

Science

PHYSICAL PROPERTIES OF GASES

A gas can be **compressed to a smaller volume** resulting in an increase in density. This is why air is used as a shock absorber in the form of air bags installed in cars.

Gas particles are **far apart** and **always moving**. Gases behave differently from solids and liquids.

1. **Kinetic energy** – Gas particles have **high kinetic energy**, moving freely and rapidly in all directions.
2. **Shape and volume** – Gases **do not have a fixed shape or volume**; they expand to fill the container.
3. **Compressibility** – Gases are **easily compressible** because the particles are far apart.
4. **Density** – Gases have **low density** compared to solids and liquids.
5. **Diffusion** – Gas particles **mix and spread out quickly** due to their motion.
6. **Pressure** – Gas particles **exert pressure** on the walls of their container due to collisions.

So basically, if a substance **moves freely, spreads out, has low density, and exerts pressure**, it's a gas.

Gases fill their containers **uniformly**. When a tire or a balloon is filled with air, the air is **distributed evenly** throughout the tire or balloon.

In gases, **differential stress is basically negligible** because:

1. Gas particles **move freely in all directions**.
2. They **cannot resist shape or directional forces** like solids.
3. Any applied stress is usually **isotropic** (same in all directions), so there's **no significant difference between σ_1 and σ_3** .

In gases, **stress is usually uniform**, so “differential stress” isn't really a factor—unlike in solids or rocks.

Key behaviors:

- **Expand to fill** any container
- Easily compressed
- Particles move freely and randomly
- Change quickly when temperature or pressure changes

Gas exerts pressure. The **pressure** of the gas inside a balloon **is responsible for keeping its shape**.

Properties:

1. Temperature (T)

– the higher the temp, the higher the kinetic energy; when the temperature is higher, gases move faster

– measures the average kinetic energy (movement) of gas particles

– as temperature increases, particles move faster

– measured in Kelvin (K) in gas laws

– Ex. warm air rises because particles move faster

2. Volume (V)

- small objects, inflates, therefore there is uniform distribution of energy. The bigger the volume, energy is more uniformly distributed. More central and unified
- space occupied by a gas
- no fixed volume—it takes the shape and volume of its container
- measured in liters (L) or milliliters (mL)
- Ex. air inside a balloon increases in volume when heated

3. Pressure (P)

- force gas particles exert when they collide with the walls of a container
- measured in atm, kPa, or mmHg
- Ex. a tire becomes hard because of air pressure

4. Amount of Gas (n)

- number of gas particles present
- measured in moles (mol)
- ex. More gas particles = more pressure (if volume is constant)

GAS LAWS

Boyle's Law

If volume decreases → pressure increases.

P = (atmosphere, mmHg, torr)

V = (mm, mL, L)

$$P_1 V_1 = P_2 V_2$$

Equations:

$$P_1 = \frac{P_2 V_2}{V_1} \quad P_2 = \frac{P_1 V_1}{V_2}$$

$$V_1 = \frac{P_2 V_2}{P_1} \quad V_2 = \frac{P_1 V_1}{P_2}$$

P_1 = Initial pressure

P_2 = Final pressure

V_1 = Initial volume

V_2 = Final volume

Charles' Law

If temperature increases → volume increases.

Equations:

$$T_1 = \frac{V_1 T_2}{V_2} \quad T_2 = \frac{V_2 T_1}{V_1}$$

$$V_1 = \frac{V_2 T_1}{T_2} \quad V_2 = \frac{V_1 T_2}{T_1}$$

T_1 = Initial temperature

T_2 = Final temperature

V_1 = Initial volume

V_2 = Final volume

Temperature = Kelvin (K)

When the given temperature is in Celsius, convert to Kelvin first by adding 273 to the given. And then you solve the whole problem. The temperature is always in Kelvin.

