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## **The impact of Science Literacy delivery methods - what works?**

### Bibliography

#### **Curricula | Group 2. Education and training - including online**

Ver. 1.00

Date: October 2018

## Introduction

This thematic bibliography is the result of research to survey existing literature available on Science Literacy delivery methods.

The search was carried out by retrieving documents and articles from a wide range of sources, including research databases, Google Scholar, ResearchGate, subject databases, open access repositories etc. using keyword combinations.

The results of the resource discovery are divided into two groups: one containing impact assessments using qualitative, quantitative or mixed method (both qualitative and quantitative) approaches to data collection and a second including descriptive resources, which encompass, for example, reviews, guides, handbooks, reports and project reports.

This bibliography is work in progress and is not designed to be fully exhaustive or complete. We will be pleased to receive suggestions and recommendations for additions that can contribute to the understanding of science, its applications and, to the promotion of science literacy.

## Groups and methods list

During the first part of the Desk Research phase of this project (i.e. Task 1), the team identified 42 single-mechanism approaches, 2 composite approaches and 1 related approach that were relevant to the delivery and dissemination of scientific information. The list of single mechanisms was further organised into 7 thematic groups, as presented in the following Table.

Single mechanism approach	Group
Exhibitions, Expo, Festivals, Movies, Picnics, Science fairs, Seminars, Talks, TED Talks, Theatre, Workshops	1. Events, meetings, performances
Colloquia, Courses, Curricula, E-learning, Webinars	2. Education and training – including online
Animations, Books, Brochures, Cartoons, Comics, Games, Graphics, Posters, Publications, Radio, Reports, TV, Videos	3. Traditional publishing and journalism – print and broadcast
Competitions, Experiments, Makerspaces, Mobile classrooms, Mobile laboratories	4. Activities and services
Blogs, E-books, E-zines, Mobile Apps, Podcasts, Social media, Websites, Wikis	5. Online interactions
<b>Composite approaches</b>	
Multiliteracies	
Multimodalities	
<b>Related approach</b>	
Citizen Science	

