Revista Ciencia en Desarrollo. Vol. 16 Núm. 1E pp. 31 - 38
VII International Meeting of the Faculty of Sciences - 2024

Artículo de investigación
Número especial 1E

Sociocultural perception of insects in seventh grade students: an ethnoentomological study in Miraflores, Boyacá

Percepción sociocultural de los insectos en estudiantes de séptimo grado: un estudio etnoentomológico en Miraflores, Boyacá

Deisy Pinilla-Peña[1], Paola Muñoz-Cárdenas[1], Daniel Gonzalez-Galindo[2] and Héctor Jaime Gasca-Álvarez[3,4]✉

[1]Grupo de investigación en Ciencias Biomédicas (GICBUPTC). Facultad de Ciencias. Universidad Pedagógica y Tecnológica de Colombia, Tunja, Colombia.
[2]Grupo de Sistemática Biológica. Facultad de Ciencias (SISBIO). Universidad Pedagógica y Tecnológica de Colombia, Tunja, Colombia.
[3]Grupo de Ecología de Organismos (GEO). Facultad de Ciencias. Universidad Pedagógica y Tecnológica de Colombia, Tunja, Colombia.
[4]Programa de Investigación, Corporación Sentido Natural.

Received: 27-oct-2024 **Accepted:** 02-mar-2025 **Published:** 09-jul-2025
Citation: Pinilla-Peña, D., Muñoz-Cárdenas, P., Gonzalez-Galindo, D., & Gasca-Álvarez, H. J. (2025). Percepción sociocultural de los insectos en estudiantes de séptimo grado: un estudio etnoentomológico en Miraflores, Boyacá. *Ciencia en Desarrollo*, 16(1E). doi: 10.19053/uptc.01217488.v16.nE.2025.19782

Abstract

This study analyzes the sociocultural perception of insects among seventh-grade students at the Sergio Camargo Educational Institution in Miraflores, Boyacá. A qualitative methodology was employed, based on playful activities and educational workshops designed by the authors, following a constructivist approach that promotes active participation. The results show that students tend to group insects with other arthropods, relying on general physical characteristics rather than precise taxonomic criteria. However, more than 90% correctly identified common insects and demonstrated significant knowledge about their habitats. Additionally, students' attitudes and perceptions toward insects were explored. About 67% expressed positive perceptions, such as curiosity and admiration, while 26% reported feelings of rejection or fear. These results highlight the role of environmental education in fostering ecological awareness and reducing misconceptions about entomofauna. Although students recognize the ecological importance of insects, persistent conceptions show the need to strengthen educational approaches to biodiversity. The study emphasizes the importance of understanding children's perceptions of insects to develop educational strategies that promote biodiversity appreciation and contribute to the Sustainable Development Goals in Colombia.

Keywords: Environmental education, entomofauna, children's perception, ecosystem conservation.

Resumen

Este estudio analiza la percepción sociocultural de los insectos en estudiantes de séptimo grado de la Institución Educativa Sergio Camargo en Miraflores, Boyacá. Se empleó una metodología cualitativa basada en actividades lúdicas y talleres educativos diseñados por los autores, con un enfoque constructivista que promueve la participación activa. Los resultados muestran que los estudiantes tienden a agrupar a los insectos con otros artrópodos, basándose en características físicas generales más que en criterios taxonómicos precisos. No obstante, más del 90% identificó correctamente insectos comunes y demostró un conocimiento significativo sobre sus hábitats. Se exploraron las actitudes y valoraciones de los estudiantes hacia los insectos. El 67% manifestó percepciones positivas, como curiosidad y admiración, mientras que un 26% expresó rechazo o temor. Estos resultados destacan el papel de la educación ambiental en la formación de una conciencia ecológica y en la reducción de ideas erróneas sobre la entomofauna. A pesar de que los estudiantes reconocen la importancia ecológica de los insectos, persisten concepciones que evidencian la necesidad de fortalecer los enfoques educativos en biodiversidad. El estudio resalta la importancia de comprender la percepción infantil sobre los insectos para desarrollar estrategias educativas que fomenten la valoración de la biodiversidad y contribuyan a los Objetivos de Desarrollo Sostenible en Colombia.

