People do not want electricity or oil ... but rather comfortable rooms, light, vehicular motion, food, tables, and other real things.

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Energy in Everyday Life

Thermal Radiators

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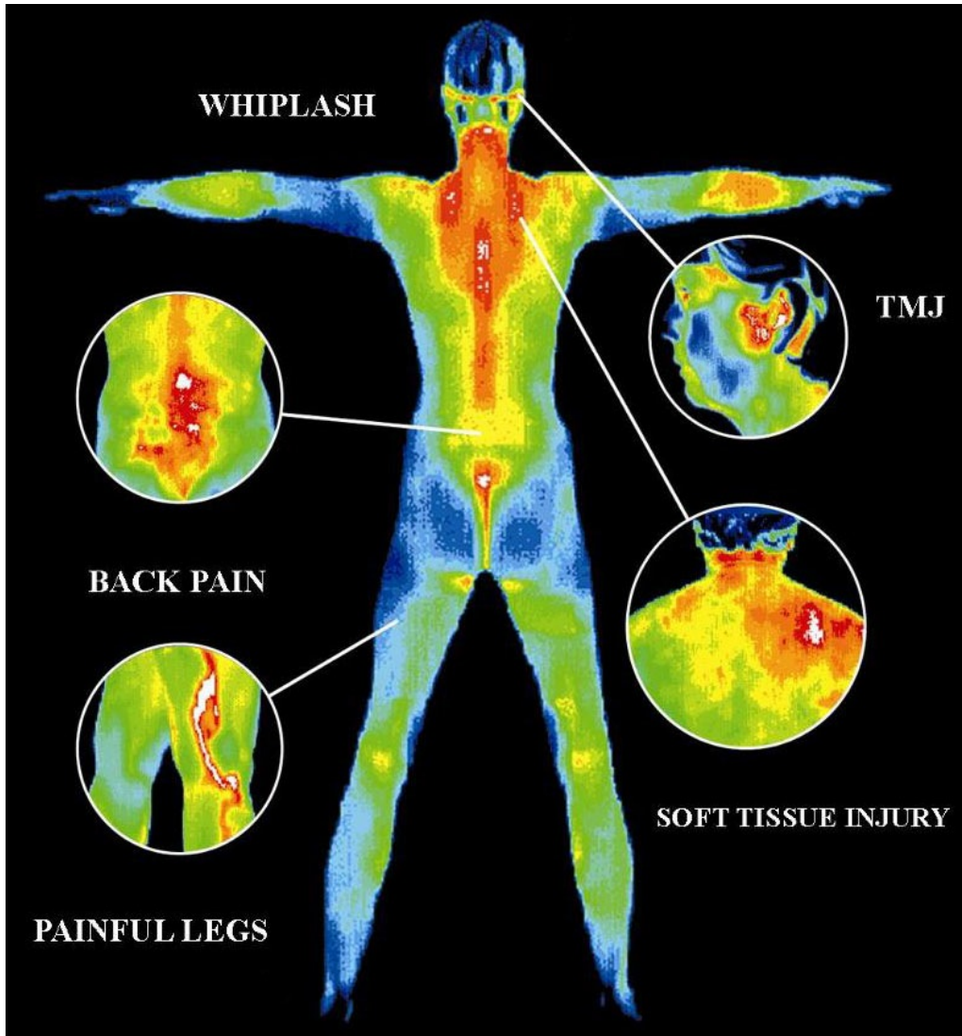
How does light tell us the temperature?

