Jurnal Paedagogy:
Jurnal Penelitian dan Pengembangan Pendidikan
https://e-journal.undikma.ac.id/index.php/pedagogy/index
Email:paedagogy@undikma.ac.id

Vol. 13 No. 1 : January 2026
E-ISSN: 2722-4627
pp. 362-372

Development of Edutainment and Problem Solving Based Student Worksheet on Magnet Concept for Elementary Science

Dewi Nur Aeni*, Siska Desy Fatmaryanti, Nur Ngazizah
Faculty of Teacher Training and Education,
Universitas Muhammadiyah Purworejo, Indonesia.
*Corresponding Author. Email: dewinuraeni626@gmail.com

Abstract: This study aims to develop a student worksheet integrating edutainment and problem solving approaches to improve fifth grade students' understanding of magnetism. The research employed a Research and Development (R&D) method with the ADDIE model (Analysis, Design, Development, Implementation, Evaluation) and was conducted over four meetings at Muhammadiyah I Elementary School Purworejo, involving limited and large scale trials with 10 and 21–22 students. The data analysis technique used in this study was quantitative descriptive analysis, which included product validity analysis, practicality analysis, effectiveness analysis, and analysis of the improvement in conceptual understanding. The developed student worksheet was validated by a media expert and two material experts, yielding an average validation score of 86.3% (highly valid). The practicality assessment reached 95.2%, categorized as very practical. Pretest and posttest results showed improved student understanding with an average increase of 80.61%. Its effectiveness was further supported by an N-Gain score of 0.8 (high category). These findings indicate that the edutainment and problem solving based student worksheet has strong potential as an effective learning medium for enhancing students' understanding of magnetic concepts and addressing misconceptions in Integrated Natural and Social Sciences learning at the elementary level.

Article History
Received: 23-12-2025
Revised: 05-01-2026
Accepted: 12-01-2026
Published: 20-01-2026

Key Words:
Student Worksheet; Edutainment; Problem Solving.

How to Cite: Aeni, D. N., Fatmaryanti, S. D., & Ngazizah, N. (2026). Development of Edutainment and Problem Solving Based Student Worksheet on Magnet Concept for Elementary Science. *Jurnal Paedagogy*, *13*(1), 362-372. https://doi.org/10.33394/jp.v13i1.19015

https://doi.org/10.33394/jp.v13i1.19015

Introduction

Education at the elementary level plays a crucial role in building students' conceptual understanding, which influences their future academic success (Setyowati et al., 2024). Contemporary learning no longer focuses solely on theoretical mastery but also emphasizes problem solving development and the understanding of contextual phenomena (Nursyam, 2023). In Integrated Natural and Social Sciences learning, conceptual understanding is essential for connecting scientific concepts with everyday life (Prahasdita et al., 2024). Misconceptions in magnetism often arise because instruction provides limited opportunities for students to construct understanding through direct experiences, causing students to rely on memorization rather than conceptual comprehension (Agustina et al., 2021; Fatmaryanti et al., 2024; Maison, 2020). These misconceptions commonly occur in everyday applications, magnet formation, and magnetic fields, and are influenced by inaccurate prior knowledge, incomplete instruction, and limited learning resources. Therefore, interactive and contextual learning strategies are needed to help students explore magnetic concepts more accurately, as misconceptions remain a critical issue affecting conceptual understanding (Ngazizah et al., 2024).

Jurnal Paedagogy:
Jurnal Penelitian dan Pengembangan Pendidikan
https://e-journal.undikma.ac.id/index.php/pedagogy/index
Email:paedagogy@undikma.ac.id

