Session 3
1:00 – 2:30 PM

Activating Prior Knowledge

Large-group Discussion

Emergent Properties

Bazinga

Jeopardy-Alternative Review Game

Make & Take

Bazinga

Practice Round

General Science Content

How do you activate prior knowledge?

Opening and Closing a Lesson

Question of the Day 9/7/18

The four emergent properties of water that are important for life are:

a) Cohesion, expansion upon freezing, high heat of evaporation, and ~~capillarity~~

b) Cohesion, moderation of temperature, expansion upon freezing, and solvent properties

c) Moderation of temperature, solvent properties, high surface tension, and ~~capillarity~~

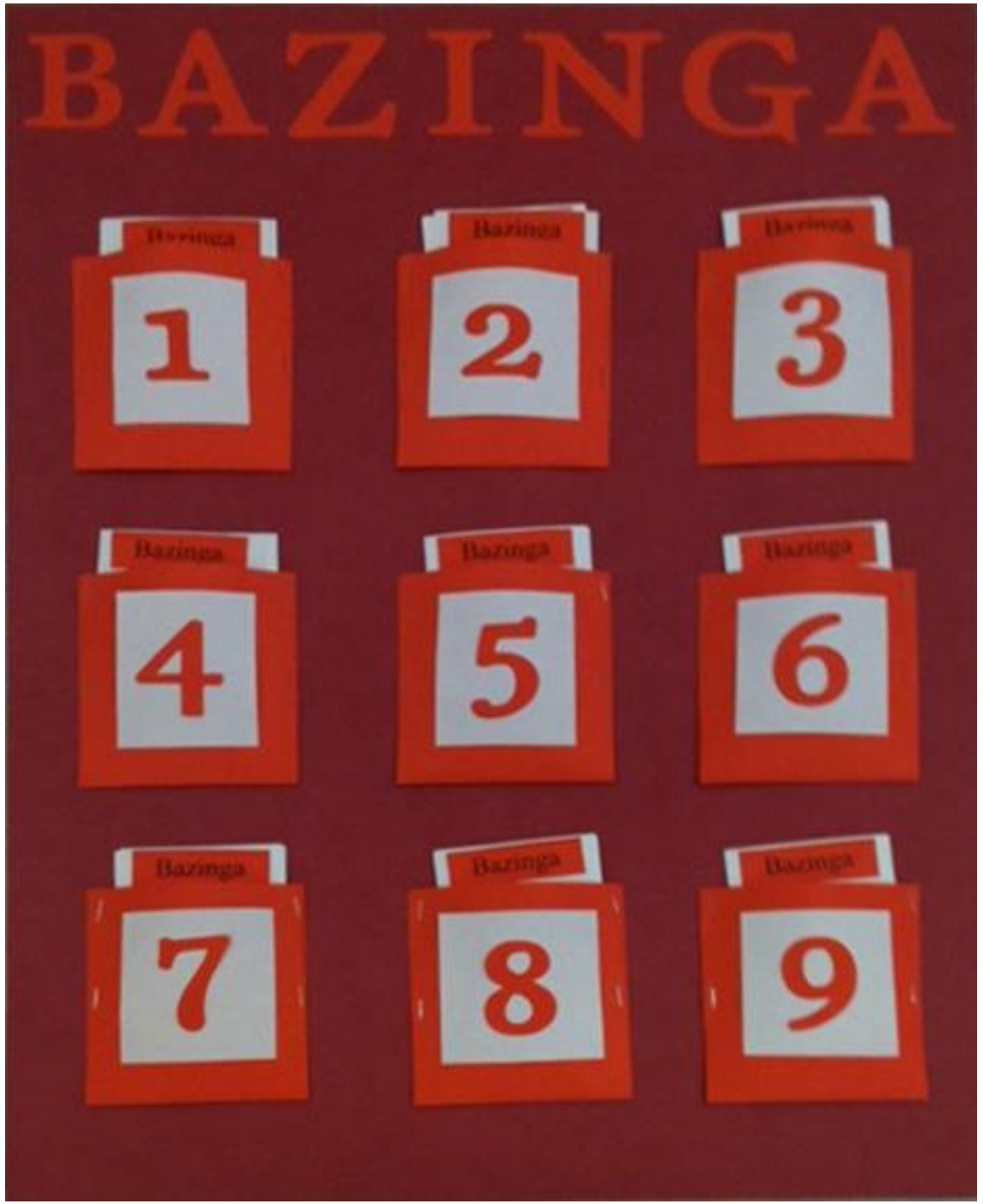
d) Heat of vaporization, high specific heat, high surface tension, and ~~capillarity~~

e) ~~Polarity, hydrogen bonding~~, high specific heat, and high surface tension


Should You GET OUT THE GLITTER?
DO YOU HAVE A FEVER?
NO
YES
ARE YOU A SUBSTITUTE TEACHER?
YES
NO
DO YOU LIKE YOUR CUSTODIAL STAFF?
NO
YES
Do you remember what happened last time you got out the glitter?
YES
NO
KEEP CALM AND GLITTER ON
STEP away FROM THE GLITTER
WE ARE TEACHERS

BAZINGA

- Jeopardy-alternative review game
- Make & Take
- If you don’t like the game, give it away to someone who might.



