1 Building the PDM: Instructions

In your kits for the Portable Partial Derivative Machine should be the following:

- A 1ft by 1ft board with 5 holes and measuring tapes (the measuring tapes will be on the **top** side)
- 2 S-hooks
- A spring with 3 strings attached
- 2 small cloth bags
- 4 large ball bearings
- 8 small ball bearings
- 2 vertical clamp pulleys
- A ziploc bag containing
  - 5 screws
  - 5 hex nuts
  - 5 washers
  - 5 wing nuts
  - 2 horizontal pulleys

To assemble the Portable PDM, start by placing the PDM on a table surface with the measuring tapes perpendicular to the table's edge and the board edge with 3 holes closest to you.

(a) one screw should be put through each hole so that the threads stick out through the top side of the board. Next use a hex nut to secure **each** screw in place. It is not critical that they be screwed on any more than you can comfortably manage by hand.

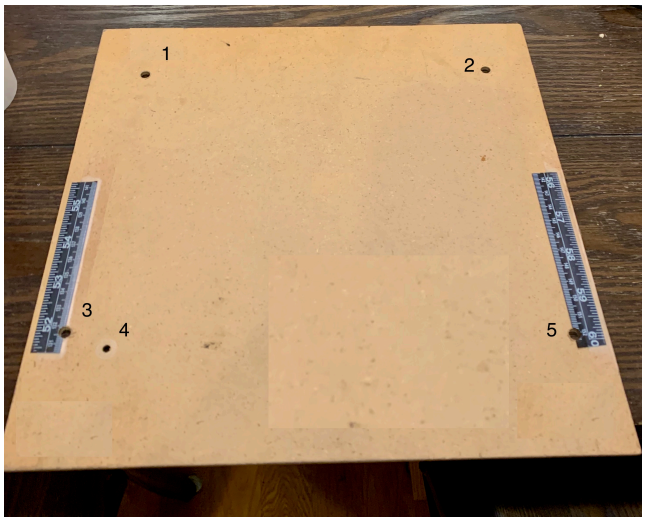
(b) After securing all 5 screws in place with a hex nut, put a washer on each screw.

(c) Slide a horizontal pulley onto screws 1 and 2 (as labeled above).

(d) On all 5 screws, add a wing nut to secure the other pieces. Again, it does not need to be tightened all the way as long as it is secure enough that nothing will fall off.

(e) Using the middle wingnut/washer/screw (Screw 4), clamp the shortest of the strings tied to the spring.

(f) Loop the remaining 2 looped-ends of string around the horizontal pulleys and along the measuring tape.



(g) Using the string as a guide, clamp the vertical pulleys into place on the edge of the board.

(h) Through the looped-end of each string, place 1 S-hook.

(i) Put the other end of each s-hook through the hole in the small cloth bag.

Here is a poor photo of the final result, which doesn't show the two vertical pulleys. If you would like, you could view a video of the building process.