## Procedure:

1. Stand an appropriate distance (see start position on Position 1-3)(50-cm for Velocity plots) in front of the Motion Sensor. *WARNING: You will be moving backward, so clear the area behind you.*

2. After you click RECORD, there is a three-second countdown before data recording begins. Watch the Ready clock on the bottom of the screen and be ready to move when it reaches zero.

3. The Score display will show how closely you match the graph. The closer to 100, the better.

4. Click RECORD. The Motion Sensor will make a faint clicking noise to tell you it is on and the green LED will flash.

5. Try to match the graph by moving forward or backward. The recording will stop automatically after 10 sec.

6. Repeat the data recording process as many times as you need (time permitting) to get your best match. See which lab partner can get the best Score. On a piece of paper, note which Run #'s were the best and who did them. Use the white triangle by the Delete Last Run icon at the bottom of the page to delete unwanted runs (too many recorded runs can cause problems with the program). If you want to examine a previous run, use the black triangle by the Run Select icon in the graph toolbar above the graph. It is fairly easy to get a score above 95 on the position plots. The velocity plots are harder and scores above 80 are good.

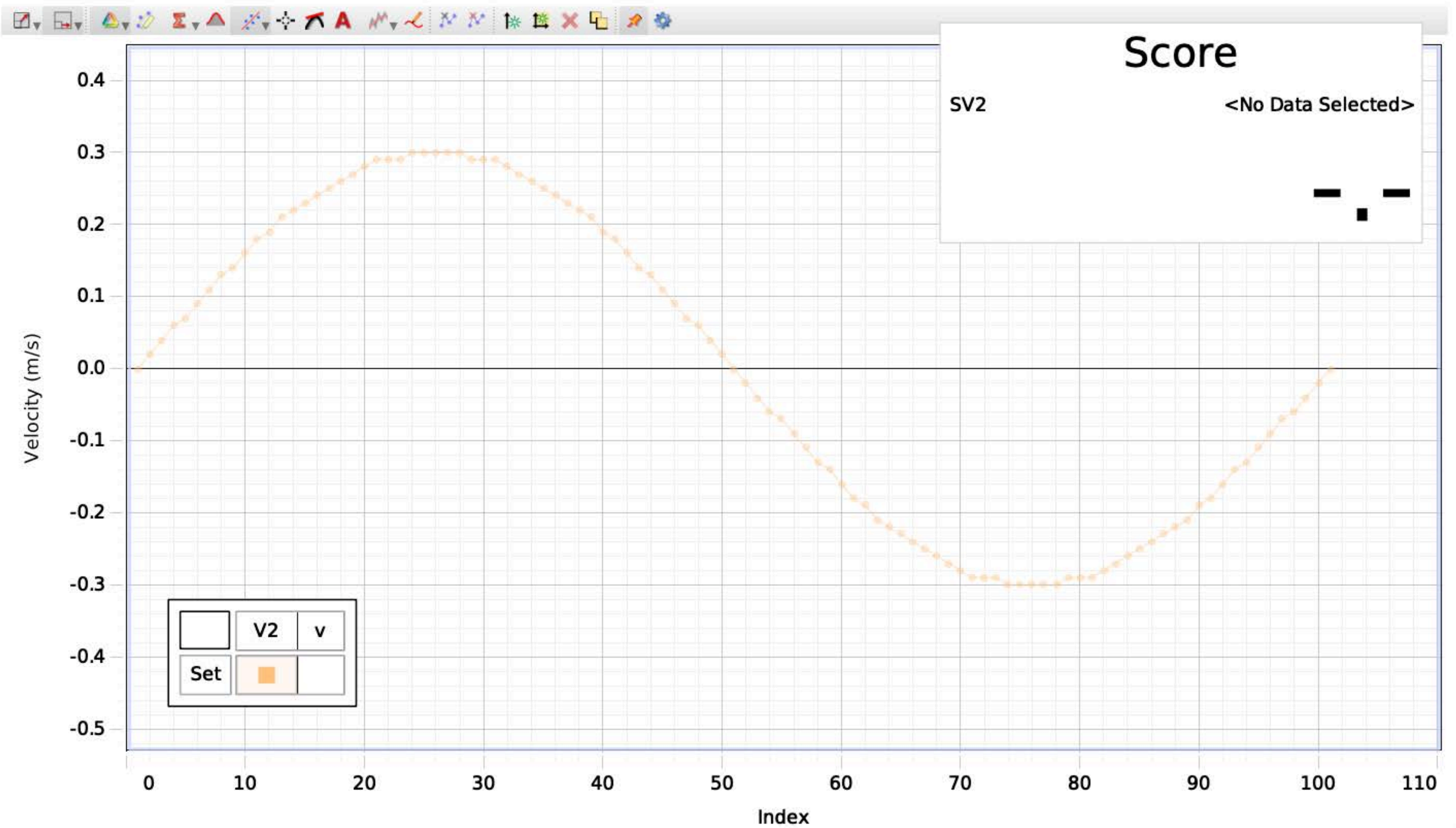7. Repeat the process for Position 2 & 3 and for Velocity 1-4.
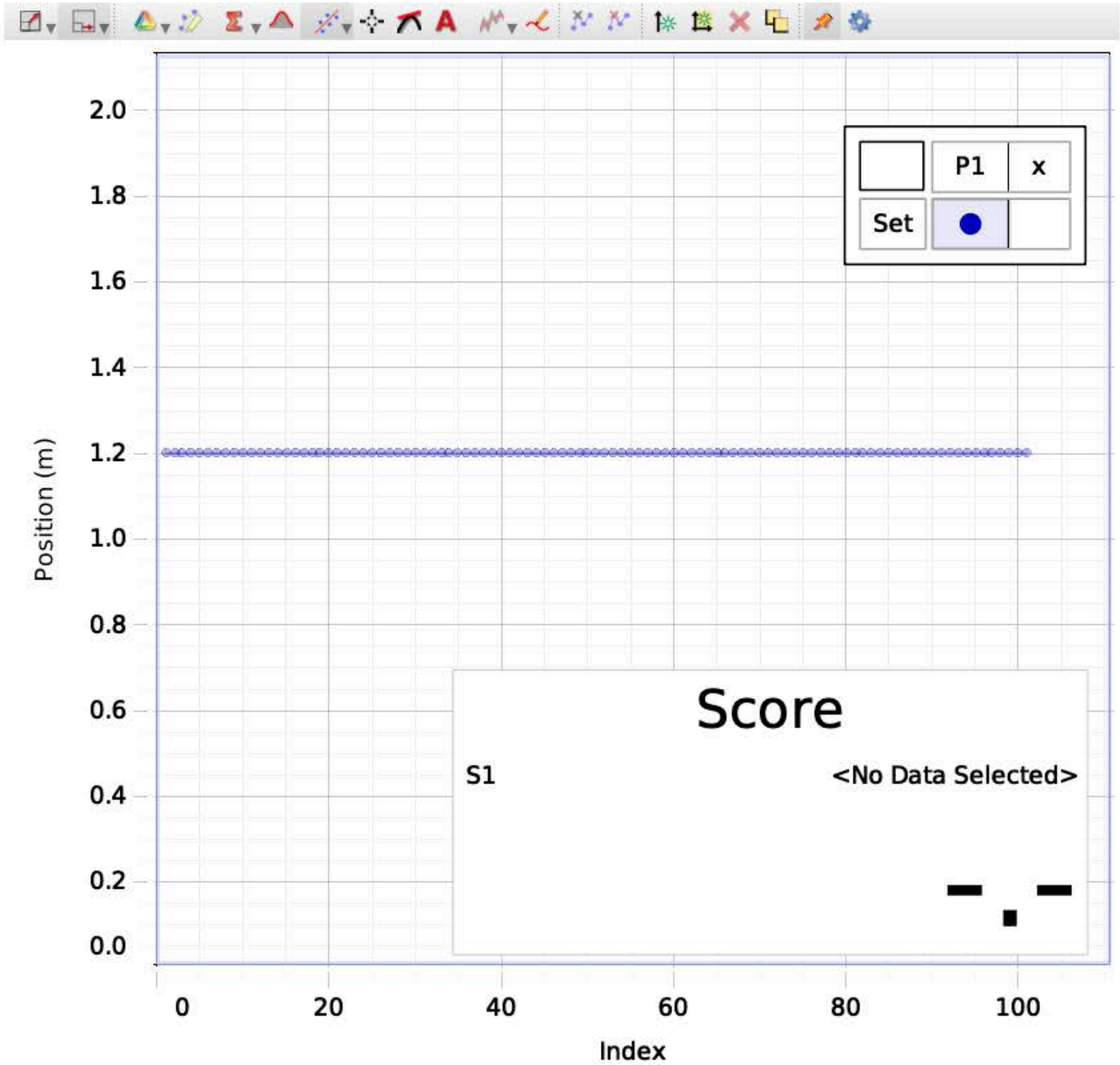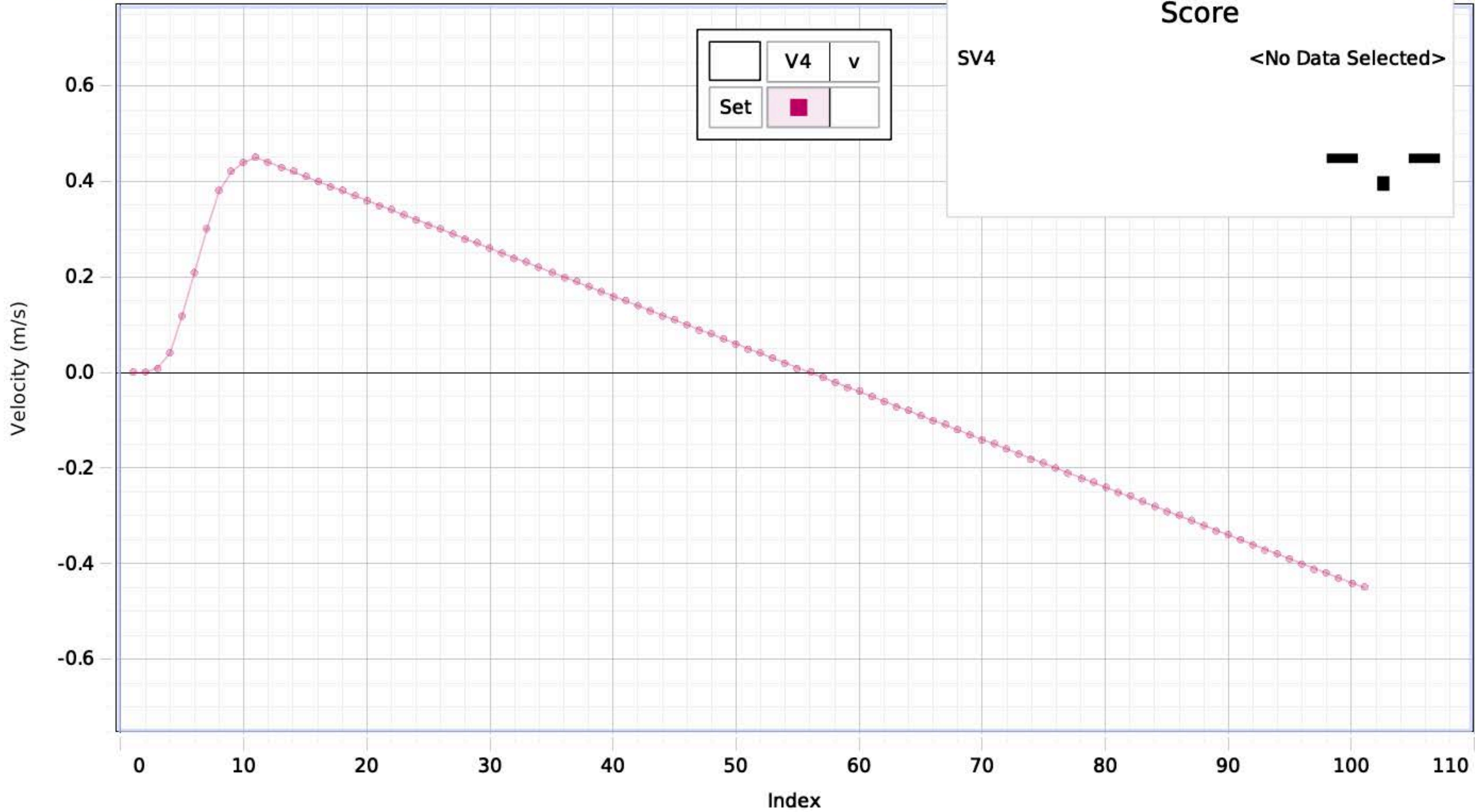

