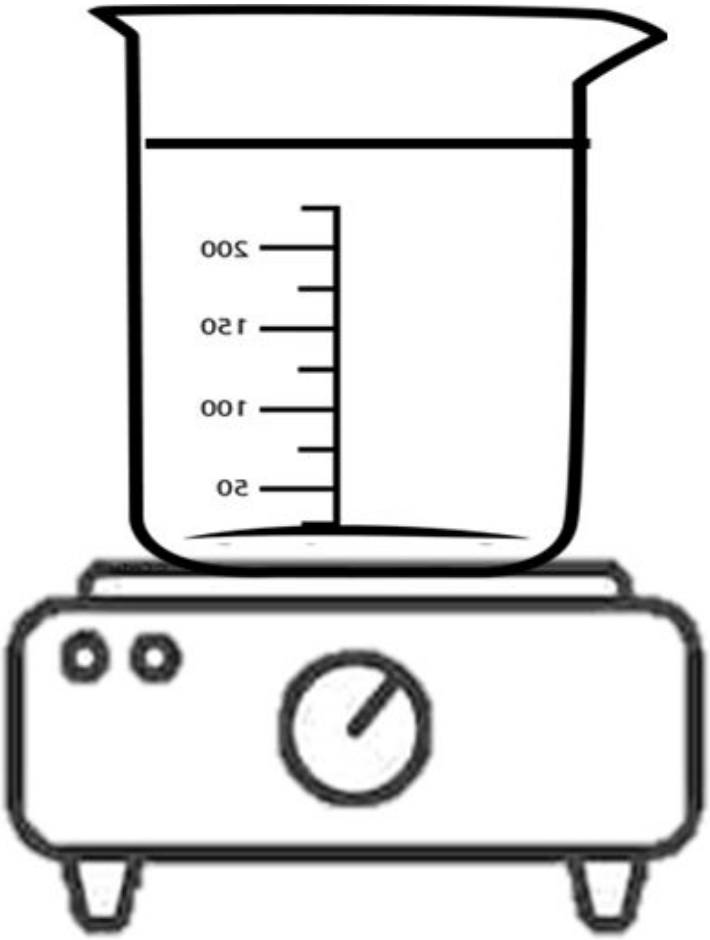
Name: Date: Pd:

Unit 3, Section 1 - Energy Forms and Electromagnetic Radiation - HONORS

Energy Transfer:

_____ is the process in which energy is transferred from object to another. This process can be broken down into three different methods: conduction, convection, and radiation. _____ is the first method of which energy is directly transferred from one object to another. The second method, _____, is when energy is transferred due to the presence and movement of fluids or gases. The third method, _____, is the process in which energy is transferred through waves, or more specifically electromagnetic waves. It is important to note that this method of energy transfer **does not** require the objects to be in direct contact.

Label and color the diagram below to show conduction, convection, and radiation:



Types of Energy:

Kinetic Energy	Potential Energy

Forms of Energy:

Energy Form	Type of Energy (Kinetic or Potential)	Description

Practice:

Identify the type of heat transfer as conduction(CD), convection(CV), or radiation(R):

_____ The heat you feel from a fireplace

_____ Transfer through solids

_____ A pan heating on a hot stove

_____ Moves as a wave

_____ Moves as a current

_____ Sun rays on Earth

Match the form of energy with its definition.

1. _____ Heat
2. _____ Nuclear
3. _____ Radiant
4. _____ Mechanical
5. _____ Chemical
6. _____ Electrical
7. _____ Potential
8. _____ Kinetic

A. Energy of an atom being split or fused
B. Energy of moving electrons (charged particles)
C. Energy of motion
D. Light energy - electromagnetic radiation
E. Energy (kinetic or potential) of **moving** objects
F. Energy of bonds in molecules and compounds
G. Stored energy
H. Thermal energy - motion of molecules

Electromagnetic Radiation (Radiant Energy):

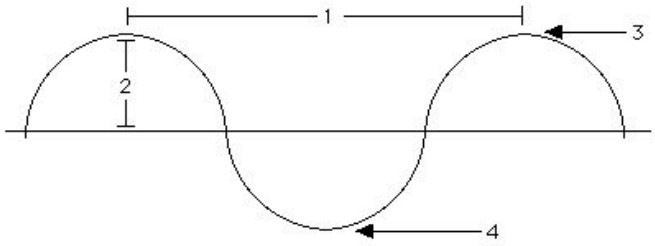
As a form of energy, light (electromagnetic radiation) travels in _____ through the environment. Below are the parts of a wave:

1 - _____

2 - _____

3 - _____

4 - _____



Energy of a wave can be identified in two easy ways: wavelength and frequency of the wave. Wavelength is a measurement of the distance from _____ to _____ on two consecutive waves and is often measured in meters or nanometers. Frequency refers to the number of waves that pass a point per _____, measured in Hertz (Hz).

Let's practice some metric conversions!

