

DAFTAR PUSTAKA

- Al Sultan, A., Henson, H., & Lickteig, D. (2021). Assessing preservice elementary teachers' conceptual understanding of scientific literacy. *Teaching and Teacher Education*, 102. <https://doi.org/10.1016/j.tate.2021.103327>
- Alviaturrohman, K., Niswatul Fauziah, H., Candra Kusumaningrum, A., Tadris IPA, J., Ponorogo, I., & artikel, R. (2021). *Efektivitas Model Pembelajaran PDEODE (Predict-Discuss-Explain-Observe-Discuss-Explain) Berorientasi pada Socio Scientific Issue terhadap Kemampuan Observasi Peserta Didik Info Artikel ABSTRAK*. <http://ejournal.iainponorogo.ac.id/index.php/jtii>
- Aprilia, R. (2022). *Pengembangan Media Video untuk Meningkatkan Literasi Sains Sekolah Dasar* (Vol. 3).
- Aras & Shahab. (2024). *Aras, F., Shahab, I., (2024). The Filsafat Pendidikan dan Transformasi Kurikulum Abad 21: Mengintegrasikan Kecakapan Hidup dengan Teknologi. Jurnal Pendidikan Biologi, Vol 10 No 1, 2024.*
- Ardiyantoro et al. (2025). *Bakteriologi. PT Media Pustaka Indo.* <https://repository.umj.ac.id/22284/1/246.Ebook%20Bakteriologi.pdf>
- Asyhari & Hariyanti. (2020). *Asyhari, A., & Hariyanti, D., (2020). Pengaruh Pembelajaran Integrative Learning (IL) dan Predict, Discuss, Explain, Observe, Discuss, Explain (PDEODE) terhadap Pemahaman Konsep. Khazanah Pendidikan Islam, Vol. 2 No. 1: 43-51. DOI: 10.15575/kp.v1i1.8387.*
- Azzahra, N. T., Islam, U., Sunan, N., Surabaya, A., Nur, S., Ali, L., Yunus, M., & Bakar, A. (2025). Teori Konstruktivisme Dalam Dunia Pembelajaran. *Jurnal Ilmiah Research Student*, 2(2), 64–75. <https://doi.org/10.61722/jirs.v2i2.4762>
- Bintari, Ms., Noor Andryan Ilsan, Ms., Istyanto, F., Rochmanah Suhartati, M., Ratih Kartika Dewi, Ms., Biomed Zuraida, M., Herlina, M., Maulin Inggraini, Mk., Seftiwan Pratami, Ms., Jumriah Nur, Ms., Doni Setiawan, Ms., Biotek Dian Rachma Wijayanti, M., & Fitriani Safari, W. (2023). *Bakteriologi untuk Mahasiswa Kesehatan*.
- Bunga Aditya. (2024). *Implementasi Teams Games Tournament Untuk Meningkatkan Keterampilan Kolaborasi Peserta Didik Kelas Sekolah Dasar Implementation Of Teams Games Tournament To Improve Primary School Students' Collaboration Skills*.
- Chandra, A., Suhartono, S., & Fitriani, E. (2019). Penggunaan Peta Konsep Sebagai Instrumen Penilaian Terhadap Pemahaman Konseptual Peserta Didik Melalui Model Pembelajaran PDEODE Pada Materi Asam Basa. *JRPK: Jurnal Riset Pendidikan Kimia*, 9(1), 1–13. <https://doi.org/10.21009/jrpk.091.01>
- Citra Dewi, V., Susantini, E., & Poedjiastoeti, S. (2021). The Effectiveness of Learning Tools: Improving Students' Scientific Literacy through Collaborative Learning. *Journal of Educational Science and Technology*, 7(2). <https://doi.org/10.26858/est.v7i2.21858>

- Coştu, B. (2008). Learning Science through the PDEODE Teaching Strategy: Helping Students Make Sense of Everyday Situations. *Eurasia Journal of Mathematics*, 4(1), 3–9.
