

REFERENCE

- Afriana, J., Permanasari, A., & Fitriani, A. (2016). Project based learning integrated to stem to enhance elementary school's students scientific literacy. *Jurnal Pendidikan IPA Indonesia*, 5(2), 261–267. <https://doi.org/10.15294/jpii.v5i2.5493>
- Aldila, C., Abdurrahman, A., & Sesunan, F. (2017). Pengembangan LKPD Berbasis STEM Untuk Menumbuhkan Keterampilan Berpikir Kreatif Siswa. *Jurnal Pembelajaran Fisika Universitas Lampung*, 5(4), 138491.
- Amelian, D., Zulfa. (2017) Pengaruh Model Pembelajaran Science Enviroment Technology and Society (SETS) Berbasis Proyek Terhadap Kemampuan Berpikir Kreatif Siswa Pada Konsep FLuida Dinamis, Skripsi: UIN Syarif Hidayatullah Jakarta.
- Apriyani, R., Ramalis, T. R., & Suwama, I. R. (2019). Analyzing Student's Problem Solving Abilities of Direct Current Electricity in STEM-based Learning. *Journal of Science Learning*, 2(3), 85–91. <https://doi.org/10.17509/jsl.v2i3.17559>
- Arikunto, S. (2002). *Research Procedure A Practical Approach*. Jakarta: PT Reneka Cipta.
- Arikunto, S. (2010). *Research Procedures A Practical Approach*. Jakarta: PT Reneka Cipta.
- Aswin, B. (2017). *Learning Activities*. Medan: Larispa Indonesia. teacher association.
- Bybee, R. W., & Landes, N. M. (2013). What research says about new science curriculums (BSCS). *Science and Children*, 25, 35-39. Critical Thinking about Values: A Quasi-Experimental Study: ResearchGate, 26(1), 4. Department of Education and Skills. 2011. National Strategy: Literacy and Numeracy for Learning and Life. Tersedia online: www.education.ie/en/Publications/Policy-Reports/lit_num_strategy_full.pdf
- Capraro, RM, Capraro, MM, & Morgan, JR (2013). STEM project-based learning an integrated science, technology, engineering, and mathematics (STEM) approach. In *STEM Project-Based Learning an Integrated Science, Technology, Engineering, and Mathematics (STEM) Approach*.
- Chiang, C. L., & Lee, H. (2016). The Effect of Project-Based Learning on Learning Motivation and Problem-Solving Ability of Vocational High School Students. *International Journal of Information and Education Technology*, 6(9), 709–712. <https://doi.org/10.7763/ijiet.2016.v6.779>
- Davidi, EIN, Semen, E., & Supardi, K. (2021). Integration of STEM (Science, Technology, Engineering and Mathematical) Approaches for Improving Critical Thinking Skills of Elementary School Students. *Scholaria: Journal of Education and Culture*, 11 (1), 11–22.
- Fithri, S., Tenri Pada*, A. U., Artika, W., Nurmaliah, C., & Hasanuddin, H. (2021). Implementasi LKPD Berbasis STEM untuk Meningkatkan Keterampilan Berpikir Kritis Peserta Didik. *Jurnal Pendidikan Sains Indonesia*, 9(4), 555–564. <https://doi.org/10.24815/jpsi.v9i4.20816>