- Convert from 34 cm to meters:

34 centimeters (cm)	0.01 meters (m)
	1 centimeters (cm)

- Convert from 1,340 km to millimeters:

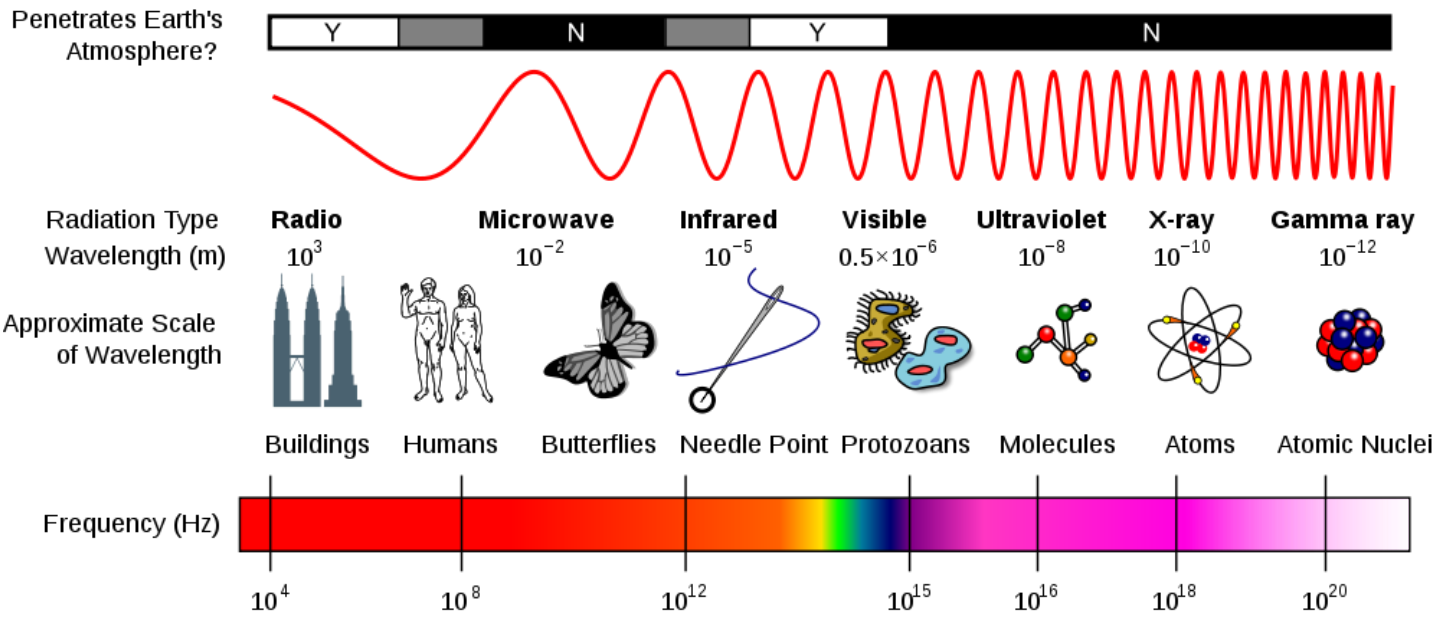
- Convert from 1.23×10^{14} nanometers (nm) to meters:

- Convert from 2.3 Megahertz (MHz) to Hertz (Hz):

Common Prefixes Used with SI Units			
Prefix	Symbol	Conversion Factor to Base Unit	Order of Magnitude
Giga-	G	1,000,000,000 base = 1 Giga	10^9
Mega-	M	1,000,000 base = 1 Mega	10^6
kilo-	k	1,000 base = 1 kilo	10^3
hecto	h	100 base = 1 hecto	10^2
deka-	da	10 base = 1 deka	10^1
	Base Unit	1 base	10^0
deci-	d	1 base = 10 deci	10^{-1}
centi-	c	1 base = 100 centi	10^{-2}
milli-	m	1 base = 1,000 milli	10^{-3}
micro-	μ	1 base = 1,000,000 micro	10^{-6}
nano-	n	1 base = 1,000,000,000 nano	10^{-9}
pico-	p	1 base = 1,000,000,000,000 pico	10^{-12}

Electromagnetic Spectrum:

The electromagnetic spectrum is the full spectrum of all light energy. The spectrum is designed based on decreasing _____ and increasing _____. The shorter the wavelength, the _____ the energy of the wave.



Circle the correct answer for the statements/questions below:

1. The waves to the RIGHT on the spectrum are at a (**higher energy** / **lower energy**) than the waves to the left.

2. Which of the following energies has the LONGER wavelength? **Radio** or **Infrared**

3. Which of the following energies has the SHORTER wavelength? **X-Ray** or **Microwave**

Match the following wavelengths/frequencies of light with their correct type of radiation:

1. Wavelength of 1.0×10^{-5} meters (m) = _____
2. Wavelength of 9.43×10^{-10} meters (m) = _____
3. Frequency of 1.22×10^{5} meters (m) = _____
4. Frequency of 5.4×10^{15} meters (m) = _____

Now, let's put it all together. Convert the following, then identify the correct type of radiation:

1. 49 nanometers (nm) = _____ meters (m) - _____

2. 0.0032 nanometers (nm) = _____ meters (m) - _____