

ABOUT THE COVER



The cover features human hair, a potential sorbent material for oil spill removal. Hair is the only human body part that continually grows, degenerates, and miraculously grows again throughout life. While it is composed of dead cells in its cuticle, the presence of biochemical and hydrophobic properties exemplifies its functionality as a sorbent. Hair can be a symbol of hope, of life and of better things to come. Despite the adversities life brings, we persevere and stay afloat. To rise above the sea of darkness means to emerge from a catastrophe — even stronger, wiser, and more powerful.

Illustrated by:
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FOREWORD

From the Campus Director

Celebrating the Research Excellence of Batch 2023, Class Eunoia

It is with great pleasure and immense pride that we present the sixth volume of PubliScience, the Research Journal showcasing the remarkable research works of the graduating Batch 2023 from the Philippine Science High School Western Visayas Campus. This volume stands as a testament to the unwavering pursuit of truth and excellence exhibited by these exceptional young minds.

The research outputs presented within the pages of this journal are a reflection of the countless hours of hard work, dedication, and intellectual curiosity that the members of Class Eunoia have demonstrated throughout their research journey. Their innovative ideas, meticulous data collection, and insightful analyses have culminated in a collection of studies that push the boundaries of knowledge and contribute to the advancement of various scientific fields.

We would be remiss not to acknowledge the invaluable role of our esteemed research teachers and advisers, who have served as mentors, guiding our PisayWVC scholars every step of the way. Their expertise, guidance, and unwavering support have been instrumental in shaping the research capabilities and nurturing the passion for inquiry among our students.

This volume of PubliScience is a celebration of the intellect, tenacity, and collaborative spirit of Batch 2023, Class Eunoia. We are confident that the research showcased here will inspire future generations of scholars and scientists to continue pushing the boundaries of knowledge.

May this journal serve as a lasting testament to the outstanding achievements of our graduating batch and as a reminder of the remarkable potential they possess as they embark on their future endeavors. We extend our heartfelt congratulations to Class Eunoia for their exceptional output in research and wish them continued success in all their future endeavors.

SHENA FAITH M. GANELA
Campus Director III

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FOREWORD

From the Curriculum Instruction Division Chief

My heartfelt congratulations to Batch 2023, Class Eunoia, for their remarkable achievement in publishing *PubliScience: A Research Journal of High School Research*, Vol. 6. This accomplishment stands as a testament of a true Pisaynon that embodies dedication, perseverance, and exceptional scholarly abilities in the field of STEM courses.

This publication of research journals marks a highlight of your academic journey as a Pisay scholar. It demonstrates your proficiency in critical thinking, analytical skills, and commitment to pushing the boundaries of human character and understanding.

The depth and breadth of your research reflect the countless hours of meticulous investigation, thoughtful analysis, steady collaboration with groupmates, and rigorous experimentation or revisions to achieve the goals and objectives of your study. Your valuable findings and insights are poised to impact society, address pressing issues, and catalyze transformative change.

I commend your formidable effort to finish your research. You remain steadfast even at times you feel like giving up. This manifests your relentless pursuit of excellence, integrity, and service. Your success serves not only as an inspiration to your peers but also as a shining example for lower batches of Pisay scholars.

Moreover, let me also extend my heartfelt gratitude to the research teachers, advisers, and external experts who have guided and supported these students throughout their research endeavors. Your expertise, guidance, and unwavering encouragement have played a pivotal role in shaping these bright minds and nurturing their passion for knowledge.

Once again, congratulations to Batch 2023, Class Eunoia, on this extraordinary accomplishment. Your research journals will undoubtedly leave an indelible mark on the academic world, and we are immensely proud of your achievements.

Ingat kayo lagi,

ROLANDO S. LIBUTAQUE
Curriculum Instruction Division Chief

* * *

THE RESEARCH PROGRAM

The RESEARCH PROGRAM is a three-year curriculum aimed at honing the scholars' quality and skills as world-class Filipino scientists. Beginning with Grade 10, the curriculum presents a variety of research principles to cultivate the scholars' expertise in becoming respectable figures in their respective fields.

RESEARCH 1

Research as a subject is introduced in Grade 10. It is the foundational year for aspiring researchers wherein an in-depth discussion of the basics of the Scientific Method and the Research Process is done. The curriculum primarily covers the fundamentals of research such as topic selection, literature search, research design, and paper presentation. Scholars are also trained in writing their research proposals and research papers with general topics provided by the Research 1 teachers. Scholars form groups, called work units composed of at most five members. Research 1 culminates with the paper presentation of the Grade 10 scholars in *Pagsugidadon*.

