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Environmental Awareness, Scientific Attitude, and Environmental Responsibility of Grade 10 Learners of Tabon M. Estrella National High School, Bislig City Division: A Descriptive-Survey Study as Basis for a YES-O-Integrated Science Advocacy Program

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ABSTRACT

This descriptive-survey study determined the environmental awareness, scientific attitude, and environmental responsibility of Grade 10 learners of Tabon M. Estrella National High School, Bislig City Division, during School Year 2025-2026 as basis for a proposed Youth for Environment in Schools Organization (YES-O)-Integrated Science Advocacy Program. A quantitative descriptive-survey design was employed using 275 valid responses from a total Grade 10 population of 282 learners, equivalent to a 97.52% response rate. Data were gathered through a researcher-made questionnaire administered through Google Forms using a four-point Likert scale. The instrument demonstrated high internal consistency, with Cronbach's alpha coefficients of .970 for environmental awareness, .980 for scientific attitude, and .981 for environmental responsibility. Frequency and percentage were used to describe learner participation variables, while weighted mean and standard deviation were used for the major study variables. Only 18.18% of learners were YES-O members and 32.73% had participated in school environmental activities. Despite limited formal participation, environmental awareness was Very High (M = 3.533), led by awareness of environmental issues (M = 3.575), while awareness of school-based environmental programs was comparatively lowest (M = 3.473). Scientific attitude was Very High (M = 3.425), with open-mindedness highest (M = 3.465) and critical-mindedness lowest (M = 3.393). Environmental responsibility was also Very High (M = 3.417), with responsible waste disposal strongest (M = 3.469) and conservation of school resources lowest (M = 3.400). The findings show strong environmental and scientific dispositions but limited formal participation. Accordingly, the proposed YES-O-Integrated Science Advocacy Program emphasizes program awareness, scientific inquiry, waste management, resource conservation, campus greening, and student-led advocacy to sustain learner strengths and expand meaningful participation in science-based environmental action.

Keywords: *environmental awareness, scientific attitude, environmental responsibility, Grade 10 learners, YES-O, science advocacy*

INTRODUCTION

Environmental responsibility is an increasingly important outcome of science education because schools are expected not only to teach scientific concepts but also to help learners develop the knowledge, attitudes,

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judgment, and habits needed for environmental protection. International frameworks emphasize that climate and environmental education should prepare learners to understand sustainability challenges and participate in practical solutions (UNESCO, 2021, 2024). Similarly, OECD (2022) noted that students' readiness to respond to environmental challenges depends on both knowledge and opportunities for action.

For Filipino learners, this concern is closely tied to scientific literacy. PISA 2022 results reported that only 23% of Filipino 15-year-old students reached at least Level 2 proficiency in science, indicating continuing difficulty in applying scientific knowledge and evaluating evidence-based conclusions (OECD, 2023). Environmental decisions involving climate change, pollution, waste management, and resource conservation require these same competencies. Ordonio et al. (2025) likewise found that Filipino learners could be aware of climate-related experiences while still showing uneven conceptual understanding, suggesting the need to connect environmental awareness with scientific ways of thinking.

Local studies in Surigao City further demonstrate the relevance of school-based environmental education. Escatron et al. (2023) reported very high environmental awareness and positive environmental practices among public senior high school students, while Abecia et al. (2023) examined awareness, attitudes, and practices among learners in a private senior high school. However, Grade 10 learners remain less represented in localized environmental education research, particularly in studies that simultaneously describe environmental awareness, scientific attitude, and environmental responsibility.

Within Philippine basic education, the Youth for Environment in Schools Organization (YES-O) provides an institutional mechanism for learner involvement in clean-up drives, waste management, segregation and recycling, awareness campaigns, nursery establishment, tree planting, and related environmental activities (Department of Education, 2003, 2011). The program also aligns with Republic Act No. 9512, which promotes environmental education, and Republic Act No. 9003, which supports ecological solid waste management. These policies create opportunities to connect Science 10 learning with school-based environmental action.

Against this context, the study determined the environmental awareness, scientific attitude, and environmental responsibility of Grade 10 learners of Tabon M. Estrella National High School, Bislig City Division, and used the descriptive findings as basis for a YES-O-Integrated Science Advocacy Program. It specifically examined learner participation in YES-O and school environmental activities; five dimensions of environmental awareness; five dimensions of scientific attitude; and five dimensions of environmental responsibility. The study sought to generate local evidence that could guide science instruction, school environmental programming, and learner participation without introducing or testing an intervention.

