Republic of the Philippines
Department of Education
NATIONAL CAPITAL REGION

Advisory No. 041, s. 2024
February 15, 2024
In compliance with DepEd Order No. 8, s. 2013
This Advisory is issued not for endorsement per DO 28, s. 2001,
but only for the information of DepEd officials,
personnel/staff, as well as the concerned public.
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10th HSM: Hanep sa Science at Math

The University of the Philippines Association of Chemistry Majors and Enthusiasts (UP ACME) Diliman campus will conduct the above captioned activity on April 20, 2024 at the College of Fine Arts Gallery Atrium.

The activity aims to:

- promote the appreciation of natural sciences and its importance in the society;
- develop academic excellence in the field of Science and Mathematics; and
- build camaraderie and sportsmanship among participants and coaches.

Participation of learners shall be entirely voluntary and should not hamper instructional time in school. Please refer to the attached communication for detailed information on the mechanics of the activity.

For more information, please email Eloisa Marie M. San Diego, HSM Steering Committee Co-Head at up.acme.hsm@gmail.com

Encl.: As stated

Address: #6 Misamis St., Bago Bantay, Quezon City
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University of the Philippines
Association of Chemistry Majors and Enthusiasts

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EXECUTIVE COMMITTEE
AY 2023 - 2024

UP ACME 23'24

12 February 2024

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

Dear Ms/Mrs. Jocelyn DR. 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.

As of December 9, 2020, **UP ACME** is an officially **accredited Club for UNESCO.** UP ACME continues to take part in promoting the ideals of UNESCO in participating in social development, supporting human rights, and mobilizing science knowledge and has been recognized as an **Outstanding UNESCO Club for Science and Technology** for three consecutive years.

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 **27th 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"***.

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OUR EVENT

In UP ACME's 27th 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 **10th HSM: Hanep sa Science at Math**. This year's HSM is bringing back its on-ground **Quiz Bee competition** and will be 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 **April 20, 2024** (Saturday) at the **College of Fine Arts Gallery Atrium**. Following this invitation, you can find more information about the event, including its guidelines and mechanics. This is also stated in the attached competition guidebook.

OUR REQUEST

With that in mind, we are humbly requesting your office **to issue an advisory by releasing a DepEd Memorandum for the 10th 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 requesting if we can be provided with a **list of high schools in the National Capital Region (NCR), as well as their contact information.** However, the memorandum alone would suffice. For any inquiries or clarifications, please do not hesitate to contact us through:

Eloisa Marie M. San Diego
HSM Steering Committee Co-Head
0977 850 0781
up.acme.hsm@gmail.com

Sincerely,

Eloisa Marie M. San Diego
Overall Co-Head
10th Hanep sa Science at Math

John Lord Cedric M. Sausa
Overall Co-Head
10th Hanep sa Science at Math

Noted by:

Lord Richard B. Verania
Chairperson
UP ACME

Jerrieme Lemuel A. Maderazo
Junior Faculty Adviser
Institute of Chemistry

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HANEP SA SCIENCE AT MATH

Vision

For the past eight years, HSM has taken pride in developing students to be more academically competent and inclined toward the sciences. UP ACME hopes to engage a larger audience in its tenth installment in 2024 in order to continue striving for what we stand for as an organization that encourages appreciation for the natural sciences and the importance of effective science communication to youth.

Date and Location

When: April 20, 2024
Where: College of Fine Arts Gallery Atrium
Time: 7 am - 5 pm

Target Numbers

- Sixty (60) Schools
  - Three (3) official participants
    - Belonging in Grade 10 and at least one (1) in Grade 9
- One (1) Coach
- One (1) Optional Substitute

Prizes for Winners

Champion: Php. 10,000
First Runner-Up: Php. 7,000
Second Runner-Up: Php. 5,000
Giveaways from Sponsors

COMPETITION GUIDELINES

A. Registration

1. Registration starts on February 12, 2024.

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.

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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 10th HSM Registration Form: **bit.ly/HSM2024Registration** until March 22, 2024. Only the first 60 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:

- Proof of enrollment of all participating students (ID for the current academic year AND certificate of enrollment)
- Proof of Employment of Coach/Trainer
- COVID-19 vaccination cards of all participating students and coach/trainer
- Endorsement letter from the School Principal
- Signed Parental Consent Form for participants below 18 years old (download here: **bit.ly/HSM2024ParentsConsent**)
- Official School Logo

8. Teams are only given until the end of registration period (March 22, 2024) 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 10th HSM: Hanep sa Science at Math 2024 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 2024 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 from April 1 to April 13, 2024.

4. The competition shall be held on April 20, 2024 (Saturday), at the College of Fine Arts Gallery Atrium.

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.

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6. Any changes in the final list of participants without the knowledge of the HSM 2024 Steering Committee shall be grounds for disqualification.