Vol. 13 No. 1 : January 2026
E-ISSN: 2722-4627
pp. 362-372

One effective way to reduce misconceptions in magnetic concepts is through an edutainment based learning approach that combines educational content with entertaining elements to create an engaging and easily understood learning experience (Mehrotra, 2020). In addition, problem solving plays a crucial role in strengthening students' conceptual understanding by encouraging them to think and find solutions when no immediate answers are available (Listyani et al., 2024; Yuliza et al., 2025). The student worksheet is an appropriate medium because it supports independent and interactive learning while assisting teachers in guiding instruction (Rasyid et al., 2025; Agusta et al., 2024). Integrating edutainment and problem solving in a student worksheet can enhance students' interest, promote active participation, and reduce misconceptions in magnetism learning. Therefore, this study focuses on developing an edutainment and problem solving based student worksheet for fifth grade magnetism learning, in line with findings that meaningful and contextual learning media improve understanding in Integrated Natural and Social Sciences (Muizz et al., 2023). Previous studies have developed student worksheets based on Problem Based Learning and contextual approaches, demonstrating their effectiveness in enhancing students' thinking skills and linking learning to real life experiences (Sukmawati and Ghofur 2022; Setianingrum & Nurohman, 2022). However, edutainment based worksheets for elementary IPAS magnetism learning are still limited. Therefore, this study develops an edutainment and problem solving based worksheet to improve understanding, reduce misconceptions, and increase student engagement.

Research Method

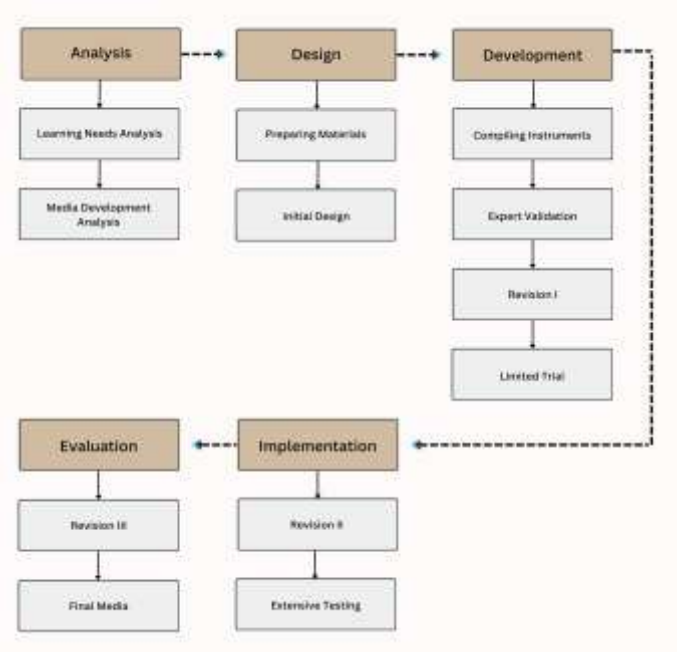

Figure 1. Flow Diagram of the ADDIE Model

This study used a research and development (R&D) approach with the ADDIE model to develop and evaluate an edutainment and problem solving based student worksheet on magnetism in elementary school. The ADDIE model was chosen for its systematic and structured development process, ensuring both product feasibility and effectiveness (Widiyanti et al., 2024; Setiawan & Cahyaningtyas, 2025; Siringoringo & Sugiharti, 2025). The research was conducted at Muhammadiyah I Elementary School Purworejo with fifth

Jurnal Paedagogy:
Jurnal Penelitian dan Pengembangan Pendidikan
https://e-journal.undikma.ac.id/index.php/pedagogy/index
Email:paedagogy@undikma.ac.id

Vol. 13 No. 1 : January 2026
E-ISSN: 2722-4627
pp. 362-372

grade students, focusing on the validity, practicality, and effectiveness of the developed worksheet (Fauziah et al., 2023). The stages of applying the ADDIE model in this study are presented in Figure 1.

The analysis stage identified learning needs and reviewed instructional media suitable for elementary students (Nurussalamah et al., 2025). The design stage developed the initial draft of the edutainment and problem solving based student worksheet, followed by the development stage, which included instrument preparation, expert validation, revisions, and a limited trial. The implementation stage involved a broader field trial to examine practicality and effectiveness, while the evaluation stage assessed students' conceptual understanding of magnetism. Data were collected using validation sheets, student response questionnaires, and pretests and posttests to evaluate the worksheet's feasibility, practicality, and effectiveness, as summarized in Table 1.

