminder that continuously loops a scrolling message telling people to turn off the lights when leaving.

Why: We haven't learned about buttons or timers yet.

System Planning: Draw a simple sketch of your project. Label the micro:bit and any crafting materials.

Answers will vary.

BROUGHT TO YOU BY

Name:

Date:

Class:

Algorithmic Thinking (The Plan)

Write your **Pseudocode** here. Explain the steps your "brain" (micro:bit) must follow.

Example: 1. Show Heart -> 2. Wait 1 sec -> 3. Clear Display.

Pseudocode:

Start the program and import the micro:bit library.

Start the loop

Show a Heart image

Wait

Display message "Close Lighting If Going Out"

Wait

Pattern Recognition (Efficiency)

Did you have to **repeat** the same code many times?

Yes, the reminder needs to show up all day long, every single day.

The Loop: Describe how you used a `for` loop or `while` loop to make your code shorter and more efficient.

Instead of copying and pasting the image and text lines hundreds of times, we used a `while True` loop. This creates an infinite loop that tells the micro:bit's "brain" to run this sequence forever.

Debugging (Thriving in Uncertainty)

What is one "bug" or challenge you found in your Python code?

A WebUSB browser connection issue where the browser wouldn't recognize the micro:bit when clicking "Flash."

An `IndentationError` where the code inside the `while True` block wasn't spaced correctly.

How did you fix it?

For the connection issue, we unplugged the USB cable, restarted the browser, and made sure to hit "Connect device" before flashing.

For the indentation, we made sure all commands under the loop were perfectly aligned with four spaces.

BROUGHT TO YOU BY

Name:

Date:

Class:

Reflecting Frequently

If you had two more hours, what would you add to or edit on your project?

I would integrate the micro:bit's light sensor so the text message only scrolls if the room is bright. If the room is already dark, the micro:bit could sleep to save its own battery power.

Which skill did you use most today, and why?

Imagination: to brainstorm multiple ideas and think about multiple shapes for the device.

BROUGHT TO YOU BY