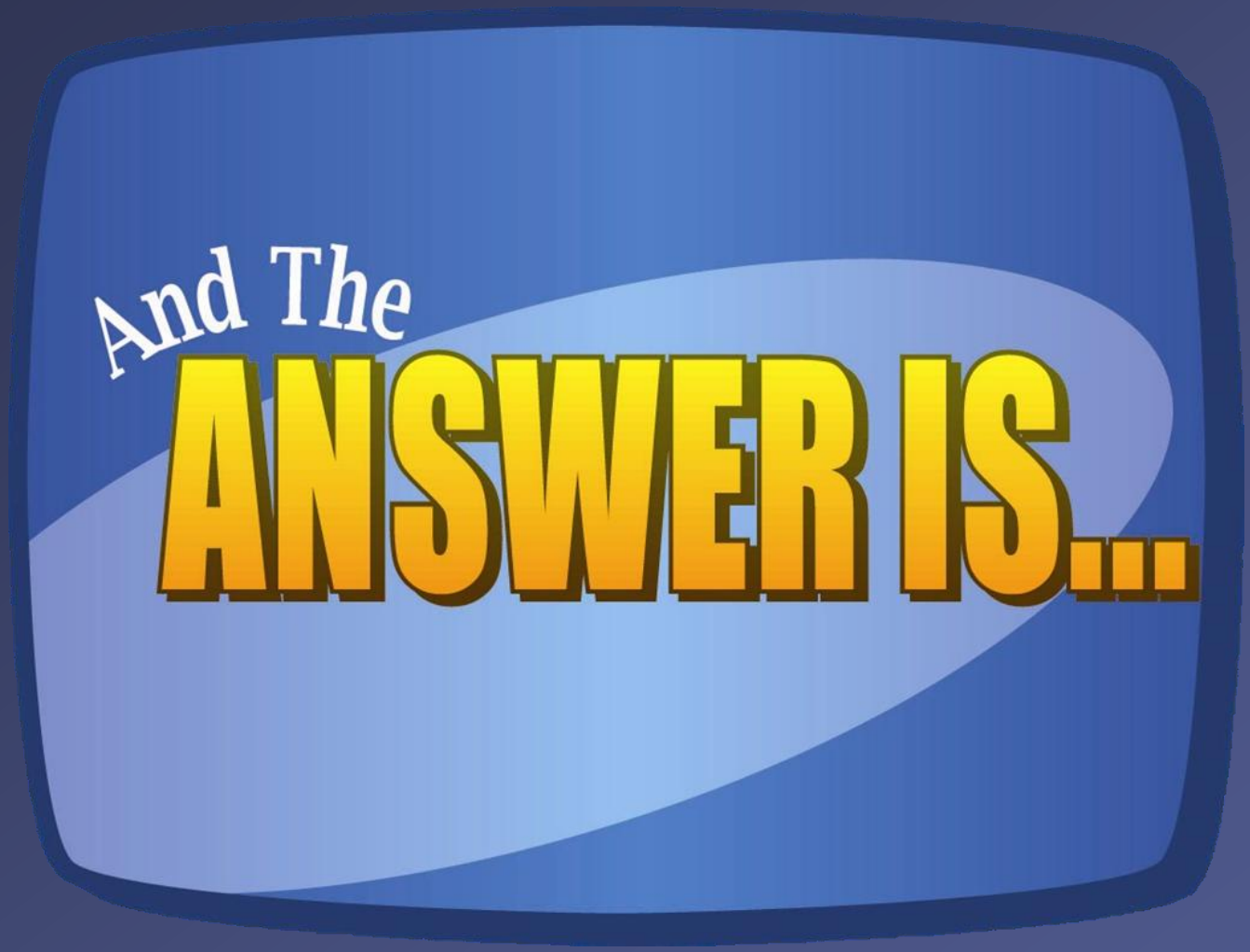

And The
ANSWER IS...

Atmospheric Structure and Composition	Radiation Laws	Matter & Thermo-dynamics	Time Series & Energy	Odds & Ends
100	100	100	100	100
200	200	200	200	200
300	300	300	300	300
400	400	400	400	400
500	500	500	500	500

This gas is NOT a Greenhouse Gas.

What is…

1. O_2
2. O_3
3. CH_4
4. Freon-11 (a CFC)

The gases: H_2O and CO_2.