7. Parents of the students may accompany their children during the competition. Separate seats will be allotted for them to avoid any disturbances during the program.

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. In case of a tie during the Elimination or Final Round, the teams who tie will undergo a Clincher Round. Both scores shall be reverted back to zero and the team who will garner the highest points will proceed to the next and/or be declared the Runner Up/Champion.

10. Each school shall receive a Certificate of Appreciation from the UP ACME.

11. 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:

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

12. The UP ACME and the HSM 2024 Steering Committee reserves the right to modify the rules if they see fit. The participating teams shall be notified of these changes before or during the competition.

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.

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.

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6. Each student will be given a Questionnaire 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.

13. 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.

14. Team scores are 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.

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.

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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.

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.

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

9. 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.

10. 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 shall consist of three (3) questions and the team who gets the highest score will proceed.

GUIDELINES AND MECHANICS MODIFICATION

1. The UP ACME and the HSM 2024 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

A. Atoms, Molecules, and Ions

1. Give the history of the development of the structure of the atom.
2. Compare and contrast atomic number, mass number and atomic mass.
3. Name a compound from the chemical formula.

B. Stoichiometry

1. Calculate compound's formula/molar mass.
2. Convert mass to moles and vice versa, and moles to number of particles and vice versa.
3. Solve problems involving percent composition and empirical formula.
4. Solve mass-mass or mole-mole stoichiometric problems.
5. Identify limiting reactant/s and calculate the theoretical yield and percent yield.

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C. Chemical Reactions

1. Write balanced chemical equations.
2. Identify different types of reactions.
3. Assign oxidation numbers to species and identify the oxidizing and reducing agents.

D. Electron Configuration and Periodicity

1. Apply the Aufbau principle, Hund's rule and Pauli Exclusion Principle.
2. Represent electron configurations using different notations.
3. Predict whether an element exhibits paramagnetism or diamagnetism.
4. Describe the group trend and period trend for different properties (atomic radius, ionization energies, electron affinity, electronegativity, etc.)

E. Chemical Bonding

1. Distinguish ionic, covalent and metallic bonding.
2. Draw Lewis structures for molecules and polyatomic ions.
3. Calculate formal charges.

F. Molecular Geometry

1. Apply the concept of Valence Shell Electron Pair Repulsion (VSEPR) in predicting and
describing the electron group geometry and molecular group geometry of compounds.
2. Describe the polarity of a bond and the overall polarity of the molecule.

G. Gases

1. Solve problems involving gas laws.
2. Solve gas mixture problems involving partial pressures and mole fractions.
3. Work on Graham's law problems.

H. Liquids and Solids

1. Describe, compare, and contrast the types of intermolecular forces.
2. Apply the concept of intermolecular forces to explain solubility.

I. Mixtures and Solutions

1. Describe solutions in terms of various units of concentration.
2. Solve problems related to different colligative properties of solutions (e.g. vapor pressure lowering, boiling point elevation, freezing point depression, osmotic pressure).
3. Differentiate colloids from solution and identify various types of colloids.

J. Acids and Bases

1. Differentiate Arrhenius, Bronstead-Lowry and Lewis definition of acids and bases.
2. Calculate pH and pOH.
3. Describe and explain how buffers work.

K. Organic Compounds and Biomolecules

1. Identify the general classes of organic compounds
2. Draw and name organic chemical structures.
3. Recognize the major categories of biomolecules such as carbohydrates, lipids, proteins, and nucleic acids.

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II. Living Things and Their Environment

A. Cells

1. Give the history of the development of the structure of the atom.
   a. Identify the different types of microscopes.
   b. Identify the basic parts of a light microscope and describe their functions.
2. Cell Structure and Components
   a. Distinguish between prokaryotic and eukaryotic cells
   b. Describe the structure and functions of the various cellular components
   c. Explain how substances are transported across a cell membrane.
3. Cellular Metabolism
   a. Describe the processes involved in cellular respiration and photosynthesis.
   b. Describe the functions of enzymes and coenzymes.
4. Cellular Reproduction
   a. Identify the different phases of the cell cycle and describe the sequence of events that occurs during each phase.
   b. List the phases of mitosis and meiosis and describe the events characteristic to each phase.
   c. Distinguish between asexual and sexual reproduction.

B. Genes & Heredity

1. Use Punnett square to predict genotypic and phenotypic expressions of traits.
2. Identify the relevant law of genetics in a particular situation.
3. Explain the different patterns of non-Mendelian inheritance.
4. Describe how genetic information is organized in genes on chromosomes.
5. Outline the process of how protein is synthesized from the information stored in the DNA.
6. Identify various genetic mutations and their consequences.