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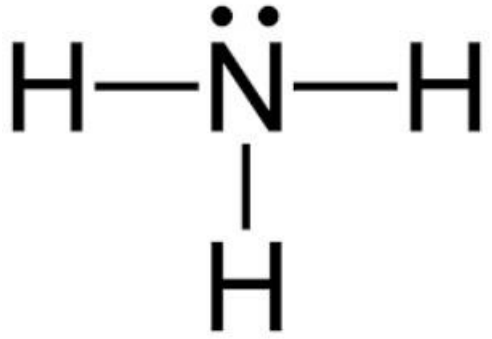
Hydrogen bonding is not only seen in water molecules.

Name this polar nitrogen compound: NH_3.



ammonia

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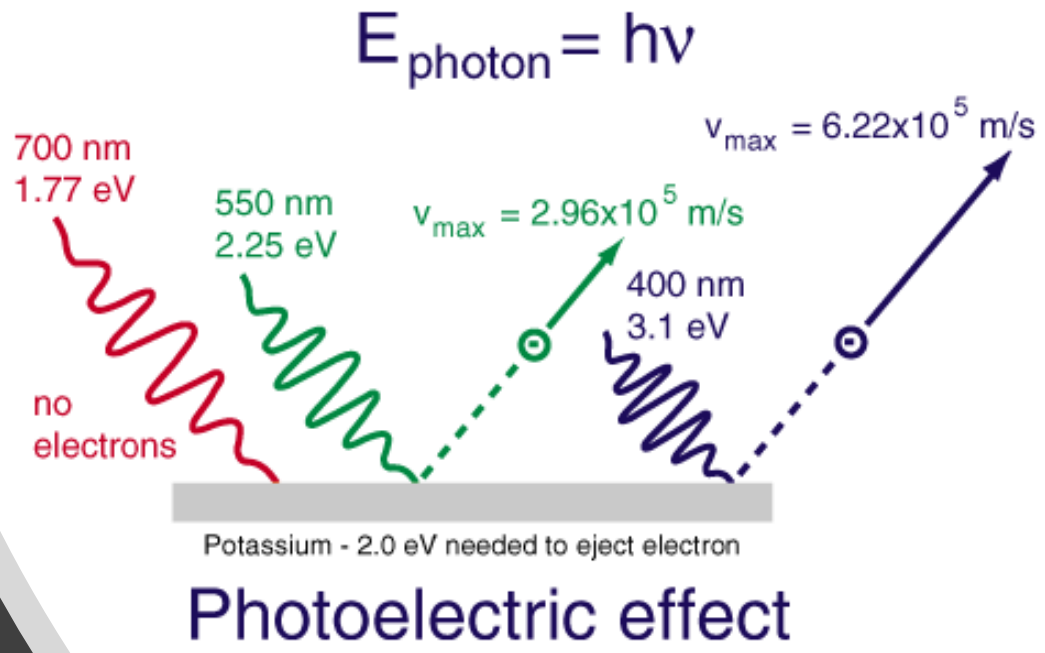
The Nobel Prize in Physics 1921 was awarded to this scientist for his discovery of the law of the photoelectric effect.



Albert Einstein

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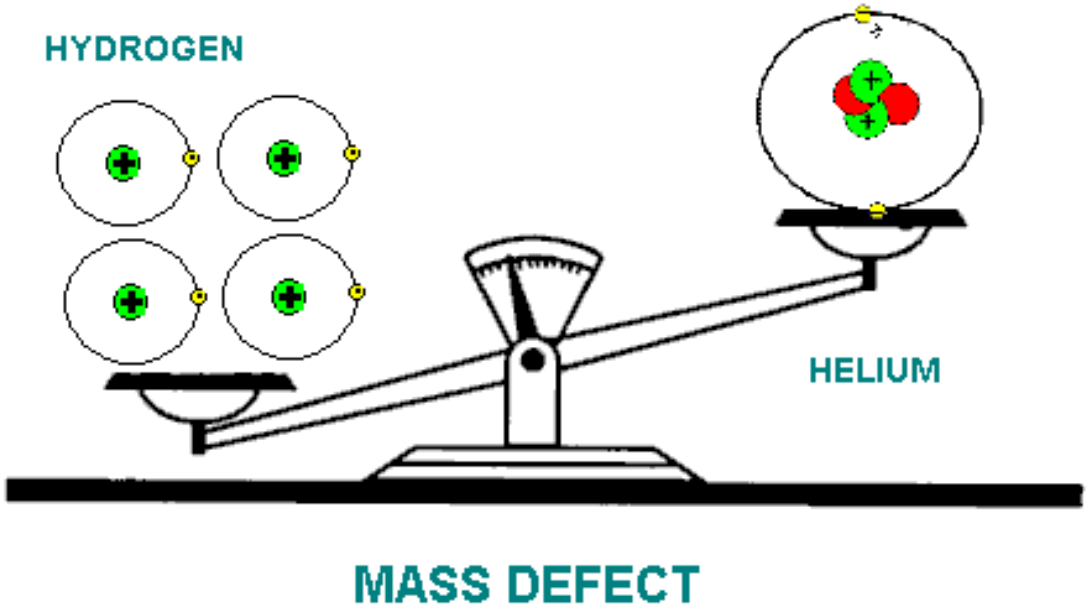
This most famous formula in all of physics answers the question, “What is mass?”



