

## DAFTAR PUSTAKA

- Alberts, B., Johnson, A. Lewis, J., Raff, M., Roberts, K., Walter, P.(2008).*Molecular Biology of the Cell. Fifth edition.* New York: Garland Science, Taylor & Francis Group.
- Allen, D. & Tanner, K. (2005). Infusing active learning into the large-enrollment biology class: seven strategies, from the simple to complex. *Cell Biology Education.* Vol. 4, 262-268, Winter 2005.
- American Association for the Advancement of Science (AAAS).(2009). *Benchmarks for Science Literacy.Blueprint of Assessment.* <http://www.project2061.org/publications/bsl/online>.
- Anderson, E. (2010). Learning progressions: Informing and supporting instruction and formative assessment.*Paper presented at APEC Conference on Replicating Exemplary Practices in Mathematics Education,* Koh Samui, Thailand, 7-12 Mar. 2010.
- Anderson, L.W., & Krathwohl, D.R.(2001). *A Taxonomy for Learning, Teaching, and Assessing. A Revision of Bloom's Taxonomy of Educational Objectives.* New York: Addison Wesley Longman, Inc.
- Arends, R.I. (2008). *Learning to Teach, 7<sup>th</sup> ed.* Boston: McGraw Hill.
- Bao, L., Cai, T., Koenig, K., Fang, K., Han, J., Wang, J., Liu, Q., Ding, L., Cui, L., Luo, Y., Wang, Y., Li, L., Wu, N. (2009). Learning and scientific reasoning. *Science.* Vol.323,586-587, January 2009, [www.sciencemag.org](http://www.sciencemag.org).
- Ben-Zvi Assaraf, O. & Orion, N. (2006).Development of System Thinking Skills in the Context of Earth System Education.*Journal of Research in Science Teaching.* Vol. 42 (5), pp. 518–560, 2006.
- Black, P. & Wiliam, D. (1998a). Assessment and classroom learning. *Assessment in Education: Principles, Policy & Practice.* Mar 1998, Vol. 5, Issue 1.
- Black, P. & Wiliam, D. (1998b). Inside the black box: Raising standards through classroom assessment. *Phi Delta Kappan,* Vol.80, (2), 139-148.
- Black, P. & Harrison, C. (2001a). Feedback in questioning and marking: The science teacher's role in formative assessment.*School Science Review,* Vol. 82, (301), 55-61.

- Black, P. & Harrison, C. (2001b). Self- and peer-assessment and taking responsibility: The science student's role in formative assessment. *School Science Review*, Vol. 83, (302), 43-49.
- Bloom, B. S. (1956, Retrieved March 5, 2003). *Major Categories in the Taxonomy of Educational Objectives*. Available Washington University Website, <http://faculty.washington.edu/krumme/guides/bloom.html>.
- Brookhart, S.M. (2010). *How to Assess Higher-Order Thinking Skills in Your Classroom*. Virginia: ASCD.
- Bruner, J.S. (1977). *The Process of Education*. Cambridge: Harvard University Press.
- Campbell, N.A., Reece, J.B., Urry, L.A., Cain, M.L., Wasserman, S.A., Minorsky, P.V., Jackson, R.B. (2008). *Biology, 8<sup>th</sup> edition*. San Fransisco: Pearson Benjamin Cummings.
- Chi, M.T.H. (2008). Three types of conceptual change: Belief revision, mental model transformation, and categorical shift. In S.Vosniadou (Ed.). *Handbook of Research on Conceptual Change* (pp.61-82). Hillsdale, NJ: Erlbaum.
- Coletta, V.P., Phillips, J.A. & Steinert, J.J. (2007). Why you should measure your students' reasoning ability. *The Physics Teacher*. Vol. 45, 235-238, April 2007.
- Collins, V. (2010). Higher Order Thinking (HOT) program assessment plan. *Prepared August 2010 for Submission to the Southern Association of Colleges and Schools Commission on Colleges*. Dates of the on-site visit: March 9–11, 2010. University of North Texas Health Science Center.
- Cook, H.G. (2009). *Formative assessment: Best practices*. World-class International Design and Assessment (WIDA) Consortium.
- Council of Chief State School Officers. (2012). *Distinguishing Formative Assessment from Other Educational Assessment Labels*. Washington: Formative Assessment for Students and Teachers (FAST) SCASS.
- Crowe, A., Dirks, C. & Wenderoth, M.P. (2008). Biology in Bloom: implementing Bloom's taxonomy to enhance student learning in biology. *CBE-Life Sciences Education*. Vol. 7, 368-381, Winter 2008.