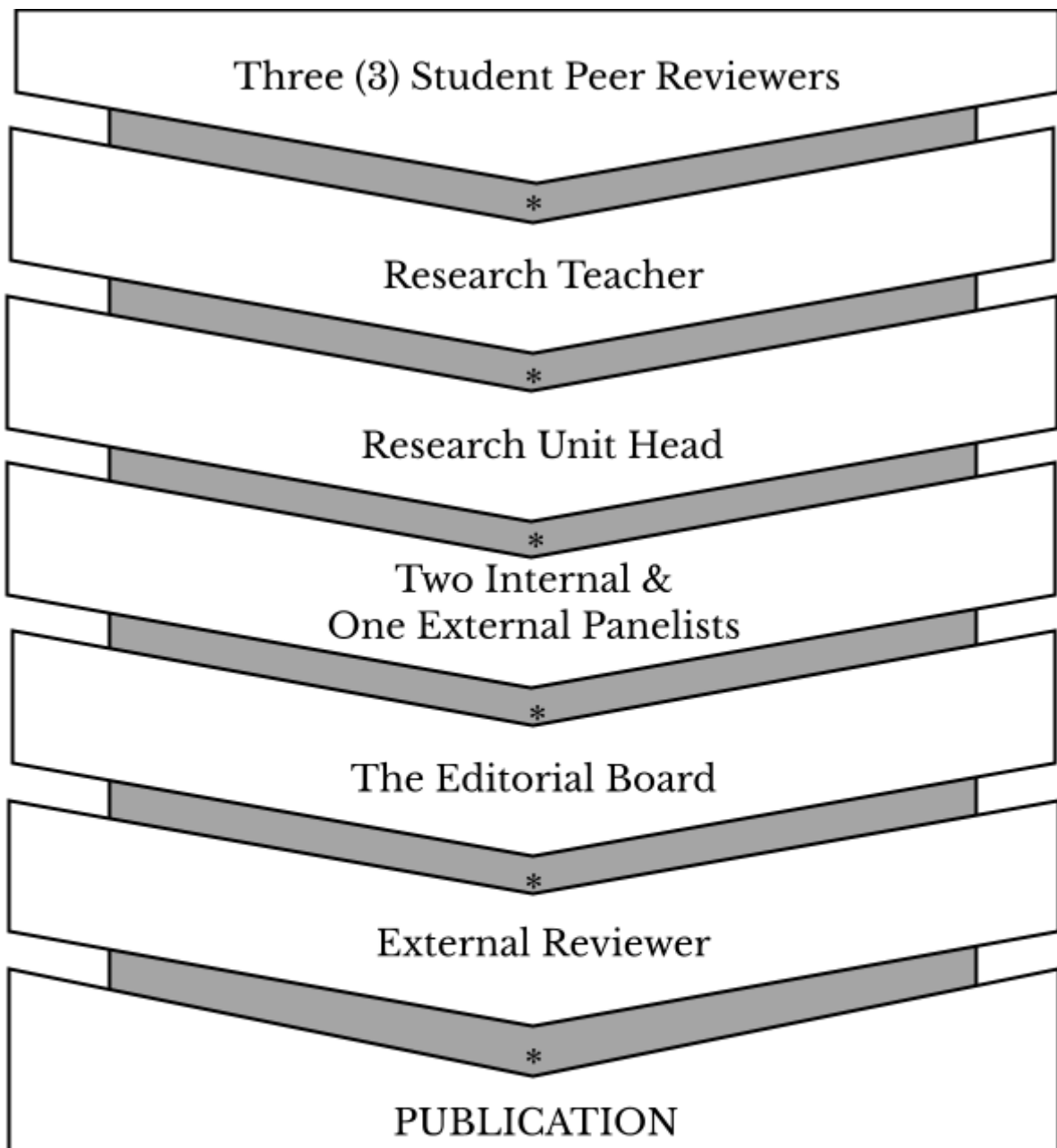
RESEARCH 2

Research 2 is the reinforcement year in Grade 11. During this year level, the writing of the proposal and the research paper are further scrutinized. Each section of a standard research paper: abstract, introduction, method, results, discussion, and conclusion is more pronounced in the syllabus. Research 2 is performed in work units of at most three members. Scholars are allowed to select any topic in alignment with their science options or elective under the supervision of their advisers, propose and defend their proposal to a panel, develop and enhance skills related to the study, perform the method outlined in their proposal, and report their findings in a full-fledged research paper. Research 2 concludes with the presentation of the results in the final defense.

RESEARCH 3

Research 3 is the culminating year of the research curriculum. It is reserved for Grade 12 scholars who organize activities and events that share their respective study's findings, including but not limited to research presentation (*Pagbantala*), poster presentation (*Pagbalandra*), seminar-workshop (*Pahisayod*), and community science conference (*Pagwaragwag*) with more events described at the end of this journal. This very journal is the fruit of the previous two batches' research experience. Research 3 focuses on finalizing the study and networking the results. It focuses on a community-oriented approach to making science more accessible. This is evident in the oral and poster presentations for students and professionals, workshops and seminars for high school students, and the gamification of each study for elementary students during the aforementioned events. Each study is given the opportunity to be published in this journal, provided that they have accomplished the review process outlined in the next page.

