Capacitor Charge and Discharge

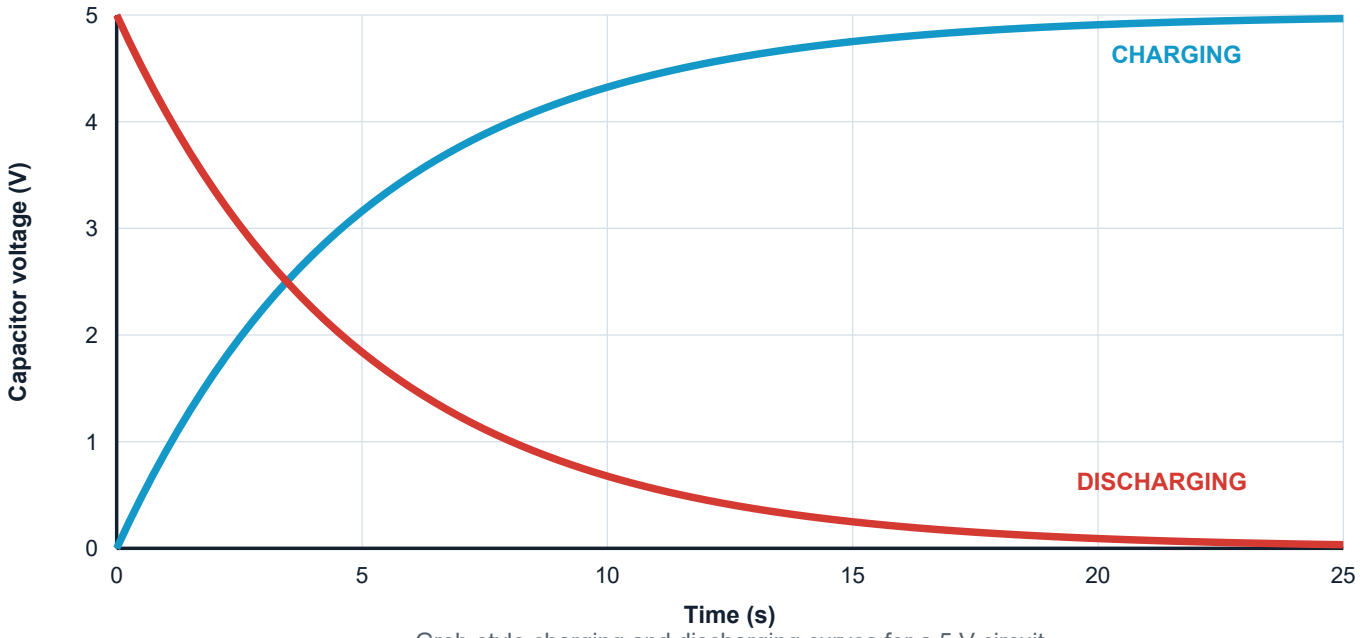
Connect Monday's capacitor lesson to a graph that changes over time.

Name: _____ Group: _____ Date: _____

1 Connect to Monday

1. A capacitor stores separated charge and energy.
2. A polarized capacitor must be connected in the correct direction.
3. The voltage rating must be greater than the circuit voltage.
4. A resistor controls how quickly the capacitor charges or discharges.

2 Read the two curves



Grob-style charging and discharging curves for a 5 V circuit

3 Explain what the graph shows

1. Charging starts near _____ V and moves toward _____ V.

2. Discharging starts near _____ V and moves toward _____ V.

3. The voltage changes fastest at the beginning / end. Circle one.

4. Why does the resistor belong in the charging and discharging path?

_____

Adapted from the qualitative method in Grob Basic Electronics Experiments, Experiment 22-1: RC Time Constant.

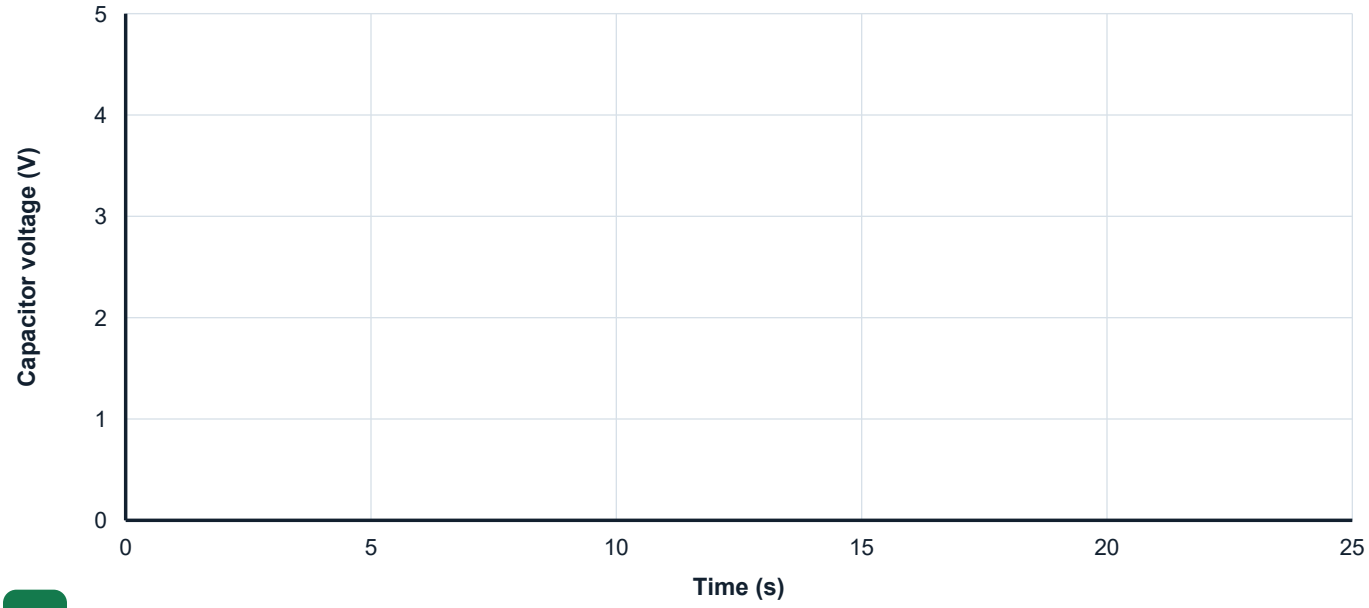
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Plot the data while small groups rotate through the component-sorting table.

4 Plot the provided data

Time	Charging	Discharging
0 s	0.0 V	5.0 V
5 s	3.2 V	1.8 V
10 s	4.3 V	0.7 V
15 s	4.8 V	0.2 V
20 s	4.9 V	0.1 V
25 s	5.0 V	0.0 V

Use blue for charging and red for discharging. Connect the points with smooth curves.



5 Use the graph, not an equation

1. At 5 seconds, which curve has the larger voltage?

2. For the same capacitor, Q = CV. As voltage rises, stored charge:
   increases / decreases / stays the same. Circle one.

When your group is called to the sorting table:

1. Decode and meter-check two resistors. 2. Read two capacitor values and ratings.
3. Identify polarized parts. 4. Put uncertain parts in CHECK WITH TEACHER.

No powered capacitor circuit is required for this activity. Use resistance mode only on disconnected resistors.