- Gulen, S. (2018). *World Journal on Educational Technology: Current Issues based science learning approach in solving daily life problems*. 10(4), 95–114.
- Hasanah, Z., Tenri Pada*, A. U., Safrida, S., Artika, W., & Mudatsir, M. (2021). Implementasi Model Problem Based Learning Dipadu LKPD Berbasis STEM untuk Meningkatkan Keterampilan Berpikir Kritis pada Materi Pencemaran Lingkungan. *Jurnal Pendidikan Sains Indonesia*, 9(1), 65–75. <https://doi.org/10.24815/jpsi.v9i1.18134>
- Irwan, A. (2014). *Educational Psychology*. Jakarta: Raja Afindo.
- Kardi, S. and Nur, M. (2000). *Direct Learning*. Surabaya: University Press.
- Kemendikbud. (2014). *Implementation of the 2013 curriculum*. Jakarta. Agency for the development of human resources for education and culture to guarantee the quality of education.
- Kemendikbud. (2014). *Materials for teacher training for 2013 curriculum implementation*. Jakarta: Kemendikbud.
- Lastuti, S. (2018). Pengembangan Bahan Ajar berbasis HOTS untuk Meningkatkan Kemampuan Pemecahan Masalah Matematis Mahasiswa. *Kreano: Jurnal Matematika Kreatif-Inovatif*, 9(2), 191–197. <https://doi.org/10.15294/kreano.v9i2.16341>
- Lubis, A. B., Miaz, Y., & Putri, I. E. (2019). Influence of the Guided Discovery Learning Model on Primary School Students' Mathematical Problem-solving Skills. *Mimbar Sekolah Dasar*, 6(2), 253. <https://doi.org/10.17509/mimbar-sd.v6i2.17984>
- Laboy-Rush. (2010). Integrated STEM education through project based learning (online). available at <https://www.learningprojectbasedlearning.com/STEM/whitepaper/integrated-STEM-throughprojectbasedlearning>.
- Martinis, Y. (2008). *Competency-based Learning Strategies*. Jakarta: Echoes of Pesada (GP) Press.
- Mawarni, R., & Sani, R. A. (2020). Pengaruh model problem based learning terhadap kemampuan Berpikir kreatif siswa pada materi pokok fluida statis di kelas XI SMA Negeri Tebing Tinggi T.P 2019/2020. *Jurnal Inovasi Pembelajaran Fisika (INPAFI)*, 8(2), 8–15. <https://jurnal.unimed.ac.id/2012/index.php/inpafi/article/view/18678>
- Mac Donell, C. (2016). *Project Based Learning Inquiry Units for young Children: First Step to Research for Grade Pre-K-2*. Ohio: Linworth Publishing, Inc
- McDonald's. (2014). *Project based learning inquiry unit for young children: Frist step to research for grade pre-k-2*. Ohio: Linworth Publishing.
- Meita, L., Furi, I., Handayani, S., & Maharani, S. (2018). Eksperimen Model Pembelajaran Project Based Learning Dan Project Based Learning Terintegrasi Stem Untuk Meningkatkan Hasil Belajar Dan Kreativitas Siswa Pada Kompetensi Dasar Teknologi Pengolahan Susu. *Jurnal Penelitian Pendidikan*, 35(1), 49-60–60. <https://doi.org/10.15294/jpp.v35i1.13886>