Table 1. Research Instruments

Indicator Pretest, Postest	Indicator Student Response Questionnaire
Explaining	Learning materials in the student worksheet make the lesson more interesting
Analyzing	I can understand the material more easily with this student worksheet
Applying	This student worksheet is easy to use
Evaluating	I feel more active during learning activities when using this student worksheet
Concluding	I would like to use this student worksheet again in future lessons
	I enjoy it when the teacher uses the student worksheet during teaching
	The student worksheet helps me learn through direct experience
	I hope the teacher uses this student worksheet more often in classroom learning

The instruments included a student response questionnaire and pretest posttest indicators related to the edutainment and problem solving based student worksheet. The questionnaire measured students' interest, understanding, and engagement, while the pretest and posttest assessed changes in conceptual understanding. Comparing both test results was used to determine improvements after using the developed worksheet.

Table 2. Validity Analysis (Sari & Novita, 2023)

Percentage	Category
81%-100%	Very valid
61%-80%	Valid
41%-60%	Fairly valid
21%-40%	Invalid
0%-20%	Very invalid

Product validation involved material and media experts. Material experts evaluated content suitability, alignment with edutainment and problem solving approaches, and language clarity, while media experts assessed visual design and information presentation (Table 2). Student responses were used to evaluate practicality through indicators of interest, ease of understanding, engagement, and willingness to reuse the worksheet, reflecting its effectiveness as an enjoyable and interactive learning medium.

Table 3. Practicality Analysis (Sari & Novita, 2023)

Percentage	Category
81% - 100%	Very practical
61% - 80%	Practical
41% - 60%	Fairly practical
21% - 40%	Impractical
0% - 20%	Very impractical

Jurnal Paedagogy:
Jurnal Penelitian dan Pengembangan Pendidikan
https://e-journal.undikma.ac.id/index.php/pedagogy/index
Email:paedagogy@undikma.ac.id

Vol. 13 No. 1 : January 2026
E-ISSN: 2722-4627
pp. 362-372

The practicality of the student worksheet (Table 3) was assessed via student questionnaires on ease of use, understanding, motivation, and engagement, determining its feasibility for classroom implementation. Its effectiveness was evaluated through pretest and posttest scores, measuring improvements in students' understanding of magnetism (Table 4).

Table 4. Effectiveness Analysis (Febriani et al., 2022)

Range	Criteria
N-Gain score ≥ 0.7	High
$0.3 \leq$ N-Gain score ≤ 0.7	Moderate
N-Gain score ≤ 0.3	Low

The effectiveness of the student worksheet was measured by comparing pretest and posttest scores, with improvements analyzed using the N-Gain test. This analysis evaluated the extent of students' conceptual understanding of magnetism, demonstrated the worksheet's impact on learning outcomes, and provided insights for refining and enhancing the product for classroom use.

Results and Discussion

The developed product is a fifth grade student worksheet on magnetism, designed using edutainment and problem solving approaches to create an engaging learning experience and enhance conceptual understanding. It includes explanatory content, interactive activities, and problem solving exercises, and is intended for printed use to support meaningful learning. The worksheet also aims to reduce misconceptions, stimulate critical thinking, and encourage active student participation, making it a practical and effective instructional medium (Hakim et al., 2023).

In this stage, an analysis identified that conventional, one way teaching limits student engagement and independent problem solving, leading to difficulties in understanding magnetism (Margianah et al., 2024; Ardiansah & Zulfiani, 2023). Students struggle with independent problem solving and need media that boost engagement, correct misconceptions, and develop problem solving skills. Existing worksheets are mostly textual and lack interactive or entertaining elements. Therefore, an edutainment and problem solving based worksheet is needed to make magnetism learning more engaging and effective.

In the design stage, researchers created the initial student worksheet layout using magnetism references and Canva to ensure it was engaging, well structured, and easy to understand (Tanama et al., 2023). The worksheet is concise, relevant to daily life, and includes edutainment and problem solving activities to enhance conceptual understanding, with covers shown in Figures 2(a) and 2(b), and prepared in printed form aligned with curriculum standards.

Jurnal Paedagogy:
Jurnal Penelitian dan Pengembangan Pendidikan
https://e-journal.undikma.ac.id/index.php/pedagogy/index
Email:paedagogy@undikma.ac.id

Vol. 13 No. 1 : January 2026
E-ISSN: 2722-4627
pp. 362-372

(a) (b)

Figure 2. (a) Front Cover, (b) Back Cover

The cover design of a student worksheet is important as it serves as the first visual attraction for students. An effective cover uses appealing colors, illustrations, and layout aligned with the learning theme to stimulate curiosity and motivation. In addition, a neat and attractive design reflects the quality of the content and shows careful consideration of both pedagogical and aesthetic aspects.

