What color gets the hottest?

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Purpose: to find out what color light bulb gets to the hottest temperature

Hypothesis: If different color light bulbs have different temperatures, then blue will give off the most heat because it has the highest frequency.

Has anyone ever had a really hot room in their living space? It could be the lack of air conditioning, maybe the sun is beaming through a window, or maybe it's the lights. Surprisingly, different light bulb colors could affect things like that.

Light bulbs get hot because of something called filament temperature. Their temperature depends on the wavelength of light they produce. The filament in white light can reach up to 2,000 degrees Fahrenheit, and some of that heat seeps to the surface of the bulb. That is why the bulbs get so hot. (Flournoy, 2018)

Tints and shade are a big part of testing which color gets the hottest. White reflects the most heat wavelengths, so it is the color that gets the least hot out of every single color. Black is made up of all the colors of the color spectrum. It is the darkest color possible and absorbs the most heat because it is so dark. (What Colors Absorb More Heat? 2018)

The light appearance of lightbulbs is measured by something called Kelvin. Kelvin can be measured from 2000k and 6500k. Colored light bulbs that are usually in houses are warm incandescent (2700k), warm white halogen (3000k), and household fluorescent (3500k). The average number of Kelvin in most household light bulbs are around 2500k - 3500k. (How to Choose the Right Color Kelvin, 2020?).

Heat was found to be a type of energy in 1847 and was found by James Prescott Joule. Thermal energy (heat energy) is created when atoms and molecules move faster and collide with each other. Joule found this out while he was studying heat, energy, and light. He noticed that when he heated up water, it reacted differently than normal. (What is thermal energy?, 2020)

The history of the lightbulb itself started in 1802 when Humphry Davy created the first electric light. He connected electric wires to a piece of carbon and the carbon started glowing

(making light). It wasn't the most useful or amazing thing ever because it didn't glow for long and didn't produce a lot of light. (History of the Light Bulb, n.d.)

In 1840, things got better. A British scientist named Warren de la Rue took a coiled filament and put it in a vacuum tube. He ran electric power through it, hoping to make the platinum melt. His goal was to improve the timespan of the light. (History of the Light Bulb)

Ten years later, an English man named Joseph Wilson Swan enclosed carbonized paper filaments in an evacuated glass bulb. His experiment didn't work that well. As the years went on, better vacuum pumps were created and allowed Swan to upgrade his invention and improve it. By 1878, he was able to make a new lightbulb that was better than his other ones. (History of the Light Bulb)

In 1874, two Canadian men named Henry Woodward and Matthew Evans attempted to build lamps with different shapes and sizes of carbon rods held between electrodes (a conductor which electricity passes through) filled with nitrogen. Their invention wasn't successful and they later sold their invention to Thomas Edison in 1879. (History of the Light Bulb)

In 1878, Edison started researching incandescent lamps. He filed his first patent application for “Improvement in Electric Lights” and was not successful. He filed for another patent in 1879 for “An Electric Lamp Using a Carbon Filament”. His patent was granted and he later found out that carbonized bamboo filament lasted for more than 1200 hours (50 days). That is how his lamp business took off in 1880. (History of the Light Bulb)

Other major events that happened with light bulbs and bulb colors are that in 1906, Edison proved that tungsten was the best choice for filament light bulbs and was soon taken to his advantage. In 1910, a scientist named William David Coolidge improved the process of the tungsten filament and it became the longest lasting filament.

In the 1920s, the first frosted light bulb was invented and was used for car headlights and neon lightings. In the 1930s, flashbulbs for photography and tanning fluorescent lamps were created. In the 1940s, the first soft light bulbs were invented and were a big hit. In the 1950s, quartz glass and halogen bulbs were produced. In the 1980s, low wattage halides were created. And in the 1990s, long life bulbs and compact fluorescent bulbs became popular. (History of the Light Bulb)