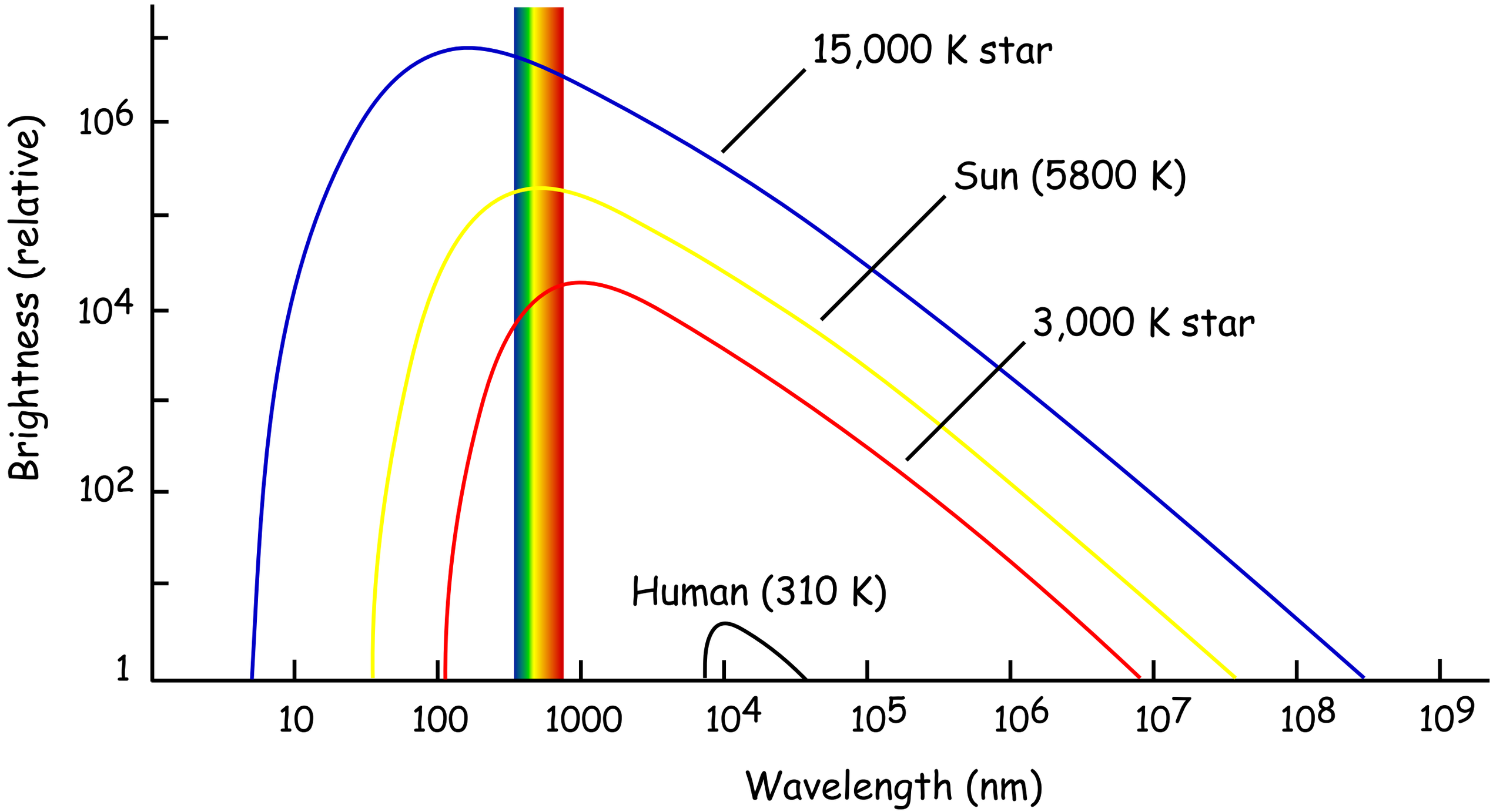
Any object with a temperature emits light.

We can determine temperature because hotter objects emit more light per unit area with a higher average energy.

You, the Sun, even the universe is a thermal radiator.