Figure 3. Magnetism Topic

The learning sequence in the edutainment and problem solving based student worksheet starts with stimulation through guiding questions, followed by problem identification. Students then gather information through interactive activities, solve problems through discussion, and draw conclusions, before the lesson is closed with evaluation and reflection. Figure 3 presents the core magnetism content, including the definition, types, and main properties of magnets.

Jurnal Paedagogy:
Jurnal Penelitian dan Pengembangan Pendidikan
https://e-journal.undikma.ac.id/index.php/pedagogy/index
Email:paedagogy@undikma.ac.id

Vol. 13 No. 1 : January 2026
E-ISSN: 2722-4627
pp. 362-372

(a) (b)

Figure 4. (a) Edutainment questions, (b) Problem solving questions

The edutainment section uses a magnetic maze game with reflective questions to foster conceptual understanding and problem solving skills, encouraging observation, prediction, and solution finding. The problem solving section guides students to apply magnetism concepts to real life situations, enhancing cognitive, affective, and process skills and strengthening their understanding of magnetism.

In the development stage, the fully designed student worksheet was validated by a media expert and two material experts to ensure alignment with learning objectives and classroom feasibility (Widiyani & Pramudiani, 2021). Their feedback guided revisions, supporting the view that validity testing is essential for assessing the suitability of instructional media before use (Silvia et al., 2023). This process ensured the worksheet was feasible, engaging, and met students' needs.

Table 5. Expert Validation Results

Validation	Indicator	Validation Result	Category
Media Expert	Visual appearance, Information, presentation	81.8%	Very Valid
Material Expert 1	Content feasibility, Material relevance, Clarity of language	88.5%	Very Valid
Material Expert 2	Content feasibility, Material relevance, Clarity of language	88.5%	Very Valid

Validation by a media expert and two material experts categorized the edutainment and problem-solving-based student worksheet as highly valid (Table 5), ensuring accuracy, clarity, design quality, and alignment with learning objectives. Iterative refinements based on expert feedback further improved its content, design, and classroom usability.

The edutainment and problem-solving-based student worksheet was implemented at Muhammadiyah I Elementary School Purworejo through limited and large-scale trials over four meetings. The results of the practicality test, based on student responses, showed very positive perceptions of the worksheet. Overall, the findings indicate that the student worksheet is highly practical and suitable for use in learning activities, as shown in Table 6.

Jurnal Paedagogy:
Jurnal Penelitian dan Pengembangan Pendidikan
https://e-journal.undikma.ac.id/index.php/pedagogy/index
Email:paedagogy@undikma.ac.id

Vol. 13 No. 1 : January 2026
E-ISSN: 2722-4627
pp. 362-372

Table 6. Student Responses

Stage	Average	Percentage	Category
Limited Student Response 1	3.8	95.13%	Very Practical
Broad Student Response 1	3.75	95.75%	Very Practical
Limited Student Response 2	3.86	96.56%	Very Practical
Broad Student Response 2	3.81	95.38%	Very Practical

Student responses (Table 6) showed very high practicality of the edutainment and problem solving worksheet, with scores above 95% in both limited and broader trials, indicating it was engaging, easy to understand, and effective. A slight dip in session 2 of the broader trial (95.38%) may be due to fatigue. These findings align with previous studies linking student engagement to learning conditions and media use intensity (Fajriah & Suryaningsih, 2020; (Handayani & Djukri, 2024).

Table 7. Product Trial of the Student Worksheet

Stage	Number	Average
Limited Trial 1	822	82.2%
Broad Trial 1	1772	84.38%
Limited Trial 2	824	82.4%
Broad Trial 2	1861	84.59%

Classroom trials (Table 7) showed the worksheet's practicality ranged from 82–85% in all sessions, indicating it is easy to use, supports learning, and poses no major obstacles for teachers or students. This aligns with research highlighting the importance of product trials in ensuring effective learning media (Wahyuni et al., 2021).

