

Name:

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## Day 2: Interface and Experiment Design Worksheet

Group Members: \_\_\_\_\_

### Project Overview

Over the next few days, you will be completing an exciting project at the intersection of technology and neuroscience. You will design and build a brain-machine interface that translates movement between your own muscles and a robot. By the end of this project, you will be able to control a robot's movements based on muscle signals from your own body.

### Designing Your Interface

Your goal is to create a brain-machine interface that translates electromyography (EMG) signals from a person's arm to movements in a robot. The following components will be provided to your group:

- laptop (Qty: 1)
- [micro:bit V2 starter kit](#) (Qty: 2)
- [micro:bit compatible robot kit](#) (Qty: 1)
- [MyoWare 2.0 muscle sensor](#) (Qty: 1)
- [MyoWare electrodes](#) (as many as needed)

Your teacher may optionally provide you with the following:

- [Red Dot electrodes](#) (Qty: 3)
- [MyoWare 2.0 cable shield](#) (Qty: 1)
- [3.5mm jack electrode pads sensor cable](#) (Qty: 1)

You will have to research the components to figure out how they should be connected. Think about the following three parts of the system:

- Muscle to micro:bit connection
- EMG data collection and processing
- Micro:bit to robot connection

Use this worksheet to plan your interface and experiment design. You may need to do research through outside sources to plan appropriately. Potential sources of information include the following:

- [MyoWare muscle sensor product page](#)
- [Micro:bit start guide and resources](#)
- [Cutebot micro:bit robot wiki](#)
- [Introduction to EMG video](#)

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**Part 1: Muscle to Micro:bit Connection**

How will you connect the micro:bit to your muscles to gather EMG data? Where on your arm will you place the electrodes? For what movements will you collect data, and how will this affect the placement of the electrodes?

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**Part 2: EMG Data Collection and Processing**

What data do you need to collect? Which arm movements will you experiment with? How will you process the data in order to translate EMG signals to robot movements? Which arm movements should correspond to which robot movements?

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**Part 3: Micro:bit to Robot Connection**

How will you connect the second micro:bit to your robot? How will you send signals from the first micro:bit (the muscle connection) to the second micro:bit (the robot connection) in real time?