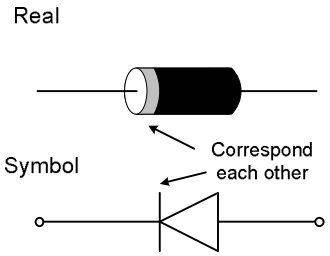
Diode Properties and the Circuits

Name_____ ID_____

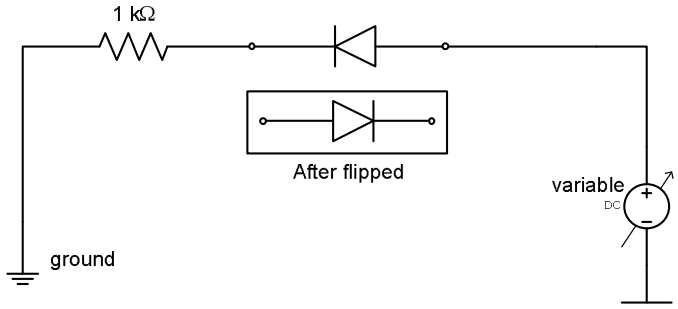
Partners_____

Please be careful about touching the diode because the current heats up the part.

1. A diode's property in DC voltage:



- **Pick up the diode and make sure the direction. ⇒**
- **Make sure the provided circuit is appropriately arranged on the breadboard; you will measure the 5 currents with respect to the different voltages.**

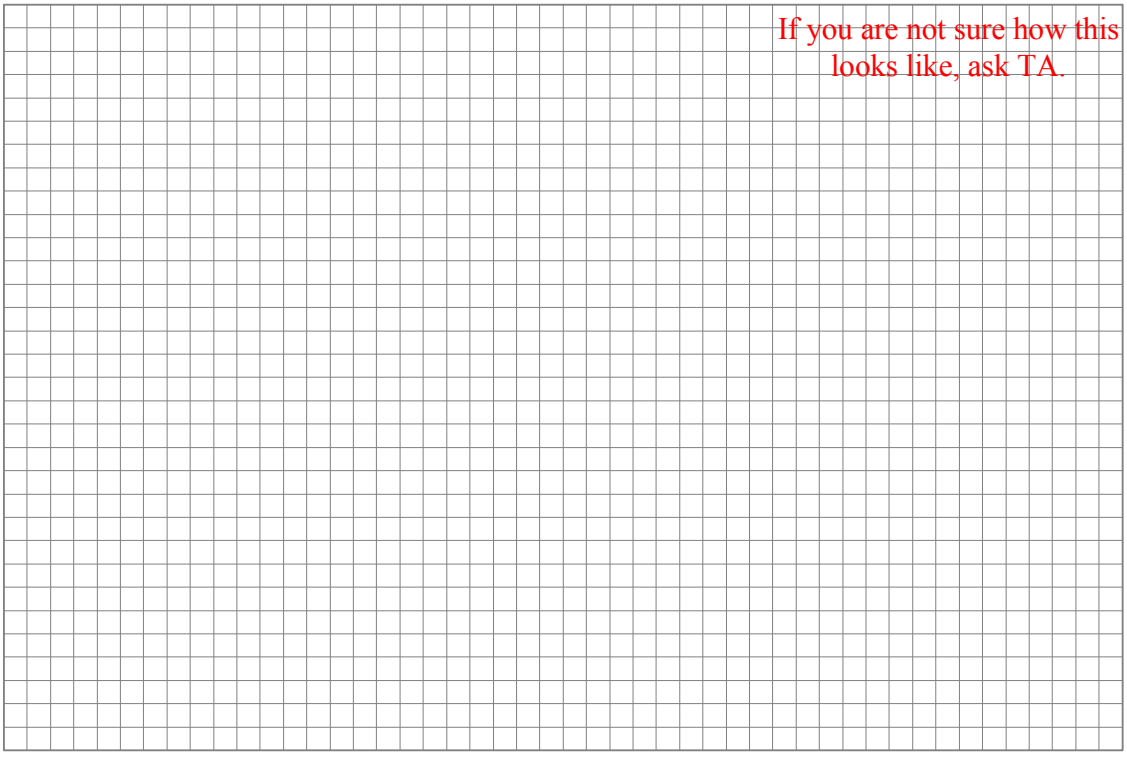


- **Voltage is measured with a parallel circuit, and current is measured in a series circuit connection with multimeter.**
  You have to measure the voltages in the diode, NOT the resistor.
- **Change the 5 voltages by following the data sheet.**
- **After the above measurement, flip the direction of the diode; then, measure the reversed currents for three different voltages. (Be careful! The diode might be very hot.)**

Use the variable voltage source. (*Measure the voltage in the diode.*)

Forward bias			Reverse bias	
Voltage (V)	Current (mA)		Voltage (V)	Current (mA)
Vc = 1 V			Vc = 1 V	
Vc = 2 V			Vc = 3 V	
Vc = 3 V			Vc = 5 V	
Vc = 4 V			For reversed bias, the expression of voltage values is negative.	
Vc = 5 V				

- **Plot the data on a graph sheet.**
  The instructor will show the appropriate shape of the graph. Make sure if your graph is proper.