Table 8. Pretest and Posttest Results

Stage	Average		N-Gain (%)	Criteria
	Pretest	Posttest		
Limited Trial 1	43.4	90.9	83.53%	High
Broad Trial 1	41.76	86.61	76.08%	High
Limited Trial 2	51.8	94	87.81%	High
Broad Trial 2	48.59	89.63	80.08%	High

The effectiveness of the student worksheet was evaluated through pretests and posttests, which demonstrated an improvement in learning outcomes across all trial stages (Hardiyansyah et al., 2023). The students' average scores increased significantly, with N-Gain values ranging from 76% to 88%, categorized as high. The highest N-Gain (88%) in the second limited scale trial is presumed to result from the integration of educational game elements within the edutainment approach, which made abstract magnetism concepts more concrete and engaging, thereby enhancing students' motivation and active participation in problem solving activities. These findings indicate that the edutainment and problem solving based student worksheet effectively improves students' understanding of magnet concepts and learning engagement, in line with previous studies highlighting the effectiveness of N-Gain analysis in evaluating instructional media (Syafitri & Anas, 2023).

The evaluation phase of this study was conducted by implementing the edutainment and problem solving based student worksheet directly in classroom learning activities. Based on a comprehensive evaluation, this student worksheet has been proven capable of transforming magnetism learning from rote memorization into an enjoyable problem based discovery process (Hamid et al., 2024). The purpose of this evaluation phase was to assess students' overall responses to the use of the student worksheet, including how they reacted to the material, activities, and methods of delivery provided in the student worksheet. Thus, this evaluation sought to determine the extent to which the student worksheet is feasible in

supporting students to participate in learning in an enjoyable and effective manner (Jarlis et al., 2023).

Conclusion

Based on the research findings, the edutainment and problem solving based student worksheet on the magnet topic for Grade 5 elementary school students was found to be valid, practical, and effective. Expert validation yielded a score of 86.3% (very valid), and students' responses indicated a practicality level of 95.2% (very practical). The student worksheet was able to present the material in an engaging, interactive, and easily understandable manner, thereby helping to reduce misconceptions and increase student engagement in learning. Its effectiveness was demonstrated by improvements in learning outcomes with N-Gain values ranging from 76.08% to 87.81% (high category), while simultaneously enhancing students' conceptual understanding of magnets, problem solving skills, and collaboration. Furthermore, the student worksheet supported both independent and collaborative learning, providing a more enjoyable and meaningful learning experience. Thus, the developed student worksheet has the potential to serve as an innovative instructional medium capable of improving the quality of Integrated Natural and Social Sciences learning in elementary schools.

Recommendation

Based on the findings, teachers are encouraged to use the edutainment and problem-solving-based student worksheet in Integrated Natural and Social Sciences learning, particularly on magnet topics, as it effectively improves students' conceptual understanding. Future studies may expand this development to other topics, integrate digital interactive features, and involve more diverse schools and student characteristics. Given the limited trial duration and sample size, further research with a larger number of participants and longer implementation is recommended to obtain more comprehensive results.

Acknowledgment

The author would like to express gratitude to the elementary school that granted permission, provided support, and actively participated in the implementation of this study. Appreciation is also extended to all validators for their time, attention, suggestions, and valuable assessments in refining the research product. Furthermore, the author thanks the funding parties for providing financial support, which enabled the research activities to be carried out successfully. The author also acknowledges all individuals who contributed, either directly or indirectly, to the smooth completion of this study.

References

Agusta, R., Sartika, R. P., & Rasmawan, R. (2024). Pengembangan Lembar Kerja Peserta Didik Zat Pengawet Makanan Berbasis Project Based Learning. *Jurnal Ilmiah Universitas Batanghari Jambi*, 24(2), 1246. https://doi.org/10.33087/jiubj.v24i2.5071

Agustina, I., Astuti, D., Bhakti, Y. B., & Prasetya, R. (2021). Four Tier-Magnetic Diagnostic Test (4T-MDT): Instrumen Evaluasi Medan Magnet Untuk Mengidentifikasi Miskonsepsi Siswa. *Jurnal Inovasi Pendidikan Fisika dan Riset Ilmiah*. 5(2), 110–115. https://journal.unuha.ac.id/index.php/JIPFRI/article/view/1205/531

Ardiansah, R., & Zulfiani, Z. (2023). Development of interactive e-LKPD based on creative thinking skills on the concept of environmental change. *JPBI (Jurnal Pendidikan*

