

Do not copy or attach
or print out this manual
for your lab report.
Follow the instruction.

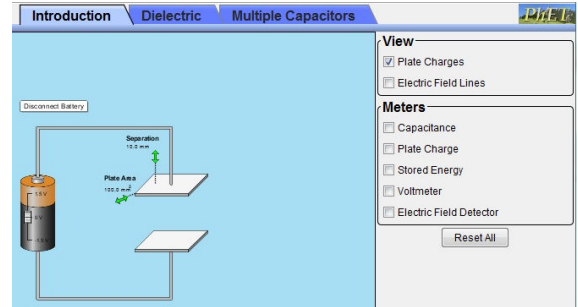
Capacitor

Your name _____ Instructor's sign _____

Go at <https://phet.colorado.edu/en/simulation/capacitor-lab> and download the software.

1. Basic property

- In the "Meter" category in the right side of display, check "Capacitance" to see the values.
- Click on the arrows to change the separation and the plate area.
- Fill out the table for each capacitance. The row is separation; and column is area.

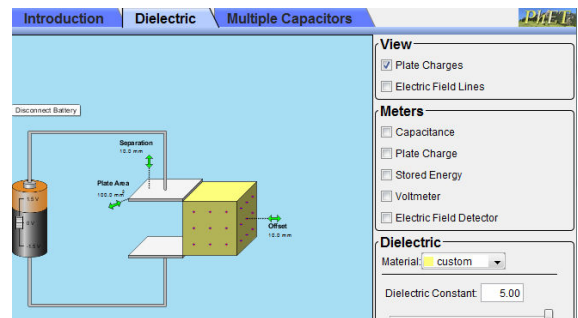


	100 mm ²	150 mm ²	200 mm ²	250 mm ²	300 mm ²	350 mm ²	400 mm ²
5.0 mm							
6.0 mm							
7.0 mm							
8.0 mm							
9.0 mm							
10.0 mm							

◆ **Question 1:** In which case can you obtain the largest and smallest capacitances?

2. Dielectrics

- Click the Dielectric tab.
- Check "Capacitance" in the Meter category.
- Fix separation as 5.0 mm, plate area as 400.0 mm², and dielectric constant as 5.
- Insert the dielectric one fourth of the side capacitor, and then record the capacitance.
- Repeat the above with inserting a half, three fourths, and entire dielectric.

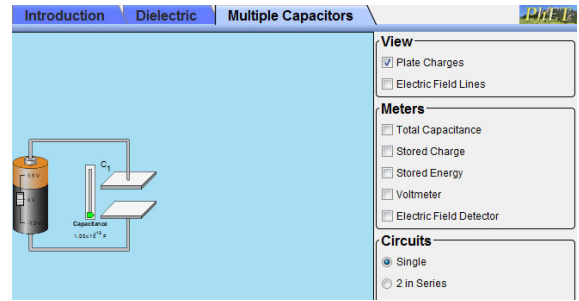


	One fourth of dielectrics inserted	A half of dielectrics inserted	Three fourths of dielectrics inserted	One entire dielectrics inserted
The capacitance (F)				

- ◆ **Question 2:** How do you describe the relationship between the amount of dielectrics inserted and the capacitance of the capacitor?

3. **Multiple capacitors**

- Click "Multiple Capacitors" tab.
- Check "2 in series" in the "Circuits" category.
- C1 and C2 must be different capacitances.



C₁ _____ (); C₂ _____ ()

- Show the calculation to obtain the equivalent capacitance by using the formula.

$$\frac{1}{C_{eq}} = \frac{1}{C_1} + \frac{1}{C_2}$$

C_{eq} by calculation = _____ ()

- Check "Total Capacitance" in the "Meters" category.

C_{eq} from the simulation = _____ ()

- ◆ **Question 3:** Did you obtain the same value for the equivalent capacitance?

- Check "2 in parallel" in the "Circuits" category and choose C₁ and C₂.
- Show the calculation to obtain the equivalent capacitance by using the formula.

$$C_{eq} = C_1 + C_2$$

C_{eq} by calculation = _____ ()

- Check "Total Capacitance" in the "Meters" category.

C_{eq} from the simulation = _____ ()

- ◆ **Question 4:** Did you obtain the same value for the equivalent capacitance?

For the lab report

① Write the introduction. ② Copy and paste the tables you filled out. ③ Write the discussions and conclusion including the answers of the questions above.