1. Convert 522 nm to m.

\[
522 \text{ nm} \times \frac{1 \text{ m}}{10^9 \text{ nm}} = 5.22 \times 10^{-7} \text{ m}
\]

2. Convert 4.44×10⁻⁷ m to nm.

\[
4.44 \times 10^{-7} \text{ m} \times \frac{10^9 \text{ nm}}{1 \text{ m}} = 444 \text{ nm}
\]

3. What is the wavelength of a light wave with a frequency of 5.7×10¹⁴ Hz? What color is it?

\[
\lambda = \frac{c}{\nu} = \frac{3.00 \times 10^8 \text{ m/s}}{5.7 \times 10^{14} \text{ Hz}} = 5.26 \times 10^{-7} \text{ m} = 5.26 \text{ nm} \quad \text{Green}
\]

4. What is the frequency of a light wave with a wavelength of 6.2×10⁻⁷ m? What color is it?

\[
\nu = \frac{c}{\lambda} = \frac{3.00 \times 10^8 \text{ m/s}}{6.2 \times 10^{-7} \text{ m}} = 4.8 \times 10^{14} \text{ Hz}
\]

5. What is the energy of a light wave with a frequency of 7.3×10¹⁴ Hz?

\[
E = \frac{hc}{\lambda} = \frac{(6.626 \times 10^{-34} \text{ J s}) (7.3 \times 10^{14} \text{ Hz})}{5.65 \times 10^{-7} \text{ m}} = 3.31 \times 10^{-19} \text{ J}
\]

6. What is the energy of a light wave with a wavelength of 600 nm?

\[
E = \frac{hc}{\lambda} = \frac{(6.626 \times 10^{-34} \text{ J s}) (3.00 \times 10^8 \text{ m/s})}{6.00 \times 10^{-7} \text{ m}} = 3.31 \times 10^{-19} \text{ J}
\]

7. What is the frequency of a light wave with a wavelength of 565 nm? What color is it?

\[
\nu = \frac{c}{\lambda} = \frac{3.00 \times 10^8 \text{ m/s}}{5.65 \times 10^{-7} \text{ m}} = 5.31 \times 10^{14} \text{ Hz} \quad \text{green}
\]

8. What is the frequency of a light wave with energy of 6.22×10⁻⁵ J? What type of electromagnetic radiation is it?

\[
\nu = \frac{E}{h} = \frac{6.22 \times 10^{-5} \text{ J}}{6.626 \times 10^{-34} \text{ J s}} = 9.39 \times 10^{28} \text{ Hz} \quad \text{γ rays}
\]

9. What is the wavelength of a light wave with energy of 5.5×10⁻¹⁹ J? What color is it?

\[
\lambda = \frac{hc}{E} = \frac{(6.626 \times 10^{-34} \text{ J s}) (3.00 \times 10^8 \text{ m/s})}{5.5 \times 10^{-19} \text{ J}} = 3.6 \times 10^{-7} \text{ m} = 360 \text{ nm} \quad \text{violet}
\]

10. Is an orange flame cooler or hotter than a blue flame? Explain your answer.

   Orange flame has shorter small frequency, therefore, it has smaller lower energy.