Literature Review

Environmental Awareness and Environmental Literacy

Environmental awareness refers to learners' knowledge, recognition, and understanding of environmental conditions, problems, causes, consequences, and possible solutions. Within environmental literacy, awareness is not limited to factual recall; it is connected with cognitive skills, affective dispositions, and responsible behavior (Hollweg et al., 2011). The study therefore treated environmental awareness as a multidimensional construct involving environmental issues, proper waste management, climate change and environmental protection, school-based environmental programs, and the learner's role in conservation.

Awareness becomes educationally meaningful when learners can connect environmental concepts with their immediate surroundings. OECD (2022) emphasizes that environmental knowledge and skills are important for responding to environmental challenges, while UNESCO (2024) calls for climate learning that is accurate, action-oriented, and connected with sustainability. In the Philippine context, waste management knowledge is especially relevant because Republic Act No. 9003 promotes segregation, recycling, composting, and responsible disposal, while school environmental programs provide settings where these practices can be reinforced.

Local evidence suggests that awareness may be high even when participation or conceptual depth varies. Escatron et al. (2023) found very high environmental awareness among public senior high school learners in

Surigao City, whereas Ordonio et al. (2025) showed that Filipino learners' climate knowledge could remain uneven despite awareness of visible climate effects. These findings support measuring separate awareness dimensions and identifying comparatively weaker areas that school programs can address.

Scientific Attitude and Evidence-Based Environmental Learning

Scientific attitude concerns the disposition to ask questions, consider alternative explanations, base judgments on evidence, and evaluate claims carefully. In the study, it was represented by curiosity, open-mindedness, objectivity, critical-mindedness, and respect for evidence. Osborne et al. (2003) emphasized that attitudes toward science influence learners' engagement, while Lederman et al. (2013) linked scientific inquiry and evidence-based thinking with scientific literacy.

Environmental issues are particularly suitable contexts for scientific attitude because they require learners to interpret evidence and distinguish supported explanations from assumptions. Zeidler and Nichols (2009) explain that socioscientific issues require scientific reasoning alongside responsible judgment. McNeill and Krajcik (2012) similarly emphasize the use of claims, evidence, and reasoning when learners construct scientific explanations. These competencies are relevant to climate change, waste management, pollution, and resource conservation, where students encounter competing information and practical decisions.

The need for evidence-based environmental learning is reinforced by national science performance. OECD (2023) showed that many Filipino learners still need stronger capacities for scientific explanation and data-based judgment. Accordingly, environmental advocacy in school can serve not only as a participation activity but also as a setting for inquiry, observation, data collection, source comparison, and evidence-based explanation.

Environmental Responsibility and Pro-Environmental Behavior

Environmental responsibility is the behavioral expression of environmental understanding and commitment. It involves actions such as proper waste disposal, participation in environmental activities, conservation of resources, care for plants and school surroundings, and personal commitment to environmental protection. Stern (2000) describes environmentally significant behavior as action that contributes to environmental protection, while Kollmuss and Agyeman (2002) explain that environmental behavior is shaped by interacting internal and external factors rather than knowledge alone.

The Theory of Planned Behavior provides a useful explanation for this action dimension. Ajzen (1991) proposes that behavior is influenced by behavioral intention, which is shaped by attitudes, subjective norms, and perceived behavioral control. In a school setting, learners may be more likely to conserve resources, dispose of waste properly, or participate in environmental activities when these actions are personally valued, socially supported, and perceived as feasible. Bamberg and Möser (2007) likewise found that attitudes, perceived control, norms, and intentions contribute to pro-environmental behavior.

Environmental responsibility can be strengthened through repeated practice and supportive school environments. Ardoin et al. (2020) found that well-designed environmental education programs can contribute to conservation-related outcomes, while Monroe et al. (2019) identified active learning, relevance, and engagement with solutions as effective features of climate change education. These findings support school programs that move beyond information campaigns to provide structured opportunities for environmental action.

YES-O, Science Integration, and Learner Participation

The Youth for Environment in Schools Organization institutionalizes environmental participation in Philippine schools. DepEd Order No. 72, s. 2003 established YES-O to promote environmental awareness, values, skills, and action, while DepEd Order No. 93, s. 2011 identified related programs and activities (Department of Education, 2003, 2011). YES-O thus provides a practical platform for connecting classroom concepts with clean-up drives, waste segregation, recycling, campus greening, conservation, and environmental advocacy.