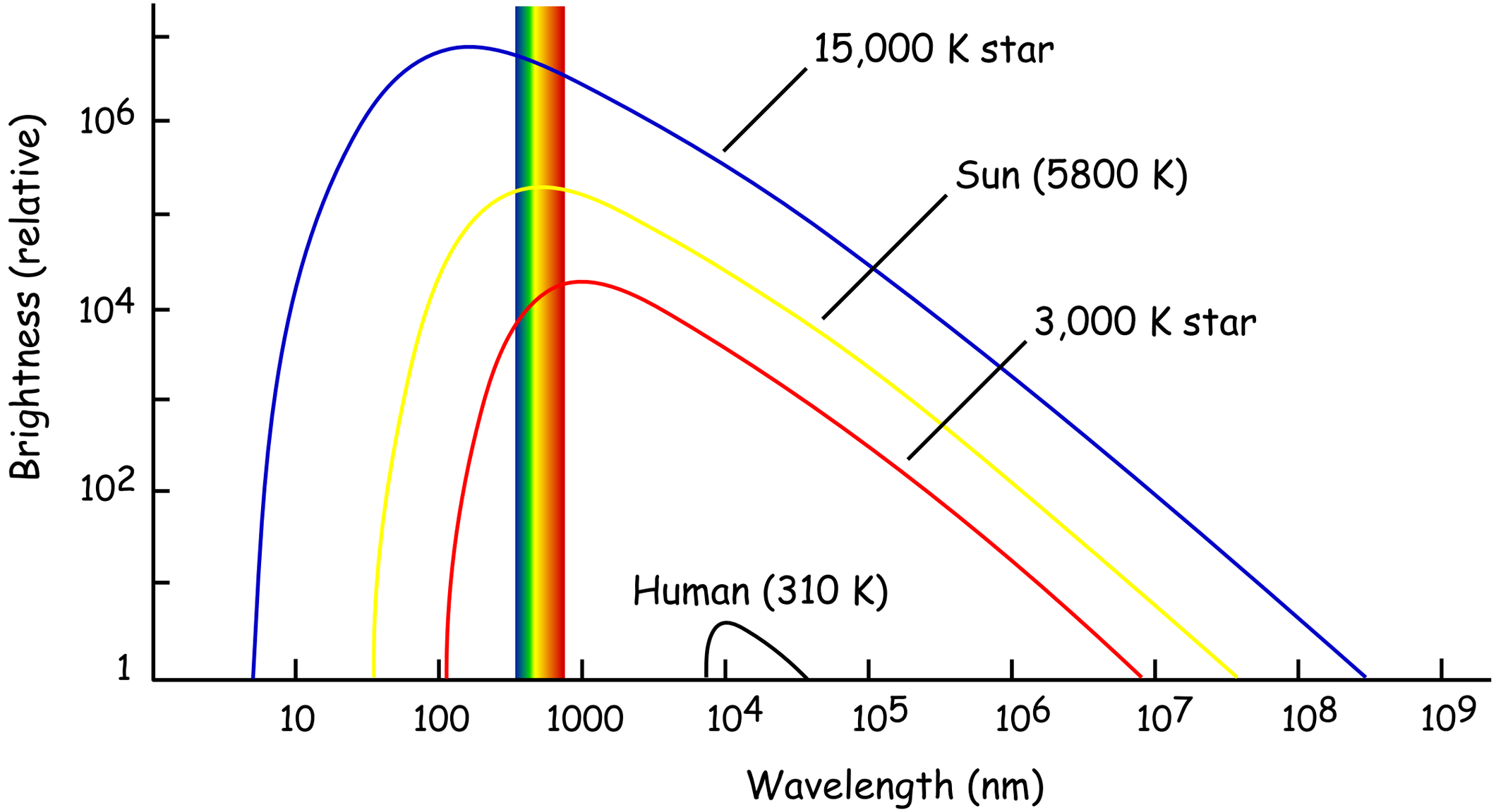


If we plot the brightness of each color emitted by an object, we find all wavelengths are present.



The hotter you are the brighter you are.

