Name: Lito J. Libradilla	**Yr. & Sec.:** Grade 12 – STEM Asclepius
Subject Code: APPLIED 05	**Subject Title**: Inquiries, Investigations, and Immersion
Module No: 2	**Topic**: Formulating a Research Title

VI. WALKING THE EXTRA MILE

DIRECTION: Prepare at least five research problem related to your research title for our next module.

1. Optimizing Integration of Renewable Energy Sources in Smart Grid Systems: Enhancing the Efficiency of Solar and Wind Energy Distribution:

- How can the intermittent nature of renewable energy sources be mitigated to ensure a consistent and reliable power supply in smart grid systems?
- What technological advancements can be implemented to improve the storage capacity and efficiency of energy from solar and wind sources in smart grids?
- How can smart grid infrastructure be optimized to accommodate a higher penetration of renewable energy sources without compromising stability and security?
- What policy frameworks are needed to incentivize the integration of renewable energy sources in smart grid systems on a large scale?
- What are the economic and environmental impacts of transitioning to a smart grid system with optimized renewable energy integration?

2. CRISPR-Cas9 Gene Editing: Navigating Ethical Dilemmas and Envisioning Future Impacts: Balancing the Promise and Perils in Genetic Manipulation:

- What ethical guidelines should be established to govern the use of CRISPR-Cas9 in human germline editing to prevent unintended consequences?
- How can public awareness and understanding of the ethical implications of gene editing technologies be improved to foster responsible usage?
- What regulatory frameworks are necessary to ensure the safe and ethical application of CRISPR-Cas9 in various fields, including medicine and agriculture?
- What potential risks and ethical considerations arise when using CRISPR-Cas9 for genetic modifications, and how can they be addressed?
- In what ways can international collaboration contribute to establishing ethical standards for the global use of gene editing technologies?

3. Augmented Reality in Education: Transformative Applications for Enhanced STEM Learning: Exploring Innovative Ways to Improve Educational Experiences:

- How does the integration of augmented reality (AR) impact student engagement and learning outcomes in STEM subjects?
- What challenges and opportunities exist in implementing AR technologies in diverse educational settings, and how can they be addressed?
- How can AR be tailored to accommodate various learning styles and preferences, ensuring inclusivity in STEM education?
- What are the long-term effects of AR-enhanced education on students' retention of STEM concepts and their overall academic performance?

- How can educators be effectively trained and supported in incorporating AR technologies into their teaching methodologies?

4. Design and Optimization of an Eco-Friendly Urban Transportation System: Creating Sustainable Urban Mobility Solutions for Environmental Harmony:

- What innovative technologies can be implemented to enhance the efficiency and sustainability of urban transportation systems?
- How can urban planning and policy initiatives be designed to encourage the adoption of eco-friendly transportation solutions in cities?
- What challenges and barriers exist in creating a seamless integration of various sustainable transportation modes, and how can they be overcome?
- What are the social and economic impacts of transitioning to an eco-friendly urban transportation system, and how can they be measured and mitigated?
- How can community engagement and public awareness contribute to the successful implementation of sustainable urban mobility solutions?

5. Quantum Cryptography: Elevating Network Security with Quantum Key Distribution: Harnessing Quantum Principles for Next-Level Communication Security:

- How does quantum key distribution enhance the security of communication networks compared to classical encryption methods?
- What are the current limitations and challenges in implementing quantum cryptography on a large scale, and how can they be addressed?
- How can businesses and organizations effectively integrate quantum cryptography into their existing cybersecurity frameworks?
- What potential threats and vulnerabilities exist in quantum communication systems, and how can they be mitigated?
- How can international collaboration contribute to the development of standardized protocols for the global implementation of quantum cryptography?