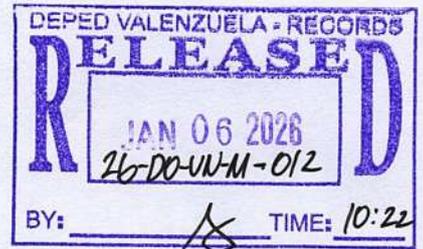




DepEd ICT Unit
 Web Posted by: ph
 Control no.: 26-PUB-018

Republic of the Philippines
Department of Education
 NATIONAL CAPITAL REGION
 SCHOOLS DIVISION OFFICE OF CITY OF VALENZUELA



**Office of the Schools Division
 Superintendent**

January 5, 2026

To: Chief Education Supervisors – CID & SGOD
 Public Schools District Supervisors
 Secondary School Heads
 All Concerned

Dear Sirs/Mesdames:

This is in reference to the attached letter dated December 5, 2025, along with its attachment, from Dr. Jocelyn DR. Andaya, Regional Director, NCR, Concurrent Officer-in-Charge, Office of the Assistant Secretary for Operations, inviting participation of all non-science junior high school students to the **12th HSM: Hanep sa Science and Math**, on **March 21, 2026 (Saturday)** at the **Institute of Biology Auditorium, Institute of Biology, UP Diliman, Quezon City**, for information and appropriate action.

Participation is free of charge. Registration opens on January 19, 2026. Interested schools may register their team(s) through the following link: bit.ly/HSM2026Registration.

Teacher-participants in this activity shall be entitled to Vacation Service Credits (VSC) for service rendered on Saturdays, in accordance with DepEd Order No. 13, s. 2024, entitled “Revised Guidelines on the Grant of Vacation Service Credits.”

Thank you.

Very truly yours,

NOEL D. BAGANO
 Schools Division Superintendent

Division Letter No. 004, s. 2026

CID/LQP

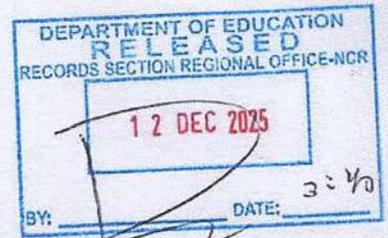


Address: Pio Valenzuela St., Marulas, Valenzuela City
 Telephone Nos.: (02) 8293-4507, 8277-4648, 8291-0873, 8277-3439
 Email Address: sdovalenzuela@deped.gov.ph
 Official Website: <https://www.depedvalenzuela.com>





Republic of the Philippines
Department of Education
 NATIONAL CAPITAL REGION



December 5, 2025

To: Schools Division Superintendents

Dear Sirs/Mesdames:

Attached is a letter from Samantha Q. Opena, Overall Co-Head, 12th Hanep sa Science and Math of the University of the Philippines Association of Chemistry Majors and Enthusiasts (UP ACME) regarding the 12th HSM: Hanep sa Science and Math, for all non-science junior high school students on March 21, 2026 (Saturday) at the Institute of Biology Auditorium, Institute of Biology, UP Diliman, Quezon City.

Participation is free of charge. Registration starts on January 19, 2026. Interested schools can register their team/s through the registration form: bit.ly/HSM2026Registration.

For inquiries or clarifications, please contact Samantha Q. Opena at up.acme.hsm@gmail.com.

For your information.

Very truly yours,

JOCELYN DR ANDAYA
 Regional Director, NCR
 Concurrent Officer-In-Charge, Office of
 Assistant Secretary for Operations

Regional Letter No. 179 s. 2025

clmd/dke



Address: 6 Misamis St. Bago Bantay, Quezon City
 Email Address: ncr@deped.gov.ph
 Website: <https://www.deped:ncr.com.ph>



47



**EXECUTIVE
COMMITTEE**
AY 2025 - 2026

University of the Philippines
**Association of Chemistry
Majors and Enthusiasts**

3/F Institute of Chemistry Teaching Building
University of the Philippines - Diliman

upd.acme@gmail.com

08 December 2025

DIR. JOCELYN DR. ANDAYA

Regional Director
Office of the Regional Director
Department of Education - National Capital Region
Misamis St., Bago Bantay, Quezon City

ANGELA NEYLAN V. SUNGA
Chairperson

YESTIN IÑIGO C. DAYUPAY
Vice Chairperson for Internal
Affairs

IAN DANIELLE M. ABRIOL
Vice Chairperson for External
Affairs

FEONA JENN P. RAFIN
Vice Chairperson for Academic
Affairs

PHOEMELA INGRID C. DE SILVA
Vice Chairperson for Financial
Affairs

ADRIAN E. SANTIAGO
Vice Chairperson for Publicity
Affairs

J'DION HYACINTH T. DEALCA
Executive Secretary

...
Where matter meets purpose
...