Participation matters because environmental education becomes more meaningful when learners have direct opportunities to apply what they learn. Ardoin et al. (2020) and Monroe et al. (2019) show that active, relevant, solution-oriented experiences can support environmental outcomes. In the study context, participation in YES-O

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and school environmental activities was therefore treated as an important contextual indicator rather than as a prerequisite for environmental awareness or responsibility.

A YES-O-integrated Science Advocacy Program can bridge scientific learning and environmental action. Environmental investigations, classroom eco-audits, waste monitoring, climate information campaigns, conservation tasks, and student-led reporting can simultaneously strengthen scientific dispositions and responsible behavior. This approach is consistent with the Education for Sustainable Development framework, which views learners as active participants in sustainability solutions (UNESCO, 2024; United Nations, 2015).

Theoretical Foundations of the Study

The study was anchored on three complementary perspectives: the Environmental Literacy Framework, the Theory of Planned Behavior, and the Education for Sustainable Development Framework. The Environmental Literacy Framework explains that environmental knowledge, dispositions, cognitive skills, and behavior work together in environmental competence (Hollweg et al., 2011). This supports the study's measurement of environmental awareness as a foundation for environmental action.

The Theory of Planned Behavior explains the movement from beliefs and attitudes toward action. In the school context, social expectations, perceived capacity, and personal attitudes can influence learners' willingness to practice environmentally responsible behaviors (Ajzen, 1991). This theoretical lens helps explain why high awareness does not automatically guarantee formal participation and why school structures and peer-supported opportunities remain important.

The Education for Sustainable Development Framework emphasizes knowledge, skills, values, attitudes, participation, and action for sustainability (UNESCO, 2024). It supports the study's use of descriptive findings to design an advocacy program that integrates Science learning with YES-O activities. Together, the three frameworks connect environmental understanding, scientific ways of thinking, behavioral responsibility, and school-based action.

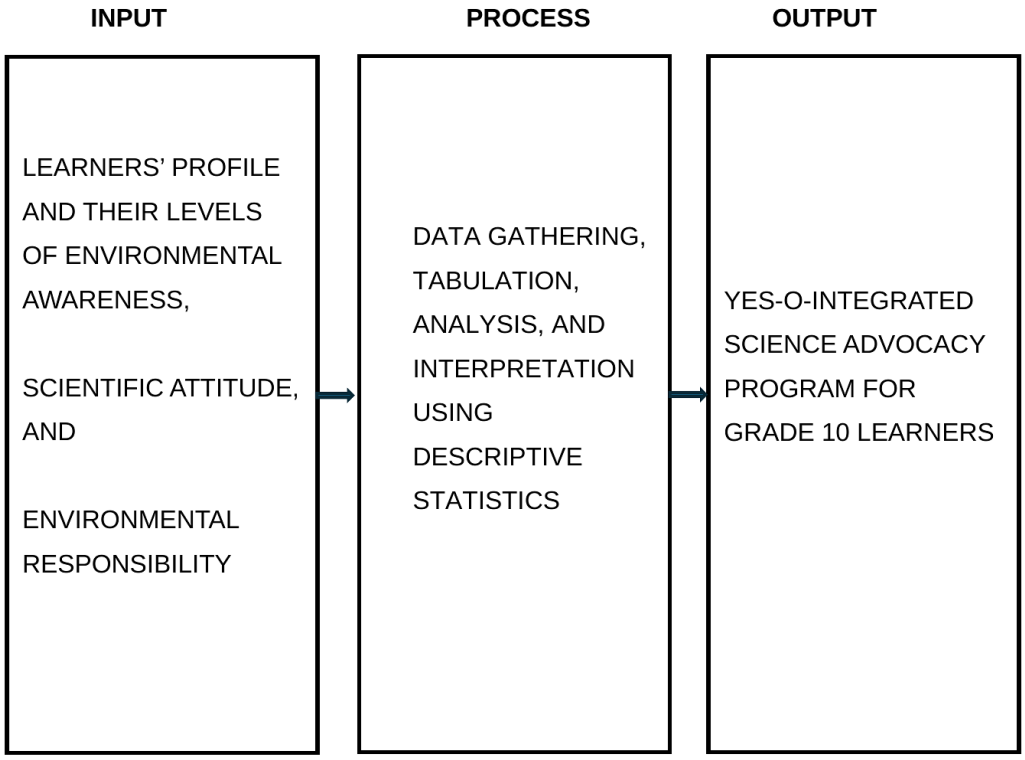

Figure 1. *Schematic Diagram of the Study*

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METHODS

Research Design

The study employed a quantitative descriptive-survey research design. It described the existing levels of environmental awareness, scientific attitude, and environmental responsibility without manipulating variables or introducing an intervention. The design also allowed the researcher to summarize learner participation characteristics and use the resulting school-level evidence as basis for developing a YES-O-Integrated Science Advocacy Program (Creswell & Creswell, 2018; Fraenkel et al., 2019).