Palabras Clave: Educación ambiental, entomofauna, percepción infantil, conservación de ecosistemas.

E-ISSN: 2462-7658

1 Introduction

The anthropic understanding of ecosystems is established through reciprocal interactions between biotic and abiotic factors, where humans play a fundamental role [1]. Among the biotic components, the class Insecta stands out as one of the most diverse, encompassing approximately 75% of all known animal species [2]. Insects inhabit a wide range of environments, both terrestrial and aquatic, and their ecological significance cannot be understated. Yet, despite their critical role, insects often remain overlooked by the general public [3] or are erroneously conflated with other animal groups.

Cultural perceptions of insects are profoundly shaped by the relationships societies forge with these organisms [4]. Elements such as literature, art, history, and religion significantly influence people's attitudes toward insects. Given that children are active social agents within their communities [5], their practices and attitudes toward biological diversity are molded by personal experiences of exploration and discovery [6]. Therefore, understanding how children perceive insects and the relationships they cultivate with them is vital.

Engaging children in early explorations of their environments from a critical perspective fosters environmental sensitivity, which is crucial for shaping their future relationships with nature [7]. Environmental education plays a significant role in influencing their cognitive interpretations of insects, the benefits these organisms provide [8], and their emotional connections to them. Direct interactions with biodiversity prompt children to inquire about and investigate their surroundings [9], leading to more favorable attitudes toward insects based on knowledge acquired in educational settings and within their communities. This process not only enhances their understanding of insects' ecological functions but also aids in mitigating habitat loss [10], thereby fortifying their daily interactions with these essential organisms.

Numerous studies indicate that children's perceptions and the construction of the ethno-semantic domain of "insect" are heavily influenced by their daily experiences [11]. Early exposure to insects can profoundly shape their values regarding these organisms in adulthood. The ecological and cultural significance of insects is paramount in shaping these attitudes [12]. Moreover, Colombia's rich cultural and biological diversity suggests that regional variations in insect perception likely exist, underscoring the necessity of investigating how children in this country conceptualize "insect." [13, 14]. This understanding is essential for enhancing biodiversity appreciation and informing effective environmental education practices [15].

This study aims to elucidate the sociocultural concept of "insect" from the perspective of children at the Sergio Camargo Educational Institution, El Bosque campus. By exploring students' perceptions, knowledge, and beliefs about the local entomofauna, this research encourages reflection on the recognition and appreciation of insect biodiversity within the municipality of Miraflores, Boyacá. Conducting this study in Colombia is particularly important due to the country's extraordinary ecological richness and cultural diversity, which provide a unique context for understanding how children interact with and value biodiversity.

2 Methodology

Study area: The study was conducted in Miraflores, a municipality in the Boyacá department of Colombia, with an approximate population of 15,000. Miraflores features diverse ecosystems, including páramos (high-altitude wetlands) and Andean and sub-Andean forests, supporting a rich entomofauna [16, 17]. The municipality is situated at an average altitude of 1,640 meters above sea level, with an annual mean temperature of 18.8 °C and yearly precipitation of 1,626 mm [18]. The sample comprised 66 seventh-grade students (31 girls and 35 boys) from the Sergio Camargo Educational Institution, El Bosque campus, aged 11 to 14 years.

Study design: This qualitative and interpretative study utilized playful activities to gather non-quantifiable data on students' beliefs, values, and meanings regarding insects. The methodology was developed by the authors, drawing on a constructivist learning approach to foster active student participation. This approach facilitates knowledge construction and cognitive skill development [19].

The data were analyzed from a sociocultural perspective, reflecting students' daily experiences and cultural formation within their social context. The project unfolded in three phases:

First Phase: Prior Knowledge Booklet

Students completed a booklet designed to gauge their prior knowledge of insects (Annex 1), comprising four sections:

1. Insect Classification: Students identified animals they considered insects from a series of images and justified their choices, exploring significant characteristics for classification.
2. Hexapod Ecology: Students illustrated three common insect habitats and drew their favorite species.
3. Trophic Networks: Students indicated the diets of insects and their predators, identifying insects consumed in cases of entomophagy.
4. Emotional Perception: A table classified students' emotional responses to insects as positive (e.g., affection) or negative (e.g., disgust).