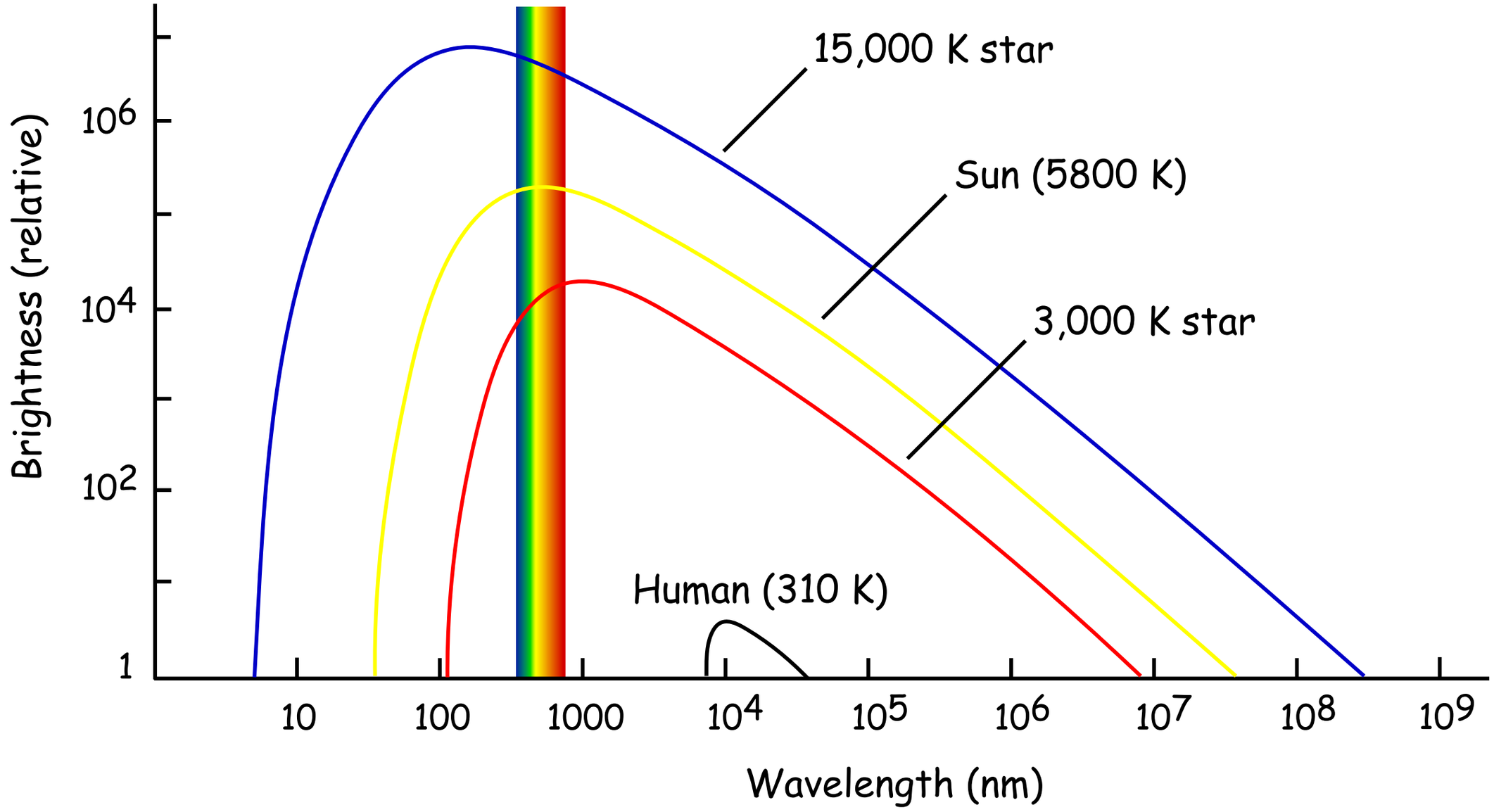
Hotter objects emit more light for a given area.