$E=mc^2$ or $m=E/c^2$

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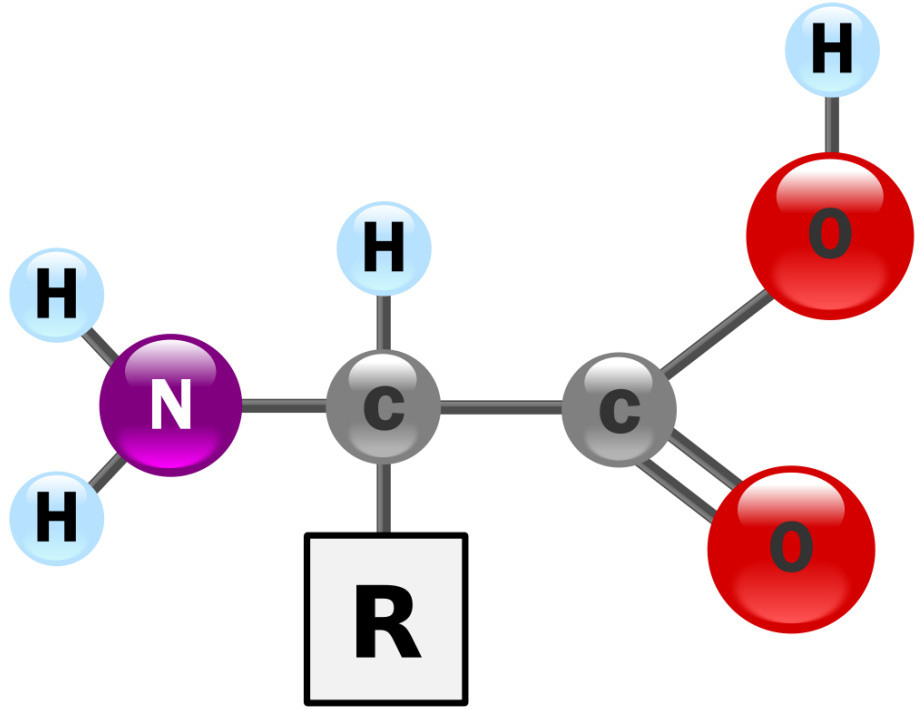
This important group of biologic molecules all possess a carboxyl group at one end and an amino group at the other.



amino acids

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The amount of heat per unit mass required to raise the temperature by one degree Celsius

$$Q = cm\Delta T$$

Q: heat added; c: specific heat; m: mass; ΔT: change in temperature

specific heat

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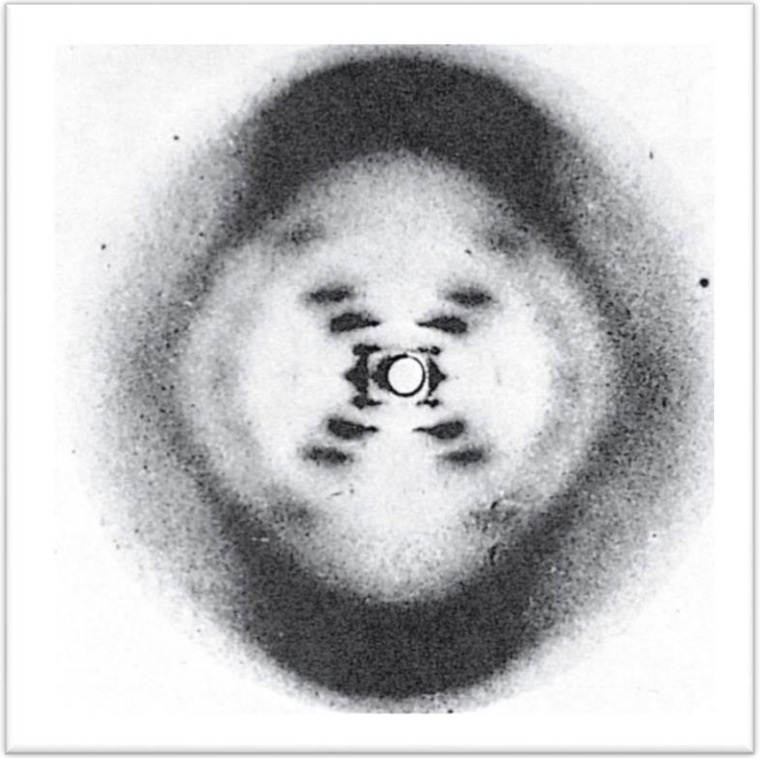
This British biophysicist and X-ray crystallographer made critical contributions to the understanding of the fine molecular structures of DNA.