Second Phase: Discussion Session

Following the booklet completion, a discussion session led by the supervising teacher addressed the questions raised. Theoretical and practical foundations regarding insect characteristics, ecological importance, taxonomic classification, and collection methods were provided to clarify doubts and deepen understanding.

Third Phase: Group Qualitative Evaluation

The project concluded with a playful activity where two murals depicting terrestrial and aquatic ecosystems were prepared, along with images of various invertebrates and vertebrates. In groups, students identified organisms from the class Insecta, justifying their selections based on defining characteristics. This activity offered a qualitative evaluation of the knowledge gained, promoting active and reflective learning.

Before each project phase, objectives were clearly communi-

cated to foster a participatory atmosphere. This methodological approach facilitated an exploration of students' understanding of insects, integrating prior knowledge with newly acquired insights throughout the project.

3 Results

During the diagnostic phase, students' prior knowledge of insects was assessed. The results showed that when identifying organisms in the class Insecta, students grouped them based on shared physical traits and subjective factors that did not always align with taxonomic classifications. Common descriptors included size and physical attributes, with phrases such as "small animals with legs that fly" or "they are small, they fly, walk, and crawl" highlighting their focus on these characteristics.

A smaller subset of students offered more accurate definitions, stating that insects "are small, fly everywhere, have a pair of antennae, and three pairs of legs," or describing them as "arthropods, invertebrates that play a role in the ecosystem." These responses underscore a variability in students' understanding of insect classification. Notably, none of the students correctly identified the two vertebrate species in the images, with many mistakenly classifying earthworms and snails as insects. This highlights a need for improved understanding of the distinctions between various invertebrate groups.

Over 90% of students accurately identified the six insects presented in the images. Additionally, approximately 70% selected arthropods, 60% selected annelids, and 20% identified mollusks (Table 1), indicating a positive correlation between students' autonomous understanding and the scientific definition of insects.

Table 1: Animals that were considered insects by the surveyed students.

Animal	Number of students	Percentage
Fly	66	100
Ladybug	66	100
Cricket	65	98,5
Ant	65	98,5
Beetle	62	93,9
Butterfly	60	90,9
Centipede	51	77,3
Spider	47	71,2
Earthworm	41	62,1
Snail	15	22,7
Frog	0	0
Hummingbird	0	0

In the second section, 47% of students identified vegetation-related habitats such as forests, meadows, and crops, while 37%mentioned specific microhabitats like anthills, spider webs, beehives, and nests (Fig 1). Less commonly reported habitats included urban areas (9%), rocks (3%), bodies of water (2%), and decaying matter (0.5%). Some habitats were categorized as "other or undetermined locations," representing 2% of total responses. Insect illustrations depicted ten different types of insects (Fig 2), with butterflies (32%), ants (21%), and ladybugs (9%) being the most frequently drawn. Notably, spiders were often included in students' definitions of insects, reflecting their general description of "small animals with several legs." The community's concept also encompassed myriapods (centipedes and millipedes), annelids (earthworms), and mollusks (snails).

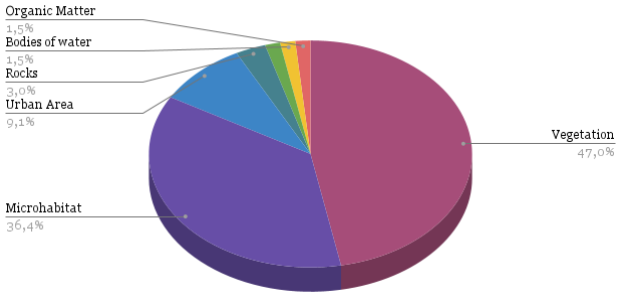


Figure 1: Habitats drawn by students. The vegetation category includes: forests, meadows, crops.

Regarding insect feeding habits (Fig 3), the most common response was that insects consume plant material (27%), followed by organic matter (16%), and other insects (15%). Fruits were mentioned by 10% of students, while pollens, nectar, and honey were noted by 9%, along with feces (9%). Less frequent mentions included processed foods (4%) and blood (3%), with sporadic responses covering soil, water, nutrients, and other organic materials.