What are…

1. **The two most abundant gases.**

2. **The two most abundant Greenhouse gases.**

3. **The two most abundant anthropogenically enhanced Greenhouse gases.**

4. **The two gases that comprise 99% of the atmosphere**

The observation that "the atmosphere is heated from below" is most evident in this layer.

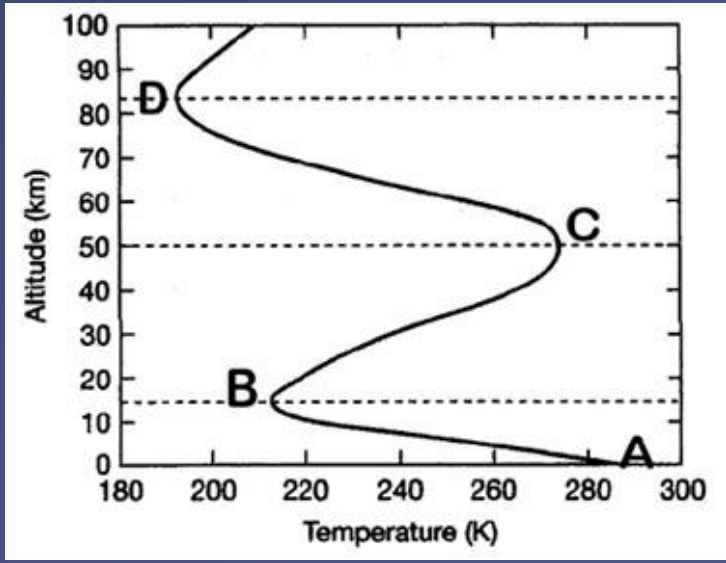
What is…

1. Layer A - B

2. Layer B - C

3. Layer C - D

4. Layer D and above



The average temperature in this layer of the atmosphere gets cooler with increasing altitude.

What is the…

1. TROPOSPHERE

2. TROPOPAUSE

3. STRATOSPHERE

4. THERMOSPHERE

The residence time of CO2 gas molecules, once they get into the atmosphere.

What is…

1. ~10-12 years

2. ~50 years

3. ~100 years

4. ~ 500 years

N2, N, O and O2 are effective absorbers of extremely harmful X-ray and UVC radiation in this layer.

What is…

1. Troposphere

2. Stratosphere

3. Mesosphere

4. Thermosphere

The Radiation Laws that best explains why absorption curves exist.

What is…

1. The hotter the body, the shorter the wavelength $\lambda_m = a / T$

2. Shorter electromagnetic wavelengths have higher intensity radiation than longer wavelengths $E = h c / \lambda$

3. The hotter the body, the (much) greater the amount of energy flux or radiation $E = \sigma T^4$

4. Some substances emit and absorb radiation at certain wavelengths only.

The reason the relatively cooler Earth radiates its energy in longwave radiation, in contrast to the Sun which radiates most of its energy in short wave radiation:

What is…

1. The hotter the body, the shorter the wavelength

$$\lambda_m = a / T$$

2. Shorter electromagnetic wavelengths have higher intensity radiation than longer wavelengths

$$E = h c / \lambda$$

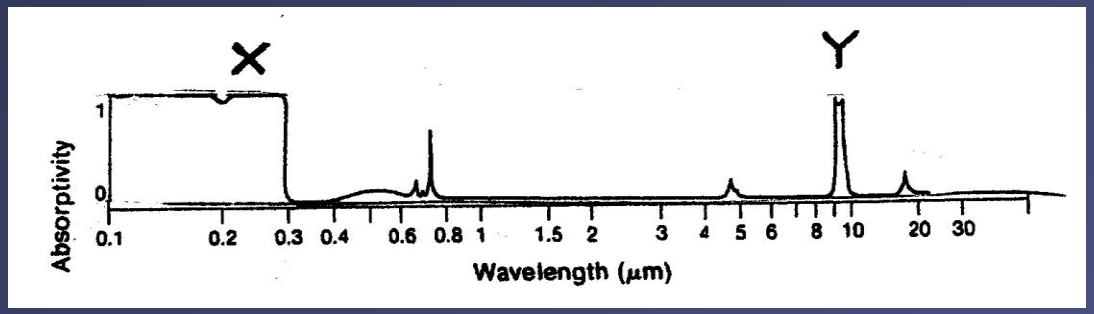
3. The hotter the body, the (much) greater the amount of energy flux or radiation