Rosalind Franklin

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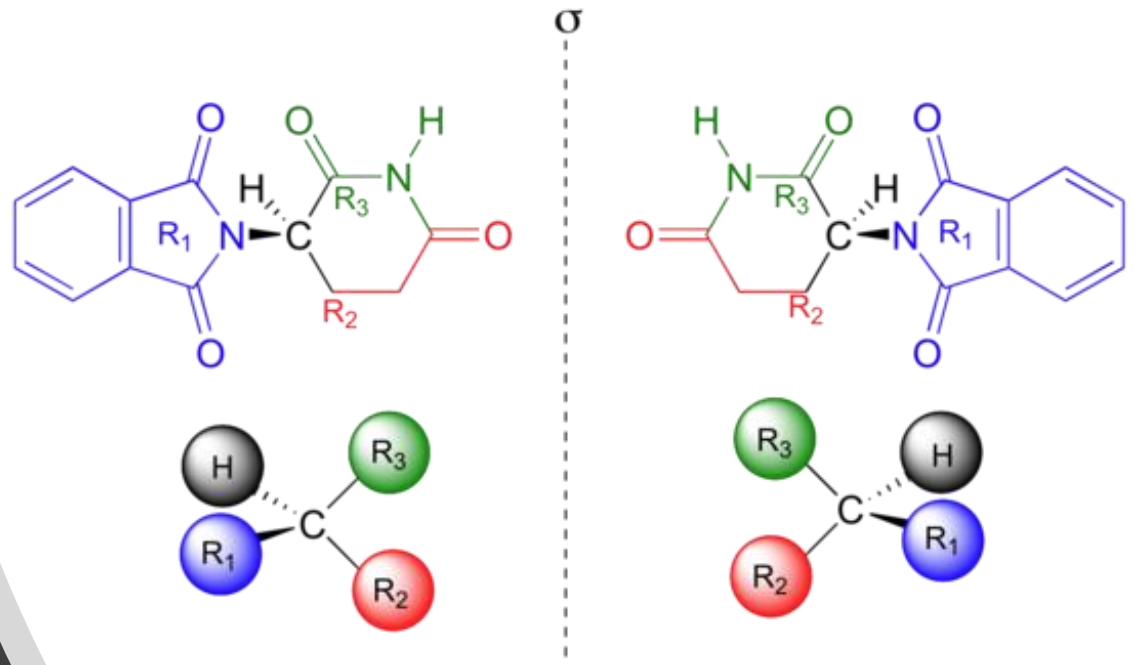
One of the stereoisomers is an effective medication, the other caused severe birth defects.

Name this historic drug.



thalidomide

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The net result of any and all forces acting on the object, as described by Newton's Second Law.

acceleration

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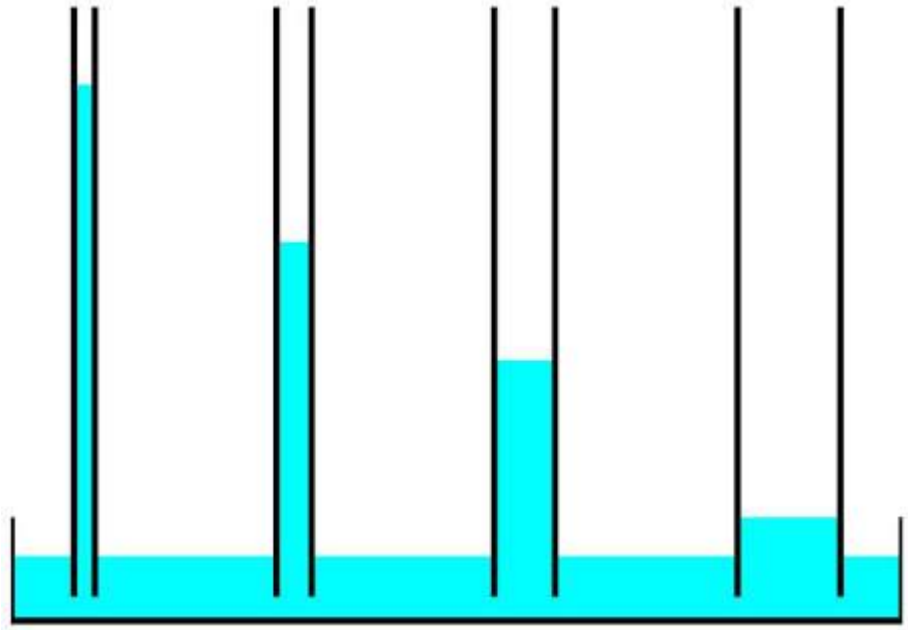
This occurs when water's adhesion to the walls is stronger than the cohesive forces between the liquid molecules.



capillary action

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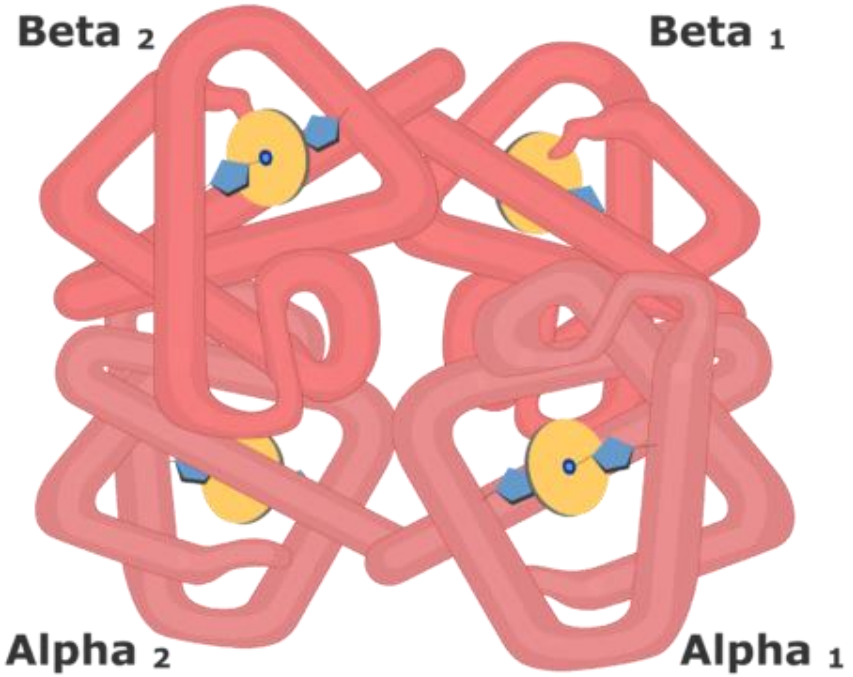
This oxygen-binding quaternary protein is composed of four identical subunits, each containing a single ion of Fe^{2+}.