Biologi Indonesia), 9(2), 179–197. https://doi.org/10.22219/jpbi.v9i2.22389

Azmi, N., & Muchtar, Z. (2024). Development of Media Smart Apps Creator Integrated Problem-Based Learning Model Learning on Reaction Rate Material. *Jurnal Teknologi Pendidikan : Jurnal Penelitian Dan Pengembangan Pembelajaran*, 9(2), 256. https://doi.org/10.33394/jtp.v9i2.11161

Fatmaryanti, S. D., Kurniawan, E. S., Hakim, Y. Al, & Luthfianti, D. (2024). Enhancing 21st Century Skills for Prospective Physics Teachers through Arduino-Based Multiple Representations in Learning Heat and Temperature. Jurnal Penelitian Pendidikan IPA, 10(4), 1–8. https://doi.org/10.29303/jppipa.v10i4.5315

Fajriah, N., & Suryaningsih, Y. (2020). The development of constructivism-based student worksheets. *Journal of Physics: Conference Series*, 1470(1). https://doi.org/10.1088/1742-6596/1470/1/012011

Fauziah, S., Khairuna, K., & Reflina, R. (2023). Development of LKPD Based on Discovery Learning on Human Respiratory System Material to Train Skills Student Critical Thinking. *Jurnal Teknologi Pendidikan : Jurnal Penelitian Dan Pengembangan Pembelajaran*, 8(4), 813. https://doi.org/10.33394/jtp.v8i4.8877

Febriani, S. M., Haryani, S., Prasetya, A. T., Widiarti, N., & Ningrum, P. (2022). Kelayakan dan Keefektifan Bahan Ajar Pengayaan Berbasis Literasi Sains Materi Hidrolisis Garam. Chemined, 11(2), 133–142.

Ghaniem, A. F., Rasa, A. A., Oktora, A. H., & Yasella, M. Ilmu pengetahuan alam dan sosial. Pusat Perbukuan. https://shorturl.at/onVSP

Hakim, L., Bentri, A., Hidayati, A., & Amilia, W. (2023). Development of Interactive Multimedia Using Problem Based Learning Model in Class VIII Integrated Science Subjects Junior High School. *Jurnal Teknologi Pendidikan : Jurnal Penelitian Dan Pengembangan Pembelajaran*, 8(4), 787. https://doi.org/10.33394/jtp.v8i4.8751

Hamid, A., Nana, Syahmani, & Rusmansyah. (2024). The Development Of Steam-Based LKPD-PJBL Acid-Base Solution Material to Improve Creative Thinking Ability. *Jurnal Inovasi Pembelajaran*. 10(1), 130–146. https://doi.org/10.22219/jinop.v10i1.27191

Handayani, N. D., & Djukri. (2024). Development of Electronic Student Worksheet Based on Problem-Based Learning for Material on Environmental Change Geoheritage Gumuk Pasir. *Jurnal Penelitian Pendidikan IPA*, 10(5), 2438–2445. https://doi.org/10.29303/jppipa.v10i5.7283

Hardiansyah, H., Asmawi, U. S., & Darmansyah, A. (2023). Pengembangan LKPD Interaktif dalam Pembelajaran Berdiferensiasi. *Jurnal Riset Pedagogik.* 7(3). 1162-1167. https://doi.org/10.20961/jdc.v7i3.78584

Jarlis, R., Supriyanti, J., Syuhada, F. A., Ananto, A., Taufiqqurahman, T., Putri, S. D., & Rahmi, P. (2023). Development of Student Worksheets Based Inquiry using PhET Simulations to Enhance the Curiosity Attitude of High School Students. *Asian Journal of Science Education*, 5(1), 90–101. https://doi.org/10.24815/ajse.v5i1.30861

Judijanto, L., Muhammadiah, M., Utami, R. N., Suhirman, L., Laka, L., Boari, Y., Lembang, S. T., Wattimena, F. Y., Astriawati, N., & Laksono, R. D. (2024). Metodologi Research and Development: Teori dan Penerapan Metodologi RnD. PT. Sonpedia Publishing Indonesia. https://books.google.co.id/books?id=y3INEQAAQBAJ

Lestari, N., & Widaningtyas, A. (2020). Identifikasi Miskonsepsi Siswa pada Materi Usaha dan Energi. *Jurnal Penelitian Pendidikan IPA.* 6(1). 32-39.