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## Impact Assessment

- Auerbach, Anna Jo, and Elisabeth E. Schussler. "Curriculum Alignment with *Vision and Change* Improves Student Scientific Literacy." Edited by Brickman Peggy. *CBE—Life Sciences Education* 16, no. 2 (June 2017): ar29. <https://doi.org/10.1187/cbe.16-04-0160>.
- Balschweid, Mark A., Greg W. Thompson, and R.L. Cole. "The Effects of an Agricultural Literacy Treatment on Participating K-12 Teachers and Their Curricula," 14. Las Vegas, NV, USA, 1997. <https://eric.ed.gov/?id=ED415443>.
- Banner, Indira, and Jim Ryder. "The Impact of a Context-Led Curriculum on Different Students' Experiences of School Science." In *Topics and Trends in Current Science Education*, edited by Catherine Bruguière, Andrée Tiberghien, and Pierre Clément, 1:369–83. Dordrecht: Springer Netherlands, 2014. [http://link.springer.com/10.1007/978-94-007-7281-6\\_23](http://link.springer.com/10.1007/978-94-007-7281-6_23).
- Begoray, Deborah L., Joan Wharf-Higgins, and Marjorie MacDonald. "High School Health Curriculum and Health Literacy: Canadian Student Voices." *Global Health Promotion* 16, no. 4 (December 2009): 35–42. <https://doi.org/10.1177/1757975909348101>.
- Belansky, Elaine S., Catherine Romaniello, Catherine Morin, Terry Uyeki, Rebecca L. Sawyer, Sharon Scarbro, Garry W. Auld, et al. "Adapting and Implementing a Long-Term Nutrition and Physical Activity Curriculum to a Rural, Low-Income, Biethnic Community." *Journal of Nutrition Education and Behavior* 38, no. 2 (March 2006): 106–13. <https://doi.org/10.1016/j.jneb.2005.11.011>.
- Bodzin, Alec M., Qiong Fu, Tamara E. Peffer, and Violet Kulo. "Developing Energy Literacy in US Middle-Level Students Using the Geospatial Curriculum Approach." *International Journal of Science Education* 35, no. 9 (June 2013): 1561–89. <https://doi.org/10.1080/09500693.2013.769139>.
- Brandt, Molly, Cory Forbes, and Jenny Keshwani. "Exploring Elementary Students' Scientific Knowledge of Agriculture Using Evidence-Centered Design." *Journal of Agricultural Education* 58, no. 3 (September 30, 2017): 134–49. <https://doi.org/10.5032/jae.2017.03134>.
- Brown, William B., and Robert Stewart. "Agricultural Instruction in the Middle School." *Journal of Agricultural Education*, 1993, 17–23. <https://pdfs.semanticscholar.org/c46c/b0fb22650e5863e39c458301326c356c63d1.pdf>.
- Burek, Karey. "The Impact of Socioscientific Issues Based Curriculum Involving Environmental Outdoor Education for Fourth Grade Students." Graduate Theses and Dissertations, University of South Florida, 2012. <http://scholarcommons.usf.edu/etd/3997/>.
- Burkholder Kristin, Devereaux Jessica, Grady Caroline, Solitro Molly, and Mooney Susan. "Longitudinal Study of the Impacts of a Climate Change Curriculum on Undergraduate Student Learning: Initial Results." *Sustainability* 9, no. 6 (May 30, 2017): 913. <https://doi.org/10.3390/su9060913>.
- Cailor, Stephanie M., and Aleda M.H. Chen. "Immediate and Longitudinal Effects of Incorporating Health Literacy and Cultural Competency into a Yearlong Pharmacy Curriculum." *Currents in Pharmacy Teaching and Learning* 7, no. 3 (May 2015): 292–301. <https://doi.org/10.1016/j.cptl.2014.12.005>.
- Cervetti, Gina N., Jacqueline Barber, Rena Dorph, P. David Pearson, and Pete G. Goldschmidt. "The Impact of an Integrated Approach to Science and Literacy in Elementary School Classrooms." *Journal of Research in Science Teaching* 49, no. 5 (May 2012): 631–58. <https://doi.org/10.1002/tea.21015>.
- Chang, Chun-Yen, Ting-Kuang Yeh, Chun-Yen Lin, Yueh-Hsia Chang, and Chia-Li D. Chen. "The Impact of Congruency Between Preferred and Actual Learning Environments on Tenth Graders' Science Literacy in Taiwan." *Journal of Science Education and Technology* 19, no. 4 (August 2010): 332–40. <https://doi.org/10.1007/s10956-010-9203-1>.