Example:

$$37^{\circ}\text{C} = (37 + 273) = 310\text{K}$$

IDEAL GAS LAW

General Formula:

$$PV = nRT$$

R value	When to use
$0.0821 \frac{L \cdot atm}{mol \cdot K}$	Pressure in atm, vol. in L
$8.314 \frac{J}{mol \cdot K}$	Pressure in Pa, volume in m^3
$62.36 \frac{L \cdot mmHg}{mol \cdot K}$	Pressure in mmHg

Equations:

$$P = \frac{nRT}{V} \quad V = \frac{nRT}{P}$$

$$n = \frac{PV}{RT} \quad T = \frac{PV}{nR}$$

Similar to Charles' law, the temperature is always denoted in Kelvin.

BIOMOLECULES

Macromolecules - essential to the functioning of the human body because they act as the fundamental building blocks of

cells, provide necessary energy, and facilitate vital biochemical reactions.

|> Proteins, carbohydrates, lipids, and nucleic acids

- **Carbohydrates**

- body's main source of energy
- formed in carbon, hydrogen, and oxygen atoms with a ratio of 1:2:1
- the two categories of carbohydrates are: sugar and starch
- glucose is an example of a simple sugar

- **Nucleic acids**

- stores and carries genetic information
- composed of nucleotides
- unlike the other macromolecules, nucleic acids are not obtained from food
- Deoxyribonucleic Acid (DNA) is an example

DNA - double-stranded nucleic acid

- responsible for making each person functional and unique; they are making the blueprint for our genetic function

Thymine - nitrogenous base in DNA pairing with adenine

Nucleotide - building blocks of nucleic acids; monomer of nucleic acids

Tertiary - protein shape level involving folding

Monosaccharide - smallest unit of saccharide ("mono" - one)

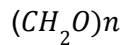
two or more carbon-carbon bonds.

“Simple sugars”

|> example: glucose and fructose

Glucose - monosaccharide used as primary energy source

Fructose - monosaccharide found in fruits



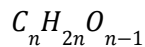
carbon:hydrogen:oxygen = 1:2:1

n - number of carbon atoms

Disaccharide - when monosaccharides are combined together (“di” - two)

|> ex. Lactose (milk) and sucrose (table sugar)

Lactose - simple sugar found in milk



“double sugars”

Hexose - sugar with six carbons

Oligosaccharides - chains of 3-10 monosaccharides (“oligo” - few)

linked by **glycosidic bonds**

crucial prebiotic fibers that support gut health, immunity, and cell recognition. They are found in plants like onions, garlic, and beans, and in human milk. These compounds are generally non-digestible by human enzymes, fermenting in the gut to promote healthy bacteria.

Polysaccharides - largest unit of carbohydrates (“poly” - many)

Glycogen - polysaccharide storage form in animals

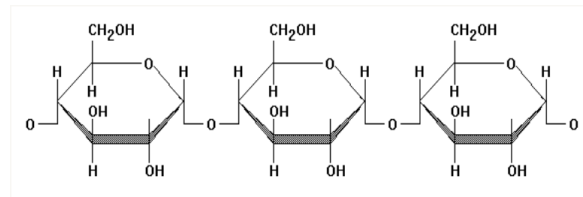
Starch - polysaccharide storage form in plants

Cellulose - structural polysaccharide in plant cell walls

complex carbohydrates and mostly **insoluble in water.**

used for **storage or structure**

energy storage (starch, glycogen) or structural components (cellulose, chitin) in plants, animals, and microorganisms.



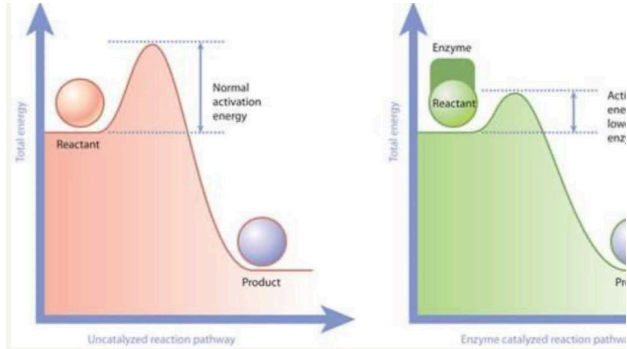
Starches - polysaccharide chains made from 300-1000 glucose units

Polysaccharide form in plants

Enzymes in the mouth, stomach and small intestine, breakdown the carbohydrate molecules