Dear Dir. Andaya:

Greetings!

The **University of the Philippines Association of Chemistry Majors and Enthusiasts (UP ACME)** is a duly recognized, non-partisan, non-religious, non-stock, non-profit, student-oriented organization based in the Institute of Chemistry at the College of Science, UP Diliman. Founded in **1997**, the organization has been geared towards the **promotion of the study of Chemistry in the Philippine setting** through various university-based and community-based projects and events.

Throughout the years, UP ACME has been **developing individuals into scientists and enthusiasts** by providing them the opportunities for exceptional leadership skills and further appreciation of the sciences, specifically Chemistry. In line with the goal to **strive for academic excellence alongside holistic development**, the organization has consistently produced honor students, top-notchers, professors, instructors, leaders, and winners of competitions.

Now in its **29th year**, UP ACME continues to attain a **legacy of brilliance** by transforming every member into honorable servants of the nation. UP ACME is "**where matter meets purpose**".





University of the Philippines
**Association of Chemistry
Majors and Enthusiasts**

3/F Institute of Chemistry Teaching Building
University of the Philippines - Diliman

upd.acme@gmail.com

OUR EVENT

In UP ACME's 29th year, we remain dedicated to advancing the field of science and technology, ensuring a greater understanding of chemistry and encouraging a greater appreciation for the sciences. With this, we are proud to present one of our biggest events – the **12th HSM: Hanep sa Science at Math**, a **quiz bee competition** open to **all non-science junior high school students** from the **National Capital Region (NCR), Region III (Central Luzon), and Region IV-A (CALABARZON)**. This event has **three main objectives**:

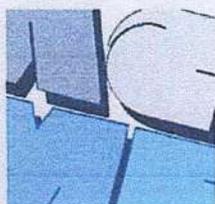
1. to **promote the appreciation of natural sciences** and emphasize its importance in today's society;
2. to **develop academic excellence** in the field of Science and Mathematics; and
3. to **build camaraderie and sportsmanship** among participants and coaches

The quiz bee will take place on **March 21, 2026 (Saturday)** at the **Institute of Biology Auditorium, Institute of Biology, UP Diliman, Quezon City**. Following this letter, you can find more information about the event, including its guidelines and mechanics.

OUR REQUEST

With that in mind, we are humbly requesting your good office to **issue an advisory by releasing a DepEd Memorandum for the 12th HSM: Hanep sa Science at Math**. This memorandum, along with our proposal, will be distributed to various high schools so that they may sign up for our event. Furthermore, we are also inquiring if we could be provided with a **list of non-science junior high schools in the National Capital Region, as well as their contact information** for invitation purposes. However, due to data privacy, rest assured that the memorandum alone would suffice. For any inquiries or clarifications, please do not hesitate to contact us through:

Samantha Q. Opeña
HSM Steering Committee Co-Head
0927 161 5195
up.acme.hsm@gmail.com





University of the Philippines
**Association of Chemistry
Majors and Enthusiasts**

3/F Institute of Chemistry Teaching Building
University of the Philippines - Diliman

upd.acme@gmail.com

Very respectfully yours,

Samantha Opeña

Samantha Q. Opeña
Overall Co-Head
12th Hanep sa Science at Math

Jodi V. Mariano

Jodi V. Mariano
Overall Co-Head
12th Hanep sa Science at Math

Noted by:

Angela Neylan V. Sunga
Angela Neylan V. Sunga
Chairperson
UP ACME

Laiya Aneka P. Miller
Laiya Aneka P. Miller
Junior Faculty Adviser
UP Diliman, Institute of Chemistry

HANEP SA SCIENCE AT MATH

Vision

HSM has been geared towards nurturing the youth to be more academically competent and Science-oriented. This 2026, for its 12th installment, UP ACME strives to engage an even wider audience in hopes of further solidifying our purpose as an organization that promotes an appreciation for the natural sciences, as well as the importance of effective communication of scientific information to the youth.