- Ching Chen, Lin. "The Effects of Integrated Information Literacy in Science Curriculum on First-Grade Students' Memory and Comprehension Using the Super3 Model." *Knowledge Management & E-Learning: An International Journal* 3, no. 3 (September 1, 2011). <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.712.9559&rep=rep1&type=pdf>.
- Coleman, Cliff, Sylvia Peterson-Perry, Bhavaya Sachdeva, Amy Kobus, and Roger Garvin. "Long-Term Effects of a Health Literacy Curriculum for Family Medicine Residents." *PRiMER* 1 (December 6, 2017). <https://doi.org/10.22454/PRiMER.2017.703541>.
- Coleman, Clifford A., Sylvia Peterson-Perry, and Tracy Bumsted. "Long-Term Effects of a Health Literacy Curriculum for Medical Students." *Family Medicine* 48, no. 1 (January 2016): 49–53.
- Collins, Andrew. "Citizen Science in the Classroom: Assessing the Impact of an Urban Field Ecology Program on Learning Gains and Attitudes toward Science," 2014. <https://doi.org/10.7916/d89p2ztt>.
- Colthorpe, Kay, Kirsten Zimbardi, Andrea Bugarcic, and Aaron Smith. "Progressive Development of Scientific Literacy through Assessment in Inquiry-Based Biomedical Science Curricula." *International Journal of Innovation in Science and Mathematics Education* 23, no. 5 (January 1, 2015): 52–64. <https://openjournals.library.sydney.edu.au/index.php/CAL/article/view/10506>.
- Conroy, Molly B, Helen K Delichatsios, Janet P Hafler, and Nancy A Rigotti. "Impact of a Preventive Medicine and Nutrition Curriculum for Medical Students." *American Journal of Preventive Medicine* 27, no. 1 (July 2004): 77–80. <https://doi.org/10.1016/j.amepre.2004.03.009>.
- Fang, Zhihui, and Youhua Wei. "Improving Middle School Students' Science Literacy Through Reading Infusion." *The Journal of Educational Research* 103, no. 4 (April 15, 2010): 262–73. <https://doi.org/10.1080/00220670903383051>.
- Faulkner, Sarah F. "Science Literacy: Exploring Middle-Level Science Curriculum Structure and Student Achievement." In *NERA Conference Proceedings 2012*. 18, 2012. [http://digitalcommons.uconn.edu/nera\\_2012/18?utm\\_source=digitalcommons.uconn.edu%2Fnera\\_2012%2F18&utm\\_medium=PDF&utm\\_campaign=PDFCoverPages](http://digitalcommons.uconn.edu/nera_2012/18?utm_source=digitalcommons.uconn.edu%2Fnera_2012%2F18&utm_medium=PDF&utm_campaign=PDFCoverPages).
- Girod, Mark, and Todd Twyman. "Comparing the Added Value of Blended Science and Literacy Curricula to Inquiry-Based Science Curricula in Two 2nd-Grade Classrooms." *Journal of Elementary Science Education* 21, no. 3 (April 2009): 13–32. <https://doi.org/10.1007/BF03174720>.
- Glassman, Rodney B., Kack Elliot, and James Knight. "Interactive Agricultural Experiences of 4th Grade Students in the Arid Southwest: An Examination of the Impact of Hands-On Learning Experiences as a Component of Agriculture in the Classroom Curriculum." Doctoral Dissertation, The University of Arizona, 2005. <http://hdl.handle.net/10150/195882>.
- Gormally, Cara, Peggy Brickman, Brittan Hallar, and Norris Armstrong. "Effects of Inquiry-Based Learning on Students' Science Literacy Skills and Confidence." *International Journal for the Scholarship of Teaching and Learning* 3, no. 2 (July 1, 2009). <https://doi.org/10.20429/ijstl.2009.030216>.
- Green, Jamie A., Alda Maria Gonzaga, Elan D. Cohen, and Carla L. Spagnoletti. "Addressing Health Literacy through Clear Health Communication: A Training Program for Internal Medicine Residents." *Patient Education and Counseling* 95, no. 1 (April 2014): 76–82. <https://doi.org/10.1016/j.pec.2014.01.004>.
- Hallar, A. Gannet, Ian B. McCubbin, and Jennifer M. Wright. "CHANGE: A Place-Based Curriculum for Understanding Climate Change at Storm Peak Laboratory, Colorado." *Bulletin of the American Meteorological Society* 92, no. 7 (July 2011): 909–18. <https://doi.org/10.1175/2011BAMS3026.1>.
- Haussler, Peter, and Lore Hoffmann. "A Curricular Frame for Physics Education: Development, Comparison with Students' Interests, and Impact on Students' Achievement and Self-Concept." *Science Education* 84, no. 6 (November 2000): 689–705. [https://doi.org/10.1002/1098-237X\(200011\)84:6<689::AID-SCE1>3.0.CO;2-L](https://doi.org/10.1002/1098-237X(200011)84:6<689::AID-SCE1>3.0.CO;2-L).

