Build and Observe Circuits

Online Simulation:
https://phet.colorado.edu/sims/html/circuit-construction-kit-dc-virtual-lab/latest/circuit-construction-kit-dc-virtual-lab_en.html

1. Build a series circuit with 3 light bulbs and a 9V voltage source. Call these light bulbs 1, 2, and 3.
    a. Compare the brightness of each light bulb.
       The brightness of each bulb is the same
    b. What happens if you disconnect one of the light bulbs? (Just detach one of the wires connecting to the light bulb)
       If one of the light bulbs gets disconnected, the whole circuit stops
    c. Take out one light bulb, then reconnect the circuit. Then take out one more. How does removing a light bulb affect the brightness of each bulb?
       By taking out one of the light bulbs and then reconnecting, the bulb gets brighter by 1.5x (voltage increases by 1.5x). When you take out another one, you the bulb get the max (or the max voltage output from the power source)
    d. Try to turn off one (only one) of the light bulbs by <u>adding</u> a wire to the circuit. Where did you place the wire? Why does it cause the light bulb to turn off? Draw the circuit below.
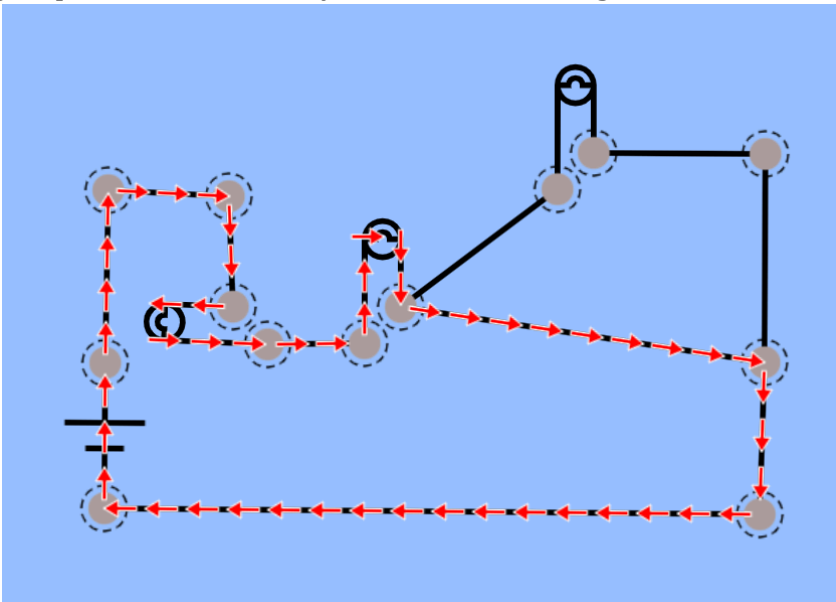
       This causes the light bulb to turn off because electricity typically likes to take the easiest path, this is because the resistance of the wire is 0Ω, thus causing the light bulb to have a current of $0A$
2. Build a parallel circuit with 3 light bulbs and a 9V voltage source. Call these light bulbs 4, 5, and 6.
    a. Compare the brightness of each light bulb.
       The brightness of each bulb is the same, and should be at it's brightest
    b. What happens if you disconnect one of the light bulbs? (Just detach one of the wires connecting to the light bulb)
       The other bulbs still shine, at the same intensity

  c. Take out one light bulb. Then take out one more. How does removing a light bulb affect the brightness of each bulb?
   When you take out another light bulb, there was no effect
  d. How does the brightness of 4, 5, and 6 compare with the brightness of 1, 2, and 3?
   4, 5, 6's brightness isn't affected when one of the bulbs is taken out of the circuit. However, 1, 2, 3 become brighter when another bulb is taken out. 4, 5, 6 also shite at max brightness, so it's going to be brighter than 1, 2, 3

3. Build a complex circuit with 1 light bulb connected in parallel with 2 light bulbs that are in series. Call the single light bulb 7 and the light bulbs in series 8 and 9.
  a. Compare the brightness of each bulb.
   Bulb 7 will be brighter than both bulb 8 and 9
  b. What happens if you disconnect (detach wire) light bulb 7? 8?
   Literally nothing happens except the fact that 9 may be turned off when you disconnect 8

4. Build a complex circuit with 1 light bulb connected in series with 2 light bulbs that are parallel. Call the 1st light bulb 10 and the other two 11 and 12.
  a. Compare the brightness of each bulb.
   Bulb 10 is the brightest, while bulb 11 and 12 are equal
  b. What happens if you disconnect (detach wire) light bulb 10? 11?
   If you disconnect bulb 10's wire, 11, and 12 won't work. Disconnecting 11 will increase 12 and decrease 10