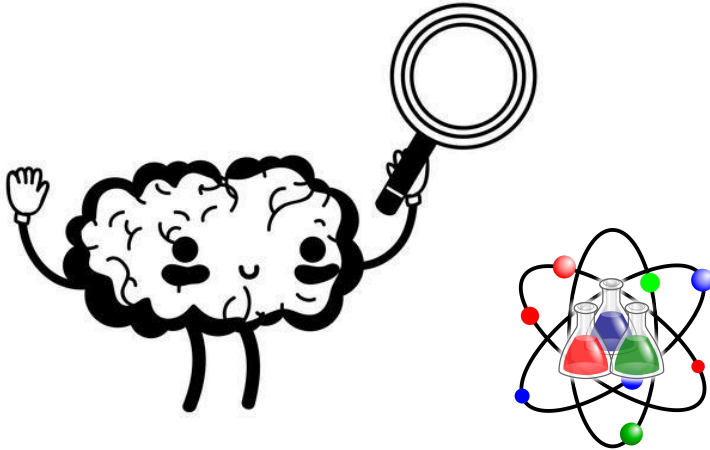


Name \_\_\_\_\_ Per \_\_\_\_\_



# Dare to Inquire Science

## **Quiz - The Electron (Speed & Energy of Light) and key**

Suggestions:

This is a straightforward quiz incorporating the EM spectrum, unit conversions, speed of light equation as well as the  $E=h\nu$

Materials needed:

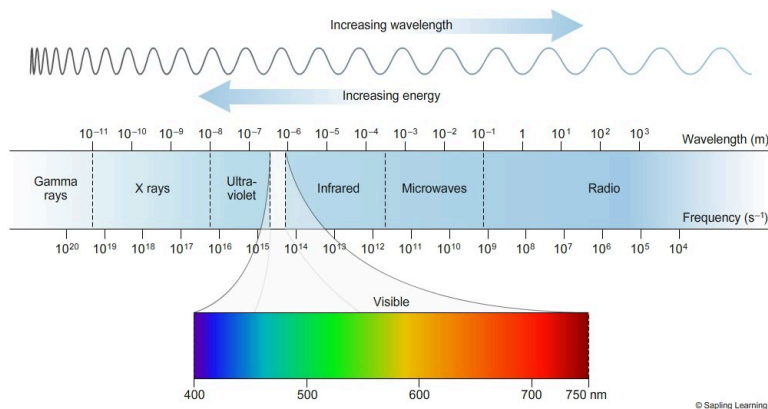
Calculator and formula or conversion sheet.

Brain Logo Source:

<https://www.vecteezy.com/vector-art/658053-contour-kawaii-happy-brain-with-magnifying-glass>

## Quiz - The Electron, Speed and Energy of Light - Chemistry

**True/False** .Indicate whether the statement is true or false. **IF FALSE, CORRECT** to make it true.



- \_\_\_\_\_ 1. Wavelength has an inverse (opposite) relationship with frequency.
- \_\_\_\_\_ 2. Red light waves have higher frequencies than blue light waves.
- \_\_\_\_\_ 3. Under natural conditions, microwaves are not harmful to living things.
- \_\_\_\_\_ 4. A “quantum leap” refers to electrons getting excited and moving into the next energy level.

**Problems. We all got ‘em!** Show work, label units & **BOX** final answers.  $c = 3 \times 10^8$  m/s,  $h = 6.63 \times 10^{-37}$  KJ \* s

5. The wavelength of a light beam is 382 nm. What is its frequency?(Hint:  $10^9$  nm = 1 m)

What type of light energy would this be? \_\_\_\_\_

6. Find the Energy of light with a 16.2 m wavelength.

\_\_\_\_\_

**Quiz - The Electron, Speed and Energy of Light - Chemistry****TRUE/FALSE**

1. ANS: T                      PTS: 1

2. ANS: F                      PTS: 1

Red light waves have **lower** frequencies than blue light waves.OR **Blue** light waves have higher frequencies than **red** light waves.

3. ANS: T                      PTS: 1

4. ANS: T                      PTS: 1

**PROBLEMS**

5. ANS:

frequency=c/wavelength

Must convert  $3 \times 10^8$  m/s to nm/s OR give conversion to students

$$3 \times 10^8 \text{ m/s} \times 10^9 \text{ nm/m} = 3 \times 10^{17} \text{ nm/sec}$$

$$3 \times 10^{17} \text{ nm/sec} \times 382 \text{ nm} = 7.85 \times 10^{14} \text{ sec}^{-1}$$

PTS: 5 (1 point for set-up and/or showing equation/work, 1 point for correctly computed/reported value, 1 point for correct unit, 1 point for box) 1 point for identifying the **type of light energy as UV** (382 nm) 400 nm begins visible light.

6. ANS:

frequency = c/wavelength

$$3 \times 10^8 \text{ m/sec} \times 16.2 \text{ m} = 1.85 \times 10^7 \text{ sec}^{-1}$$

$$6.61 \times 10^{-37} \text{ KJ} \cdot \text{sec} \times 1.85 \times 10^7 \text{ sec}^{-1}$$

**1.22 x 10<sup>-27</sup> KJ**

PTS: 5 (2 points for set-up and/or showing **both** equations/work, 1 point for correctly computed/reported value, 1 point for correct unit, 1 point for box)

Name \_\_\_\_\_ Per \_\_\_\_\_