

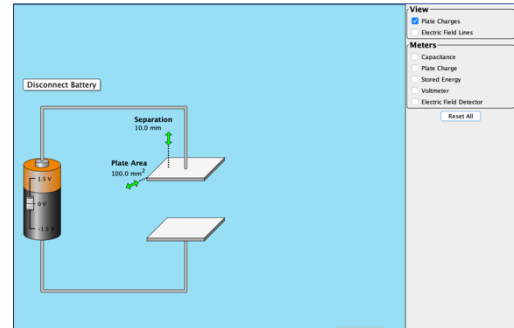
Virtual Capacitor and Dielectric Experiment

Name _____

Open the following webpage, and then click on the “Run Now” button (you may need to go into your security preferences to approve this application)

<http://phet.colorado.edu/en/simulation/capacitor-lab>

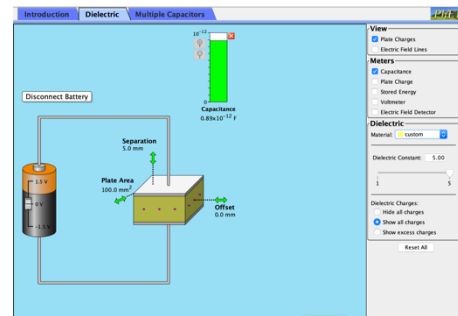
The window to the right should appear.



- Now click on the Capacitance square. Slide the voltage to +1.5 V and connect the voltmeter to the capacitor plates. Using the arrows to control the separation and the plate area, take data for a variety of values.

Trial	Separation d (mm)	Plate Area A (mm ²)	Area/Separation A/d	Capacitance
1				
2				
3				
4				
5				
6				
7				
8				

- Now click on the Dielectric tab at the top. Slide the dielectric in between the two plates. Adjust the plate area and separation again to take 10 new data points. Record the dielectric constant in your chart.



Trial (Dielectric = _____)	Separation d (mm)	Plate Area A (mm ²)	Area/Separation A/d	Capacitance
1				
2				
3				
4				
5				
6				
7				
8				

Trial (Dielectric = _____)	Separation d (mm)	Plate Area A (mm ²)	Area/Separation A/d	Capacitance
1				
2				
3				
4				
5				
6				
7				
8				

Trial (Dielectric = _____)	Separation d (mm)	Plate Area A (mm ²)	Area/Separation A/d	Capacitance
1				
2				
3				
4				
5				
6				
7				
8				

- 3) Now, add a Voltmeter and the Plate charge meter and the Electric Field Detector. Keeping the separation and the plate area the same, play with several different dielectric materials. Notice how each measurable quantity changes.

Analysis:

- Using Excel or the program of your choice, plot plate area/separation vs. Capacitance (with area/separation on the x-axis) for each set of data is on the same axes. Find unique equation that best fits your data for each set.
- What do you think your equations represent? How to the equations change depending on the dielectric? How do plate area and separation affect capacitance? Discuss.
- From playing with the different dielectrics, explain how you think a dielectric affects the capacitance and the electric field. What purpose do you think a dielectric might serve?

Hand in data, graphs, and discussion. Please type your discussion. Due Thursday, March 7th.