Hands-on Lecture Workbook 04

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| **PSCI 1102 Sec #:** |  | **Date:** |
| **Name:** | | |

1. Blackbody Radiation

Part 01: Black Body Radiation Curves

1. Open up the simulation: <https://phet.colorado.edu/en/simulations/blackbody-spectrum>
2. Gráfico, Histograma

   Descripción generada automáticamenteThe following is a black body radiation curve plot with different temperature.

Questions:

1. What type of relationship is there between a star color and its temperature?

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1. How about the star temperature vs. the intensity of radiation?

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1. Tell me about all blackbody radiation curve characteristics of a Sirius A star.

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1. Tell me about all blackbody radiation curve characteristics of a light bulb.

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Part 02: Wein’s Law https://latex.codecogs.com/gif.latex?%5Clambda_%7Bmax%7D%20%3D%20%5Cfrac%7B2.898%5Ctimes10%5E%7B-3%7Dm%5Ctextup%7BK%7D%7D%7BT%7D

1. Complete table 1.

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| --- | --- |
| Temperature (K) | Wavelength (μm) |
| 2000 |  |
| 3000 |  |
| 4000 |  |
| 5000 |  |
| 6000 |  |
| 7000 |  |

1. Plot a graph of peak wavelength (y-axis) vs. temperature (x-axis) with MS Excel. Copy and paste your plot to here.
2. What type of relationship does wavelength and temperature have?

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| Ex. Linear, Inverse, Quadratic, or other  Answer: |

7-segment Display

The 7-segment display is a device that has a figure 8 and a decimal point. Each of the rectangular shaped LED's is called a segment. Within the one figure, you can display several different types of numbers from 0 through 9. An additional eighth LED is sometimes displayed as a decimal point.

After the appropriate pins have been placed, the LED segment will display numbers in a certain pattern, and some segments will be darkened while others will be illuminated.

Part 01: 7 - S E G M E N T D I S P L AY

This activity will introduce the operation of a 7-segment display.

Component list:

• Arduino Uno R3

• Breadboard

• 1-digit-7-segment display

• 74HC595

• 8x Resistor 330 Ω

Create the 1-digit 7-segment display below:



Questions:

1. What is the 7-segment display displaying?

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1. What does the 74HC595 do?

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1. If the 74HC595 is removed, do you think the Arduino program will be harder or easier? Why?

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