- Hindin, Toby J., Isobel R. Contento, and Joan Dye Gussow. "A Media Literacy Nutrition Education Curriculum for Head Start Parents about the Effects of Television Advertising on Their Children's Food Requests." *Journal of the American Dietetic Association* 104, no. 2 (February 2004): 192–98. <https://doi.org/10.1016/j.jada.2003.11.006>.
- Howard-Pitney, B., M. A. Winkleby, C. L. Albright, B. Bruce, and S. P. Fortmann. "The Stanford Nutrition Action Program: A Dietary Fat Intervention for Low-Literacy Adults." *American Journal of Public Health* 87, no. 12 (December 1997): 1971–76. <https://www.ncbi.nlm.nih.gov/pubmed/9431286>.
- Hubert, D., A. Frank, and C. Igo. "Environmental and Agricultural Literacy Education." In *Environmental Challenges*, edited by Shimshon Belkin, 525–32. Dordrecht: Springer Netherlands, 2000. [http://www.springerlink.com/index/10.1007/978-94-011-4369-1\\_41](http://www.springerlink.com/index/10.1007/978-94-011-4369-1_41).
- Ketelhut, Diane Jass. "The Impact of Student Self-Efficacy on Scientific Inquiry Skills: An Exploratory Investigation in River City, a Multi-User Virtual Environment." *Journal of Science Education and Technology* 16, no. 1 (April 13, 2007): 99–111. <https://doi.org/10.1007/s10956-006-9038-y>.
- Koh, Kim Hong, and Ai Noi Lee. "The Quality of Teachers' Assessment Tasks and Student Work in the Singapore Science Classrooms," 17. Chicago, 2007. <http://hdl.handle.net/10497/2275>.
- Koparan, Timur, and Bulent Guvent. "The Effect of Project Based Learning on the Statistical Literacy Levels of Student 8th Grade." *European Journal of Educational Research* 3, no. 3 (July 15, 2014): 145–57. <https://doi.org/10.12973/eu-jer.3.3.145>.
- Kutcher, S., Y. Wei, A. McLuckie, and L. Bullock. "Educator Mental Health Literacy: A Programme Evaluation of the Teacher Training Education on the Mental Health & High School Curriculum Guide." *Advances in School Mental Health Promotion* 6, no. 2 (April 2013): 83–93. <https://doi.org/10.1080/1754730X.2013.784615>.
- Kutcher, Stan, Yifeng Wei, Heather Gilberds, Omary Ubuguyu, Tasiana Njau, Adena Brown, Norman Sabuni, Ayoub Magimba, and Kevin Perkins. "A School Mental Health Literacy Curriculum Resource Training Approach: Effects on Tanzanian Teachers' Mental Health Knowledge, Stigma and Help-Seeking Efficacy." *International Journal of Mental Health Systems* 10, no. 1 (December 2016). <https://doi.org/10.1186/s13033-016-0082-6>.
- Kutcher, Stan, Yifeng Wei, and Catherine Morgan. "Successful Application of a Canadian Mental Health Curriculum Resource by Usual Classroom Teachers in Significantly and Sustainably Improving Student Mental Health Literacy." *The Canadian Journal of Psychiatry* 60, no. 12 (December 2015): 580–86. <https://doi.org/10.1177/070674371506001209>.
- Kutcher, Stan, Wei Med Yifeng, Alan McLuckie, and Heather Hines. "Successful Application of the Mental Health and High School Curriculum Guide in the Toronto District School Board (TDSB)," 2014. <http://teenmentalhealth.org/product/successful-application-mental-health-high-school-curriculum-guide-tdsb/>.
- Kutcher, Stanley, Yifeng Wei, Heather Gilberds, Adena Brown, Omary Ubuguyu, Tasiana Njau, Norman Sabuni, Ayoub Magimba, and Kevin Perkins. "The African Guide: One Year Impact and Outcomes from the Implementation of a School Mental Health Literacy Curriculum Resource in Tanzania." *Journal of Education and Training Studies* 5, no. 4 (March 3, 2017): 64. <https://doi.org/10.11114/jets.v5i4.2049>.
- Kuwahara, Jennifer L. H. "Impacts of a Place-Based Science Curriculum on Student Place Attachment in Hawaiian and Western Cultural Institutions at an Urban High School in Hawai'i." *International Journal of Science and Mathematics Education* 11, no. 1 (February 2013): 191–212. <https://doi.org/10.1007/s10763-012-9387-3>.
- Laius, Anne, Aveliis Post, and Miia Rannikmäe. "Assessment of Scientific Literacy of Estonian Gymnasium Students during the Operation of a Competence-Based Science Curriculum." *Universal Journal of Educational Research* 4, no. 5 (May 2016): 1142–47. <https://doi.org/10.13189/ujer.2016.040525>.