$$E = \sigma T^4$$

4. Some substances emit and absorb radiation at certain wavelengths only.

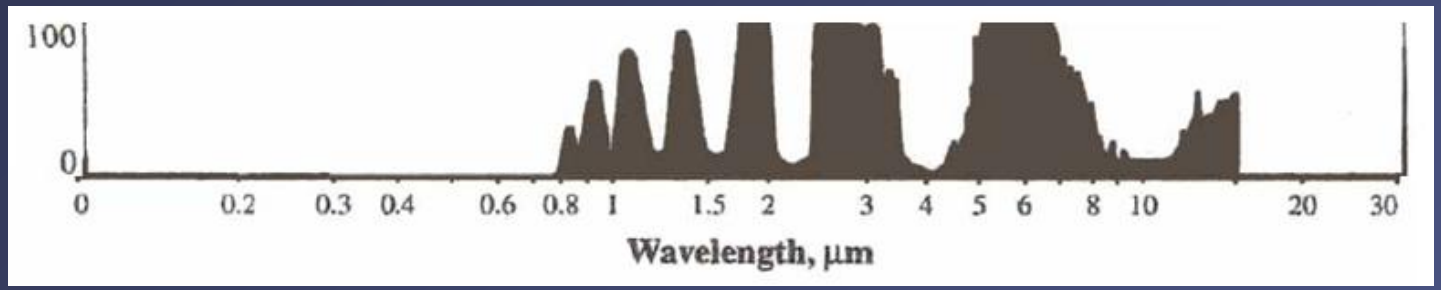
The part of this O_3 absorption curve that is linked to OZONE'S absorption of harmful UV radiation in the stratosphere.

What is…



1. Part X of the absorption curve
2. Part Y of the absorption curve
3. Both Parts X & Y working together
4. Neither X or Y – this is NOT an absorption curve!

This curve represents absorption by:



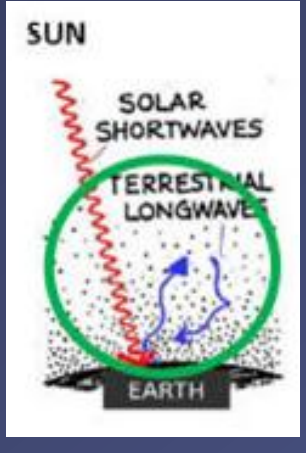
What is…

1. A blackbody
2. A gas that is NOT a Greenhouse Gas
3. All the gases in the atmosphere as a whole
4. A gas that absorbs ONLY infrared wavelengths of radiation

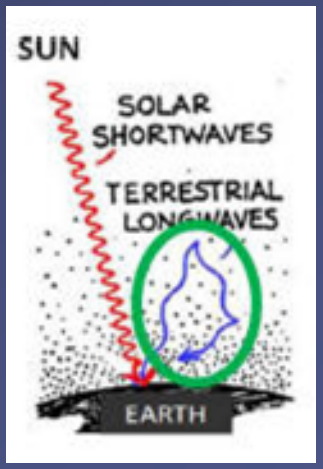
What is…

The Greenhouse Effect is best represented by the circled area in this sketch:

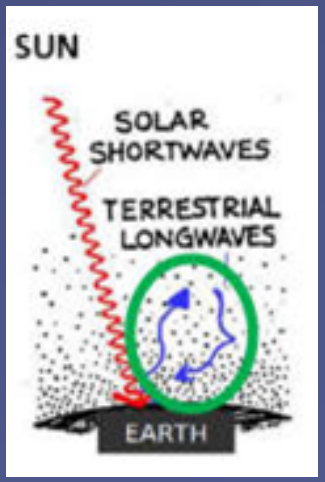
1. This one:



2. This one:



3. This one



The reason why -- if Global Warming is occurring --we should be able to detect it FIRST in LAND SURFACE temperatures rather than OCEAN SURFACE temperatures.

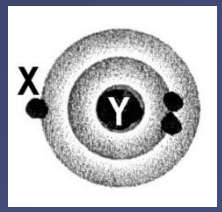
What is…

1. **The specific heat & heat capacity of WATER is higher than that of SOIL, hence water heats up more slowly than soil.**

2. **The specific heat & heat capacity of SOIL is higher that that of LAND, hence soil heats up more slowly than water.**

3. **The reflectivity of WATER is higher than that of SOIL, hence it will absorb more radiation**

The number of positively charged protons the nucleus of this neutral lithium atom contains.