Date and Location

When: March 21, 2026 (Saturday)

Where: Institute of Biology Auditorium, Institute of Biology, UP Diliman

Time: 7 am - 5 pm

Target Numbers

- **Fifty (50) Schools**
 - Three (3) official participants
 - Belonging in Grade 10 and at least one (1) in Grade 9
- One (1) Coach
- One (1) Optional Substitute



University of the Philippines
**Association of Chemistry
Majors and Enthusiasts**

3/F Institute of Chemistry Teaching Building
University of the Philippines - Diliman

upd.acme@gmail.com

Prizes for Winners

Champion: Php 10,000
First Runner-Up: Php 7,000
Second Runner-Up: Php 5,000

COMPETITION GUIDELINES

A. Registration

1. Registration starts on January 19, 2026.
2. Participation in the competition is FREE of charge.
3. Each team from a participating school is to be composed of three (3) official participants and one (1) trainer or coach. Each student participant and the trainer must be a bona fide student/teacher, respectively, of the participating school, to be proven by the presentation of any of the following:
 - Valid identification card of the student/teacher of the current academic year, or
 - Any government-issued ID of the student and/or teacher (Passport, Student's Driving license, Birth Certificate, Postal ID), or
 - (for the trainer) Professional Regulation Commission (PRC)-issued Teacher's License.
4. The team may also opt to include one (1) substitute participant in the event that one of the official participants cannot proceed to the quiz bee due to any valid reason.
5. Only two (2) delegate teams can register from the same institution. This will be based on a first-come, first-serve basis; after two teams from the same school have been registered, any other team from that institution will be politely rejected.
6. Interested schools can register their team/s by answering the 12th HSM Registration Form: bit.ly/HSM2026Registration until February 13, 2026. Only the first 50 teams who registered and submitted all of the requirements found below will be accepted.
7. Each team will be asked to submit a scanned/digital copy of each of the following:



University of the Philippines Association of Chemistry Majors and Enthusiasts

3/F Institute of Chemistry Teaching Building
University of the Philippines - Diliman

upd.acme@gmail.com

- Proof of enrollment of all participating students (ID for the current academic year AND certificate of enrollment)
- Proof of Employment of Coach/Trainer
- Endorsement letter from the School Principal
- Signed Parental Consent Form for participants below 18 years old (download here: bit.ly/HSM2026ParentsConsent)
- Official School Logo

8. Teams are only given until the end of registration period (February 13, 2026) to submit ALL requirements. Failure to submit any lacking requirements is grounds for the cancellation of the team's slot for the competition.

9. After confirmation of registration and teams have submitted all necessary requirements, the team will receive a confirmation email and will also be contacted by a team facilitator, who will be the point person between the team and the organizers for the rest of the competition.

B. COMPETITION PROPER

1. The 12th HSM: Hanep sa Science at Math 2025 is a quiz bee competition organized by the University of the Philippines Association of Chemistry Majors and Enthusiasts (UP ACME).
2. The primary organizing body of the event is the HSM 2026 Steering Committee, composed of members from UP ACME. The Delegate Relations Officer is in charge of accepting participants and ensuring that all requirements for registration are complied with. The Delegate Experience Officer is in charge of the guidelines and mechanics of the event, as well as the monitoring of team facilitators.
3. The competition is open to all public and private non-science junior high schools in the National Capital Region (NCR), Region III (Central Luzon), and Region IV-A (CALABARZON). All secondary schools shall confirm their interest in participation no later than February 13, 2026.
4. The competition shall be held on March 21, 2026 (Saturday), at the Institute of Biology Auditorium, Institute of Biology, UP Diliman.
5. Each participating school shall bring with them the ID of all participating students on the day of the Competition as proof of their enrollment.



University of the Philippines
**Association of Chemistry
Majors and Enthusiasts**

3/F Institute of Chemistry Teaching Building
University of the Philippines - Diliman

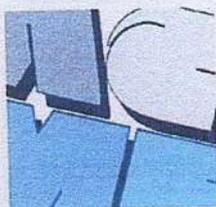
upd.acme@gmail.com

6. Any changes in the final list of participants without the knowledge of the HSM 2026 Steering Committee shall be grounds for disqualification.
7. Parents of the students may accompany their children to and during the competition. However, due to limited space, there are no guaranteed seats inside the venue for them.
8. Any review material, laptops, cellular phones, and the like are allowed to be brought by the team to the venue. However, bringing any of these materials during the Elimination and Finals Round shall be considered cheating and is grounds for disqualification.
9. Each school shall receive a Certificate of Appreciation from the UP ACME.
10. The Top 3 schools that will emerge from the Final Round shall be named the Second Runner Up, First Runner Up, and Champion. Each school will receive a Certificate of Recognition and a cash prize. Prizes for each are as follows:
 - Champion Php 10,000
 - First Runner Up Php 7,000
 - Second Runner Up Php 5,000
11. Additionally, the highest scorer for each subtest shall be awarded as "Hanep sa Chemistry", "Hanep sa Earth Science", "Hanep sa Physics", "Hanep sa Biology", and "Hanep sa Mathematics", respectively, and shall receive a Certificate of Recognition.