hemoglobin

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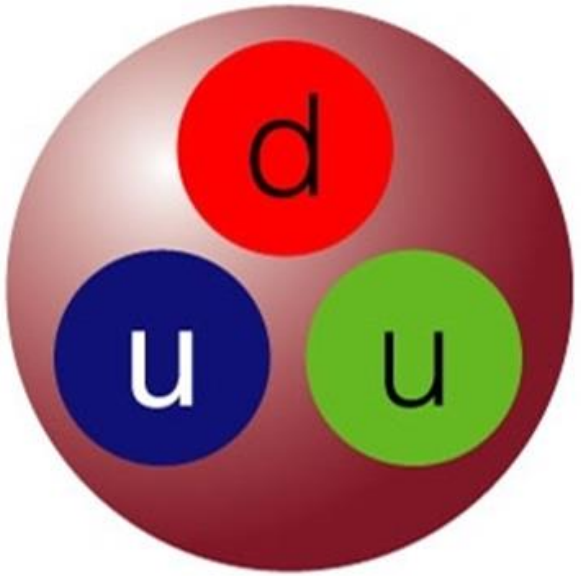
The mass of this subatomic particle is about 80–100 times greater than the sum of the rest masses of the quarks that make it up, while the gluons have zero rest mass.

proton



Total charge:
$+ 2/3 + 2/3 - 1/3 = +1$

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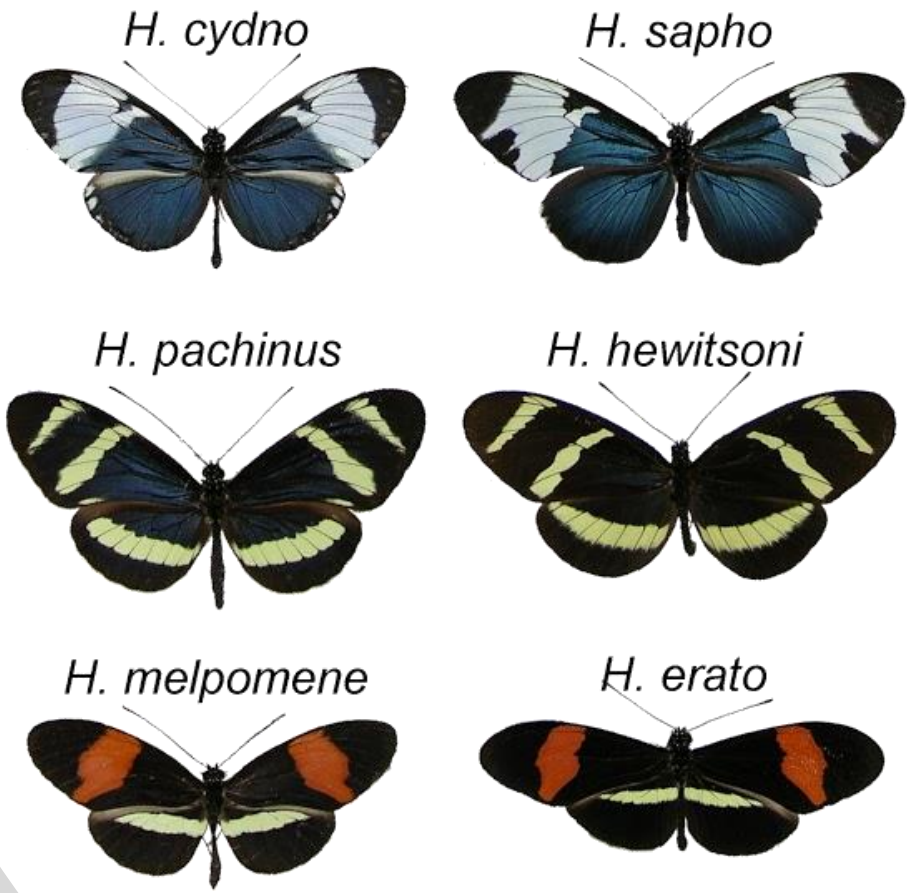
A group of interbreeding organisms that do not ordinarily breed with members of other groups.



species

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The expected genotypic ratio in any monohybrid cross