For organisms that consume insects (Fig 4), 62% of respondents mentioned groups such as arachnids, amphibians, birds, and mammals, including chickens, ducks, and rodents. Furthermore, 23% referenced entomophagy in local and Asian cultures, mentioning species such as ants, beetle larvae, and crickets. However, there is no strong tradition of insect consumption in the municipality, with sporadic instances among children who seek novelty.

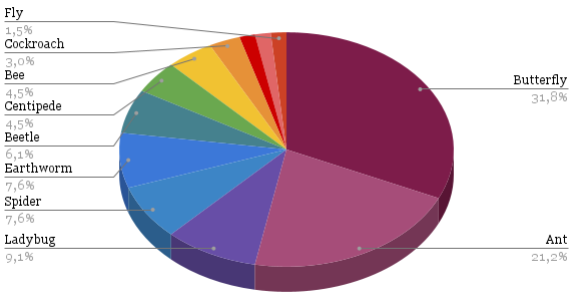


Figure 2: Insects drawn by students.

In the fourth section, emotional perceptions of insects were evaluated (Fig 5). A total of 67% reported positive emotions, including awe, curiosity, and admiration, while 26% expressed negative feelings such as disgust and fear. The remaining 8% maintained a neutral stance, indicating indifference or ambivalence toward insects. Throughout discussions (Annex 2), students exhibited significant interest, asking

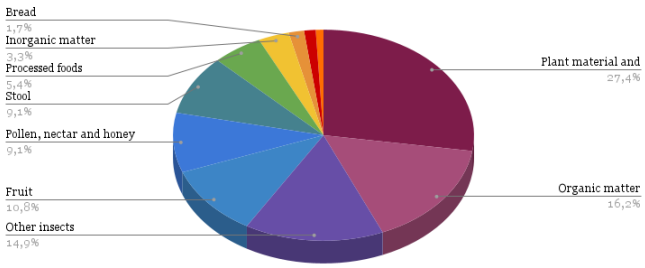


Figure 3: Insect diet. Organic matter includes: dead animals, spiders, birds, bacteria, people; processed foods includes: peanuts, cookies, candy, sugar; plant material includes: grass, plants, flowers, wood; inorganic matter includes: land, water, nutrients, minerals.

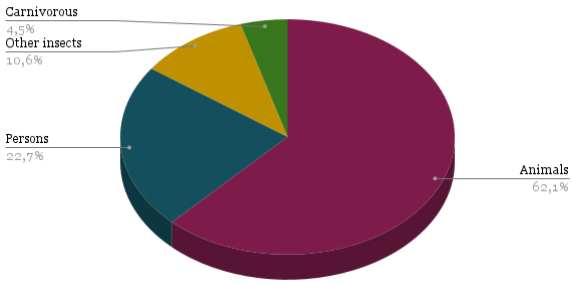


Figure 4: Insect feeding habitats.

questions about insect morphology, ecology, and the consequences of their absence. Notable inquiries included the existence of defense mechanisms and the classification of worms. Their curiosity peaked during explanations of collection methods and the importance of preserving collected specimens. In the final mural activity, students demonstrated their understanding of insect characteristics, discussing traits like the number of legs and wings. They effectively classified specimens, differentiating insects from other organisms, and highlighted their ecological significance and the need for conservation (Annex 2).

4 Discussion

The diagnostic phase results revealed that over 70% of the surveyed children included arachnids and centipedes in their

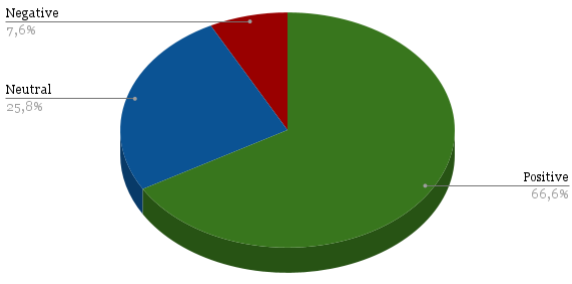


Figure 5: Emotional perception of students.

concept of an insect. This trend indicates that while students recognize morphological characteristics that classify these organisms as arthropods, they struggle to differentiate between insects and other groups within this phylum [11, 20]. Scientific literature supports this confusion, as children tend to categorize any "small" invertebrate as an insect, complicating the distinction among various types of arthropods [21]. However, other studies emphasize that these diverse perspectives on defining an insect are valuable for understanding how children perceive these organisms and the relationships they establish with them [22]. Driven by curiosity, children often generate intuitive theories about natural phenomena based on their experiences and personal observations [23].