Position 1

Position 2

Score

S3   <No Data Selected>
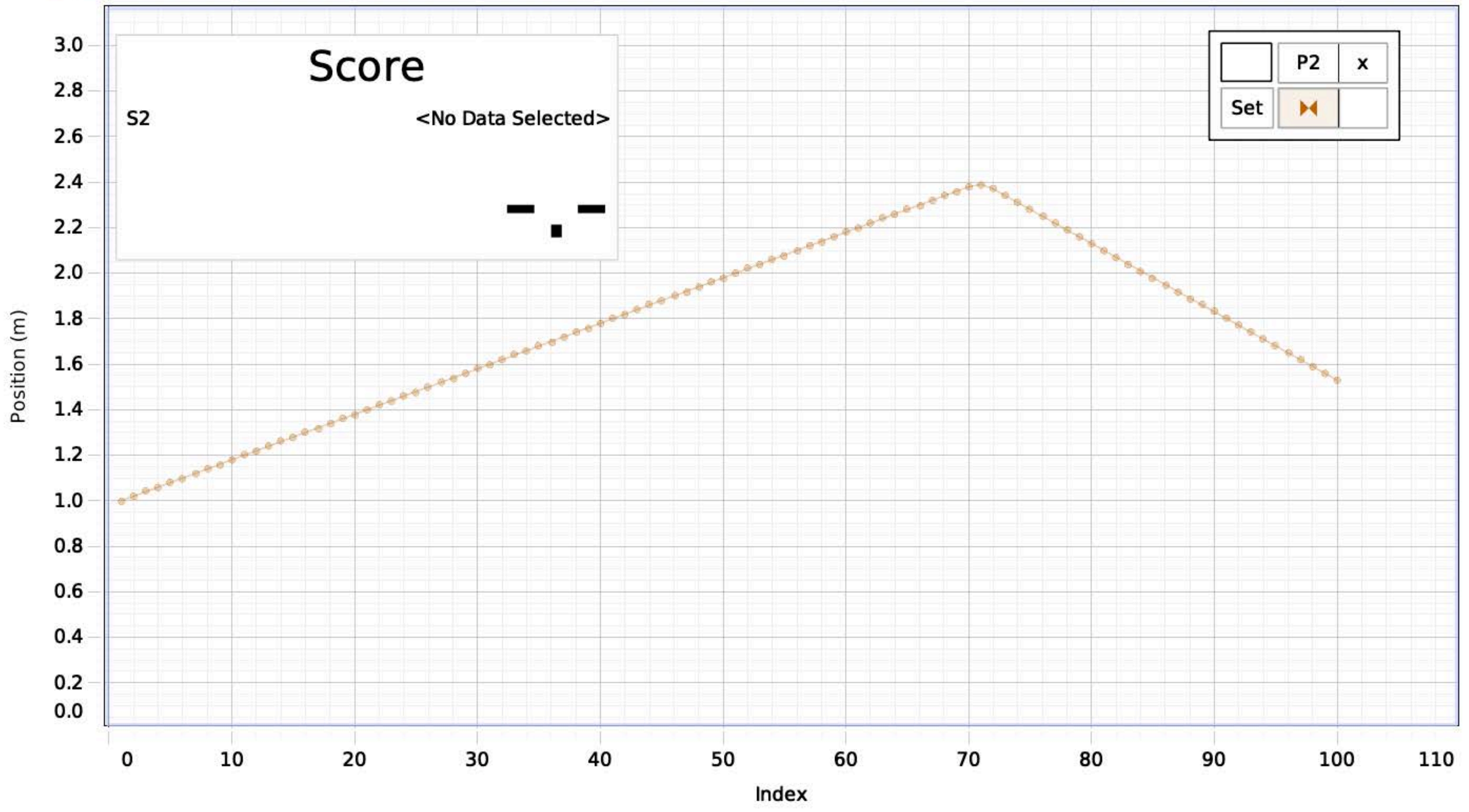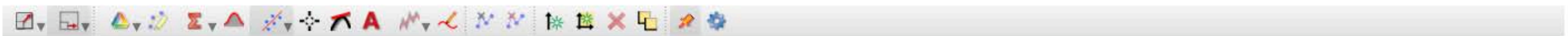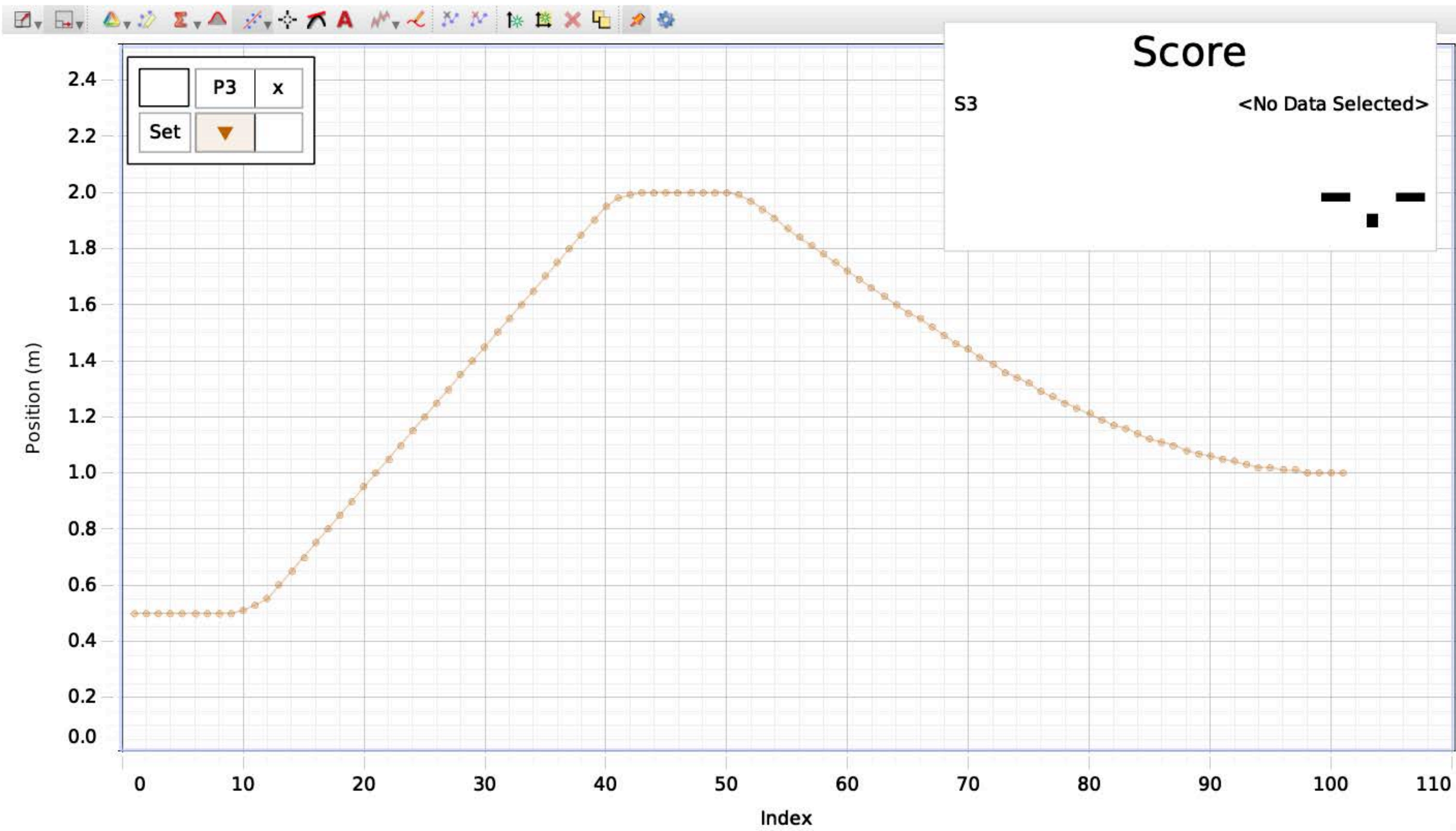
Position 3

Velocity 2

Velocity 1

Velocity 3

Velocity 4

Analysis (recall that Index = 10 on the horizontal axis means 1 second):

Position plots:

1. What does a horizontal line mean?

2. What is the difference between the parts of the plot with positive slope and the parts with negative slope?

3. On the Position 3 plot, what is happening between 5 and 10 seconds?

4. What parts of the plot were easier to match? What parts of the plot were the hardest to match? Why?

Velocity plots:

5. What does a horizontal line mean?

6. What is the difference between the parts of the plot with positive slope and the parts with negative slope?

7. Consider the Velocity 2 plot. What is the difference between places where the slope is large and places where it is near zero.

8. Consider the Velocity 2 plot. Where the acceleration largest? What is the speed at that point?

9. Which of the four Velocity plots could qualitatively describe the vertical speed of a ball thrown vertically upward?

1.

2.

3.

4.

5.

6.

7.

8.

9.