Measuring Temperature and Distance Remotely

Turn in one copy of this lab with each group member's printed name and signature. By signing, you certify that you have actively participated in the exercise and have put forth effort in equal share to your fellow group members.

Printed Name	**Signature**
_____	_____
_____	_____
_____	_____
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<u>Part 1:</u> Relating apparent brightness to distance

Table 1: Measured Illumination and Distance

d (cm)	**$1/d^2$**	**Illumination (lux)**

Table 2: Measured Illumination and ***Predicted*** Distance

Illumination (lux)	
$1/d^2$ (measured from plot)	
Distance (calculated)	
Distance (actual)	

1. Discuss how your predicted distance compared to the actual distance.

2. Referring to your graph, discuss how well distance and brightness of a source relate to each other.

Part 2 - Relating color index to temperature

1. Examine Figure 2. What characteristics of the black body curve change as the temperature of the emitter changes?

2. Color index is defined as the **ratio** between the illumination in the Blue filter and the illumination in the Red filter. Using this information and the brightness of each star's spectrum in those colors from Figure 2, fill out the table below with whether the color index is **greater than, less than, or equal to 1:**

Temperature	**Color Index**
12,000 K	
8,000 K	
3,000 K	

3. Explain in two or three sentences **why** color index is a good indicator of temperature.

Table 3: Measurements

Voltage	Lambda Max	Wein Temperature	Blue Illumination	Red Illumination	Color Index (B/R)
140					
130					
110					
100					
90					

Table 4: Prediction and Comparision

Blue Illumination	
Red Illumination	
Color Index (B/R)	
Predicted Temperature	
λ_{max}	
Wein Temperature	

<u>Part 3:</u> Determining the distance to a star.

Describe a three step process starting with Color Index that will allow you to measure the distance to a star.

Step 1

Step 2

Step 3