NAME _____ DATE _____

Scenario

Consider two different light bulbs A and B, which are unequal but ohmic resistances. When the bulbs are connected to a source of emf in parallel, Bulb A is brighter than Bulb B. When the bulbs are later connected to the same source of emf in series, Bulb B is brighter than Bulb A but is dimmer than Bulb B in the parallel circuit.

Using Representations

PART A: Sketch a circuit diagram for the two bulbs (A and B) in series and in parallel.

Series	Parallel

Quantitative Analysis

PART B: Which light bulb has a greater resistance? Justify your reasoning.

PART C: Suppose that both light bulbs have filaments that are made of the same material and both filaments are cylindrically shaped. Based on your answer to Part A, compare geometric quantities between the two bulbs' cylindrical filaments to explain why the more resistive bulb has greater resistance.

Argumentation

PART D: In a clear, coherent, paragraph-length response that may include figures and/or equations, explain why bulb B is brighter than bulb A in series but bulb A is brighter than bulb B in parallel and why both bulbs in series are dimmer than the bulbs in parallel.