Dominant and Recessive
(T = Tall & t = short
Cross: Tt x Tt

	T	t
T	TT	Tt
t	Tt	tt

1:2:1

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The two chemical products of any Arrhenius acid-base neutralization reaction

water and a salt

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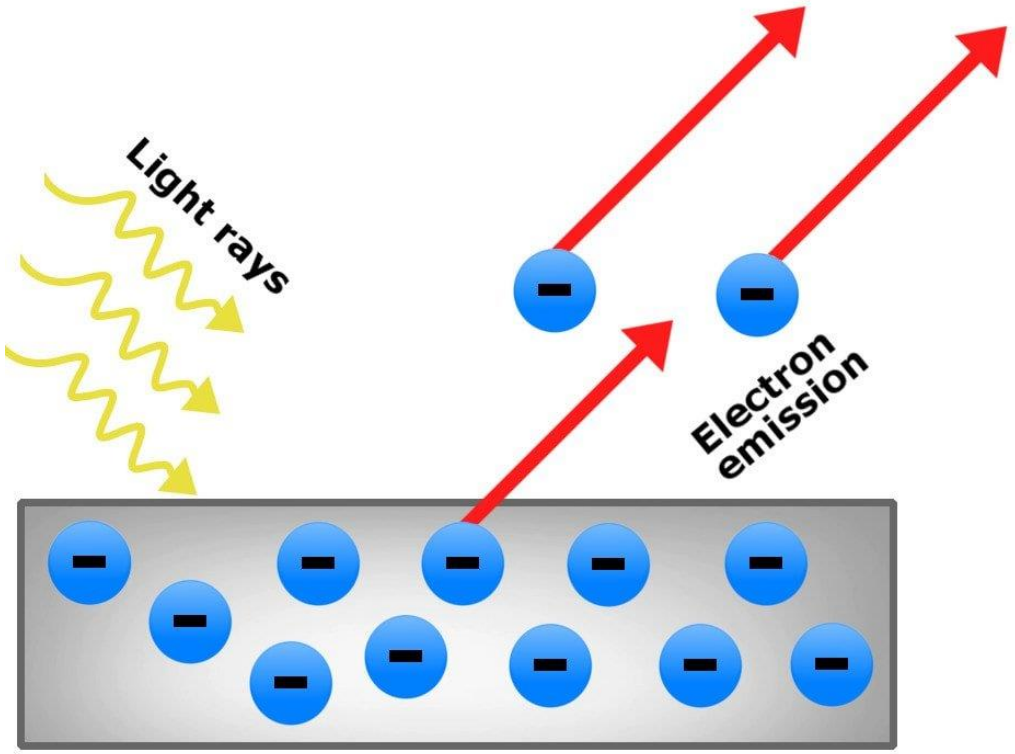
According to classical electromagnetic theory, this effect can be attributed to the transfer of energy from light to an electron.

photoelectric effect



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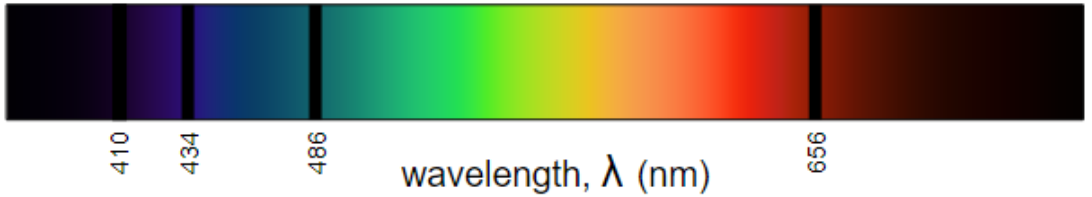
This element gives off a characteristic pink light.

Its absorption spectrum is shown.



hydrogen

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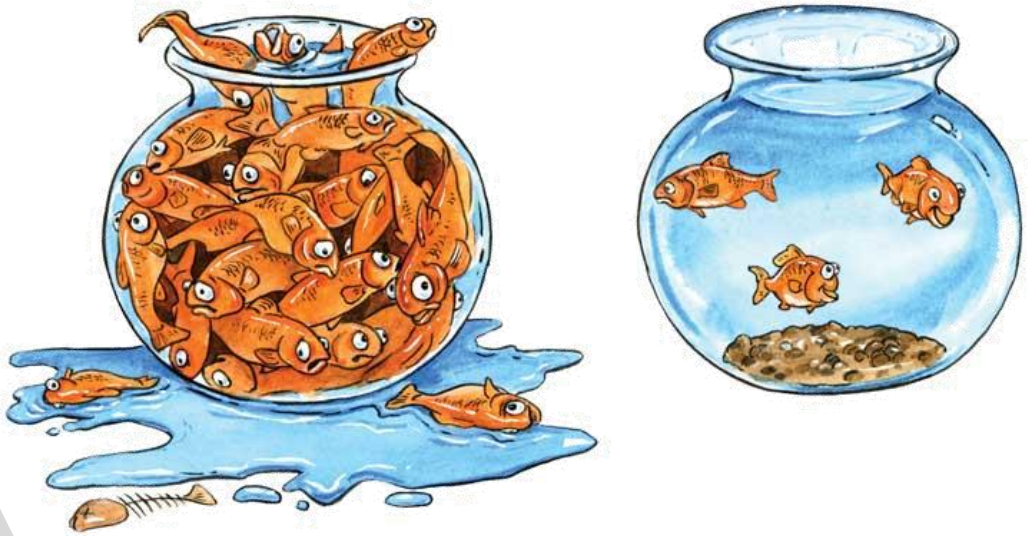
The limit of how many individuals in a population an ecosystem can sustain



carrying capacity

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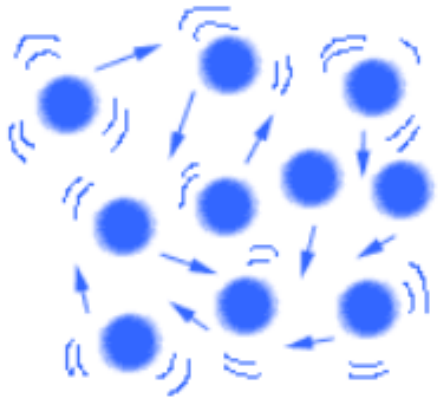
The result of the movement of tiny particles, this form of energy transfers among particles in a substance by means of kinetic energy.