- Dauer, J.M., Doherty, J.H., Freed, A.L., Anderson, C.W. (2014). Connections between student explanations and arguments from evidence about plant growth. *CBE—Life Sciences Education*. Vol. 13, 397–409, Fall 2014.
- Davidson, B.W. & Dunham, R.A. (1997). Assessing EFL student progress in critical thinking with the Ennis-Weir critical thinking essay test. *JALT Journal*, Vol. 19 (1), 43-57, May, 1997.
- DeBoer, G.E. (1991). *A History of Ideas in Science Education: Implication for Practice*. New York: Teacher College Press.
- Dewey, J. (1938). *Experience and Education*. E-book. Kindle Edition. Kappa Delta Pi Publications.
- Duschl, R., Maeng, S. & Sezen, A. (2011). Learning progressions and teaching sequences: A review and analysis. *Studies in Science Education*, 47 (2), 123-182.
- Eddy, S.L., Brownell, S.E. & Wenderoth, M.P. (2014). Gender gaps in achievement and participation in multiple introductory biology classrooms. *CBE—Life Sciences Education*, Vol. 13, 478–492, Fall 2014.
- Ellis, G. (2009). Biological membranes. *Journal of College Science Teaching*, 38 (3), 52-53, Jan/Feb 2009: Research Library.
- Fencl, H.S. (2010). Development of students' critical-reasoning skills through content-focused activities in a general education course. *Journal of College Science Teaching*. May/June 2010, 55-62.
- Fisher, K.M., Williams, K.S. & Lineback, J.E. (2011). Osmosis and diffusion conceptual assessment. *CBE—Life Sciences Education*, Vol. 10, 418–429, Winter 2011.
- Franzoni, A. L., & Assar, S. (2009). Student Learning Styles Adaptation Method Based on Teaching Strategies and Electronic Media. *Educational Technology & Society*, 12 (4), 15–29.
- Fry, H., Ketteridge, S. & Marshall, S. (2009). Understanding student learning. Dalam Fry, H., Ketteridge, S. & Marshall, S. (2009). *A Handbook for Teaching and Learning in Higher Education: Enhancing Academic Practice*. New York: Routledge.

- Furtak, E.M. & Ruiz-Primo, M.A. (2008). Making students' thinking explicit in writing and discussion: an analysis of formative assessment prompts. *Science Education*, February, 799-823.
- Gall, M.D., Gall, J.P. & Borg, W.R. (2003). *Educational Research: An Introduction*. 7<sup>th</sup> ed. Boston: Pearson Education, Inc.
- Gotwals, A.W. & Songer, N.B. (2009). Reasoning up and down a food chain: using an assessment framework to investigate students' middle knowledge. *Science Education*, 94, 259-28.
- Gray, R., Gray, A. Fite, J.L., Jordan, R., Stark, S., Naylor, K. (2012). A simple *microscopy* assay to teach the processes of phagocytosis and exocytosis. *Cell Biology Education-Life Sciences Education*, Vol. 11, 180–186, Summer 2012.
- Hall, K. & Burke, W.M. (2004). *Making Formative Assessment Work*. London: McGraw Hill-Education.
- Hanuscin, D.L. & Lee, M.H. (2007). "Using a learning cycle approach to teaching the learning cycle to preservice elementary teachers". *Paper presented at the 2007 Annual Meeting of the Association for Science Teacher Education*, Clearwater, FL.
- Hanuscin, D.L., Garderen, D., Lee, E.J., Hill, T., Presley, M. (2013). "Breaking the cycle: Supporting elementary teachers' understanding and ability to apply the 5E model". *Paper presented at the 2013 Annual Meeting of the Association for Science Teacher Education*, <http://web.missouri.edu/~hanuscind/ASTE2013.pdf>
- Heritage, M. (2008). "Learning progressions: Supporting instruction and formative assessment". *Paper prepared for the Formative Assessment for Teachers and Students (FAST) State Collaborative on Assessment and Student Standards (SCASS) of the Council of Chief State School Officers (CCSSO)*.
- Hurney, C.A. (2012). Learner-centered teaching in non-majors introductory biology: The impact of giving students choices. *Journal of Microbiology & Biology Education*, Vol. 13 (2), p. 133-141, December 2012.
- Janssen, F.J.J.M., Tigelaar, D.E.H., & Verloop, N. (2009). Developing biology lessons aimed at teaching for understanding: a domain-specific heuristic for student teachers. *Journal of Science Teacher Education*, 20, 1-20.