COMPETITION MECHANICS

A. Elimination Round

1. The Elimination Round shall be in the form of a Multiple Choice Test.
2. The Elimination Round shall cover five (5) different categories, namely Biology, Chemistry, Physics, Earth Science, and Mathematics.
3. Only the three (3) official participants shall be allowed to take the Elimination Round Examination.



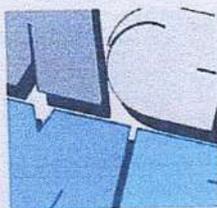


University of the Philippines
**Association of Chemistry
Majors and Enthusiasts**

3/F Institute of Chemistry Teaching Building
University of the Philippines - Diliman

upd.acme@gmail.com

4. Each exam shall be given separately, with varying times allotted for each. The time allotment is as follows:
 - Chemistry - 30 minutes
 - Earth Science - 15 minutes
 - Physics - 30 minutes
 - Biology - 15 minutes
 - Mathematics - 40 minutes
5. Each student will garner five (5) points for each correct answer, while zero (0) points for each incorrect or no answer.
6. Each student will be given a questionnaire booklet and an answer sheet. The Questionnaire shall also serve as the participant's scratch paper for computations.
7. Each student must answer by properly shading the circle of their answer on the Answer Sheet using a pen or pencil, which will be electronically checked. Incorrect/improper shading may cause errors in system scanning and checking, leading to the student's score being completely unrecorded or void.
8. Students must properly fill out all the necessary information on their answer sheet. Incorrect/incomplete information will result in a technical zero for the subtest.
9. Calculators or any computing device (except phones) will be allowed to be used during this round for all subtests except Mathematics. Calculators will be collected before the Mathematics subtest is administered.
 - a. Calculators will be reset upon registration. If the student does not have their own calculator, UP ACME will be lending calculators during the event. Borrowing of calculators will only be allowed during the registration. Students or their advisers must leave a valid ID upon borrowing from the designated booth.
10. Any form of cheating committed by one student shall be a ground for disqualification of the whole team.
11. Papers submitted late will not be accepted and checked.
12. Latecomers, if any, will still be allowed to take the Elimination Exams. However, no time extension will be given to the student.





University of the Philippines
**Association of Chemistry
Majors and Enthusiasts**

3/F Institute of Chemistry Teaching Building
University of the Philippines - Diliman

upd.acme@gmail.com

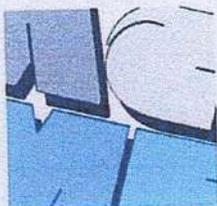
13. Team scores are summative and cumulative. The teams belonging to the top 50% will proceed to the Finals Round. The scores from the Elimination Round will not be reset and will be the starting points for the Finals. Points earned in the Clincher Round will not be added to these starting points.

14. In case of a tie during the Elimination Round, the teams that tied will undergo a Clincher Round. The Clincher Round will be held live on stage. Both scores shall be reverted to zero, and the first team to answer the clincher question correctly will proceed to the next round.

15. A Clincher Round will also be held in case of a tie for the highest scorer for each subtest to determine the final Hanep awardee. This will also be held live on stage. The first participant to answer the question correctly will be declared as the Hanep awardee of that specific subtest.

B. Finals Round

1. The finals round is a typical answer-on-board quiz bee, with a point bidding system.
2. There will be 25 questions, 5 questions per category (Chemistry, Biology, Physics, Earth Science, and Math) with varying levels of difficulty. The subject and difficulty of the questions will be in no particular order and will be shown before the question is flashed.
3. Using their starting points, each team will bid the amount of points that they will get for each question. Their bid shall not be lower than 10 and shall not exceed their current points. Their bid must be in increments of 10.
 - a. The bidding shall be done after a category is selected and before the question is read. This is to be noted by the assigned Facilitator for the team.
4. Time allotted for the teams to answer will vary depending on the difficulty of the question. After the time given, all teams shall raise their boards up to be recognized.
5. Getting the correct answer will gain the team the amount of points that they bid for the question, while failure to do so (i.e. no or wrong answer) will incur a demerit equal to half of their bid.