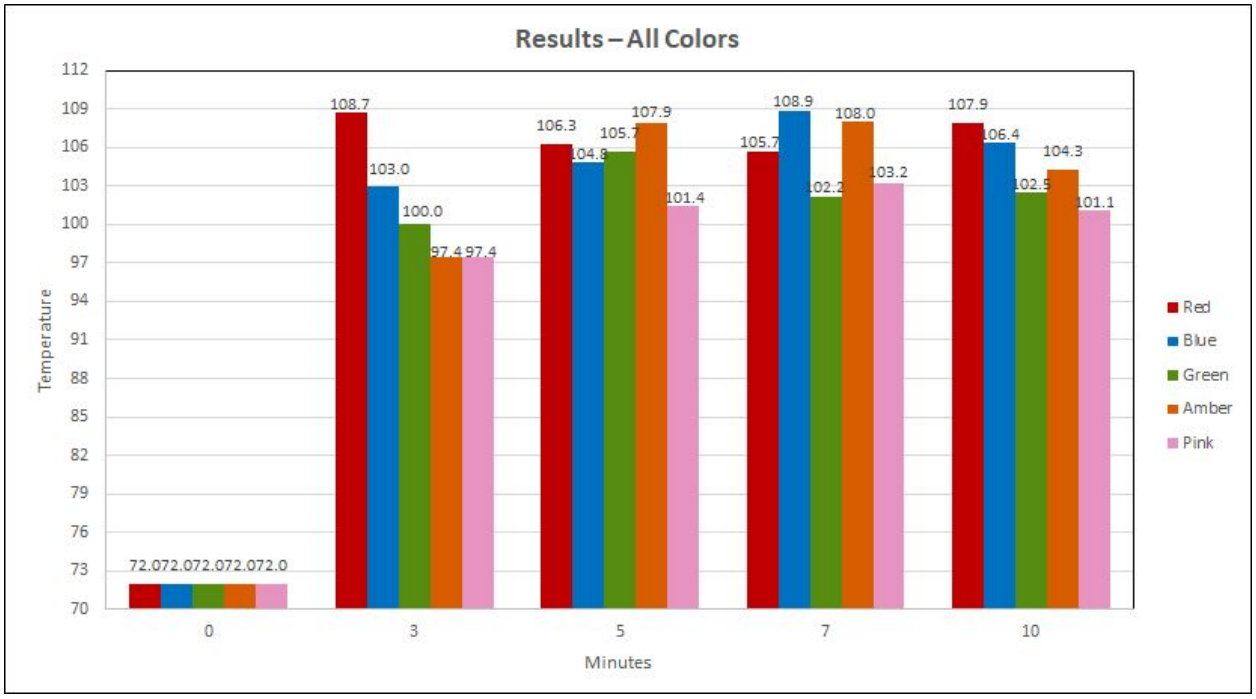
The experiment that is going to be tested is what color lightbulb projects the most heat? There will be different colored, incandescent bulbs that will be turned on for the same amount of time. The temperature of the bulb, surfaces around the bulb, how hot it gets by a certain amount of time and how long it takes to cool off will all be tested. The bulbs will be left on for the exact amount of time and in the same place. Only one thing is going to be changed and the results will be recorded.

Materials used for experiment:

- Thermometer
- Lamp stand
- Timer
- Red incandescent light bulb
- Amber incandescent light bulb
- Green incandescent light bulb
- Blue incandescent light bulb
- Pink incandescent light bulb

Procedure:

1. Took the temperature of the light bulb before starting my experiment
2. Went into a dark room with my thermometer and my light bulbs
3. Separately inserted each light bulb into a lamp and took their temperature at 3, 5, and 10 minutes.
4. Measured the temperature of the bulbs in the order of Red, Blue, Green, Amber and Pink


Results – All Colors
Temperature
Minutes
0
3
5
7
10
72.0 72.0 72.0 72.0 72.0
108.7
103.0
100.0
97.4 97.4
106.3
104.8
105.7
107.9
101.4
105.7
108.9
102.2
108.0
103.2
107.9
106.4
102.9
104.3
101.1
Red
Blue
Green
Amber
Pink

Conclusion: My hypothesis was correct. Different color light bulbs measured different temperature results. The blue light bulb got the hottest at 7 minutes with a temperature of 108.9F. My experiment could be useful because it demonstrated the heat of the light bulb changes by color variations.

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