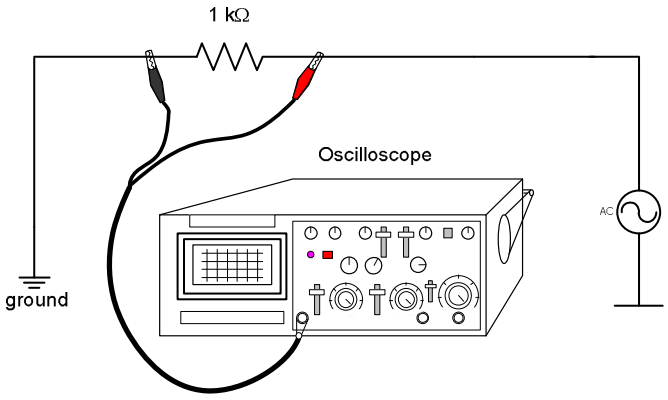


Question: Does the current increase exponentially (NOT linearly) for the forward bias?

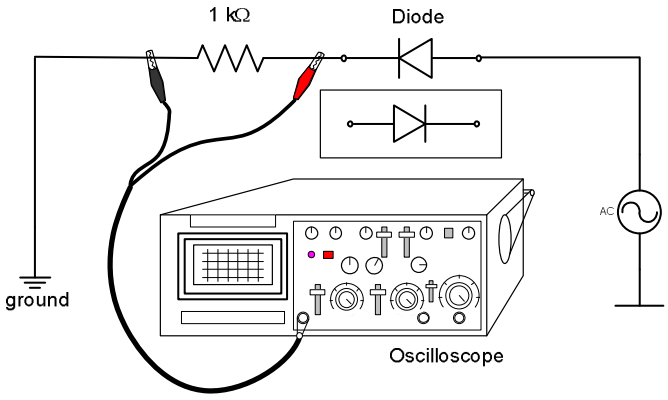
2. A diode's property in AC voltage (Half-wave rectification):

- **Change the voltage sources from DC to AC.**

- **Connect the wires from the oscilloscope to the resistor, and display the voltage curves.**
  1. Voltage of R without diode; 2. Voltage of R with diode; 3. Voltage of R with flipped diode.



Case 1



Cases 2 & 3

- **Draw the voltage curves displayed on the oscilloscope under the following conditions.**

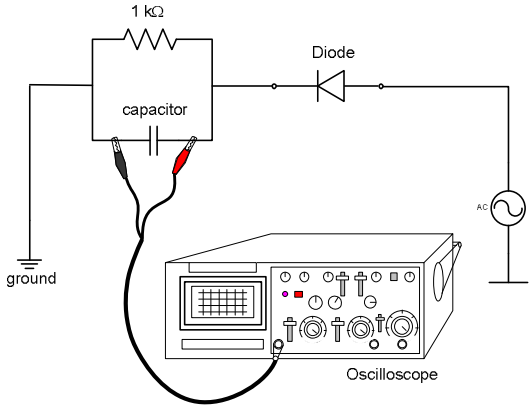
- Case 1 Voltage in the resistor without the diode

- Case 2 Voltage in the resistor with the diode

- Case 3 Voltage for the resistor after flipping the diode

3. RC circuit with diode

- **Make the circuit and measure the voltage on the capacitor with the oscilloscope.**
  Just sketch the voltage curve displayed on the oscilloscope.



- Voltage for the capacitor

4. A human antenna

- **Grab the oscilloscopes (+) and (ground) terminals with each hand; <u>then touch the tip of the terminal with a finger</u>.**
- **Adjust the scale of the frequency on the oscilloscope so that you can have the envelope waves.**
- **Read the period for the "envelope wave" and calculate the frequency.**
  Frequency = 1 / period

The period of the envelope waves _____ (s)

The frequency of the envelope waves _____ (Hz) ⇦ *close to 60 Hz*