- Mettas, A. C., & Constantinou, C. C. (2008). The technology fair: A project-based learning approach for enhancing problem solving skills and interest in design and technology education. *International Journal of Technology and Design Education*, 18(1), 79–100. <https://doi.org/10.1007/s10798-006-9011-3>
- Ministry of Education and Culture. (2013). Teacher Training Materials for 2013 Curriculum Implementation. Jakarta: Kemendikbud.
- Musyaroll, nugroho, M. (2020). *Diversities of Student ' L Earning Style in Discovery Learning Method and Their Ability in Physic Problem .9* (2), 111–115.
- Nasution. (2005). *Integrated quality management*. Bogor: Ghalia Indonesia.
- Nguyen, N.-G. (2020). Using the Problem-Based Learning in STEM Teaching About Bamboo Toothpick Houses. *International Education Studies*, 13(12), 70. <https://doi.org/10.5539/ies.v13n12p70>
- Nurhaliza, P., & Syafitri, Y. (2021). *Meta Analisis Pengaruh Penerapan STEM dalam Model Pembelajaran Pada Mata Pelajaran IPA dan Fisika Terhadap Keterampilan Siswa Program Studi Magister Pendidikan Fisika Pascasarjana UNP*. 7(1), 101–108.
- Odell, M. R. L., Kennedy, T. J., Stocks, E., Odell, M. R. L., Kennedy, T. J., & Stocks, E. (2019). *The Interdisciplinary Journal of Problem-based Learning SPECIAL ISSUE : UNPACKING THE ROLE OF ASSESSMENT IN PROBLEM- AND PROJECT-BASED LEARNING The Impact of PBL as a STEM School Reform Model*. 13(2).
- Oktiningrum, W., & Wardhani, D. A. P. (2019). Kemampuan Pemecahan Masalah Matematis Siswa Sekolah Dasar Melalui Soal Higher Order Thinking Skills. *MaPan*, 7(2), 281–290. <https://doi.org/10.24252/mapan.2019v7n2a8>
- Omar Hamalik. (2006). Teaching and learning process. Jakarta: Literary Earth.
- Parno, Yuliati, L., Munfaridah, N., Ali, M., Rosyidah, F. U. N., & Indrasari, N. (2020). The effect of project based learning-STEM on problem solving skills for students in the topic of electromagnetic induction. *Journal of Physics: Conference Series*, 1521(2), 0–7. <https://doi.org/10.1088/1742-6596/1521/2/022025>
- Prastiwi, V. D., & Wisodo, H. (2017). Profil Pemahaman Konsep Siswa SMA pada Materi Fluida Statis. *Prosiding Seminar Pendidikan IPA Pascasarjana UM*, 2(2013), 325–332.
- Putri, N. (2019). *Pengaruh Model Project Based Learning Terintegrasi Stem Terhadap Kemampuan Pemecahan Masalah Fisika Siswa pada Konsep Fluida Dinamis*.
- Sarwi, S., Baihaqi, M. A., & Ellianawati, E. (2021). Implementation of Project Based Learning Based on STEM Approach to Improve Students' Problems Solving Abilities. *Journal of Physics: Conference Series*, 1918(5), 0–5. <https://doi.org/10.1088/1742-6596/1918/5/052049>
- Simatupang, H. et al, (2019). Pengembangan LKPD Berbasis Pendekatan Science, Technology, Engineering, and Mathematic (STEM). *Jurnal Pelita Pendidikan PENGEMBANGAN LKPD BERBASIS PENDEKATAN SCIENCE* ., 170–177.

- Sucipto. (2020). Penerapan Model Pembelajaran Project Based Learning untuk Meningkatkan Hasil Belajar IPA dan Keterampilan Proses Sains Peserta Didik Kelas VIII Smp Negeri 5 Tebing Tinggi Tahun 2019. *Jurnal Handayam*. 11 (2). 46-54.
- Sugiono. (2015). *Mixed Research Methodology (Mixed Method)*. Bandung: Alfabeta CV.
- Sugiono. (2013). *Qualitative, Quantitative and RnD research methods*. Jakarta: Alfabeta CV.
- Sujana, A and Supandi. W. (2020). *Models Innovative learning models and implementation*. Depok: Rajawali Press.
- Sukmawijaya, Y., Suhendar, & Juhanda, A. (2019). Pengaruh Model Pembelajaran Stem-Pjbl terhadap Kemampuan Berpikir Kreatif Siswa pada Materi Pencemaran Lingkungan. *Jurnal Program Studi Pendidikan Biologi*, 9(9), 28–43. <https://e-journal.unipma.ac.id>.
- Thomas, J.W. (2010). *A Review of Research on Project Based Learning*. California: The Autodesk Foundation.
- Tohir, M. (2019). *Hasil PISA Indonesia Tahun 2018 Turun Dibanding Tahun 2015. Desember 2019*, 10–12. <https://doi.org/10.31219/osf.io/pcjvx>
- Torlakson, T. (2014). *Innovate: A blueprint for science, technology, engineering and mathematics in california public education california, State superilenden public institution*.
- Trianto. (2014). *integrated learning model (integrated curriculum model) in theory and practice*. Jakarta: Library achievements.
- Tseng, K. H., Chang, C. C., Lou, S. J., & Chen, W. P. (2013). Attitudes towards science, technology, engineering and mathematics (STEM) in a project-based learning (PjBL) environment. *International Journal of Technology and Design Education*,
- Walker, F., Link, N., & Nickolaus, R. (2016). A multidimensional structure of domain-specific problem-solving competencies of electronics technicians for automation technology. *Empirical Research in Vocational Education and Training*, 8(1). <https://doi.org/10.1186/S40461-016-0034-Z>
- Wanarmi, J. (2016). STEM: what, why and how the process of the National Science Education Seminar for postgraduate science Um. 1(1): 976-98.