The way students represent ecosystems reflects their direct observations and their level of interaction and knowledge of the natural environment [24]. The drawing process allows them to integrate their experiences and knowledge, which in turn fosters creativity and sensitivity toward nature [25]. The high frequency of illustrations centered around vegetation underscores its importance for biodiversity, suggesting that students have internalized its relevance, possibly as a result of educational experiences and environmental education activities [26]. This variety in children's drawings emphasizes the need for educational approaches that consider diverse conceptions of the natural world rather than limiting themselves to a single scientific perspective [27]. Such an approach can enhance their engagement and understanding of biodiversity, including the role of insects [28].

Regarding the insects most frequently represented, butterflies were the predominant, followed by ants and ladybugs, while flies and cockroaches were among the least illustrated. These results can be interpreted from an aesthetic perspective, reflecting how students value the physical characteristics of insects. Aesthetics, or the study of beauty, influences the categorization of qualities attributed to objects. For instance, butterflies are perceived as beautiful and majestic, whereas flies and cockroaches are associated with filth and disgust [29]. Similarly, the feelings of affection and preference that children have for certain insects appear to be linked to those they consider visually attractive or harmless. Conversely, negative perceptions may be influenced by the belief that these organisms can sting or cause harm [30].

Regarding insect feeding habits, most students indicated that insects primarily consume plants. This perception can be attributed to their daily experiences in a semi-rural environment. By observing insects in their natural habitat, such as caterpillars feeding on leaves, children reinforce the belief that insects feed on this type of material. Research has shown that insects leave visible traces on leaves and plants, such as holes and scars, indicative of their feeding activities [31]. This concept is constructed from personal experiences and direct observations, as evidenced by the predominance of reports about domestic animals in response to the question, "Who consumes insects?" There is a clear influence of the academic context, as students mentioned fewer common species and even those unfamiliar to their environment, such as anteaters, platypuses, and carnivorous plants. This diversity of responses suggests that students' learning extends beyond their local environment, integrating knowledge acquired in

the classroom.

The evidence shows that environmental education significantly impacts students' attitudes toward their environment, highlighting the effectiveness of well-planned educational interventions [32]. This is essential for achieving the Sustainable Development Goals in Colombia [33]. Educating students on ecological concepts strengthens their capacity to become agents of change in addressing challenges such as climate change [34]. However, in many institutions, environmental education is treated as an additional subject rather than a core component, which reduces its effectiveness [35]. To overcome these limitations, it is crucial to adopt constructivist pedagogical models that encourage active participation and critical thinking, as well as innovative approaches that foster a deeper understanding of ecological interdependence [36].

Conducting this discussion was essential, as it addressed children's concerns about insects and provided them with theoretical and practical foundations. The primary aim was to promote a positive attitude towards the conservation of all species, encouraging responsible behaviors toward the natural environment. The results obtained in the final phase of the project clearly reflect the success of this intervention, consolidating the achievement of the stated objectives.

5 Conclusion

Children's perceptions of insects are profoundly shaped by their everyday experiences and the education they recieved at the Sergio Camargo Educational Institution. Inquiry-based learning processes promote collaborative knowledge construction, enhancing exploratory and sensory skills. As a result, seventh-grade students at the El Bosque campus exhibit a positive attitude toward insects, characterized by curiosity about their ecological roles and potential uses. This sense of wonder facilitates a collaborative teaching-learning environment that reinforces essential concepts for identifying insects through their morphological characteristics and taxonomic classification within the class Insecta. Colombia's cultural diversity and rich insect fauna provide valuable resources for indigenous and local communities, who utilize insects for food, medicine, and crafts. Ethnoentomology enables the documentation of traditional knowledge and identification of sustainable practices that support conservation efforts. Research in this area is essential for understanding community-environment interactions and promoting conservation and sustainable development. Future studies should adopt an interdisciplinary and multicultural approach, recognizing that perceptions of "insect" vary across cultures and regions. Integrating qualitative and quantitative methods will enhance understanding of attitudes and perceptions within communities.

