

Isotonic Instructions:

Part 1:

Determine the angle at your elbow when you hold the weight in a curled position. Determine the change of length for the bicep muscle from full extension to the curled position. You will need to use trigonometry and assume that LB is approximately 2.54-cm in females and 3.60-cm in males.

Part 2:

For this part of the lab, you will use a webcam and Virtual Dub, which is a free software for capturing and editing movies (www.virtualdub.org). One student will operate the camera and software, the other will lift the weights while standing against a wall.

0. Virtual Dub should be running on the laptop. If not, launch the software.
1. Make sure you are in Capture Mode. It should read Virtual Dub 1.6.5 Capture Mode across the top of window. If not, go to **File>Capture AVI**.
2. Focus camera on student holding the weight.
3. Make a folder with students name to save all recorded videos.
4. Hit **F2** to name the file.
5. Name file with students initials and weight load.
6. Hit **F5** to start recording video.
7. Once video starts, tell student to lift weight as fast as they can. Warn them not to use their shoulders or swing their body to help lift the weight. Lift by isolating only the bicep muscle.
8. Hit **ESC** to stop recording.
9. Repeat steps above for more than three weights. **CAUTION:** Only lift a weight that is comfortable for you. DO NOT overstrain yourself.
10. Analyze videos to record the number of frames between initial motion and final motion. The camera captures video at 30 frames per second so the interval between each frame is $1/30^{\text{th}}$ of a second (0.033 seconds).
11. To view videos recorded, go to **File>Exit Capture Mode**. Go to **File>Open Video** and select the first video.
12. Use the arrow keys to advance frame by frame. Look for the frame right before initial motion and the one directly after final motion. Record the number of frames in between.
13. Repeat for each video file
14. Afterwards, you may save a copy of your videos to your USB memory stick. You may also save a copy of VirtualDub for you to keep.