University of the Philippines
**Association of Chemistry
Majors and Enthusiasts**

3/F Institute of Chemistry Teaching Building
University of the Philippines - Diliman

upd.acme@gmail.com

a. Once a team reaches a score lower than the accepted bid (i.e., a score lower than 10), they are dismissed from participating in the succeeding questions and are hereby disqualified from the competition.

6. Teams who fail to follow any specific and explicit instructions for each question shall be considered incorrect unless recognized by the Board of Judges.

7. Teams who wish to protest their answer must approach their assigned Facilitator to notify the hosts. Once a protest is recognized by the host and the Board of Judges, one representative of the team will approach the Board of Judges and may be accompanied by their coach. They will be given a chance to defend their answer and may use supplemental materials if needed. The decision of the Board of Judges is final and irrevocable.

a. Protests can only be done before the next question is selected. Protests regarding questions before the current question will not be recognized.

8. The top 3 teams who will garner the most points after all the questions will be declared the Second and First Runner Up and the Champion, respectively.

9. In case of a tie between the Top 3 placements, a Clincher round shall take place to determine the teams who will proceed. The Clincher Round will be held live on stage. Both scores shall be reverted to zero, and the first team to answer the clincher question correctly will be awarded the higher placement.

GUIDELINES AND MECHANICS MODIFICATION

The UP ACME and the HSM 2025 Steering Committee reserves the right to modify the guidelines and mechanics if they see fit, given the circumstances faced at the time. The participating teams shall be notified of these changes before or during the competition.

QUIZ BEE COVERAGE

I. Matter





University of the Philippines
**Association of Chemistry
Majors and Enthusiasts**

3/F Institute of Chemistry Teaching Building
University of the Philippines - Diliman

upd.acme@gmail.com

A. Electronic Structure of Matter

1. Development of Atomic Models

- Describe how the Bohr model improved Rutherford's atomic model in explaining electron arrangement and stability of atoms.
- Explain how the Quantum Mechanical Model describes the energy levels and probable locations of electrons around the nucleus.
- Compare the major features and limitations of Rutherford, Bohr, and Quantum Mechanical models.

B. Chemical Bonding

1. Ionic and Covalent Bonding

- Explain how atoms form ionic or covalent bonds to achieve stability.
- Differentiate ionic and covalent compounds through properties such as melting point, polarity, and conductivity.
- Predict the bonding type between given elements.

2. Metallic Bonding

- Describe metallic bonding and the "sea of electrons" model.
- Relate the structure of metals to their properties such as malleability, ductility, luster, and conductivity.

C. The Variety of Carbon Compounds

1. Carbon Atoms

- Explain how tetravalency and catenation lead to diverse carbon compounds.
- Describe single, double, and triple bonds and their effects on structure and reactivity.

2. Organic Compounds

- Recognize the general classes and uses of organic compounds.
- Apply IUPAC rules in naming and drawing organic compounds.

D. The Mole Concept

1. Mole

- Use molar mass and Avogadro's number to convert between mass, moles, and particles.

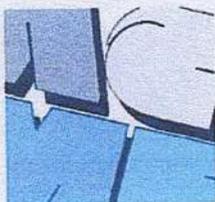
2. Percentage Composition of a Compound

- Determine the percentage composition of a compound given its chemical formula and vice versa.

E. Gas Laws

1. Kinetic Molecular Theory

- State the basic postulates of the Kinetic Molecular Theory of gases.





University of the Philippines Association of Chemistry Majors and Enthusiasts

3/F Institute of Chemistry Teaching Building
University of the Philippines - Diliman

upd.acme@gmail.com

- b. Explain how particle motion, collisions, and energy relate to pressure, temperature, and volume.
2. Volume, Pressure, and Temperature Relationship
 - a. Investigate the relationship between volume and pressure at constant temperature of a gas (Boyle's Law).
 - b. Investigate the relationship between volume and temperature at constant pressure of a gas (Charles's Law).
3. Ideal Gas Law
 - a. Use the Ideal Gas Law to solve problems involving pressure, volume, temperature, or number of moles.

F. Biomolecules

1. Elements Present in Biomolecules
 - a. Identify the main elements present in biomolecules (C, H, O, N, P, S).
2. Four Major Types of Biomolecules
 - a. Describe the structure and functions of carbohydrates, lipids, proteins, and nucleic acids.
 - b. Interpret food labels to identify biomolecules.