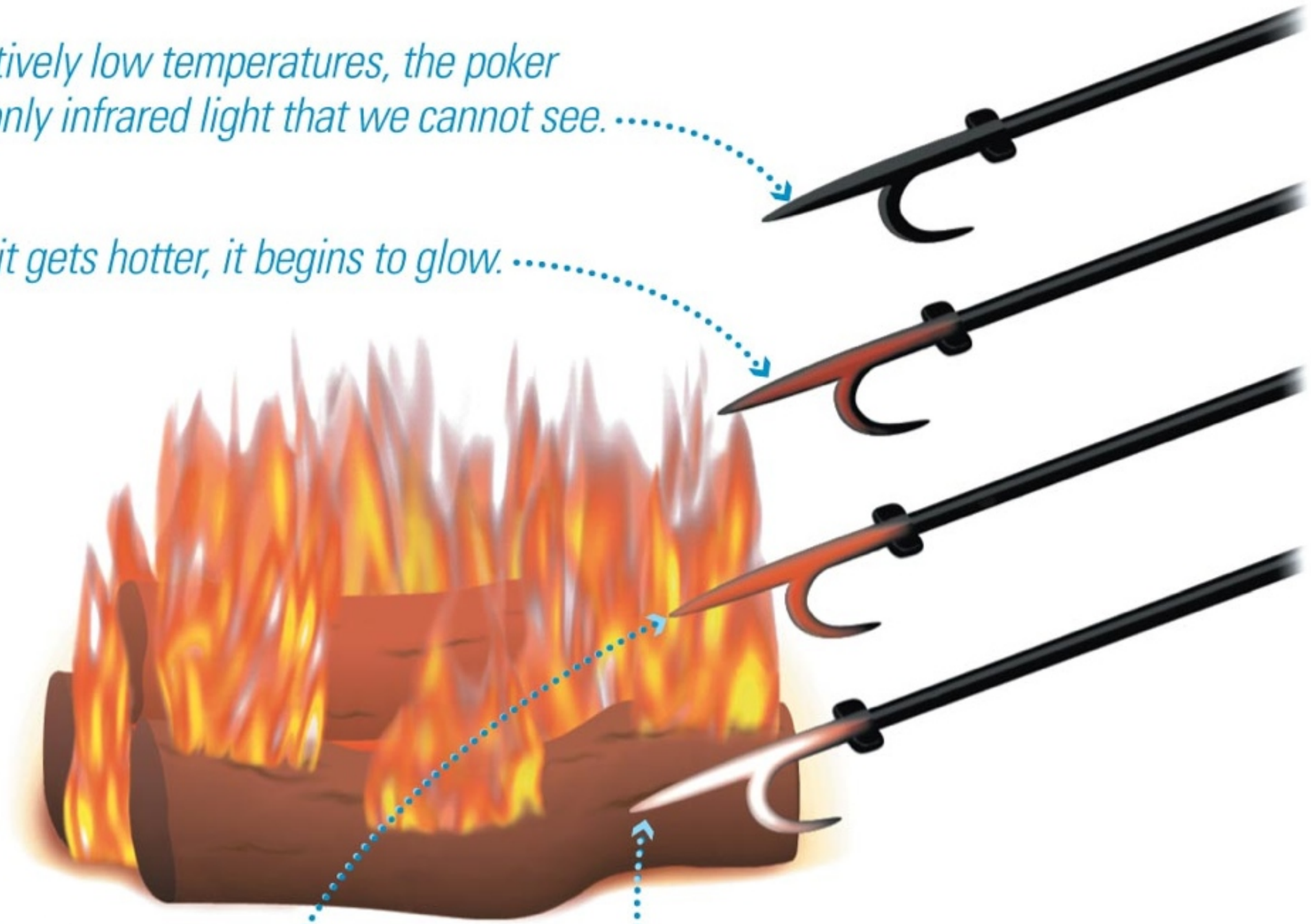
$$\text{Power} = \sigma\ \text{Temperature}^4 \cdot \text{Area}$$

Hotter objects look bluer, cooler objects look redder.

Hotter objects emit more photons with higher energy.



$$\text{Wavelength}_{\text{peak}} = \frac{2.9 \times 10^6}{\text{Temperature}} \text{ nm}$$


At relatively low temperatures, the poker emits only infrared light that we cannot see.
As it gets hotter, it begins to glow.
It gets brighter as it heats up (demonstrating Law 1) . . .
. . . and changes from red to white in color (demonstrating Law 2).