What is…

1. One
2. Two
3. Three
4. None - the nucleus contains photons, not protons!

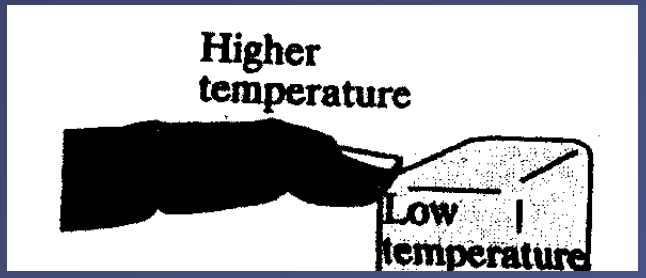
Energy transfer by means of vibrational energy from one molecule to the next through a substance.

What is…

1. Convection
2. Conduction
3. Radiation
4. Latent Energy

How thermal energy will flow in this diagram, based on the 2nd Law of Thermodynamics

What is…



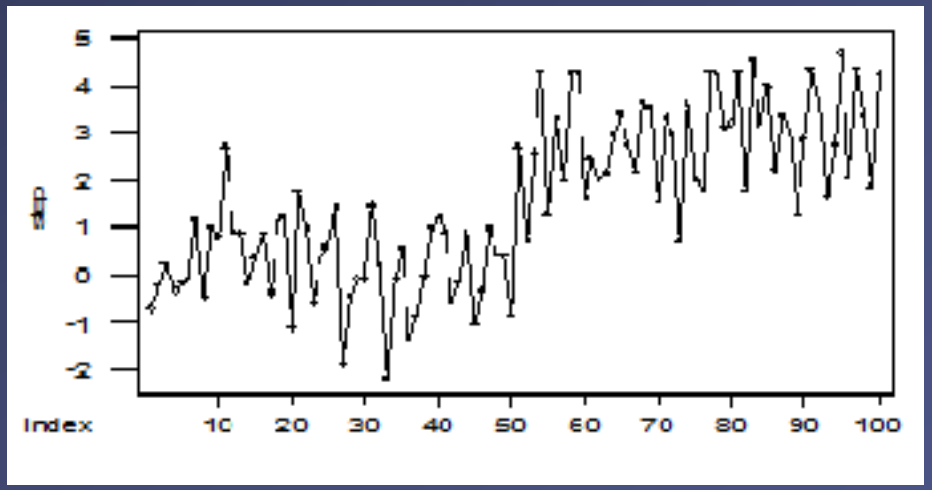
1. By means of CONVECTION

2. From the ICE CUBE to the FINGER

3. From the FINGER to the ICE CUBE

What this TIME SERIES is illustrating:

What is…

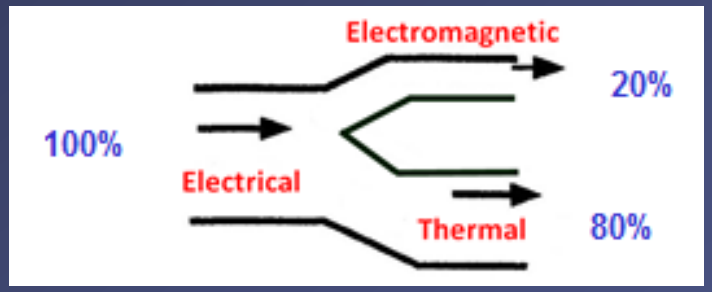


1. A constant mean
2. Quasi –periodicity
3. Abrupt change
4. An increasing trend in the variance

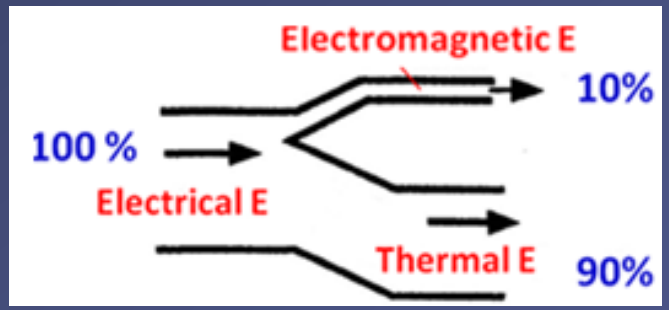
Of these choices, the energy flow diagram for an old-fashioned <u>incandescent</u> light bulb (the kind that should be replaced):