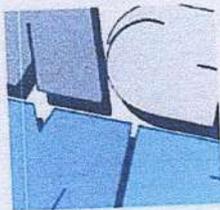
G. Chemical Reactions

1. Conservation of Mass
 - a. Apply the principles of conservation of mass to chemical reactions.
2. Applications of Chemical Reactions
 - a. Explain how the factors affecting rates of chemical reactions are applied in food preservation and materials production, control of fire, pollution, and corrosion.

II. Living Things and Their Environment

A. Human Anatomy and Physiology

1. Respiratory and Circulatory Systems
 - a. Explain how the respiratory and circulatory systems work together to transport gases, nutrients, and other essential substances throughout the body.
 - b. Analyze how these systems interact with other organ systems to maintain internal balance and proper body function.
 - c. Evaluate how lifestyle factors (e.g., diet, exercise, smoking) influence the health and efficiency of the respiratory and circulatory systems.
 - d. Identify preventive measures, early detection methods, and basic treatments for common diseases affecting these systems.
2. Coordinated Functions of the Reproductive, Endocrine, and Nervous Systems
 - a. Describe the parts of the reproductive system and their functions.





University of the Philippines
**Association of Chemistry
Majors and Enthusiasts**

3/F Institute of Chemistry Teaching Building
University of the Philippines - Diliman

upd.acme@gmail.com

- b. Explain the role of hormones involved in male and female reproductive systems.
- c. Describe the feedback mechanisms involved in regulating processes in the female reproductive system (e.g., menstrual cycle).
- d. Describe how the nervous system coordinates and regulates these feedback mechanisms to maintain homeostasis.

B. Heredity: Inheritance and Variation

1. Inheritance

- a. Describe how genetic information is organized in genes and chromosomes.
- b. Explain the patterns of non-Mendelian inheritance, including incomplete dominance, multiple alleles, and sex-linked traits.

2. Variation

- a. Explain the process of protein synthesis using genetic information from DNA.
- b. Analyze how gene mutations can alter protein structure and function.
- c. Describe how mutations in sex cells can be passed on to offspring and contribute to genetic variation.

C. Biodiversity and Evolution

1. Causes of Species Extinction

- a. Differentiate between natural and human-induced (anthropogenic) causes of species extinction.
- b. Explain how the inability of populations to adapt to rapid environmental changes can lead to extinction..

2. Evolution

- a. Explain how fossil records, comparative anatomy, and genetic information support the theory of evolution.
- b. Describe the process and mechanisms of evolution over time.
- c. Explain how natural selection drives evolution and contributes to biodiversity.

D. Ecosystems

1. Flow of Energy and Matter in Ecosystems

- a. Describe the structure and functions of plant parts and organelles (e.g., chloroplasts) involved in photosynthesis.
- b. Explain the role of mitochondria in cellular respiration and energy conversion.

2. Biodiversity and Stability

- a. Explain how species diversity enhances ecosystem resilience and the ability to adapt to environmental change.
- b. Describe how biodiversity loss can lead to ecosystem imbalance and reduced capacity to recover from disturbances.

3. Population Growth and Carrying Capacity



University of the Philippines
**Association of Chemistry
Majors and Enthusiasts**

3/F Institute of Chemistry Teaching Building
University of the Philippines - Diliman

upd.acme@gmail.com

- a. Explain the relationship between population size, growth rate, and carrying capacity in an ecosystem.
- b. Analyze how limiting factors such as food, water, space, and competition regulate population growth over time.

III. Force, Motion, and Energy

A. Motion

1. Projectile Motion

- a. Describe the horizontal and vertical components of the motion of a projectile.
- b. Analyze how the angle of projection affects the range, height, and time of flight of a projectile.

2. Impulse and Momentum

- a. Explain the relationship between impulse, momentum, and force during collisions.
- b. Apply the Law of Conservation of Momentum to real-life collisions such as vehicle impacts.
- c. Analyze factors affecting the severity of collision effects and ways to minimize damage.

B. Work, Power, and Energy

1. Forms and Transformation of Mechanical Energy

- a. Explain how potential and kinetic energy transform in different physical systems (e.g., archery, roller coasters, waterfalls).
- b. Distinguish between work, power, and energy in terms of how force and motion interact.

2. Conservation of Energy

- a. Demonstrate that total mechanical energy remains constant in the absence of non-conservative forces.
- b. Apply the principle of energy conservation to explain real-world phenomena and motion.

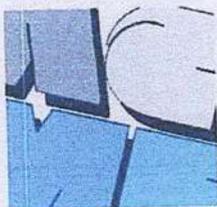
C. Heat, Work, and Efficiency

1. Heat Transfer

- a. Explain how heat energy can perform work and how work can produce or release heat.
- b. Describe the processes of conduction, convection, and radiation in everyday contexts.