C. Evolutions

1. Explain the mechanism for evolutionary change proposed by different naturalists.
2. Explain how fossil records, comparative anatomy, and genetic information provide evidence for evolution.

D. Biodiversity

1. Distinguish among the three domains of life (Eubacteria, Archaea, and Eukarya).
2. Classify organisms using the hierarchical taxonomic system.
3. Describe the characteristics, common features and structures of organisms belonging to each of the five kingdoms (Monera, Protista, Fungi, Plantae, Animalia).
4. Describe the structural components of viruses and the mechanism by which they reproduce and infect host cells.

E. Ecology

1. Differentiate biotic and abiotic components of the ecosystem.
2. Describe the different ecological relationships found in an ecosystem.
3. Describe and differentiate the major terrestrial and aquatic biomes (tropical forest, desert, taiga, tundra, lakes, estuaries, etc.)
4. Analyze the process of cycling materials in the ecosystem (e.g. water cycle, nitrogen cycle)

F. Human Anatomy & Physiology

1. Identify and classify four types of tissues found in the body (epithelial, connective, muscle, and nerve).
2. Describe the components and the function of the integumentary system.
3. Identify each bone in the skeletal system.
4. Classify the different types of joints found in the body (synarthroses, amphiarthroses, and diarthroses).
5. Identify the different types of muscle tissue and their components.
6. Describe the contraction of muscle.
7. Name the major subdivisions of the nervous system and the functions of each.
8. Explain how a neuron transmits a nerve impulse.
9. Describe the structure of the spinal cord and the principal regions of the brain.
10. Classify hormones into their major chemical categories, identify the gland that secretes them, and determine their effects in the body. Classify the different types of blood cells and their functions.
12. Describe the parts of the heart and the stages of cardiac cycle.
13. Name the major blood circulatory routes.
14. List the major and accessory organs of the digestive tract and explain how they function.
15. Name the organs of the respiratory system and describe how each is involved in the process of breathing and gas exchange.
16. Define the function of the urinary system and identify its parts.

III. Force, Motion, and Energy

A. Classical Mechanics

1. Kinematics
   a. Apply vector notations and operations.
   b. Solve problems regarding motion in one- or two- dimensions.
2. Newton's Laws of Motion
   a. Analyze free-body diagrams and solve problems involving forces such as tension, weight, normal force, friction and applied forces.
   b. Use the concept of Newton's third law to identify force pairs and state the magnitude and direction of each.
3. Work, Energy, Power
   a. Calculate the work done by a constant force on an object that undergoes displacement.
   b. Apply the work-energy theorem and law of conservation of energy to solve problems involving energy transformations.
   c. Calculate the power required to maintain the motion of an object and the work that supplies the constant power.
4. Linear Momentum
   a. Calculate total momentum of a system of objects.
   b. Relate impulse to the change in linear momentum.
   c. Solve problems involving elastic and inelastic collisions between two bodies.
5. Circular Motion and Rotation
   a. Relate the radius of the circle and the rate of revolution to the magnitude of centripetal Acceleration.
   b. Apply relations among the angular acceleration, angular velocity, and angular displacement of an object that rotates about a fixed axis.

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6. Elasticity
   a. Analyze situations in which a body is deformed by tension, compression, pressure, or shear.
7. Gravitation
   a. Determine the force that one spherically symmetric mass exerts on another.
   b. Apply Kepler's three laws of planetary motion to describe the motion of an object in elliptical orbit under the influence of gravitational forces.

B. Fluid Mechanics

1. Apply the relationship between pressure, force, and area and the relationship between pressure and depth.
2. Apply Archimedes' principle to determine buoyant forces on an object immersed in a fluid.

C. Thermodynamics

1. Thermal Expansion
   a. Analyze the changes in the dimensions of an object when heated or cooled.
   b. Differentiate the three modes of heat transfer: conduction, convection and radiation
2. Laws of Thermodynamics
   a. Identify the relevant law of thermodynamics in a given situation.
   b. Determine whether entropy will increase, decrease or remain the same.
   c. Calculate the efficiency of a heat engine.

D. Electricity and Magnetism

1. Electrostatics
   a. Determine the resulting charge of objects undergoing conduction and induction.
   b. Calculate the magnitude and the direction of the force between charges using Coulomb's law.
   c. Describe and calculate the electric field and electric potential at the vicinity of a point charge
2. Electric Circuits
   a. Apply Ohm's law to direct-current circuits to solve for a single unknown current, voltage, or resistance.
   b. Analyze DC circuits with multiple components in series or parallel connection.
3. Magnetism
   a. Calculate the magnitude and direction of the magnetic force in terms of the charge,
   q, velocity, v, and magnetic field, B.
   b. Apply Lenz's law in conceptual problems related to magnetic induction.