- Cristanty, R., & Sipahutar, H. (2025). Pengaruh Problem Based Learning (PBL) terhadap Kemampuan Literasi Sains serta Kemampuan Kolaborasi dan Berkomunikasi Siswa pada Materi Virus Kelas X SMA Swasta Sultan Iskandar Muda Medan. In *Jurnal Teknologi Pendidikan* (Vol. 18, Number 2).
- Dewanti, L. A., Siti, D., & Hidayati, N. (2018). *Penerapan Pembelajaran IPA Dengan Strategi PDEODE Untuk Mereduksi Miskonsepsi Siswa Pada Materi Perubahan Fisika dan Perubahan Kimia Kelas VII SMP*.
- Dewi et.al. (2025). *The Effect Of Predict-Discuss-Explain-Observe-Discuss-Explain (PDEODE) Learning Model On The Improvement Of High Order Thinking Skills*. 13(1), 9–16. <http://jurnalfkipuntad.com/index.php/jpft>
- Dinna Puspa Kartikasari, C., & Billah, A. (n.d.). Cut Dinna Puspa Kartikasari*). *Nurul Afdhilla / JIT*, 7, 2023. Retrieved <http://ojs.unm.ac.id/index.php/ipaterpadu>
- Dipalaya, T., Susilo, H., & Duran-Corebima, A. (2016). *Pengaruh Strategi Pembelajaran PDEODE (Predict-Discuss-Explain-Observe-Discuss-Explain) pada Kemampuan Akademik Berbeda terhadap Hasil Belajar Siswa SMA*. <https://www.researchgate.net/publication/351449610>
- Djarmiko, R., & Mahbubah, K. (2022). Identifikasi Keterampilan Literasi Sains Siswa Pada Materi Asam Basa. In *SCIENING: Science Learning Journal* (Vol. 3, Number 1). <http://ejurnal.unima.ac.id/index.php/sciening>
- Firdaus dan, E. (2020). Penerapan Model Siklus Belajar Empiris Induktif untuk Melatihkan Kemampuan Analisis pada Materi Larutan Elektrolit dan Nonelektrolit Kelas X SMAN 12 Surabaya Implementation of Inductive Empirical Learning Cycle Models to Train Student Capability in Analyzing Electrolyte and Nonelectrolyte Materials of Class X SMAN 12 Surabaya. In *Unesa Journal Of Chemical Education* (Vol. 9, Number 1).
- Firman, Syamsiara Nur, & Moh. Aldi SL.Taim. (2023). Analysis of Student Collaboration Skills in Biology Learning. *Diklabio: Jurnal Pendidikan Dan Pembelajaran Biologi*, 82–89. <https://doi.org/10.33369/diklabio.7.1.82-89>
- Gentry, R. (2012). *Collaboration skills pre-service teachers acquire in a responsive preparation program*. <http://www.aabri.com/copyright.html>.
- Gillies, R. M. (2023). Using Cooperative Learning to Enhance Students' Learning and Engagement during Inquiry-Based Science. In *Education Sciences* (Vol. 13, Number 12). Multidisciplinary Digital Publishing Institute (MDPI). <https://doi.org/10.3390/educsci13121242>
- Gormally, C., Brickman, P., & Lut, M. (2012a). Developing a test of scientific literacy skills (TOSLS): Measuring undergraduates' evaluation of scientific information and arguments. *CBE Life Sciences Education*, 11(4), 364–377. <https://doi.org/10.1187/cbe.12-03-0026>
- Gormally, C., Brickman, P., & Lut, M. (2012b). Developing a test of scientific literacy skills (TOSLS): Measuring undergraduates' evaluation of scientific information

- and arguments. *CBE Life Sciences Education*, 11(4), 364–377. <https://doi.org/10.1187/cbe.12-03-0026>
- Haloho & Theo. (2024). Pengaruh Model Pembelajaran PDEODE (Predict-Discuss-Explain-Observe-Discuss-Explain) Terhadap Hasil Belajar Siswa Pada Materi Laju Reaksi. *CHEDS: Journal of Chemistry, Education, and Science*, 8(1). <https://doi.org/10.30743/cheds.v7i1.9045>
- Hariyanti, F. (2019). *Statistical Literacy Siswa SMP dalam Pembelajaran Matematika*. 18(2), 911–920. <http://jurnal.iain-bone.ac.id/index.php/ekspose>
- He, P., Krajcik, J., & Schneider, B. (2023). Transforming standards into classrooms for knowledge-in-use: an effective and coherent project-based learning system. *Disciplinary and Interdisciplinary Science Education Research*, 5(1). <https://doi.org/10.1186/s43031-023-00088-z>
- Heryani, S., Azmi, N., & Pramono, H. (n.d.). Penerapan Model Pembelajaran PDEODE (Predict-Discuss-Explain-Observe-Discuss-Explain) Untuk Meningkatkan Keterampilan Berpikir Kritis Siswa Pada Konsep Pencemaran Lingkungan Kelas X MIPA SMA Negeri 5 Kota Cirebon. In *Jurna Pendidikan Fisika dan Sains* (Vol. 4, Number 2). JPFS.