2. Efficiency of Heat Engines

- a. Explain why no machine or heat engine can be 100% efficient.





University of the Philippines

Association of Chemistry Majors and Enthusiasts

3/F Institute of Chemistry Teaching Building
University of the Philippines - Diliman

upd.acme@gmail.com

b. Describe how energy transformation and heat transfer occur in systems like geothermal plants and internal combustion engines.

D. Electricity Generation and Transmission

1. Generation of Electrical Energy

- Explain how electrical energy is produced from mechanical, chemical, or thermal sources (e.g., hydroelectric, geothermal, solar).
- Describe the process of transmitting and distributing electrical power from power plants to homes.

2. Energy Losses and Efficiency

- Identify sources of energy loss during transmission and suggest ways to improve efficiency in power delivery.

E. Electromagnetic Spectrum

1. Regions and Properties

- Identify the different regions of the electromagnetic spectrum and compare their wavelengths, frequencies, and energies.
- Explain how visible light fits within the electromagnetic spectrum and relate its colors to wavelength and energy.

2. Applications and Effects

- Cite practical applications of each region of electromagnetic waves.
- Explain the beneficial and harmful effects of electromagnetic radiation on living things and the environment.

F. Light

1. Reflection of Light

- Predict the type, orientation, and magnification of images formed by plane, concave, and convex mirrors.

2. Refraction of Light

- Describe how light behaves as it passes through concave and convex lenses, forming real or virtual images.
- Apply Snell's Law to explain how light bends when passing between media of different refractive indices.

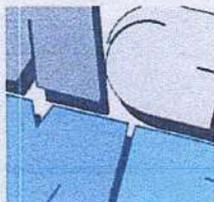
3. Optical Instruments

- Explain how the properties of mirrors and lenses determine their use in cameras, microscopes, telescopes, and other related instruments.

IV. Earth and Space

A. Volcanoes

1. Types and Activity of Volcanoes



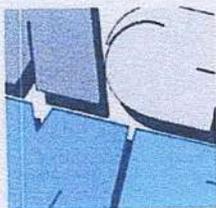


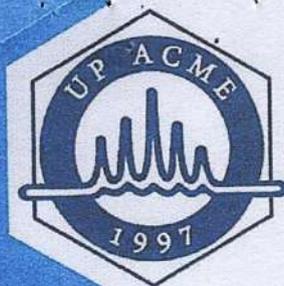
University of the Philippines
**Association of Chemistry
Majors and Enthusiasts**

3/F Institute of Chemistry Teaching Building
University of the Philippines - Diliman

upd.acme@gmail.com

- a. Describe the different types of volcanoes (shield, cinder cone, composite).
 - b. Differentiate between active, dormant, and extinct volcanoes based on their activity.
2. Volcanic Eruptions
- a. Explain the processes and causes of volcanic eruptions, including magma formation and movement.
 - b. Identify materials ejected during eruptions and their environmental effects.
3. Energy from Volcanoes
- a. Illustrate how geothermal energy from volcanic regions is harnessed for electricity generation.
 - b. Describe the basic operation of a geothermal power plant.
- B. Climatology*
1. Factors affecting Climate
 - a. Explain how latitude, altitude, ocean currents, prevailing winds, topography, and distance from bodies of water influence regional climate.
 - b. Describe how solar radiation and atmospheric circulation patterns determine temperature and rainfall distribution on Earth.
 2. Global Climatic Phenomena
 - a. Describe the occurrence, causes, and effects of El Niño and La Niña on global and Philippine weather patterns.
 - b. Explain the greenhouse effect and distinguish it from global warming.
 3. Climate Adaptation and Mitigation
 - a. Identify human activities that influence climate systems and propose ways to reduce their impacts.
 - b. Explain how adaptation and mitigation strategies (e.g., disaster preparedness, sustainable living) help address climate change.
- C. Plate Tectonics*
1. Distribution of Geological Features
 - a. Describe the global distribution of active volcanoes, earthquake epicenters, and major mountain belts.
 2. Types of Plate Boundaries
 - a. Identify and describe the different types of plate boundaries (convergent, divergent, and transform).
 - b. Explain the geologic processes (volcanism, mountain formation, and earthquakes) that occur along each boundary.
 3. Internal Structure of the Earth
 - a. Describe the internal layers of the Earth (crust, mantle, outer core, and inner core) and their compositions.
 4. Mechanisms and Evidence of Plate Movement





University of the Philippines
**Association of Chemistry
Majors and Enthusiasts**

3/F Institute of Chemistry Teaching Building
University of the Philippines - Diliman

upd.acme@gmail.com

- a. Explain the mechanisms of plate movement, including mantle convection, slab pull, and ridge push.
- b. Enumerate the lines of evidence supporting plate tectonics, such as continental fit, fossil correlation, magnetic stripes, and seafloor spreading.