- Leising, James G., Seburn Pense, and Carl Igo. *An Assessment of Student Agricultural Literacy Knowledge Based on the Food and Fiber Systems Literacy Framework*. Proceedings of the 28 Th Annual National Agricultural Education Research Conference, 2001.  
<http://citeseerx.ist.psu.edu/viewdoc/summary?doi=10.1.1.523.9760>.
- Mahatoo, Judy. "Scientific Literacy and Nature of Science as It Impacts on Boys' Achievement in South Trinidad." University of the West Indies, 2012. <http://hdl.handle.net/2139/12709>.
- Mandler, Daphna, Rachel Mamlok-Naaman, Ron Blonder, Malka Yayan, and Avi Hofstein. "High-School Chemistry Teaching through Environmentally Oriented Curricula." *Chem. Educ. Res. Pract.* 13, no. 2 (2012): 80–92. <https://doi.org/10.1039/C1RP90071D>.
- Marion, Gail S., Jade M. Hairston, Stephen W. Davis, and Julienne K. Kirk. "Using Standardized Patient Assessments to Evaluate a Health Literacy Curriculum." *Family Medicine* 50, no. 1 (January 8, 2018): 52–57. <https://doi.org/10.22454/FamMed.2018.539107>.
- McClune, Billy. "Committing Curriculum Time to Science Literacy: The Benefits from Science Based Media Resources." *The Journal of Emergent Science*, 12 (February 2017): 25–40.  
[https://pure.qub.ac.uk/portal/en/publications/committing-curriculum-time-to-science-literacy-the-benefits-from-science-based-media-resources\(3be459fb-8d77-44a0-9af1-fd655c2c0c10\).html](https://pure.qub.ac.uk/portal/en/publications/committing-curriculum-time-to-science-literacy-the-benefits-from-science-based-media-resources(3be459fb-8d77-44a0-9af1-fd655c2c0c10).html).
- McLuckie, Alan, Stan Kutcher, Yifeng Wei, and Cynthia Weaver. "Sustained Improvements in Students' Mental Health Literacy with Use of a Mental Health Curriculum in Canadian Schools." *BMC Psychiatry* 14, no. 1 (December 2014). <https://doi.org/10.1186/s12888-014-0379-4>.
- McNeill, Katherine L., and Meredith Houle Vaughn. "Urban High School Students' Critical Science Agency: Conceptual Understandings and Environmental Actions Around Climate Change." *Research in Science Education* 42, no. 2 (April 2012): 373–99. <https://doi.org/10.1007/s11165-010-9202-5>.
- Milin, Robert, Stanley Kutcher, Stephen P. Lewis, Selena Walker, Yifeng Wei, Natasha Ferrill, and Michael A. Armstrong. "Impact of a Mental Health Curriculum on Knowledge and Stigma Among High School Students: A Randomized Controlled Trial." *Journal of the American Academy of Child & Adolescent Psychiatry* 55, no. 5 (May 2016): 383–391.e1. <https://doi.org/10.1016/j.jaac.2016.02.018>.
- Millar, Robin. "Twenty First Century Science: Insights from the Design and Implementation of a Scientific Literacy Approach in School Science." *International Journal of Science Education* 28, no. 13 (October 27, 2006): 1499–1521. <https://doi.org/10.1080/09500690600718344>.
- Morehouse, Emily E. "An Assessment of the 'Chick It Out' Agricultural Literacy Program's Impact on Elementary Student Outcomes," 2005.  
[https://agliteracy.org/research/doc/influential/assessment\\_elementary.pdf](https://agliteracy.org/research/doc/influential/assessment_elementary.pdf).
- Ono, Joyce K. "Development of Faculty Collaboratives to Assess Achievement of Student Learning Outcomes in Critical Thinking in Biology Core Courses," 209–18. Washington, D.C., 2006.
- Paulsen, Thomas, Elena Polush, Taylorann Clark, and Rick Cruse. "Introducing a Precision Soil Conservation Curriculum: A Pre-and Post-Evaluation." *Journal of Agricultural Systems, Technology, and Management* 28 (January 17, 2017). <http://jastm.org/index.php/jastm/article/view/39>.
- Pense, Seburn L., James G. Leising, Matthew T. Portillo, and Carl G. Igo. "Comparative Assessment Of Student Agricultural Literacy In Selected Agriculture In The Classroom Programs." *Journal of Agricultural Education* 46, no. 3 (September 2005): 107–18. <https://doi.org/10.5032/jae.2005.03107>.
- Pollack, Keshia M., Andrew L. Dannenberg, Nisha D. Botchwey, Cynthia L. Stone, and Edmund Seto. "Developing a Model Curriculum for a University Course in Health Impact Assessment in the USA." *Impact Assessment and Project Appraisal* 33, no. 1 (January 2, 2015): 80–85.  
<https://doi.org/10.1080/14615517.2014.960213>.