Acknowledgments

We extend our sincere gratitude to the Sergio Camargo Educational Institution, El Bosque campus, for their support and facilities throughout this project. Special thanks to Professor Patricia, whose commitment and expertise in Chemistry and Biology guided our activities and ensured their success. We also thank the seventh-grade students for their crucial contributions, enthusiasm, and positive attitudes, which were fundamental to the project's development. Additionally, we appreciate Mayra Niño, Camilo Romero, and Camilo Marino for their invaluable assistance in organizing and executing the activities. This contribution is part of the Research Program of the Corporación Sentido Natural (Bogotá, Colombia).

Funding Statement

This research received no external funding.

Ethical Considerations

The study was conducted following ethical principles to guarantee the protection and well-being of the participants, who were informed about the objectives of the study, the methods used and their right to withdraw at any time. The research complied with the ethical guidelines of the Universidad Pedagógica y Tecnológica de Colombia. There was no physical or psychological risk, and confidentiality was strictly maintained. The data were anonymized and used exclusively for research purposes. The study is aligned with practices in social and educational research, respecting human dignity, autonomy and cultural sensitivity.

The authors declare no conflicts of interest.

Author Contributions

All authors contributed equally to the conceptualization, writing, review, and approval of the final manuscript.

References

[1] R. Torres and M. Reyes, "Una propuesta didáctica para la comprensión del concepto ecosistema a partir del establecimiento de las relaciones recíprocas que se dan entre los factores bióticos y abióticos para lograr el proceso de enseñanza aprendizaje y evaluación." B.S. Thesis, Universidad del Valle, Cali, Colombia, 2019.

[2] M. A. Zumbado and D. Azofeifa, "Insectos de Importancia Agrícola. Guía Básica de Entomología Costa Rica y Centroamérica," Programa Nacional de Agricultura Orgánica (PNAO), 2018.

[3] G. Gutiérrez, "Los insectos: una materia prima alimenticia promisoria contra la hambruna," Rev. Lasallista de investigación, vol. 2, no. 1, pp. 33-37, 2005.

[4] E. Costa-Neto and P. de Carvalho, "Percepção dos insetos pelos graduandos da Universidade Estadual de Feira de Santana, Bahía, Brasil," Acta Scientiarum. Biological Sciences, vol. 22, pp. 423-428, 2000.

[5] M. Echeverría, "El derecho a la participación de los niños y jóvenes. La escuela como lugar para construir capacidades participativas," Décimo Cuarto Certamen de Ensayo Político, pp. 85, 2013.

[6] H. Cortés, "Libro interactivo para primera infancia sobre los insectos: una construcción con la Escuela Maternal de la Universidad Pedagógica Nacional," B.S. thesis, U.P.N., Bogotá, Colombia, 2018.

[7] S. Barthel, S. Belton, C. M. Raymond, and M. Giusti, "Fostering children's connection to nature through authentic situations: The case of saving salamanders at school," Front. Psychol., vol. 9, no. 928, 2018.

[8] B. Rodríguez, E. Costa, and G. Santos, "Percepción y conocimiento de los insectos: un estudio de caso con niños en dos zonas urbanas de Iztapalapa, Distrito Federal, México," Boletín Sociedad Entomológica Aragonesa, vol. 41, pp. 485-493, 2007.

[9] J. Torres, J. Alcántara, J. Arrebola, S. Rubio, and M. Mora, "Trabajando el acercamiento a la naturaleza de los niños y niñas en el Grado de Educación Infantil. Crucial en la sociedad actual," Rev. Eureka sobre Enseñanza y Divulgación de las Ciencias, vol. 14, no. 1, pp. 258-270, 2017.