Research Locale

The study was conducted at Tabon M. Estrella National High School in Barangay Tabon, Bislig City, Surigao del Sur, within the Caraga Region. The school serves Junior and Senior High School learners and, during the study period, had a total enrollment of 1,151 learners, including 282 Grade 10 learners distributed across eight sections. The locale was appropriate because Grade 10 learners were taking Science 10 and were exposed to school-based environmental programs relevant to the variables of the study.

Participants and Sampling Technique

The target population consisted of all 282 Grade 10 learners enrolled during School Year 2025-2026. The study sought responses from the Grade 10 population rather than drawing a smaller probabilistic sample. A total of 276 Google Form submissions were received; one incomplete response was excluded, leaving 275 valid and analyzable responses. The final response coverage was therefore 97.52% of the Grade 10 population. The final dataset did not contain age, sex, and section information, even though these variables had originally appeared in the Statement of the Problem; consequently, they were not analyzed.

Research Instrument

A researcher-made questionnaire was used to measure three major variables. Environmental awareness contained 25 items covering awareness of environmental issues, knowledge of proper waste management, awareness of climate change and environmental protection, awareness of school-based environmental programs, and awareness of the role of learners in environmental conservation. Scientific attitude contained 25 items covering curiosity, open-mindedness, objectivity, critical-mindedness, and respect for evidence. Environmental responsibility contained 25 items covering responsible waste disposal practices, participation in environmental activities, conservation of school resources, care for plants and school surroundings, and personal commitment to environmental protection. Responses used a four-point scale from 4 (Strongly Agree) to 1 (Strongly Disagree).

The scale was interpreted as 3.26-4.00 = Very High, 2.51-3.25 = High, 1.76-2.50 = Low, and 1.00-1.75 = Very Low. Reliability analysis showed high internal consistency: Cronbach's alpha was .970 for environmental awareness, .980 for scientific attitude, and .981 for environmental responsibility. The questionnaire responses were checked and cleaned before analysis.

Data Gathering Procedure

Prior to data collection, the researcher secured the necessary permission to conduct the study and coordinated with the school head and concerned teachers. The questionnaire was prepared in Google Forms and administered to Grade 10 learners. Participants were informed about the study purpose, voluntary participation, and confidentiality. After collection, the responses were downloaded, checked for completeness, cleaned, and organized for statistical analysis. One incomplete response was excluded from the final dataset.

Data Analysis

Frequency and percentage were used to describe the available learner profile variables, particularly YES-O membership and participation in school environmental activities. Weighted mean and standard deviation were used to determine the levels of environmental awareness, scientific attitude, environmental responsibility, and their respective dimensions. The comparatively lower dimensions and participation results were then used as priority areas in developing the proposed YES-O-Integrated Science Advocacy Program.

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Ethical Consideration

The study observed voluntary participation, confidentiality, privacy, and responsible handling of learner data. Respondent names were not used in the final research database; learner responses were coded and analyzed only in summarized form. These safeguards were particularly important because the respondents were minors and the research involved school-based learner data (UNICEF, 2021).

RESULTS AND DISCUSSION

Learner Participation Profile

The final dataset included 275 valid responses, representing 97.52% of the Grade 10 population. Formal involvement in school environmental activities was limited: only 50 learners (18.18%) were YES-O members, while 225 (81.82%) were non-members. Similarly, only 90 learners (32.73%) reported participation in school environmental activities, whereas 185 (67.27%) had not participated. These results show that the strong environmental outcomes reported later in the study were not matched by equally broad participation in formal environmental programs.