<u>What is…</u>

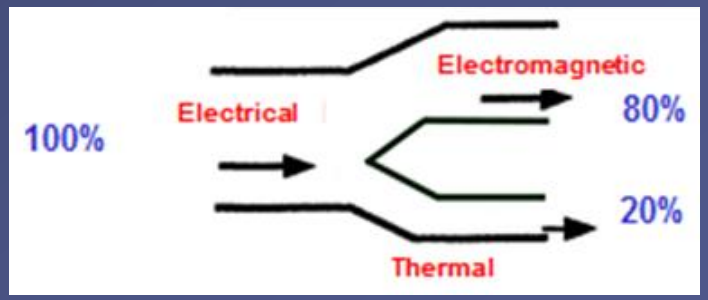
1.



2.



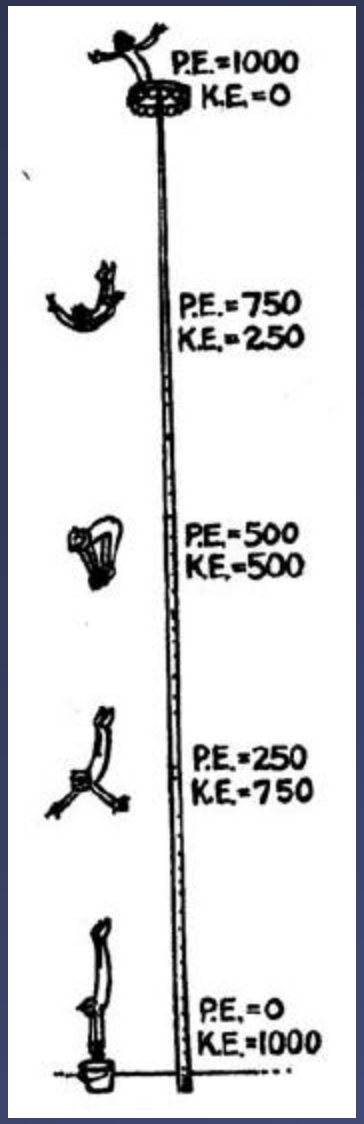
3.



The term used to describe motion-related energy.

What is…

1. Potential energy
2. Electromagnetism
3. Kinetic energy
4. Gravitational energy



The Law illustrated by this diagram of the diver's plunge to the ground is:

What is…

1. Stefan-Boltzmann
2. Sustainability
3. Conservation of Energy
4. Inverse square

The word that best completes this sentence:
"Energy may not be destroyed,
but it can become _____."

What is…

1. Matter
2. Mass
3. Inefficient

The wavelength range of infrared radiation.

What is…

1. < 0.4 micrometers
2. > 0.7 micrometers
3. 400 – 700 nanometers
4. Longer wavelengths than microwaves

The key factor that makes certain gases act as greenhouse gases!

What is…

1. They are diatomic

2. They absorb shortwave radiation and emit longwave radiation

3. They easily reflect IR radiation back to the Earth's surface

4. They absorb and emit infrared radiation

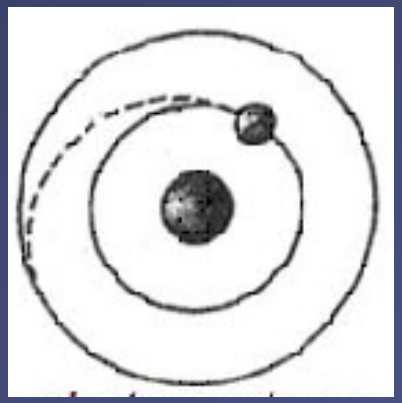
The tree ring core that represents a tree that is highly SENSITIVE to climate & good for crossdating:

What is…

1. This one: 

2. This one: 

What occurs in an atom when an electron takes a quantum leap from a higher to a lower energy level.



What is…

1. A photon is emitted
2. A photon is absorbed
3. There is no change because energy is conserved.

Quantum behavior of certain molecules (bending, rotation, vibrations)

What is…

1. Why photons leap to higher energy states
2. Behavior explained by Newton's Laws
3. The reason LE is not sensed as heat
4. The reason some gases are greenhouse gases and others are not.

THE END!