

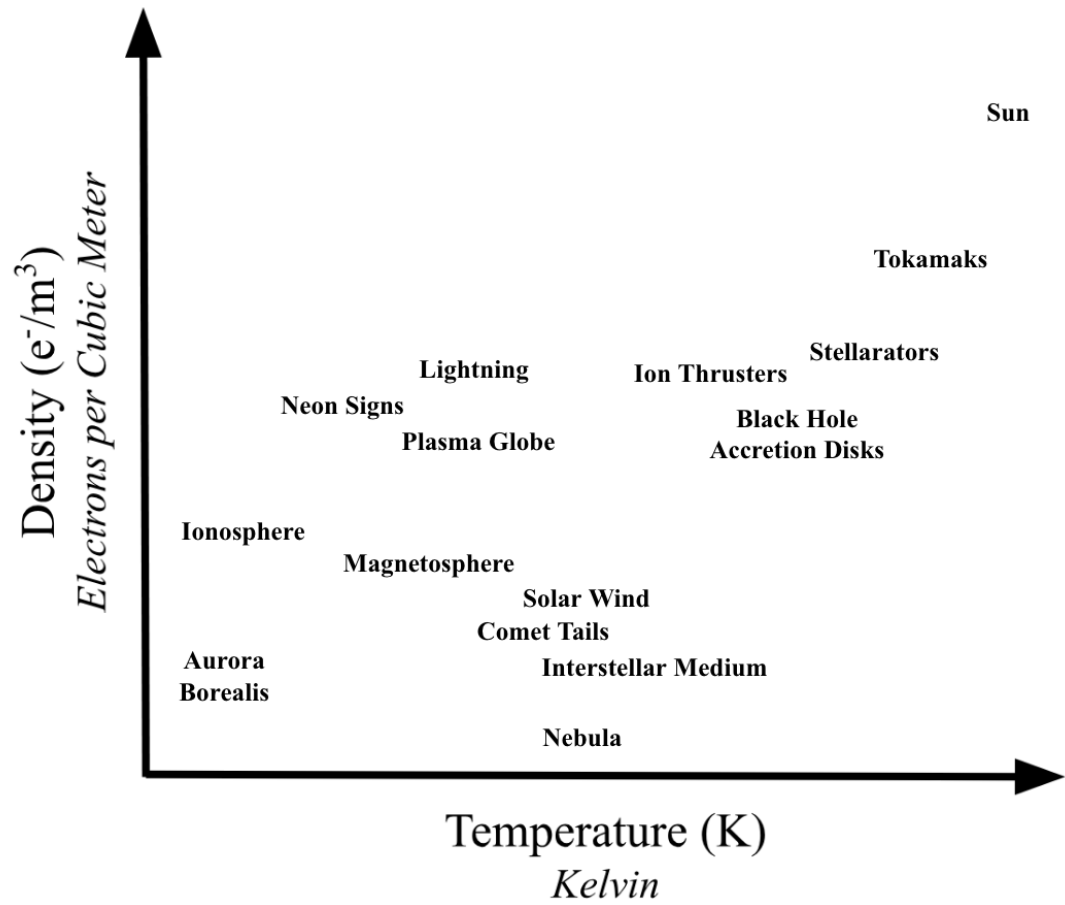
Plasma Phenomenon Cards Lesson Key

Below are the plasma phenomena that students will consider in Activity 1: Plasma Phenomena. The phenomena are categorized by type of plasma, and each category is organized in order of ascending temperature (from lower to higher temperatures).

Category: Terrestrial Plasmas		
Phenomenon	Temperature	Density
Ionosphere	500 - 1500 K (227 - 1227 °C)	$10^{11} - 10^{12} \text{ e/m}^3$
Magnetosphere	6000 - 35,100 K	$10^6 - 10^{10} \text{ e/m}^3$
Lightening	30,000 K (29,727 °C)	$10^{19} - 10^{20} \text{ e/m}^3$
Category: Astrophysical Plasmas		
Phenomenon	Temperature	Density
Aurora Borealis (can also be considered Terrestrial)	500 - 1400 K	$10^4 - 10^6 \text{ e/m}^3$
Comet Tails	$10^4 - 10^6 \text{ K (9,727 - 999,727 °C)}$	$10^5 - 10^8 \text{ e/m}^3$
Solar Wind	$10^4 - 10^6 \text{ K}$	$10^4 - 10^8 \text{ e/m}^3$
Nebula	$10^4 - 10^6 \text{ K}$	$10^2 - 10^8 \text{ e/m}^3$
The Interstellar Medium	10^5 K	10^6 e/m^3
Black Hole Accretion Disks	$10^6 - 10^8 \text{ K}$	$10^{12} - 10^{16} \text{ e/m}^3$
The Sun	10^7 K	10^{33} e/m^3
Category: Laboratory (Artificial) Plasmas		
Phenomenon	Temperature	Density
Neon Signs	6000 - 9000 K (5573 - 8727 °C)	$10^{15} - 10^{16} \text{ e/m}^3$
Fluorescent Light Bulbs	7000 - 8000 K (6673 - 7727 °C)	10^{15} e/m^3
Plasma Globe	$3 \times 10^4 \text{ (29,727 °C)}$	$10^{14} - 10^{15} \text{ e/m}^3$
Ion Thruster	$10^6 \text{ K (10}^4 - 10^5 \text{ °C)}$	$10^{16} - 10^{18} \text{ e/m}^3$
Stellarators	$4 \times 10^7 \text{ K}$	$0.8 \times 10^{20} \text{ e/m}^3$

Tokamaks	$2 \times 10^8 \text{ K}$	$10^{20} - 10^{21} \text{ e/m}^3$
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Chart of Plasma Phenomenon (Temperature vs. Density)



*Note: Fluorescent lights are not on this graph, but would be found between Aurora Borealis and Comet Trails for temperature and between Neon Signs and Plasma Globes for density.