Table 1. Profile of the Grade 10 Learner-Respondents

Profile Variable	Category	Frequency	Percentage
Grade Level	Grade 10	275	100.00%
YES-O Membership	Yes	50	18.18%
YES-O Membership	No	225	81.82%
Participation in School Environmental Activities	Yes	90	32.73%
Participation in School Environmental Activities	No	185	67.27%

The limited participation supports the need to make YES-O and related activities more visible and inclusive. Environmental education is strengthened when learners can participate in authentic activities rather than remain only recipients of information (Ardoin et al., 2020). Thus, the profile findings identify an important implementation gap: environmental dispositions were high, but formal opportunities for involvement could still be expanded.

Environmental Awareness

Grade 10 learners demonstrated Very High Environmental Awareness overall (M = 3.533, SD = 0.44). Awareness of environmental issues was the strongest dimension (M = 3.575), followed by awareness of climate change and environmental protection (M = 3.553), awareness of the role of learners in environmental conservation (M = 3.545), and knowledge of proper waste management (M = 3.520). Awareness of school-based environmental programs was comparatively lowest (M = 3.473), although it remained Very High.

Table 2. *Level of Environmental Awareness of Grade 10 Learners*

Dimension	Mean	SD	Interpretation
Awareness of Environmental Issues	3.575	0.45	Very High
Knowledge of Proper Waste Management	3.520	0.49	Very High
Awareness of Climate Change and Environmental Protection	3.553	0.49	Very High
Awareness of School-Based Environmental Programs	3.473	0.47	Very High
Awareness of the Role of Learners in Environmental Conservation	3.545	0.49	Very High
Overall	3.533	0.44	Very High

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The strong result indicates that learners recognized environmental concerns and understood practical responsibilities related to waste, climate change, and conservation. This aligns with environmental literacy perspectives in which awareness provides a foundation for responsible action (Hollweg et al., 2011). However, the comparatively lower score for school-based environmental program awareness is consistent with the limited participation profile. The finding suggests that program visibility and learner engagement should be strengthened even when general environmental knowledge is already high.

Scientific Attitude

Scientific attitude was also Very High overall (M = 3.425, SD = 0.44). Open-mindedness obtained the highest mean (M = 3.465), followed by respect for evidence (M = 3.455), curiosity (M = 3.411), objectivity (M = 3.400), and critical-mindedness (M = 3.393). The pattern indicates that learners were highly receptive to alternative explanations and evidence, while critical evaluation and objectivity were comparatively weaker areas.

Table 3. *Level of Scientific Attitude of Grade 10 Learners*

Dimension	Mean	SD	Interpretation
Curiosity	3.411	0.44	Very High
Open-Mindedness	3.465	0.45	Very High
Objectivity	3.400	0.48	Very High
Critical-Mindedness	3.393	0.48	Very High
Respect for Evidence	3.455	0.47	Very High
Overall	3.425	0.44	Very High

This finding is favorable because environmental problems require openness to evidence and careful scientific judgment. Lederman et al. (2013) emphasize the role of evidence and inquiry in scientific literacy, while Zeidler and Nichols (2009) highlight reasoning in socially relevant scientific issues. The comparatively lower objectivity and critical-mindedness scores justify inquiry activities in which learners examine environmental claims, compare sources, collect observations, interpret data, and defend conclusions with evidence (McNeill & Krajcik, 2012).

Environmental Responsibility

Environmental responsibility was Very High overall (M = 3.417, SD = 0.45). Responsible waste disposal practices ranked highest (M = 3.469). Care for plants and school surroundings and personal commitment to environmental protection each obtained M = 3.407, participation in environmental activities obtained M = 3.404, and conservation of school resources was comparatively lowest (M = 3.400).

Table 4. *Level of Environmental Responsibility of Grade 10 Learners*

Dimension	Mean	SD	Interpretation
Responsible Waste Disposal Practices	3.469	0.47	Very High
Participation in Environmental Activities	3.404	0.47	Very High
Conservation of School Resources	3.400	0.52	Very High
Care for Plants and School Surroundings	3.407	0.47	Very High
Personal Commitment to Environmental Protection	3.407	0.55	Very High
Overall	3.417	0.45	Very High

The strongest result in waste disposal reflects a practical form of environmental responsibility that is directly supported by school routines and Republic Act No. 9003. At the same time, conservation and activity participation were the relatively weaker dimensions, indicating that environmental responsibility should be sustained through daily practices involving water, electricity, paper, school materials, and organized learner action. This is consistent with the view that environmental behavior depends on supportive opportunities and repeated practice, not awareness alone (Kollmuss & Agyeman, 2002; Stern, 2000).