- Jenkinson, J. & McGill, G. (2012). Visualizing protein interactions and dynamics: Evolving a visual language for molecular animation. *CBE—Life Sciences Education*, Vol. 11, 103–110, Spring 2012.
- Jimenez-Aleixandre, M.P & Erduran, S. (2008). Argumentation in science education: An overview. *Argumentation in Science Education: Perspective from Classroom-Based Research*. Springer Science and Business Media B.V.
- Joyce, C., Spiller, L. & Twist, J. (2009). *Self Assessment: What Teachers Think*. Wellington: New Zealand Council for Educational Research.
- Karp, G. (2010). *Cell and Molecular Biology: Concepts and Experiments*. New Jersey: John Wiley & Sons, Inc.
- Kitchen, E., Bell, J.D., Reeve, S., Sudweeks, R.R., Bradshaw, W.S. (2003). Teaching cell biology in the large-enrollment classroom: methods to promote analytical thinking and assessment of their effectiveness. *Cell Biology Education*. Vol. 2, 180–194, Fall 2003.
- Lauer, S., Momsen, J., Offerdahl, E., Kryjevskaja, M., Christensen, W., Montplaisir, L. (2013). Stereotyped: Investigating gender in introductory science courses. *CBE—Life Sciences Education*. Vol. 12, 30–38, Spring 2013.
- Lawson, A.E., Banks, D.L. & Logvin, M. (2007). Self-efficacy, reasoning ability, and achievement in college biology. *Journal of Research in Science Teaching*, 4, (5), 706-724.
- Lemons, P.P. & Lemons, J.D. (2013). Questions for assessing higher-order cognitive skills: It's not just Bloom's. *CBE—Life Sciences Education*. Vol. 12, 47–58, Spring 2013.
- Libarkin, J. & Ording, G. (2012). The utility of writing assignments in undergraduate bioscience. *CBE—Life Sciences Education*, Vol. 11, 39–46, Spring 2012.
- Linton, D.L., Pangle, W.M., Wyatt, K.H., Powell, K.N., Sherwood, R.E. (2014). Identifying key features of effective active learning: The effects of writing and peer discussion. *CBE—Life Sciences Education*, Vol. 13, 469–477, Fall 2014.
- Luckie, D., Harrison, S.H. & Ebert-May, D. (2011). Model-based reasoning: Using visual tools to reveal student learning. *Advances in Physiology Education*, Vol. 35, 59-67, July 26, 2011.