- Proteins that speedup chemical reactions
- These large complex carbohydrate molecules break down into simple sugars.
- Special protein molecules
- Break larger molecules into smaller pieces
- Enzymes are catalysts
- Pure sugar cane is only one example of sugar

- it is a protein catalyst that speeds up biological reactions by lowering the activation energy
- enzymes help speed life processes



substrate - molecule that enzyme acts upon

- enzymes are very specific and only work with certain substrates

variables that impact enzyme activity

- temperature
- pH

- **Protein**

- helps us stay strong, by forming new bones and muscles, and helping us fight diseases
- nutrients which contain materials the body uses for growth and repair
- made of carbon, hydrogen, oxygen, and nitrogen
- large molecules made up of combinations of amino acids

Keratin - structural protein in hair, skin, nails

- **Amino Acids**

- building blocks of protein
- These building blocks bond together to form chains that are called peptides.
- proteins are formed of combinations of large peptide chains, called polypeptides.

Amino Acids → Peptides → Polypeptides → Protein

- Lysine is an example of an Amino Acid

In order for the body to use protein, enzymes in the stomach and small intestine break the polypeptides down into individual amino acids.

Peptide bond - type of bond in proteins connecting amino acids

- **Lipids**

- function as stored energy, insulation for the body, and assist absorption of certain vitamins
- large molecules that can be categorized as fats or oils
- composed of triglycerides
- made up of carbon, hydrogen, and oxygen atoms
- provide stored energy reserves. This allows us to survive when carbohydrates are not being supplied to the body

Phospholipid - main structural component of cell membrane

Steroid - lipid hormones

- **Triglycerides**

- glycerol + 3 fatty acids = triglyceride

Chain of triglycerides = lipid

Bile and enzymes in the small intestine break lipids down into small molecules of fatty acids and glycerol

- **Nucleotides**

- nucleic acids are made from combinations of nucleotides

- five nucleotides: uracil, cytosine, thymine, adenine, and guanine

- nucleotides are made of three parts:

1. A five-carbon sugar
2. A base that has nitrogen atoms
3. An ion of phosphoric acid known as phosphate

Catabolism/cellular respiration - process of breaking down molecules for energy

palmitoleic acid, oleic acid, myristoleic acid, linoleic acid, and arachidonic acid - unsaturated fatty acid type

Adenosine triphosphate (ATP) - energy-carrying molecule

BALANCING CHEMICAL EQUATIONS

Chemical reaction

- Process by which a chemical change takes place
- A change where a new substance is formed

Chemical equation

- Shorthand way of expressing chemical reaction using numbers, symbols, and formula

Two major parts:

- Reactants
- Products

1. Reactants

- Starting materials
- Substances that change when it is combined with another substance in a chemical reaction

2. Products

- New substance
- Substances that result of the chemical reaction

Reactant → **Product**

Coefficient

- Number before the symbol or formula of a substance

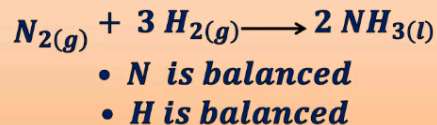
Subscript

- Number of atoms of the element found in the substance

Symbols	meaning
+	- used to separate one reactant or product from one another - can be read as "reacts with" when used in reactant, read as "and" when it is used in product
→	- used to separate the reactants from the products - read as "yields" or "produces" in

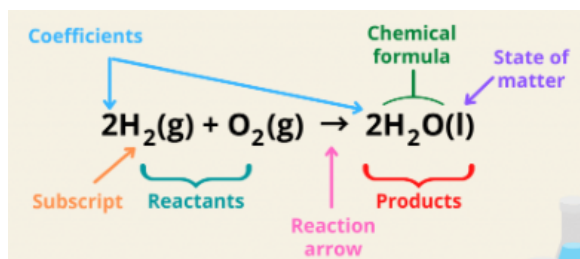
	an equation
(s)	- indicates that the substance is in the solid state
(l)	- indicates that the substance is in the liquid state
(g)	- indicates that the substance is in the gas state
(aq)	- indicates that the substance is dissolved in water - comes from the term "aqueous"
▲ -->	- indicates that there is heat applied or needed to make the reaction proceed

To balance the equation, put coefficient 3 before Hydrogen gas and coefficient 2 before NH₃.