- Heryani, S., Azmi, N., & Pramono, H. (2021). Penerapan Model Pembelajaran PDEODE (Predict-Discuss-Explain-Observe-Discuss-Explain) Untuk Meningkatkan Keterampilan Berpikir Kritis Siswa Pada Konsep Pencemaran Lingkungan Kelas X MIPA SMA Negeri 5 Kota Cirebon. In *Jurna Pendidikan Fisika dan Sains* (Vol. 4, Number 2). JPFS.
- Hidayat. (2024). *Analisis Model Pembelajaran Project Based Learning (PjBL) dalam Mendukung Keterampilan Kolaborasi Siswa di SMA Negeri 2 Kabupaten Halmahera Barat*. <https://jurnal.stkipkieraha.ac.id/index.php/jbes>
- Hidayat, A. T. (2023). *Eduproxima: Jurnal Ilmiah Pendidikan IPA*. <http://jurnal.stkipggritulungagung.ac.id/index.php/eduproxima>
- Holbrook, J., & Rannikmae, M. (2009). *The Meaning of Scientific Literacy*. <http://www.ijese.com/>
- Inggri Ayu Amala, & Yushardi, Y. (2022). Analisis Literasi Sains dan Kemampuan Pemecahan Masalah Siswa SMP pada Materi Zat Aditif dan Zat Adiktif. *JURNAL PENDIDIKAN MIPA*, 12(2), 373–378. <https://doi.org/10.37630/jpm.v12i2.610>
- Irsan, I. (2021). Implementasi Literasi Sains dalam Pembelajaran IPA di Sekolah Dasar. *Jurnal Basicedu*, 5(6), 5631–5639. <https://doi.org/10.31004/basicedu.v5i6.1682>
- Jane Esparrago. (2025). *Achievements-Concerns-Solutions (ACS): A Closure Activity to Improve Group Collaborations in English Classes*. <https://doi.org/10.22034/ijpie.2025.543065.1131>
- Juliana Siregar, W., & Nina Adlini, M. (2025). Enhancing Students' Collaboration Skills Through Scientific Approach-Based Worksheets in Human Sensory System Learning. *Biology Education Faculty of Education and Teaching Science*, 11(2), 677–696. <https://doi.org/10.36987/jpbn.v11i2.7645>
- Khairrunisa, A. N., Yusup, I. R., & Paujiah, E. (2025). Improving students' scientific literacy through a problem-based learning model integrated with socio-scientific

- issues on ecosystem learning. *Biosfer*, 18(2), 276–289. <https://doi.org/10.21009/biosferjpb.55744>
- Khoiriyah et.al. (2025). Khoiriyah, Z., Santosa, S., & Nugroho, I. (2025). *Penerapan Kegiatan Eksperimen dalam Pembelajaran IPA untuk Menumbuhkan Kolaborasi Mahasiswa PGSD. Al-Madrasah: Jurnal Ilmiah Pendidikan Madrasah Ibtidaiyah*, Vol. 9, No. 4. DOI 10.35931/am.v9i4.5539.
