1. Calculate the average Elastic modulus for each of the four different materials that were tested, as well as the standard deviation. Please use units of GPa for the Elastic modulus.

Equation:	$E = (F / \delta)$ (L^3 / 4bd^3)	
d (in mm):	3.175	1/8 inch = 3.175mm
b (in mm):	20	
L (in mm):	70	
Constant:	133.959323	

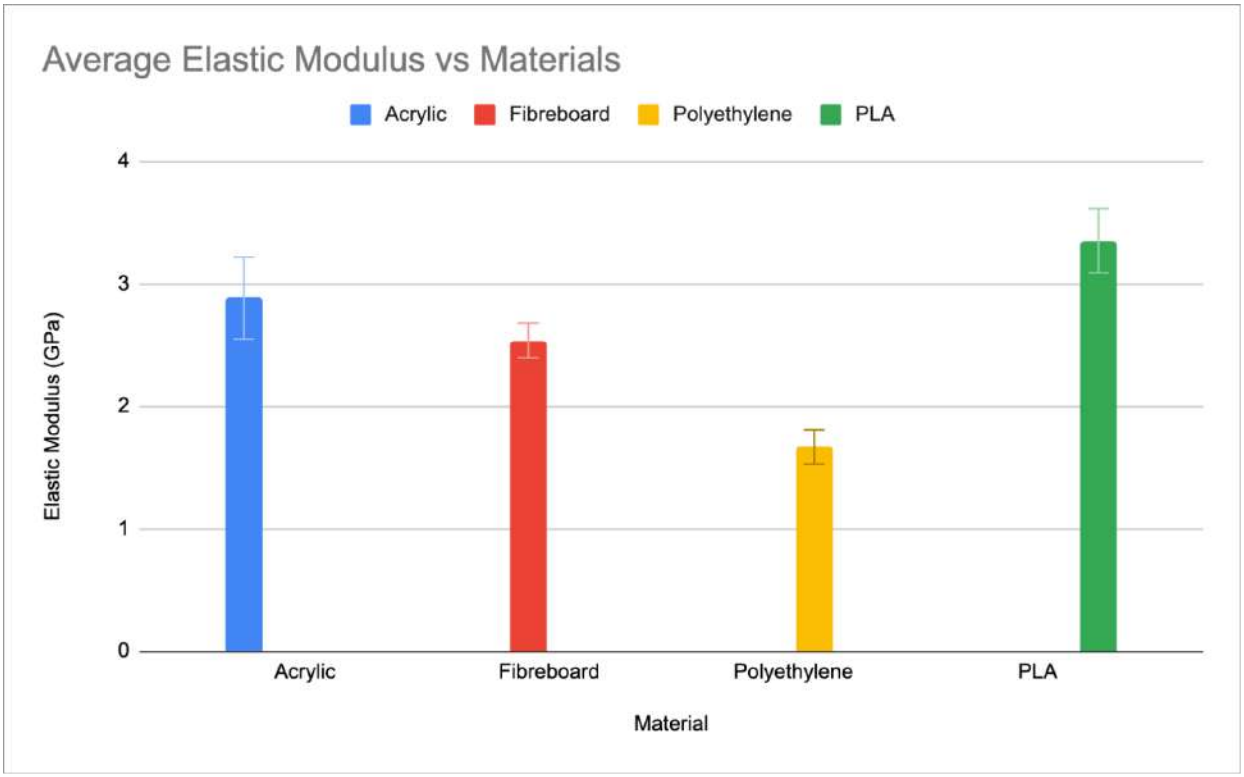
That means the right side of the equation (L^3/4bd^3) is a constant 133.959mm^-1 because the values don't change for the 4 materials.

Then I multiplied the constant by the F/δ value (which I calculated by taking the slope of the linear portion of the data).

Std deviation was calculated by using the STDEV formula in Google Sheets, with the 4 input data being the E (GPa).

Acrylic	**F/δ**	**Constant:**	**E (N/mm^2):**	**E (GPa):**	**Avg E (GPa)**	**Std Dev**
Run 1	19.2935739	133.959323	2584.554098	2.584554098	2.882105555	0.335037161
Run 2	23.9896232	133.959323	3213.633684	3.213633684		
Run 3	23.3468902	133.959323	3127.533606	3.127533606		
Run 4	19.4290384	133.959323	2602.700831	2.602700831		
Medium Densit	**F/δ**	**Constant:**	**E (N/mm^2):**	**E (GPa):**	**Avg E (GPa)**	**Std Dev**
Run 1	17.8901284	133.959323	2396.54949	2.39654949	2.537582612	0.1423958037
Run 2	18.2099212	133.959323	2439.388717	2.439388717		
Run 3	20.1092342	133.959323	2693.8194	2.6938194		
Run 4	19.5624521	133.959323	2620.57284	2.62057284		
Polyethylene te	**F/δ**	**Constant:**	**E (N/mm^2):**	**E (GPa):**	**Avg E (GPa)**	**Std Dev**
Run 1	12.4102392	133.959323	1731.004167	1.731004167	1.666389771	0.1391769066
Run 2	13.1323945	133.959323	1807.52345	1.80752345		
Run 3	12.6759023	133.959323	1643.674212	1.643674212		
Run 4	11.4569824	133.959323	1483.357255	1.483357255		
PLA	**F/δ**	**Constant**	**E (N/mm^2):**	**E (GPa):**	**Avg E (GPa)**	**Std Dev**
Run 1	25.1090562	133.959323	3363.592171	3.363592171	3.3513122	0.2623707258
Run 2	23.0694024	133.959323	3090.361528	3.090361528		
Run 3	24.2160694	133.959323	3243.968263	3.243968263		
Run 4	27.6750192	133.959323	3707.326837	3.707326837		

2. Create a bar plot that compares the Elastic modulus of the four different materials that were tested. Be sure to include error bars (standard deviations).



3. What material has an elastic modulus that is closest to bone? The elastic modulus of bone is 7-30 GPa.
    a. PLA had an average elastic modulus of 3.35 GPa, which is the closest to bone out of all the materials (even though it really isn't that similar).

4. Which material exhibited the greatest displacement before fracture/failure?
    a. Polyethylene terephthalate displaced around 0.5-1mm more than acrylic so Polyethylene terephthalate exhibited the greatest displacement before failure, with acrylic being a close second.

5. Which material fractured/failed under the least amount of force?
    a. Medium Density Fibreboard