Ang hirap iexplain nung procedure sa text...
check niyo nalang sa notes k sa notebook
yung visual rep,,,,,

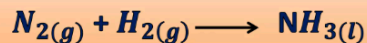
Example:



Law of Conservation of Mass

- States that mass is neither created nor destroyed in any ordinary chemical reaction

2. Nitrogen gas reacts with Hydrogen gas to form Ammonia.



Element	Reactants	Products	
N	2	1	Not equal
H	2	3	Not equal

Computer

JavaScript

- Programming language used to make web pages interactive
- Ex. changing a button's color when clicked

How does it work?

- Runs on the browser
- Works with html and css

What are the three main components of a CSS rule?

-Selectors, properties, and values

What is the correct basic syntax of a CSS rule?

-selector { property: value; }

What is the purpose of a selector in CSS?
To target the HTML element to be styled

Which of the following is an example of a CSS selector?

-h1

What does a CSS property define?

-The aspect or feature of the element to be styled

In the CSS rule "h1 { color: blue; }", what is the property?

-color

In the CSS rule "h1 { color: blue; }", what is the value?

-Blue

Which part of a CSS rule determines how the style will appear?

-Value

Which of the following is an example of a CSS property?

-font-size

What does the value in a CSS rule represent?

-The specific setting given to a property

wait...

TLE

English

Words of the Week

: **Incredulous** - difficult to believe; incredible; skeptical

: **Malfeasance** - misconduct or wrongdoing, especially by public official

: **Mercenary** - interested in making money; profit oriented; hired for service in foreign army

: **Intransigence** - refusal of any compromise; stubbornness

Guy de Maupassant (Henry-Rene-Albert Guy de Maupassant)

- French naturalist writer of short stories and novels
- Greatest french short-story writer
- One of the leading masters of the short story
- "The Necklace" most highly finished achievement

The Necklace Summary

Mathilde Loisel is a young woman who dreams of living a rich and fancy life, even though she is married to a simple, hardworking man and lives a modest life. She loves pretty clothes, jewelry, and fancy parties, and she feels unhappy with her simple home and life.

One day, her husband brings her an invitation to a fancy ball. Mathilde is upset at first because she doesn't have a nice dress or jewelry to wear. Her husband offers to give her money to buy a dress, and she borrows a beautiful necklace from her rich friend to look perfect at the ball.

At the party, Mathilde feels admired and happy. But later, she loses the necklace. She and her husband spend many years working hard to pay for a replacement, which ruins their lives.

In the end, Mathilde learns that the necklace she borrowed was actually fake and not worth much at all.

: **Feminist criticism** - focus is on the gender relationships of characters

: **Marxist criticism** - focuses on the class conflict portrayed in the story

They are similar in ways that they both focus on social and political values of a literary piece rather than on its aesthetic value.

Analogies - compares two pairs of words that are related in the same way

Types:

: synonyms

: antonyms

: object or action

: source or product

: part or whole

: animal or habitat

Ex.

shovel : dig :: pencil : write (object or action)

"Shovel is to dig as pencil is to write"

Or "shovel goes with dig like pencil goes with write"

Scissors : cut :: eraser : erase

Eye : see :: nose : smell

find : discover :: begin : start (synonyms)

right : correct :: under : below

Serious : funny :: huge : tiny (antonyms)

New : old :: narrow : wide

Well : water :: beach : sand (source or product)

Tree : lumber :: quarry : stone

Toe : foot :: finger : hand (part or whole)

Room : house :: chapter : book

Spider : web :: bird : nest (animal or habitat)

Bat : cave :: bear : den

Anton Pavlovich Chekhov

- Stories: “the steppe”, “the lady with the dog”
- Plays: The seagull, uncle vanya
- Anton emphasized the depths of human nature, hidden significance of everyday events, and fine line between comedy and tragedy
- One of the greatest short story writers of the world

The Lottery Ticket Summary

There was a man named Ivan and his wife Masha. They lived a normal, simple life. One day, they had a lottery ticket, and they were not sure if it was a winning one.