- Kolari, S., Viskari, E.-L., & Savander-Ranne, C. (2005). *Improving Student Learning in an Environmental Engineering Program with a Research Study Project**.
- Lane, A. R., Momsen, J. L., & Wiltbank-Chau, L. B. (2025). Positive microbiology: addressing students' knowledge gaps regarding the benefits of microorganisms. *Journal of Microbiology & Biology Education*, 26(2). <https://doi.org/10.1128/jmbe.00045-25>
- Ma, U., ax, rifah, Mulyani, A., Kunci, K., Pembelajaran, M., & Berpikir Kritis, K. (2019). *Jurnal Ilmu Alam Indonesia Penerapan Model Pembelajaran PDEODE (Predict-Discuss-Explain-Observe-Discuss-Explain) untuk Meningkatkan Keterampilan Berpikir Kritis Siswa pada Materi Ekosistem Kelas X SMA Negeri 1 Mandirancan*. 2(2), 112–126. <http://www.syekhnurjati.Biologi>,
- Manzulina, M., Artayasa, I. P., & Merta, I. W. (2024). Analisis Literasi Sains Siswa Pada Materi Ekosistem. *Jurnal Pendidikan, Sains, Geologi, Dan Geofisika (GeoScienceEd Journal)*, 5(4), 846–851. <https://doi.org/10.29303/goescienceed.v5i4.507>
- Maulana, A. (2022). Analisis Validitas, Reliabilitas, dan Kelayakan Instrumen Penilaian Rasa Percaya Diri Siswa Article Info ABSTRACT. *Jurnal Kualita Pendidikan*, 3(3), 2774–2156.
- Mukaramah, M., Kustina, R., & Rismawati Program Studi Pendidikan Bahasa Indonesia STKIP Bina Bangsa Getsempena Banda Aceh, dan. (2020). Menganalisis Kelebihan dan Kekurangan Model Discovery Learning Berbasis Audiovisual dalam Pelajaran Bahasa Indonesia. In *Jurnal Ilmiah Mahasiswa Pendidikan* (Vol. 1, Number 1).
- Najaah. (2021). *Analisis Keterampilan Berpikir Kritis dan Kolaborasi Peserta Didik Sekolah Menengah Pertama (SMP) Analysis Of Junior High School Students' Critical Thinking and Collaboration Skills*.
- Najlaa Annisa, Muhammad Alvin, & Renasya Ramadhan. (2025). *Keterlibatan Aktif Siswa dalam Pembelajaran Kooperatif di Sekolah Dasar*.
- Nurtamara, L., & Widyastuti, D. A. (2023). The Improving evidence-based argumentation on socioscientific issues through problem-based learning in science students. *Biosfer*, 16(2). <https://doi.org/10.21009/biosferjpb.35534>
- Ofstedal, K., & Dahlberg, K. (2009). Collaboration in student teaching: Introducing the collaboration self-assessment tool. *Journal of Early Childhood Teacher Education*, 30(1), 37–48. <https://doi.org/10.1080/10901020802668043>
- Özbulut, N., & Uyulgan, M. A. (2025). Fostering academic intrinsic motivation through PDEODE-based chemistry laboratory activities. *Eğitimde Yeni Yaklaşımlar Dergisi*, 8(1), 33–48. <https://doi.org/10.70325/eyyad.1652272>

- Paujiah, N., Wuryastuti, S., & Suratno, T. (2022). *Analisis Kemampuan Observasi Siswa pada Konsep Perubahan Wujud Benda dan Sifatnya dengan Metode Eksperimen* *Article Info* (Vol. 2, Number 1). <https://ejournal.upi.edu/index.php/didaktika>
- Pratika & Supardiyono. (2020). *1cb2b7c80e7973a8371bed603872ad2e44c5*.