heat

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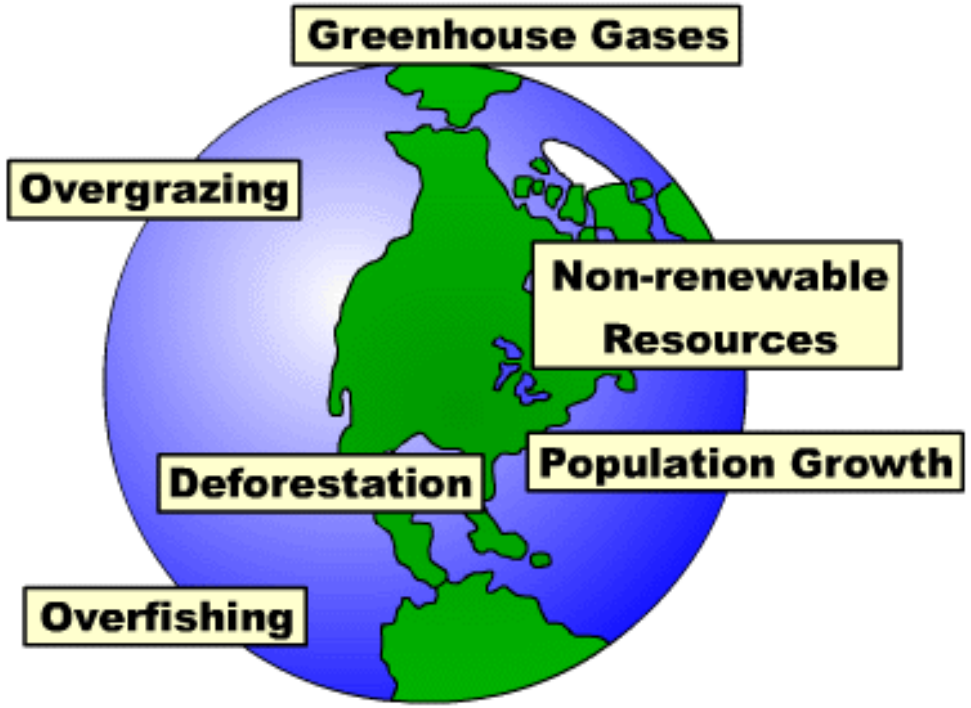
The tendency of a shared, limited resource to become depleted because people act from self-interest for short- term gain

Tragedy of the Commons



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A single dose of this radioactive element is usually enough to treat hyperthyroidism.

iodine-131

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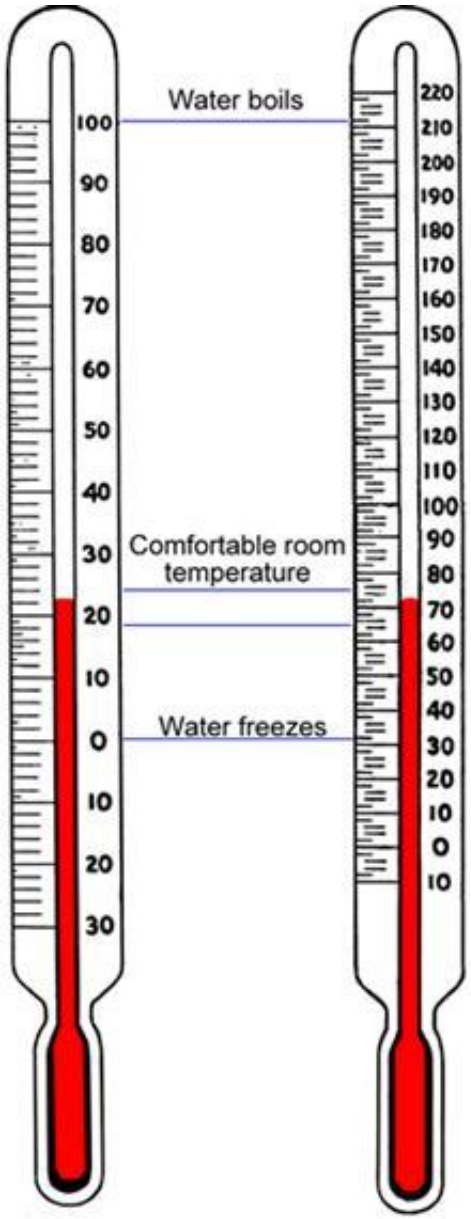
The temperature at which the Celsius and Fahrenheit scales read the same number