D. Astronomy

1. Characteristics and Life Cycle of Stars

- a. Infer the characteristics of stars (size, color, temperature, brightness) by using Sun as a reference.
- b. Describe the life cycle of a star from formation to death.

2. Constellations and Star Patterns

- a. Identify and describe major constellations visible in the night sky and their significance in navigation and culture.
- b. Explain that the arrangement of stars in constellations appears fixed but actually changes over long periods of time.
- c. Observe how the position of constellations changes during the night and across different seasons due to Earth's motion.
- d. Relate visibility of constellations to Earth's position in its orbit around the Sun.

V. Mathematics

A. Algebra

1. Quadratic Equations

- a. Solve quadratic equations by extracting square roots, factoring, completing the square, or applying the quadratic formula.
- b. Handle equations transformable to quadratic form and apply methods to find their solutions.

2. Quadratic Inequalities

- a. Address quadratic inequalities and represent their solution sets on a number line or using interval notation.

3. Applications of Quadratic Functions

- a. Analyze real-life scenarios involving quadratic functions and determine key values such as maxima, minima, and roots.

4. Polynomials and Polynomial Equations

- a. Factor polynomials completely and perform long division and synthetic division.
- b. Evaluate polynomial functions and determine solutions for polynomial equations.





University of the Philippines
**Association of Chemistry
Majors and Enthusiasts**

3/F Institute of Chemistry Teaching Building
University of the Philippines - Diliman

upd.acme@gmail.com

B. Sequences and Series

1. Arithmetic Sequences and Series

a. Determine the n th term and arithmetic mean of an arithmetic sequence, and complete the sum of its first n terms.

2. Geometric Sequences and Series

a. Determine the n th term and geometric mean of a geometric sequence, and calculate the sum of a finite or infinite series.

3. Special Sequences

a. Work with special sequences including harmonic and Fibonacci sequences.

C. Exponents and Radicals

1. Laws of Exponents

a. Apply the laws of integral exponents to simplify expressions and perform calculations.

2. Radical Expressions

a. Simplify radical expressions, perform arithmetic operations, and rationalize expressions.

D. Geometry

1. Quadrilaterals and their Properties

a. Identify the conditions that classify a quadrilateral as a specific type.

b. Solve problems involving parallelograms, rhombi, trapezoids, and kites using geometric theorems and their properties.

2. Triangles and Similarity

a. Apply triangle similarity theorems, including SAS, SSS, AA, and special right triangle properties, to determine unknown elements.

b. Use the Pythagorean theorem and properties of 30° - 60° - 90° , and 45° - 45° - 90° triangles to solve related problems.

3. Circles and Circle Theorems

a. Solve problems, involving chords, arcs, central angles, inscribed angles, and tangents by applying circle theorems.

b. Determine the center and radius of the circle from its center-radius equation and perform related calculations.

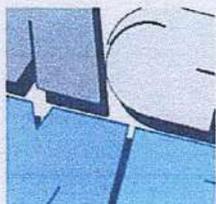
E. Trigonometry

1. Right Triangles

a. Solve for unknown sides and angles in right triangles using sine, cosine, and tangent ratios.

2. Oblique Triangles

a. Solve problems involving oblique triangles using the Law of Sines and Law of Cosines.





University of the Philippines
**Association of Chemistry
Majors and Enthusiasts**

3/F Institute of Chemistry Teaching Building
University of the Philippines - Diliman

upd.acme@gmail.com

3. Trigonometry in Real-life Applications

- a. Apply trigonometry to practical problems, including angles of elevation and depression, navigation, and height-distance problems.

F. Statistics and Probability

1. Counting and Probability

- a. Use permutations and combinatorics of n objects taken r at a time to determine outcomes in practical scenarios.
- b. Calculate probabilities for simple events, union and intersection of events, and mutually exclusive events.

2. Measures of Position in Data

- a. Determine measures of position including quartiles, deciles, and percentiles for a set of data.
- b. Calculate specified measures of position (e.g., 90th percentile) for ungrouped or grouped data sets.