- Prayoga, K. S., & Gading, I. K. (2023). Improving Students' Collaboration Ability and Scientific Literacy through the Group Investigation Type Cooperative Learning Model. *Mimbar Ilmu*, 28(3), 515–522. <https://doi.org/10.23887/mi.v28i3.65168>
- Putri, D. C., Widianingsih, D., Barif, Z. A., & Ariqah, N. (2026). *Scientific Literacy as a Catalyst for Conceptual Understanding and Scientific Attitudes in Elementary Science Learning*. 11(1), 67–74. <https://doi.org/10.26740/jp.v11n1.p67-74>
- Rini, & Rochmah. (2020). *Buku Ajar Mata Kuliah Bakteriologi Dasar UMSIDA Press Sidoarjo Universitas Muhammadiyah Sidoarjo 2020*.
- Romadhona, A. R., Prameita, A. E. D., Alvianita, M., Adha, E. A. W., & Iffah, J. D. N. (2023). Analisis Teori Belajar Konstruktivisme dalam Pembelajaran Matematika di SMA Budi Sekar Utomo Perak. *Laplace : Jurnal Pendidikan Matematika*, 6(1), 11–21. <https://doi.org/10.31537/laplace.v6i1.1097>
- Rusilowati, A., Kurniawati, L., Nugroho, S. E., & Widiyatmoko, A. (2016). Developing an Instrument of Scientific Literacy Assessment on the Cycle Theme OPEN ACCESS. In *INTERNATIONAL JOURNAL OF ENVIRONMENTAL & SCIENCE EDUCATION* (Vol. 11, Number 12).
- Samsudin, A., Zulfikar, A., Saepuzaman, D., Suhandi, A., Aminudin, A. H., Supriyadi, S., & Coştu, B. (2024). Correcting grade 11 students' misconceptions of the concept of force through the conceptual change model (CCM) with PDEODE*E tasks. *Journal of Turkish Science Education*, 21(2), 212–231. <https://doi.org/10.36681/tused.2024.012>
- Shabrina, A., & Astuti, U. P. (2022). *The Integration of 6Cs of the 21 st Century Education into English Skills: Teachers' Challenges and Solutions*. <http://journal.um.ac.id/index.php/jptpp/>
- Sri Wulan Sari, Yokhebed, Y., & Andi Besse Tenriawaru. (2025). Analisis Kemampuan Literasi Sains pada Materi Virus Kelas X di SMA Negeri 1 Rasau Jaya. *JURNAL PENDIDIKAN MIPA*, 15(3), 1222–1231. <https://doi.org/10.37630/jpm.v15i3.3201>
- Sugiyono. (2023). *Metode Penelitian Kuantitatif, Kualitatif, Dan R&D*. www.cvalfabeta.com
- Susilo. (2022). *Mikrobiologi Dasar Susilo Penerbit: Ahlimedia Press*. <http://www.ahlimediapress.web.id>
- Turnip, A. R., & Setiawan, I. (2021). Analisis Keterampilan Proses Sains pada Materi Suhu dan Kalor di SMA Selama Pembelajaran Online. *Jurnal Ilmiah Pendidikan Fisika*, 5(3), 466. <https://doi.org/10.20527/jipf.v5i3.4058>
- Ulhusna et.al. (2020). *Permainan Ludo untuk Meningkatkan Keterampilan Kolaborasi Siswa dalam Pembelajaran Matematika*.

- Wahyuni. (2020). *Wahyuni, R., (2020). Meningkatkan Hasil Belajar IPA dengan Menggunakan Model Pembelajaran Predict, Discuss, Explain, Observe, Discuss, Explain (PDEODE). Seminar Nasional Pendidikan, FKIP UNMA, 2020.*
- Wati, W., & Novita, D. (2021). Mereduksi Miskonsepsi Materi Kesetimbangan Kimia melalui Penerapan Strategi Predict Discuss Explain Observe Discuss Explain (PDEODE). *Jurnal Pendidikan Kimia Undiksha*, 5, 1–10. <https://ejournal.undiksha.ac.id/index.php/JJPK>