[10] F. Restrepo, "Diseño de una secuencia didáctica empleando insectos como herramienta de enseñanza, adaptada al currículo de Ciencias Naturales del grado noveno de la Educación Básica secundaria," M.S. thesis, Universidad Nacional de Colombia, Bogotá, Colombia, 2014.

[11] S. Tunnicliffe, A. Bartyoszeck, B. Rocha da Silva, "Children's concepts of insects by means of drawings in Brazil," Education, Biology, Environmental Science, 2011.

[12] D. P. Shepardson, "Bugs, butterflies, and spiders: Children's understandings about insects." IJSE(A), vol. 24, no. 6, pp. 627–643, 2002.

[13] H. J. Gasca-Álvarez, "El significado de los escarabajos (coleoptera: scarabaeoidea) en una comunidad uitoto de Leticia, Amazonas (Colombia): una exploración preliminar a su conocimiento etnoentomológico," Boletín Sociedad Entomológica Aragonesa, vol. 36, no. 36, pp. 309–315, 2005.

[14] P. Páramo and C. J. Galvis, "Conceptualizaciones acerca de los animales en niños de la sociedad mayoritaria y de la comunidad indígena Uitoto en Colombia," Folios, no. 32, pp. 111-124, 2010.

[15] M. Vargas, "¿Qué percepción tenemos de los insectospalo (Insecta: Phasmatodea)?," Acta Biológica Colombiana, vol. 11, no. 2, pp. 113-124, 2006.

[16] M. K. Sandoval-Espinel, L. A. Sánchez, J. S. Reyes, H. J. Gasca-Álvarez, "Aproximación sobre la percepción y conocimiento tradicional de los escarabajos (Insecta: Coleoptera) en el municipio de Miraflores, Boyacá," Dugesiana, vol. 32, no. 1, pp. 3-11, 2025.

[17] X. A. Galindo, I. Morales, "Entomofauna asociada a dos sistemas de cultivos de pitahaya amarilla en el municipio de Miraflores, Boyacá," Universidad Pedagógica y Tecnológica de Colombia, v1.1, 2021.

[18] IDEAM, "Tiempo y clima de Colombia (1981-2010)," IDEAM, 2010. [Online]. Available: www.ideam.gov.co

[19] A. Krisna, "The Constructivist Approach to Student's Metacognitive Formation," IJEDR, vol. 1, no. 1, pp. 7-16, 2023.

[20] M. S. Allen, "Preschool children's taxonomic knowledge of animal species," Journal of Research in Science Teaching, vol. 52, no. 1, pp. 107–134, 2015

[21] D. Shepardson, "Desarrollo de un juego digital basado en la concepción de insectos (DGBI) para probar las concepciones de insectos de estudiantes de primaria," Rev. Educación Creativa, vol. 24, no. 6, pp. 627-643, 2002.

[22] M. Reyes and A. Sánchez, "Los insectos en la escuela: una aproximación a la resignificación de las concepciones de los niños y niñas de segundo y tercer grado sobre los insectos," B.S. thesis, Universidad Distrital Francisco José de Caldas, Bogotá, Colombia, 2020.

[23] T. D. D. C. De Piaget, "Desarrollo cognitivo: Las teorías de Piaget y de Vygotsky," Paidopsiquiatria. 2007.

[24] L. Goldberg, M. Mattar, and J. Freitas, "O desenho infantil na ótica da ecologia do desenvolvimento humano," Psicologia Em Estudo, vol. 10, no. 1, pp. 97-106, 2005.

[25] K. Howlett and E.C. Turner, "What can drawings tell us about children's perceptions of nature?" PLoS One, vol. 18, no. 7, pp. e0287370, 2023.

[26] O. Komarovska, V. Vlasova, L. Pet'ko, A. Voloshenko, T. Holinska, O. Prodius, "The influence of arts education on love of the natural environment" E3S web of conferences, vol. 538, no. 2024, pp 1-5, 2024.

[27] M. Reiss, C. Boulter, and S. Tunnicliffe, "Seeing the natural world: a tension between pupils' diverse conceptions as revealed by their visual representations and monolithic science lessons," Visual Commun., vol. 6, no. 1, pp. 99-114, 2007.