When they looked at the newspaper, they saw their series number on the list. At first, they didn't check if their ticket number matched, but just seeing the series made them very excited! Their hearts were beating fast because they thought they might have won a lot of money—like a giant treasure!

They started dreaming about all the things they could buy and how life would change if they really got the money. They felt super happy and nervous at the same time.

But the story is tricky: it shows that just thinking about money can make people feel excited and even a little worried. And at the end, it turns out they did not actually win, which made the reader feel relieved.

So, the story is really about how money can make people dream, worry, and feel different emotions, even if they don't actually get it.

: **Poetry** - entertains the ears and the eyes

: Poems

- created by putting words together in an interesting way to express a feeling, create a mental picture, tell a story, or make a sound
- Can be found in many places

: **Anthology** - a collection of selected literary, artistic, or musical works—such as poems, short stories, plays, or songs

Parts:

: **Verse** - usually a line of poetry, but sometimes a whole poem

: Stanza

- Like a paragraph in an essay
- Each stanza is usually separated by some blank space
- Common stanza lengths are two, three, four, six or eight lines

: **Rhyme** - repetition of end sounds; words rhyme if the sound alike

: **Rhyme scheme** - pattern of rhymes in a poem

Poets use rhymes to add a musical sound to their poems.

Types of Rhyming:

: Masculine Rhyme

- Matches only one syllable, usually at the end of respective lines
- The final syllables is stress
- **Perfect rhyme** - two words or phrases conform to both 2 conditions
 - The stressed vowel sound in both must be identical, as well as any subsequent sounds. Ex. “sky” & “high”; “skylight” & “highlight”
 - The articulation that precedes the vowel in the

words differ. Ex. bean & green is a perfect rhyme, while leave & believe is not (identicals or identical rhymes)

: **Feminine Rhymes**

- Rhyming of one or more unstressed syllables, such as “**d**icing” and ent**ic**ing”. So the second-to-last or pre-final syllable is stressed

: **Half rhyme**

- Rhyming of the ending consonant sounds in a word (such as “tell” with “toll” or “sopped” with “leapt”
- Aka “off-rhyme”, “slant rhyme”, “B-rhyme”, or apophany

Rhymes can be applied in couplets (2-line verses) as well as in triplets (3-line verses) and stanzas (4 or 6-line verses)

: **Masculine ending** - line ending in a stressed syllable

: **Feminine ending** - line ending in a stressless syllable

: **Rhythm**

- Pattern of beats or a series of stressed and unstressed syllables in poem
- Poets create rhythm by using words in which parts are emphasized or not emphasized

: **Meter** - measure of a line in poetry

: **Foot** - grouping of two or more syllables making up a basic unit of meter

: **Mood**

- Feeling that a poem creates in a reader

- Can be positive or negative
- Can be made with length of the sentences, chosen words, and word sounds.

: **Tone** - attitude a writer takes towards the subject or audience of the poem

: **Imagery**

- Language that appeals to the 5 senses
- Word pictures
- Helps the reader to experience familiar things in a fresh way using the senses

: **Figures of speech**

- Mode of expressions
- Words are used out of their literal meaning or out of their ordinary use in order to add beauty or emotional intensity or to transfer the poet's sense impressions by comparing or identifying one thing with another that has a meaning familiar to the reader

: **Simile**

- Two fundamentally unlike things are explicitly compared, usually in a phrase introduced by like or as
- “Good coffee is like friendship: rich and warm and strong”

: **Metaphor**

- An implied comparison is made between two unlike things that actually have something in common
- “The streets were a furnace, the sun an executioner”

: **Personification**

- An inanimate object or abstraction is given human qualities or abilities
- “The wind stood up and gave a shout. He whistled on his fingers and kicked the withered leaves...”