-40°

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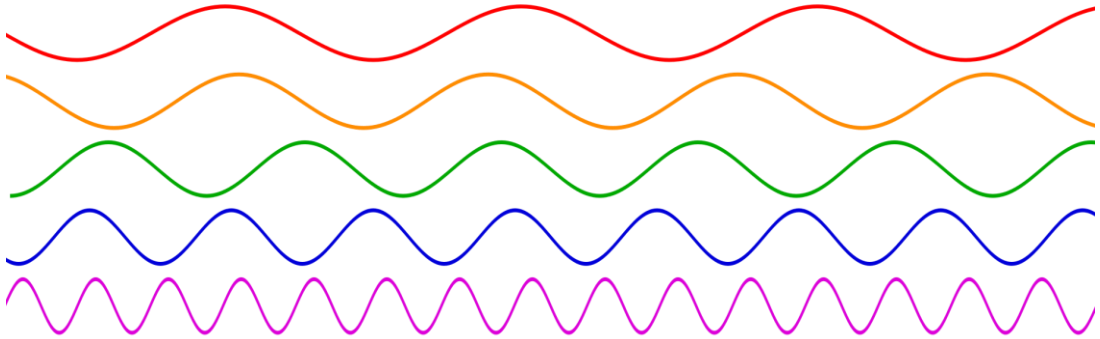
The number of occurrences of a repeating event per unit of time.



frequency

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The expected phenotypic ratio in any dihybrid cross

9:3:3:1

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This refers to the sequence of amino acids in the polypeptide chain held together by peptide bonds.

primary structure

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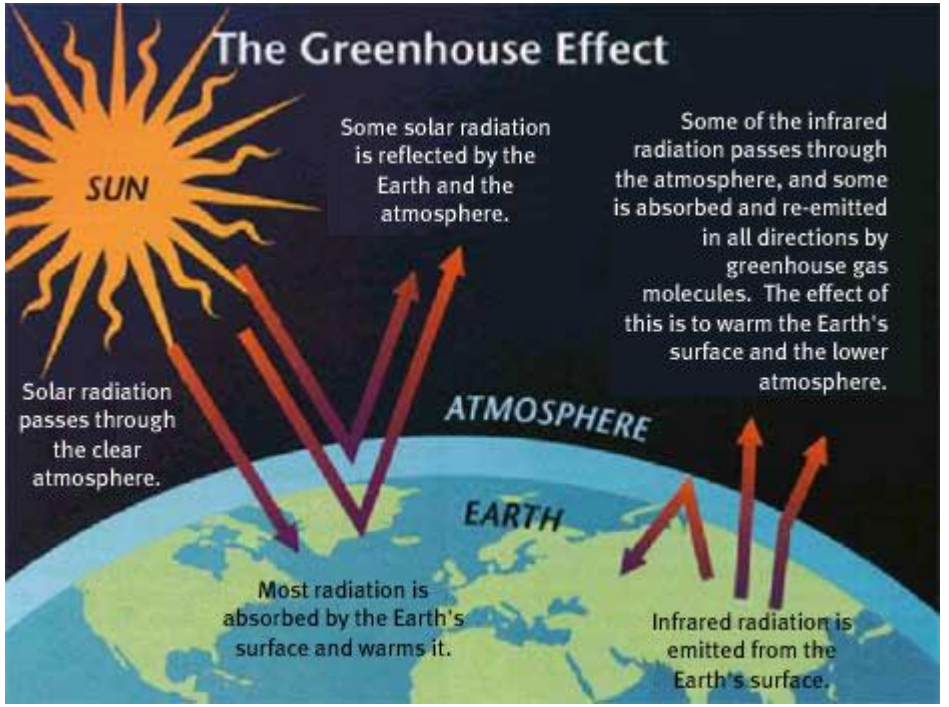
This single molecule comprises 82% of all greenhouse gas emissions



carbon dioxide

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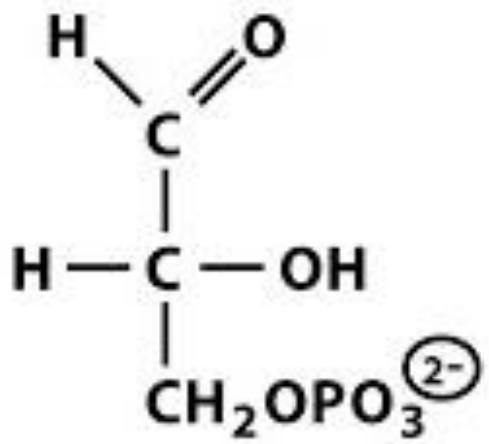
This three-carbon phosphorylated sugar is the direct product of the Calvin Cycle.



G3P glyceraldehyde 3-phosphate

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When a harmless species evolves to resemble a harmful species.

The viceroy butterfly *Limenitis archippus* (left) has evolved to mimic and look like the foul-tasting and poisonous monarch butterfly *Danaus plexippus*

Batesian mimicry

Let them talk!

- The quiet classroom where students are raising their hands to speak out is not congruent with the way many diverse cultures communicate (B.M. Davis, 2006).
- Student engagement is increased, affective filters lowered, and student participation invited when teachers use successful student-centered question-and-response discussions. (Willis, 2007).
- Having students talk about new information with their peers is one of the most powerful ways for them to process it (Allen & Currie, 2012).