[28] M. Schwarz, L. Sevegnani, and P. André, "Representações da Mata Atlântica e de sua biodiversidade por meio dos desenhos infantis," Ciência & Educação, vol. 13, no. 3, pp. 369-388, 2006.

[29] M. Tafalla, "La apreciación estética de los animales. Consideraciones estéticas y éticas," Rev. de Bioética y Derecho, vol. 1, no. 28, pp. 72-90, 2013.

[30] K. Heung-Tae, "Analysis of elementary school students' emotions to animals and plants," Biol. Educ., vol. 44, no. 1, pp. 127-145, 2016.

[31] E. Currano, "Green food through time," Palaios, vol. 25, no. 9, pp. 547-549, 2010.

[32] M. Castillo, "La importancia de la educación ambiental ante la problemática actual," Rev. Electrónica Educare, vol. 14, no. 1, pp. 97-111, 2010.

[33] L. Puentes, "La educación ambiental en Colombia en el marco de los objetivos del desarrollo sostenible," Rev. Interdisciplinaria de Humanidades, Educación, Ciencia y Tecnología, vol. 9, no. 2, pp. 408-421, 2023.

[34] K. Llópiz, D. Ruiz, R. Hernández, V. Venegas, J. Jara, and K. Robalino, "Importance of environmental education in the context of natural sustainability," Nat. Eng. Sci., vol. 9, no. 1, pp. 57-71, 2024.

[35] L. González and N. Martínez, "Educación ambiental en instituciones educativas colombianas: Un instrumento para avanzar hacia el desarrollo sostenible," Ciencia Latina Rev. Científica Multidisciplinar, vol. 8, no. 1, pp. 9920-9943, 2024.

[36] Y. Hernández, S. López, M. Gómez, and E. Maldonado, "Educación ambiental en Colombia: reflexiones teóricas y pedagógicas para una comprensión de la realidad ambiental," Perspectivas, vol. 7, no. S1, pp. 318–332, 2022.

Annex 1

Prior Knowledge Survey Format

TALLER DE INSECTOS PARA NIÑOS DEL MUNICIPIO DE MIRAFLORES, BOYACÁ

Nombre: _____ Fecha: _____ Edad: _____ Género: _____

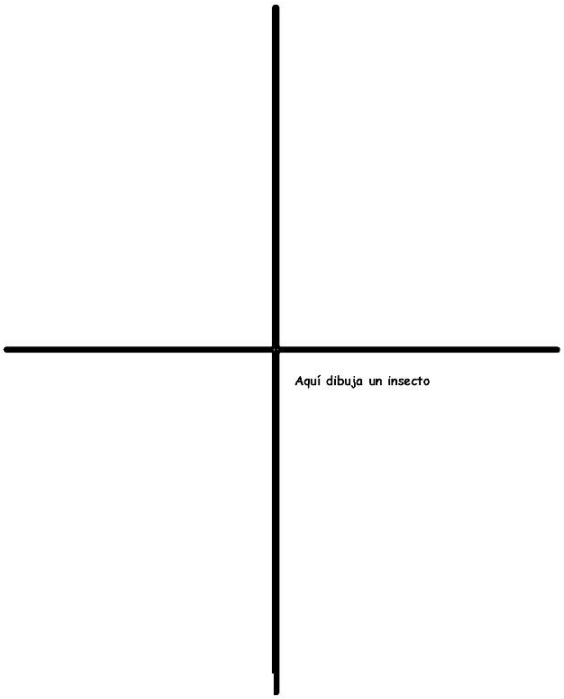
1. Definamos qué és un insecto.

A continuación se muestran varias imágenes de animales. Marca las que consideras que son insectos

¿Qué tienen en común? ¿Por qué las escogiste?

_____
_____
_____
_____
_____

2. Mediante dibujos explica en qué lugares habitan y se encuentran insectos.



3. Enumera en cada caso.

¿Qué comen los insectos?	¿Quiánes comen insectos?
-	-
-	-
-	-
-	-
-	-
-	-

4. ¿Qué emociones tienes cuando ves a un insecto?

Annex 1: Knowledge survey format.

Annex 2: Discussion and mural creation.