- Powers, Susan E., Jan DeWaters, and Suresh Dhaniyala. "New Project-Based Instructional Modules Improve Climate Change Literacy (Research to Practice)," 11. Atlanta, 2013.  
[https://www.asee.org/file\\_server/papers/attachment/file/0003/3975/climate-literacy-ASEE-2013-final.pdf](https://www.asee.org/file_server/papers/attachment/file/0003/3975/climate-literacy-ASEE-2013-final.pdf).
- Roehrig, Gillian, and Shauna Garrow. "The Impact of Teacher Classroom Practices on Student Achievement during the Implementation of a Reform-based Chemistry Curriculum." *International Journal of Science Education* 29, no. 14 (November 5, 2007): 1789–1811. <https://doi.org/10.1080/09500690601091865>.
- Roseno, Ashley T., Virginia G. Carraway-Stage, Callan Hoerdeman, Sebastián R. Díaz, Eugene Geist, and Melani W. Duffrin. "Applying Mathematical Concepts with Hands-On, Food-Based Science Curriculum: Applying Mathematical Concepts." *School Science and Mathematics* 115, no. 1 (January 2015): 14–21. <https://doi.org/10.1111/ssm.12097>.
- Rossana, Lisa Mary. "Scientific Literacy : The Effects of Incorporating Literacy into a High School Environmental Science Classroom." MS, Montana State University - Bozeman, Graduate School, 2016. <https://scholarworks.montana.edu/xmlui/handle/1/10098>.
- Sahagian, Dork, David Anastasio, Alec Bodzin, Lori Cirucci, Denise Bressler, Chris Dempsey, and Tamara Peffer. "Assessing Climate Misconceptions of Middle School Learners and Teachers." Poster. Accessed August 7, 2018. <http://www.ei.lehigh.edu/eli/research/AGU2012b.pdf>.
- Sarama, Julie, Alissa A. Lange, Douglas H. Clements, and Christopher B. Wolfe. "The Impacts of an Early Mathematics Curriculum on Oral Language and Literacy." *Early Childhood Research Quarterly* 27, no. 3 (July 2012): 489–502. <https://doi.org/10.1016/j.ecresq.2011.12.002>.
- Schreinemachers, Pepijn, Bal Bdr Rai, Desang Dorji, Hsiao-pu Chen, Thinley Dukpa, Namgay Thinley, Passang Lhamo Sherpa, and Ray-Yu Yang. "School Gardening in Bhutan: Evaluating Outcomes and Impact." *Food Security* 9, no. 3 (June 2017): 635–48. <https://doi.org/10.1007/s12571-017-0673-3>.
- Shearer, Adrienne E.H., O. Sue Snider, and Kalmia E. Kniel. "Implementation and Assessment of Food Safety Educational Materials for Secondary and Postsecondary Education:" *Journal of Food Science Education* 13, no. 1 (January 2014): 4–11. <https://doi.org/10.1111/1541-4329.12017>.
- Silk, Eli M., Christian D. Schunn, and Mari Strand Cary. "The Impact of an Engineering Design Curriculum on Science Reasoning in an Urban Setting." *Journal of Science Education and Technology* 18, no. 3 (June 2009): 209–23. <https://doi.org/10.1007/s10956-009-9144-8>.
- Smith, Martin H., Katherine E. Heck, and Steven M. Worker. "4-H Boosts Youth Scientific Literacy with ANR Water Education Curriculum." *California Agriculture* 66, no. 4 (October 2012): 158–63. <https://doi.org/10.3733/ca.v066n04p158>.
- Soto Mas, Francisco, Erika Mein, Brenda Fuentes, Barry Thatcher, and Héctor Balcázar. "Integrating Health Literacy and ESL: An Interdisciplinary Curriculum for Hispanic Immigrants." *Health Promotion Practice* 14, no. 2 (March 2013): 263–73. <https://doi.org/10.1177/1524839912452736>.
- Stage, Virginia C., Ashley Roseno, Caroline D. Hodges, Jana Hovland, Sebastian Diaz, and Melani W. Duffrin. "Implementation of a Food-Based Science Curriculum Improves Fourth-Grade Educators' Self-Efficacy for Teaching Nutrition." *American Journal of Health Education* 47, no. 3 (May 3, 2016): 155–62. <https://doi.org/10.1080/19325037.2016.1157534>.
- Struthers, Amber Lee. "The Relationship between Science Curriculum Aligned to Common Core State Standards and Scientific Literacy." Doctoral Dissertation, Walden University, 2015. <https://scholarworks.waldenu.edu/dissertations/1628/>.
- Surplus, Benjamin, Michelle Bushey, and Mark Halx. "Developing Scientific Literacy in Introductory Laboratory Courses: A Model for Course Design and Assessment." *Journal of Geoscience Education* 62, no. 2 (May 28, 2014): 244–63. <https://doi.org/10.5408/13-073.1>.