- Lynd-Balta, E. (2006). Using literature and innovative assessments to ignite interest and cultivate critical thinking skills in an undergraduate neuroscience course. *CBE—Life Sciences Education*. Vol. 5, 167–174, Summer 2006.
- Marzano, R.J. & Kendall, J.S. (2008). *Designing and Assessing Educational Objectives: Applying The New Taxonomy*. California: Corwin Press.
- McManus, S. (2008). “Attributes of effective formative assessment”. *Paper prepared for the Formative Assessment for Teachers and Students (FAST). State Collaborative on Assessment and Student Standards (SCASS) of the CCSSO (The Council of Chief State School Officers)*. Department of Public Instruction.
- McTighe, J. & Schollenberger, J. (1985). Why teach thinking: a statement of rationale. Dalam Costa, A.L. (1985). *Developing Minds: A Resource Book for Teaching Thinking*. Virginia: Association for Supervision and Curriculum Development.
- Miller, P.H., Blessing, J.S & Schwartz, S. (2006). Gender differences in high-school students’ views about science. *International Journal of Science Education*, Vol. 28, issue 4, 2006, p.363-381.
- Momsen, J., Offerdahl, E., Kryjevskaja, M., Montplaisir, L., Anderson, E., Grosz, N. (2013). Using assessments to investigate and compare the nature of learning in undergraduate science courses. *CBE—Life Sciences Education*. Vol. 12, 239–249, Summer 2013.
- NRC/National Research Council. (1996). *National Science Education Standards*. Washington DC: National Academy Press.
- NRC/National Research Council.(2013). Next generation science standards. Appendix H. *Understanding the Scientific Enterprise: The Nature of Science in the Next Generation Science Standards*. NGGS Release, April 2013.
- National Science Teachers Association. (2003). *Standards for Science Teacher Preparation*. Washington DC: National Academy Press.
- Noblitt, L., Vance, D.E. & Smith, M.L.D. (2010). A comparison of case study and traditional teaching methods for improvement of oral communication and critical-thinking skills. *Journal of College Science Teaching*, May/June 2010, 26-32.



- Noonan, B. & Duncan, C.R. (2005). Peer and self-assessment in high schools. *Practical Assessment, Research & Evaluation*. Vol. 10 No. 17, November 2005.
- Novak, J. D. & Canas, A.J. (2008). The theory underlying concept maps and how to construct and use them. *Technical Report IHMC Cmap Tools 2006-01 Rev 01-2008*. Florida Institute for Human and Machine Cognition, 2008, available online at: <http://cmap.ihmc.us/Publications/ResearchPapers/TheoryUnderlyingConceptMaps.pdf>
- Odom, A.L. & Kelly, P.V. (2001). Integrating concept mapping and the learning cycle to teach diffusion and osmosis concepts to high school biology students. *Science Education*, 85 (6), 615-635, November 2001.
- Parker, J.M., Anderson, C.W., Heidemann, M., Merrill, J., Merritt, B., Richmond, G., Urban-Lurain, M. (2012). Exploring undergraduates' understanding of photosynthesis using diagnostic question clusters. *CBE-Life Sciences Education*. Vol 11, 47-57, Spring 2012.
- Popham, W.J. (2011). *Classroom Assessment: What Teachers Need to Know*. Boston: Pearson Education.
- Powers, D.E. (2002). *Self-Assessment of Reasoning Skills*. Research Report, October 2002. New Jersey: Educational Testing Service, Princeton.
- Putra, R.A., Sudargo, F., Redjeki, S., Adianto. (2014). The analysis of concepts mastery and critical thinking skills on invertebrate zoology course. *International Journal of Science and Research (IJSR)*. Vol. 3(3), March 2014.
- Quitadamo, I.J. & Kurtz, M.J. (2007). Learning to improve: Using writing to increase critical thinking performance in general education biology. *CBE—Life Sciences Education*. Vol. 6, 140–154, Summer 2007.
- Ramsey, J. (1993). Developing conceptual storylines with the learning cycle. *Journal of Elementary Science Education*, 5(2), 1-20.
- Reynolds, J.A., Thaiss, C., Katkin, W., Thompson, Jr., R.J. (2012). Writing-to-learn in undergraduate science education: A community-based, conceptually driven approach. *CBE—Life Sciences Education*, Vol. 11, 17–25, Spring 2012.
- Reynolds, J.A. & Moskovitz, C. (2008). Calibrated peer review assignments in science courses: Are they designed to promote critical thinking and

writing skills? *Journal of College Science Teaching*, Nov/Dec 2008, 60-66.

