Name: **Date:** **Class:**

Getting Started With Spike Recorder Documentation

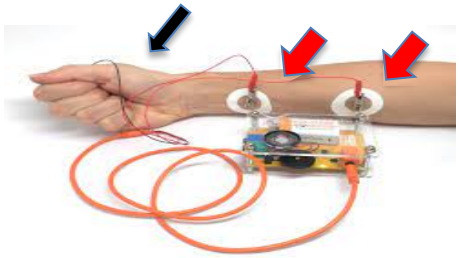
Connect your SpikerBox to your computer. To get started, use the BYB (Backyard Brains) pdf (https://backyardbrains.com/products/files/SpikeRecorderDocumentation.2018.02.pdf).

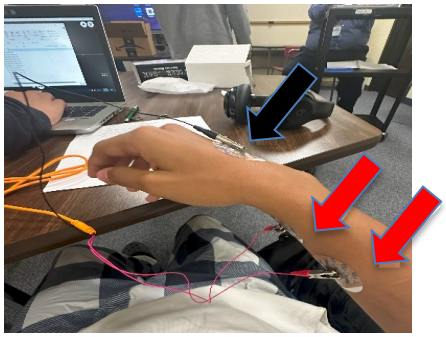
This document will help you with the following:

- Connect BYB spiker box to the computer
- Input configuration
- Data visualization
- Data recording
- Data analysis

Muscle SpikerBox Setup: Before we begin to record the group activity of muscle fibers within the wrist muscles and finger muscles, we need to make sure our experimental setup is as described and we are able to collect data. Please follow these steps carefully to ensure the experimental setup works:

1. Remove the sticky backing from your large muscle electrodes, and place these surface electrodes on two sides of your wrists.
2. Hook up the Muscle SpikerBox leads (the two red alligator clips) to the two surface electrodes (see red arrows in image below) to record your wrist activity.





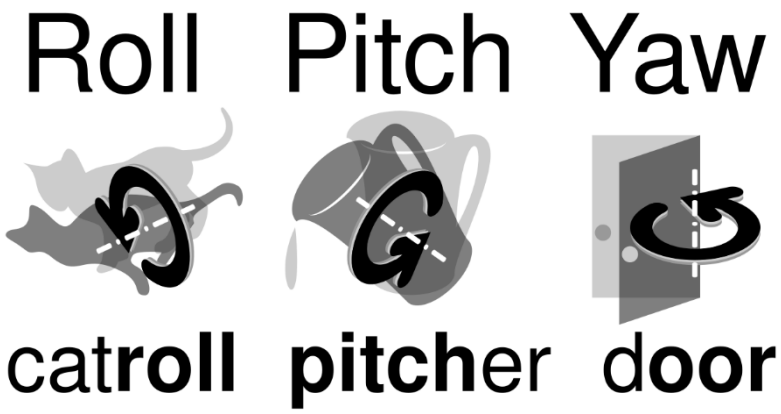
3. Place the reference electrode (see the black arrow in image above) anywhere on your arm or your body, or simply hold the reference electrode in your hand.
4. Turn on the Muscle SpikerBox and listen for changes in activity. The "whoosh" when we flex the wrist or arm is the sound of many action potentials occurring as the muscles contract.

5. Now, plug in your computer and visualize the signals using the Spike Recorder app (Backyard Brains PC app).

6. The BYB Spike Recorder turns your PC into a high-tech data recording and analysis tool. The software application can record data straight to your laptop or computer! The software is always recording in the background, so you can play back that response you just saw in real time.

Class Activity: **You are now ready to begin collecting data.** After setting up the electrodes and securing them to the correct locations:

1. Create an empty folder on your computer to save all the data that will be collected during the experiment.
2. Use an online metronome to set up three specific frequencies e.g., 40 beats per minutes (BPM), 60, and 80 BPM, respectively.
3. Once you're ready to begin the experiment, start the metronome first at 40 BPM. At the transition of every beat, switch among three specific gestures, namely, roll, pitch, and yaw of the wrist. These essentially are the degrees of freedom.



4. Make sure to try out the rhythmic gestures first using your wrist and then your finger (roll, pitch, yaw) and practice transiting between gestures (roll, pitch, yaw) for every beat, before you begin recording.
5. Record the EMG data for two minutes. At the end of two minutes, stop recording the data and stop the metronome.
6. Save the file in Wave format in a folder designated for this experiment.
7. By analyzing the EMG data in the Spike Recorder software application, we will gain an understanding of the underlying difference in electrical signals that enable amazing motions of the wrist versus the fingers.