- Trujillo, Jennifer M., and Trista A. Figler. "Teaching and Learning Health Literacy in a Doctor of Pharmacy Program." *American Journal of Pharmaceutical Education* 79, no. 2 (March 2015): 27. <https://doi.org/10.5688/ajpe79227>.
- Vaino, Katrin. *A Case Study Approach to Effect Change of Chemistry Teacher Beliefs for Enhancing Students' Scientific Literacy*. Tartu: Tartu University Press, 2013. [http://dspace.utlib.ee/dspace/bitstream/handle/10062/29674/vaino\\_katrin\\_3.pdf?sequence=5](http://dspace.utlib.ee/dspace/bitstream/handle/10062/29674/vaino_katrin_3.pdf?sequence=5).
- VanTassel-Baska, Joyce, George Bass, Roger Ries, Donna Poland, and Linda D. Avery. "A National Study of Science Curriculum Effectiveness With High Ability Students." *Gifted Child Quarterly* 42, no. 4 (October 1998): 200–211. <https://doi.org/10.1177/001698629804200404>.
- Warren, Cynthia. "Addressing Nutritional Literacy in Preschool Learning Environments." *Journal of Family Strengths* 17, no. 1 (May 10, 2017): A6. <http://digitalcommons.library.tmc.edu/jfs/vol17/iss1/6>.
- White, Jacob, Denise Shockley, Margaret Hutzal, and Natalie Wilson. "Interdisciplinary Professional Development for Teaching Science and Reading." *The Ohio Journal of Science* 114, no. 2 (July 8, 2014): 2. <https://doi.org/10.18061/ojs.v114i2.4391>.
- Yang, Joanna, Thomas J LaBounty, Stephen C Ekker, and Chris Pierret. "Students Being and Becoming Scientists: Measured Success in a Novel Science Education Partnership." *Palgrave Communications* 2, no. 1 (December 2016). <https://doi.org/10.1057/palcomms.2016.5>.