Vol. 13 No. 1 : January 2026
E-ISSN: 2722-4627
pp. 362-372

https://doi.org/10.29303/jppipa.v6i1.314

Listyani, P. C. A., Margunayasa, I. G., & Handayani, D. A. P. (2024). Model Pembelajaran Berbasis Masalah terhadap Miskonsepsi IPA Siswa Kelas V SD. *Jurnal Media Dan Teknologi Pendidikan*, 4(1), 88–97. https://doi.org/10.23887/jmt.v4i1.62051

Margianah, S. S., Tegal, U. P., Teks, P., & Nyaring, M. (2024). Pengembangan Lembar Kerja Peserta Didik (LKPD) dalam Peningkatan Pemahaman Teks dengan Metode Membaca Nyaring Terpadu Siswa SD. *Journal of Education Research.* 5(4), 6647–6655. https://jer.or.id/index.php/jer/article/view/2123

Mehrotra, P. (2020). Edutainment in dental curriculum-A systematic review. *Journal of Oral Biology and Craniofacial Research*, 10(4), 417–421. https://doi.org/https://doi.org/10.1016/j.jobcr.2020.07.016

Muizz, A., Suryanti, & Prahani, B. K. (2023). Literature Review : Penggunaan Modul IPA Berbasis Etnosains untuk Meningkatkan Literasi Sains Pada Siswa SD. *Jurnal Elementaria Edukasia*, 6(4), 1905–1914. https://doi.org/10.31949/jee.v6i4.7574

Ngazizah, N., Prahasdita, I. N., Adilah, N., Rahma, F. S. A., & Syarifah, K. (2024). Miskonsepsi IPA Materi Magnet Kelas V Di SD Muhammadiyah Se-Kabupaten Purworejo. *Jurnal Ilmiah Pendidikan Dasar*, 9(4), 321–329. https://journal.unpas.ac.id/index.php/pendas/article/view/20127

Nursyam, Herna, & Aprisal. (2023). Creative Problem Solving: Apakah Efektif Meningkatkan Kemampuan Pemecahan Masalah Matematik Peserta Dididk?. *Mathematic Education And Aplication Journal*. 5(1), 31–43. http://jurnal.borneo.ac.id/index.php/meta/article/view/4362/2452

Nurussalamah, U., Fatmaryanti, S. D., & Sriyono. (2025). Integrating E-Module with Project Based Learning (PjBL): a Strategy to Improve Students' Collaboration Abilities and Scientific Literacy. *Jurnal Penelitian Pendidikan IPA*, 11(3), 936–945. https://doi.org/10.29303/jppipa.v11i3.10864

Prahasdita, I. N., Ngazizah, N., & Ratnaningsih, A. (2025). Identifikasi miskonsepsi siswa tentang materi magnet di sekolah dasar. *Jurnal Visi Ilmu Pendidikan*. 17(1). 164-177. https://jurnal.untan.ac.id/index.php/jvip/article/view/87125/75676604746

Rasyid, M., Unayah, H., Iqdami, N., & Nurohman, S. (2025). Development of Student Worksheets on Static Electricity Material to Identify Higher Order Thinking Skill (HOTS). *Journal of Science Education Research*, 9(1), 11–20. https://doi.org/10.21831/jser.v9i1.74886

Sari, Novita. (2023). The Validity and Practicality of Realistic-Based Student Worksheets.

Setianingrum, D. A., & Nurohman, S. (2022). JSER The Development of Student Worksheets With A Contextual Approach to Improve Students ' Science Literature Capabilities. *Journal of Science Education Research*. 6(1), 51–59. https://doi.org/10.21831/jser.v6i1.48223

Setiawan, R. B., & Cahyaningtyas, A. P. (2025). Development of Digital Comic KOMA (Komik Majas) for Teaching Personification in the Fourth Grade of Elementary School. *Jurnal Teknologi Pendidikan : Jurnal Penelitian Dan Pengembangan Pembelajaran*, 10(3), 373–385. https://doi.org/10.33394/jtp.v10i3.15697