- Richmond, G., Merritt, B., Urban-Lurain, M., Parker, J. (2010). The development of a conceptual framework and tools to assess undergraduates' principled use of models in cellular biology. *CBE—Life Sciences Education*. Vol. 9, 441–452, Winter 2010.
- Roshayanti, F. (2012). *Pengembangan Model Asesmen Argumentatif untuk Mengukur Keterampilan Argumentasi Mahasiswa pada Konsep Fisiologi Manusia*. Disertasi Sekolah Pascasarjana Universitas Pendidikan Indonesia: Tidak diterbitkan.
- Russ, R.S., Coffey, J.E., Hammer, D., Hutchison, P. (2008). Making classroom assessment more accountable to scientific reasoning: A case for attending to mechanistic thinking. *Science Education*, Vol. 93, 875-891.
- Salinas, I. (2009). Learning progressions in science education: Two approaches for development. *Paper presented at the Learning Progressions in Science (LeaPS) Conference*. June 2009, Iowa City, IA.
- Saptono, S. & Rustaman, N. (2011). Undergraduate students' reasoning and analytical thinking skills in cell biology. *Proceeding International Seminar of Science Education*. Sekolah Pascasarjana UPI, 12 November 2011.
- Shi, J., Wood, W.B., Martin, J.M., Guild, N.A., Vicens, Q., Knight, J.K. (2010). A diagnostic assessment for introductory molecular and cell biology. *CBE—Life Sciences Education*. Vol. 9, 453–461, Winter 2010.
- Smith, M.K., Wood, W. B. & Knight, J. K. (2008). The genetics concept assessment: a new concept inventory for gauging student understanding of genetics. *CBE—Life Sciences Education*. Vol. 7, 422–430, Winter 2008.
- Stiggins, R.J. (1994). *Student-Centered Classroom Assessment*. New York: MacMillan College Publishing Company.
- Stith, B.J. (2004). Use of animation in teaching cell biology. *Cell Biology Education*, Vol. 3, 181–188, Fall 2004.
- Tanner, K. & Allen, D. (2004). Approaches to biology teaching and learning: from assays to assessments—on collecting evidence in science teaching. *Cell Biology Education*. Vol. 3, 69–74, Summer 2004.



- Thomas, G., Martin, D. & Pleasants, K. (2011). Using self- and peer-assessment to enhance students' future-learning in higher education. *Journal of University Teaching & Learning Practice*, Vol. 8(1), 2011.
- Tobin, K. G. & Capie, W. (1981). The development and validation of a group test of logical thinking. *Educational and Psychological Measurement*, 41.413-423, July 1981.
- Torrance, H. & Pryor, J. (2002). *Investigating Formative Assessment: Teaching, Learning and Assessment in the Classroom*. Philadelphia: Open University Press.
- Valanides, N. (1998). Formal operational performance and achievement of lower secondary school students. *Studies in Educational Evaluation*. Vol. 24 (1), 1-23, 1998.
- Vygotsky, L.S. (1978). *Mind in Society: The Development of Higher Psychological Processes*. Cambridge: Harvard University Press. Available online at [http://books.google.co.id/books/about/MIND\\_IN\\_SOCIETY.html?id=RxjjUefze\\_oC&hl=en](http://books.google.co.id/books/about/MIND_IN_SOCIETY.html?id=RxjjUefze_oC&hl=en)
- Warli & Fadiana, M. (2014). Design of mathematic learning based on cognitive style. *Proceeding of International Conference On Research, Implementation And Education Of Mathematics And Sciences 2014*. Yogyakarta State University, 18-20 May 2014.
- Wilson, C.D., Anderson, C.W., Heidemann, M., Merrill, J.E., Merritt, B.W., Richmond, G., Sibley, D.F., Parker, J.M. (2006). Assessing students' ability to trace matter in dynamic systems in cell biology. *CBE—Life Sciences Education*. Vol. 5, 323–331, Winter 2006.
- Yilmaz-Soylu, M. & Akkoyunlu, B. (2009). The effect of learning styles on achievement in different learning environments. *Turkish Journal of Educational Technology*. Vol. 8 (4), 43-50, Oktober 2009.