

This make-up activity would only be graded if:

1. you had a **valid** reason (religious, medical, etc.) for missing the lab, and
2. you have submitted letter of absence and supporting documentation to your TA in advance (except for emergency absence in the last week of lab)

Also, the makeup activity counts for **only one missed lab (with valid excuse)**. If you have missed more than one lab with a **valid** excuse (religious, medical, etc. + letter of absence + supporting documentation) please inform your TA at once, email ayush@umd.edu.

In lab, a group of students measured the acceleration of two cylinders with the same size but different masses. They measured each five times:

Brass cylinder: (m/s ²)	0.303	0.315	0.294	0.300	0.298
Aluminum cylinder: (m/s ²)	0.310	0.298	0.291	0.315	0.312

Another group measured the accelerations of cylinders with two different radii. They measured each 22 times, and then placed them in bins according to the first two significant figures:

Large-radius cylinder:		Small-radius cylinder:	
# times measured	Acceleration (m/s ²)	# times measured	Acceleration (m/s ²)
4	.24	1	.27
6	.25	1	.28
4	.26	1	.29
3	.27	3	.30
1	.28	5	.31
1	.29	7	.32
2	.30	4	.33
1	.31		

A. Representing the data: Both groups want to present their data as a picture – some kind of representation that presents clearly their data’s useful information.

Make up two representations – one for each group, that they could use in their class discussion. Draw them, and explain in 2-3 sentences how each representation communicates useful information clearly.

B. In the following questions, we ask you to draw inferences based on the data that has been presented to you. **In each case, whatever your answer/conclusion, make a persuasive case for it - grading is based on your reasoning. If you use any discriminating criterion in order to reach your conclusion, make sure you have stated that and explained your reason for choosing that criterion.**

1. (a) If you were to roll the Brass and Aluminum cylinders one more time, would you say that the Brass cylinder would accelerate *faster than, slower than, or same as*, the Aluminum one? Explain your reasoning.

1. (b) If you were to roll the small and large radius cylinders one more time, would you conclude that the small radius cylinder would accelerate *faster than, slower than, or same as*, the larger-radius cylinder? Explain your reasoning.

2. Consider that one of the students doing this experiment rolls one of these cylinders and measures an acceleration of $.304 \text{ m/s}^2$. The material (Brass vs. Aluminum) or the radius (small vs. large) of the cylinder was not noted for this measurement.

(a) Using the data, can you tell if the cylinder was the Brass one or the Aluminum one and how? Explain your reasoning.

(b) Using the data, can you tell if the cylinder had a small or a large radius and how? Explain your reasoning.

Make sure to include all graphs, spreadsheets, etc. when you hand in this assignment.