Setyowati, Y., Nurwahidin, M., & Yulianti, D. (2024). Development of Collaborative Learning-Based LKPD to Improve Collaboration Skills of Grade IV Elementary School Students. *Jurnal Teknologi Pendidikan : Jurnal Penelitian Dan Pengembangan Pembelajaran*, 9(2), 214. https://doi.org/10.33394/jtp.v9i2.10733

Silvia, F., Astuti, M., & Dewi, S. M. (2023). Development of Professional Ethics and

Vol. 13 No. 1 : January 2026
E-ISSN: 2722-4627
pp. 362-372

Aesthetics E-Modules Based on Problem Based Learning to Improve Students' Critical Thinking Ability. *Jurnal Teknologi Pendidikan : Jurnal Penelitian Dan Pengembangan Pembelajaran*, 8(3), 640. https://doi.org/10.33394/jtp.v8i3.8066

Siringoringo, D. S., & Sugiharti, G. (2025). Development Of A Problem Based Learning Module To Improve Scientific Literacy Capability And HOTS On The Material Buffer Solution. *Jurnal Teknologi Pendidikan : Jurnal Penelitian Dan Pengembangan Pembelajaran*, 10(1), 132. https://doi.org/10.33394/jtp.v10i1.13610

Sukmawati, I., & Ghofur, M. A. (2022). Pengembangan E-LKPD Berbasis Problem Based Learning Terintegrasi Keterampilan 4C untuk Meningkatkan Kemampuan Berpikir Kritis Peserta Dididk Pada Mata Pelajaran Ekonomi. Jurnal Paedagogy: *Jurnal Penelitian dan Pengembangan Pendidikan*, 10(4), 1020-1033. https://e-journal.undikma.ac.id/index.php/pedagogy/index

Syafitri, D., & Anas, N. (2023). Development of Student Worksheets Based on Scientific Literacy for High School. *Scaffolding: Jurnal Pendidikan Islam Dan Multikulturalisme*, 5(3), 299–310. https://doi.org/10.37680/scaffolding.v5i3.3585

Tanama, J., Degeng, I. N. S., & Sitompul, N. C. (2023). Pengembangan E-Modul Sejarah Indonesia dengan Aplikasi Canva untuk Meningkatkan Semangat Belajar Siswa Kelas XI SMA. *Jurnal Teknologi Pendidikan : Jurnal Penelitian Dan Pengembangan Pembelajaran*, 8(1), 71. https://doi.org/10.33394/jtp.v8i1.5648

Wahyuddin, M. I., & Indrajit, R. E. (2023). Edutainment: Membuat anak aktif, cerdas, ceria, kreatif, dan tangguh. Andi. https://shorturl.at/IASVK

Wahyuni, S., Rizki, L. K., Budiarso, A. S., Putra, P. D. A., & Narulita, E. (2021). The Development of E-Student Worksheet on Environmental Pollution to Improve Critical Thinking Skills of Junior High School Students. *Jurnal Penelitian Pendidikan IPA*, 7(4), 723–728. https://doi.org/10.29303/jppipa.v7i4.870

Wedyawati, N., Setyawan, A. E., & Putri, M. (2020). Pembelajaran SD berbasis problem solving method. Literasi Nusantara. https://shorturl.at/nxaUV

Widiyani, A., & Pramudiani, P. (2021). Pengembangan Lembar Kerja Peserta Didik (LKPD) Berbasis Software Liveworksheet pada Materi PPKn. *DWIJA CENDEKIA: Jurnal Riset Pedagogik*, 5(1), 132. https://doi.org/10.20961/jdc.v5i1.53176

Widiyanti, I., Hanifah, N., & Nugraha, R. G. (2024). Development Development of the One in Diversity Application for Class V Students on Indonesian Diversity Material. *Pedagogia : Jurnal Pendidikan*, 13(2), 238–254. https://doi.org/10.21070/pedagogia.v13i2.1654

Yuliza, N., Herpratiwi, H., Firdaus, R., & Fitiriawan, H. (2025). Development of a Digital Learning Platform to Improve Math Problem Solving Skills. *Jurnal Teknologi Pendidikan : Jurnal Penelitian Dan Pengembangan Pembelajaran*, 10(2), 239. https://doi.org/10.33394/jtp.v10i2.15157