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Proposed YES-O-Integrated Science Advocacy Program

The descriptive findings guided the development of a YES-O-Integrated Science Advocacy Program designed to sustain the learners' Very High levels while prioritizing areas that were comparatively lower. These priorities included awareness of school-based environmental programs, objectivity, critical-mindedness, participation in environmental activities, and conservation of school resources. The program also responded to the low rates of YES-O membership and school environmental activity participation.

Table 5. Proposed YES-O-Integrated Science Advocacy Program

Component	Key Activities	Persons Involved	Expected Output
Environmental Program Awareness Drive	YES-O orientation; school environmental programs; waste campaigns; learner conservation roles	YES-O adviser, Science teachers, YES-O officers, Grade 10 learners	Greater program awareness and participation interest
Science-Based Environmental Inquiry	Eco-audits, waste checks, observations, mini-investigations	Science teachers, YES-O adviser, learners	Stronger objectivity, critical-mindedness, and respect for evidence
Waste Management and Cleanliness Campaign	Segregation reminders, monitoring, recycling corners, clean-up activities	YES-O officers, class advisers, learners	Sustained responsible waste disposal and cleaner surroundings
School Resource Conservation Program	Monitoring and class tasks on saving water, electricity, paper, and materials	Science teachers, class officers, learners	Improved resource conservation and sustainability habits
Campus Greening and Care for Surroundings	Plant care, greening, tree-growing, beautification linked with science lessons	School head, YES-O adviser, Science teachers, learners	Stronger stewardship and care for school surroundings
Student-Led Environmental Advocacy	Posters, short videos, peer reminders, classroom reports, pledge boards	YES-O officers, Grade 10 learners, Science teachers	Higher participation, personal commitment, and peer-supported responsibility

The program directly links the descriptive findings with action. Program-awareness activities address low formal participation; inquiry activities target objectivity and critical-mindedness; resource conservation responds to the lowest environmental responsibility dimension; and student-led advocacy extends environmental learning beyond the classroom. The approach is consistent with the objectives of YES-O (Department of Education, 2003, 2011) and with action-oriented sustainability education that integrates knowledge, participation, and solutions (UNESCO, 2024).

CONCLUSION

Grade 10 learners of Tabon M. Estrella National High School demonstrated Very High environmental awareness, Very High scientific attitude, and Very High environmental responsibility. Their strongest areas were awareness of environmental issues, open-mindedness, and responsible waste disposal. These results indicate that learners already possess strong environmental understanding, favorable scientific dispositions, and responsible environmental practices. However, the findings also reveal comparatively weaker areas in awareness of school-based environmental programs, critical-mindedness, objectivity, participation in environmental activities, and conservation of school resources.

A notable contrast emerged between the very high survey results and limited formal participation: only 18.18% of learners were YES-O members and 32.73% had participated in school environmental activities. The principal contribution of the study is therefore not simply the identification of high environmental outcomes, but the recognition that these strengths can be sustained and translated into wider, structured participation. The proposed YES-O-Integrated Science Advocacy Program provides a practical mechanism for linking Science instruction, evidence-based inquiry, conservation practice, campus action, and student leadership within the school setting.

Recommendation

The school head, Science coordinator, Grade Level Chairpersons, and YES-O adviser may use the findings to support implementation of the proposed YES-O-Integrated Science Advocacy Program and incorporate appropriate components into science action plans, YES-O activities, learner-development initiatives, and school-improvement planning.

Science teachers may strengthen objectivity and critical-mindedness through inquiry-based activities that require learners to ask questions, compare sources, interpret environmental data, conduct simple eco-audits, and justify conclusions using evidence. Environmental concepts may be connected with practical tasks on climate change, waste management, resource conservation, and campus greening.

YES-O officers and advisers may expand participation opportunities for non-members through inclusive clean-up drives, waste-segregation campaigns, resource-conservation monitoring, tree-growing, environmental awareness drives, and student-led advocacy. Program visibility should be increased so that more Grade 10 learners become aware of and involved in school environmental activities.

Parents and guardians may reinforce environment-friendly practices at home, particularly proper waste disposal, water and electricity conservation, and care for plants and surroundings, while supporting learners' participation in school environmental programs.

Future researchers may replicate the study in other grade levels, schools, districts, or divisions; include profile variables not captured in the final dataset; compare YES-O members and non-members; and conduct intervention or evaluation studies to determine the effectiveness of the proposed program after implementation.

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