E. Waves and Optics

1. Wave Motion
   a. Distinguish transverse waves and longitudinal waves, and mechanical waves and electromagnetic waves.
   b. Apply the relation among wavelength, amplitude, frequency, and velocity for a periodic wave.
   c. Solve problems related to sound waves.
   d. Identify the different regions of the electromagnetic spectrum.
2. Optics
   a. Apply the laws of reflection and the law of refraction.
   b. Use the mirror and thin lens equation to solve problems involving image formation in mirrors and lenses respectively.

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c. Apply concepts in color addition and subtraction.

IV. Earth and Space

A. Earthquakes and faults

1. Explain how movements along faults generate earthquakes;
2. Differentiate the epicenter of an earthquake from its focus
3. Differentiate the intensity of an earthquake from its magnitude;
4. Explain how earthquake waves provide information about the interior of the Earth.

B. Rocks and the Rock Cycle

1. Describe and distinguish between igneous, sedimentary, and metamorphic rocks
2. Classify rocks according to its properties
3. Identify the events involved in the rock cycle

C. Volcanoes

1. Describe the different types of volcanoes;
2. Differentiate between active and inactive volcanoes;
3. Explain the phenomenon of volcanic eruption

D. Plate tectonics

1. Know the characteristics, processes, and landforms along plate boundaries;
2. Describe the internal structure of the Earth;
3. Describe the possible mechanisms of plate movement; and

E. Meteorology

1. Interactions in the atmosphere
   a. Discuss how energy from the Sun interacts with the layers of the atmosphere;
   b. Explain the occurrence of land and sea breezes, monsoons, and ITCZ.
2. Seasons in the Philippines
   a. Relate the tilt of the Earth to the length of daytime;
   b. Relate the latitude of an area to the amount of energy the area receives; and
   c. Know the different weather patterns and seasons in the Philippines.
3. Typhoons
   a. Explain how typhoons develop;
   b. Explain how landmasses and bodies of water affect typhoons; and
4. Climate
   a. Describe certain climatic phenomena that occur on a global level.

F. Astronomy

1. Solar System
   a. Know the different motions of the Earth (rotation and revolution);
   b. Know the characteristics of planets in the solar system;
   c. Describe the occurrence of eclipses;
   d. Compare and contrast comets, meteors,and asteroids;
2. Constellations
   a. Know the characteristics of stars; and
   b. Know the relationship between the visible constellations in the sky and Earth's position along its orbit.

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V. Mathematics

A. Algebra

1. Solve problems involving algebraic expressions;
2. Solve problems involving linear equations in two variables; and,

B. Quadratic Equation

1. Solve quadratic equations by: (a) extracting square roots; (b) factoring; (c) completing the square; and (d) using the quadratic formula;
2. Solve equations transformable to quadratic equations (including rational algebraic equations);
3. Solve problems involving quadratic equations and rational algebraic equations;
4. Analyze the effects of changing the values of a, h and k in the equation y=a(x-h)2 + k of a quadratic function on its graph;
5. Determine the equation of a quadratic function given: (a) a table of values; (b) graph; (c) zeros; and,
6. Solve problems involving quadratic functions.

C. Exponents and Radicals

1. Apply the laws involving integral exponents.
2. Simplify radical expressions using the laws of radicals;
3. Perform operations on radical expressions; and,
4. Solve equations involving radical expressions.

D. Geometry

1. Identify quadrilaterals that are parallelograms;
2. Solve problems involving parallelograms, trapezoids, and kites by applying theorems in geometry;
3. Apply the theorems in geometry to show that given triangles are similar; and,
4. Solve problems that involve triangle similarity and right triangles.

E. Trigonometry

1. Use trigonometric ratios to solve real-life problems involving right triangles; and,
2. Solve problems involving oblique triangles by applying the laws of sines and cosines.

F. Sequences

1. Determine arithmetic means and nth term of an arithmetic sequence;
2. Find the sum of the terms of a given arithmetic sequence;
3. Determine geometric means and nth term of a geometric sequence;
4. Find the sum of the terms of a given finite or infinite geometric sequence;
5. Solve problems involving special sequences (e.g., harmonic, Fibonacci);

G. Polynomials

1. Perform division of polynomials using long division and synthetic division;
2. Factor polynomials;
3. Solve problems involving polynomial functions and polynomial equations.

H. Circles

1. Solve problems on circles;
2. Determine the center and radius of a circle given its equation and vice versa; and,

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3. Solve problems involving geometric figures on the coordinate plane.

I. Statistics and Probability

1. Calculate the measures of central tendency of ungrouped and grouped data;
2. Find the probability of a simple event;
3. Differentiate permutation from a combination of objects taken at a time and vice versa;
4. Calculate a specified measure of position (e.g. 90th percentile) of a set of data; and,
5. Solve problems involving measures of position.