: Onomatopoeia

- Use of words that imitate the sounds associated with the objects or actions they refer to
- “Chug, chug, chug”, “ding-dong”

: Hyperbole

- Exaggeration is used for emphasis or effect; an extravagant statement
 - “You could have knocked me over with a feather”
-

Psalm 1

Blessed is the one
who does not walk in step with the
wicked
or stand in the way that sinners take
or sit in the company of mockers,

but whose delight is in the law of the
LORD,
and who meditates on his law day and
night.

That person is like a tree planted by
streams of water,
which yields its fruit in season
and whose leaf does not wither—
whatever they do prospers.

Not so the wicked!
They are like chaff
that the wind blows away.

Therefore the wicked will not stand in the
judgment,
nor sinners in the assembly of the
righteous.

For the LORD watches over the way of the
righteous,
but the way of the wicked leads to
destruction.

The Life Removed (explained)

This poem is about a man who is happy living a simple, quiet life away from all the noisy, fancy, and stressful things in the world. He doesn't care about money, fame, or showing off, because those things don't make people truly happy.

He loves nature—the hills, streams, and fields—and enjoys making a small garden where flowers bloom and a stream runs. He feels peaceful when he can watch, listen, and think quietly, without fear, jealousy, or anger.

While other people worry and fight for gold or power, he is happy with simple food, calm days, singing birds, and music. He feels rich in peace, freedom, and the beauty around him, not in treasures or titles.

Basically, the poem says: being calm, free, and close to nature makes life much happier than chasing fancy things or trying to impress everyone else.

: Syllables

- basic, unbroken sound units of a word, acting as "beats" in speech, with each containing one vowel sound
- Angle = AN-gel -> (not an-GEL)
- Complete = com-PLETE -> (not COM-plete)

: Scansion

- The act of scanning, or analyzing poetry in terms of its rhythmic components

- The graphic representation, indicated by marked accents, feet, etc., of the rhythm of a line or lines of verse

This sun/light shames /Novem/ ber where/ he grieves
 In dead red leaves, || and will/ not let /him shun
 The day, || though bough/ with bough/ be ov/er-run.

- The curved lines are “unstressed” syllables while the straight slashes are “stressed”

: Poetic meter

- Rhythms within the poems
- Arrangement of stressed or unstressed syllables to occur at apparently equal intervals

: Poetic foot

- Repeated sequence of rhythm comprised of two or more stressed and or unstressed syllables
- Poetic meter is comprised of poetic feet



Five main patterns of poetic feet:

: Iambic

- 1 unstressed syllable followed by 1 stress syllable
- Ex. repose (re-POSE)
Belief (be-LIEF)
Complete (com-PLETE)

: Trochaic

- 1 stressed syllable followed by 1 unstressed syllable
- Ex. garland (GAR-land)
Speaking (SPEAK-ing)
Value (VAL-ue)

: Anapestic

- 2 unstressed syllables followed by 1 stressed syllable

- Ex. on the road
Interrupt (in-ter-RUPT)
Unabridged, contradict, engineer,
masquerade, galilee

: Dactylic

- 1 stressed syllable followed by 2 unstressed syllables
- Ex. happiness (HAP-pi-ness)
Galloping (GAL-lop-ing)
Fortunate, saturday, daffodil,
murmuring, rhapsody

: Spondaic

- All syllables have equal stress
- Ex. heartbreak
Out, out...
Pen-knife, ad hoc, heartburn

- **One** foot per line: **monometer**
- **Two** feet per line: **dimeter**
- **Three** feet per line: **trimeter**
- **Four** feet per line: **tetrameter**
- **Five** feet per line: **pentameter**
- **Six** feet per line: **hexameter**

Type + Number = Meter

Types of Poetic Feet

- **Iambic** (1 unstressed + 1 stressed)
- **Trochaic** (1 stressed + 1 unstressed)
- **Anapestic** (2 unstressed + 1 stressed)
- **Dactylic** (1 stressed + 2 unstressed)
- **Spondaic** (all syllables equal)

Number of feet per line

- **Monometer**
- **Dimeter**
- **Trimeter**
- **Tetrameter**
- **Pentameter**
- **Hexameter**

Filipino

Araling Panlipunan

Accounting

FCL and VE

Practicum