The Research Review Process



***Research Adviser**

As the research advisers are co-authors of the journal articles, they are updated with the article or its changes after each round of review.

THE RESEARCH COMMITTEE

The RESEARCH COMMITTEE is tasked with ensuring the quality of all research studies produced by the Batch 2023 scholars, performed from the 10th to the 12th grade. It is headed by the Research Unit Head who oversees and approves all research works, and is composed of research teachers who handle the Research classes for a specific school year and grade level, and research advisers who provide specific guidance, insight, and assistance in a consulting capacity in their fields of expertise. The Science Research Assistants and Specialists manage the unique labs, apparatuses, equipment, and reagents for the conduct of the respective projects of the scholars.

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REVIEWERS AND PANELISTS

The research curriculum of PSHS - WVC is predominantly composed of highly immersive activities that develop the scholars' skills as researchers and scientific communicators. Commencing from , the scholars experience the rigors of having to defend their proposals and, ultimately, their final paper.

PAGSUGUIDADON

PAGSUGUIDADON, from the Hiligaynon word *suguid* or "to report", is the culminating event for the Grade 10 Research curriculum. Scholars present and defend their paper to a three-person panel, composed of two invited panelists and a faculty member of PSHS-WVC. The papers are presented in five clusters with each study's overarching theme as the basis of categorization.

PAGSUGUIDADON, from the Hiligaynon word *suguid* or "to report", is the culminating event for the Grade 10 Research curriculum. Scholars present and defend their paper to a three-person panel, composed of two invited panelists and a faculty member of PSHS-WVC. The papers are presented in five clusters, namely: Water Studies, Marine Science, Biology, Plant science, and Development, with each studies' overarching theme as the basis of categorization.

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Polina S. Espino
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Ghelai Marie F. Tolentino

Arabella Shayne S. Braña
Myanna Sharee O. Fuentes
Johar H. Racho

PAGBANTALA

PAGBANTALA, from the Hiligaynon word *bantala* or “to inform”, is the oral presentation of the scholars’ studies to a panel of experts composed of an invited panelist, an alumni, and a faculty member of PSHS - WVC. For the SY 2022-2023, the studies were presented in 5 clusters namely: Microbiology and Food Science, Material Science, Product Development and Trend Analysis, Computer Studies, and Environmental Science (ordered below left to right, top to bottom).

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Herbert John D. Escullar
COMPUTER STUDIES

Erika Eunice P. Salvador
ENVIRONMENTAL SCIENCE

THE FINAL DEFENSE

The FINAL DEFENSE is the final step towards the end of the 3-year research curriculum. The scholars invite a three-person panel composed of one external expert and two PSHSWVC faculty to assess the merits and validity of their findings. The final defense panel recommends revisions to the study's manuscript as well as continually review the same until approval.

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PREFACE

We are honored to present the sixth volume of Publiscience, the homegrown journal of PSHS-WVC scholars. This edition showcases the works of Batch 2023 (Eunoia), whose research journey was uniquely shaped by the immediate aftermath of the COVID-19 pandemic. Conducting research during this period meant that certain restrictions were still in place, requiring adaptability, resilience, and creativity from our scholars as they navigated challenges in conducting experiments, gathering data, and collaborating with their peers and advisers.

Keeping true to the spirit of Pagpasanyog—the Hiligaynon word for "innovate"—Batch 2023 continues the legacy of pushing boundaries in scientific research. This year's volume highlights 14 articles, organized into three major clusters: Material and Food Science, Product Development & Trend Analysis, and Environmental Science. These clusters reflect the scholars' commitment to address pressing needs of society, from innovations in sustainable materials and food security, to the development of products that respond to emerging consumer trends, and to advancing solutions for environmental preservation and resilience.

The Editorial Board, alongside the Research Unit, acknowledges the significant role of scientific inquiry in nation-building. Despite the limitations imposed by a transitioning world, the students of Batch 2023 embraced their responsibility as young researchers, producing studies that not only contribute to the growing body of knowledge, but also hold the potential for real-world applications with social, economic, and environmental impact.

This volume comes at a time when the lessons of the pandemic remain fresh in our memories, reminding us of the vital importance of Science and Technology in safeguarding communities and shaping a better future. We hope that through the works presented here, readers may find inspiration in the perseverance and ingenuity of these young scholars, and be encouraged to carry forward the torch of truth-seeking, innovation, and service to society no matter the limitations.

THE EDITORIAL BOARD

* * *

DEDICATION

This journal is dedicated to the mentors and families whose belief in the student-researchers made this work possible, to the young minds who prove that age is never a limitation to discovery, and to the Filipino people, whose perseverance and resilience inspire every page.