## Descriptive Resources

- Altin, Sibel Vildan, Isabelle Finke, Sibylle Kautz-Freimuth, and Stephanie Stock. "The Evolution of Health Literacy Assessment Tools: A Systematic Review." *BMC Public Health* 14, no. 1 (December 2014). <https://doi.org/10.1186/1471-2458-14-1207>.
- Angelos, J., A. Arens, H. Johnson, J. Cadriel, and B. Osburn. "One Health in Food Safety and Security Education: A Curricular Framework." *Comparative Immunology, Microbiology and Infectious Diseases* 44 (February 2016): 29–33. <https://doi.org/10.1016/j.cimid.2015.11.005>.
- Askim, Craig. "The Impacts of Agricultural Literacy in North Dakota: A High School Youths Perception." Master's thesis, North Dakota State University, 2016. [https://www.ag.ndsu.edu/ndaeea/documents/9829Askim\\_Master\\_Paper\\_Final\\_Draft\\_.pdf](https://www.ag.ndsu.edu/ndaeea/documents/9829Askim_Master_Paper_Final_Draft_.pdf).
- Atkinson, Robert. "A Compilation of Literacy Strategies to Be Used in Science and Earth Science Units." Master's thesis, The College at Brockport, 2012. [https://digitalcommons.brockport.edu/ehd\\_theses/146](https://digitalcommons.brockport.edu/ehd_theses/146).
- Bellah, Kimberley A., and James E. Dyer. "Elementary Teachers' Attitudes and Stages of Concern about an Agricultural Literacy Curriculum." *Proceedings of the 2007 AAAE Research Conference* 34 (2007): 66–81. <http://www.agedweb.org/WRAEC/2006/documents/c1paper.pdf>.
- Beyer, Charlotte, and J. Scott Thomson. "Promoting Health Literacy within a Graduate-Level Nutrition Curriculum." *Reference Services Review* 44, no. 2 (June 13, 2016): 122–31. <https://doi.org/10.1108/RSR-02-2016-0008>.
- Boakye, Cecilia. "Climate Change Education: The Role of Pre-Tertiary Science Curricula in Ghana." *SAGE Open* 5, no. 4 (December 23, 2015): 215824401561461. <https://doi.org/10.1177/2158244015614611>.
- Chang, Chew-Hung, and Liberty Pascua. "The Curriculum of Climate Change Education: A Case for Singapore." *Journal of Environmental Education* 48, no. 3 (2017): 172–81. <https://doi.org/10.1080/00958964.2017.1289883>.



- Curriculum Development Council, and Hong Kong Examinations and Assessment Authority. *Chemistry. Curriculum and Assessment Guide*. Hong Kong, 2007.  
[http://334.edb.hkedcity.net/doc/chi/curriculum2015/Chem\\_CAGuide\\_e\\_2015.pdf](http://334.edb.hkedcity.net/doc/chi/curriculum2015/Chem_CAGuide_e_2015.pdf).
- Day, Stephen, and Thomas Bryce. "Curriculum for Excellence Science : Vision or Confusion?" *Scottish Educational Review* 45 (2013): 53–67. <https://strathprints.strath.ac.uk/44092/>.
- Dillon, Justin. "On Scientific Literacy and Curriculum Reform." *International Journal of Environmental & Science Education* 4, no. 3 (209AD): 201–13. <https://files.eric.ed.gov/fulltext/EJ884393.pdf>.
- Dmytrenko, Anya. "Teaching Health Literacy To Underrepresented Adolescents: A Curriculum For High School Advisory Teachers." Master's thesis, Hamline University, 2015.  
[https://digitalcommons.hamline.edu/hse\\_all/197](https://digitalcommons.hamline.edu/hse_all/197).
- Dragoş, Viorel, and Viorel Mih. "Scientific Literacy in School." *Procedia - Social and Behavioral Sciences* 209 (December 2015): 167–72. <https://doi.org/10.1016/j.sbspro.2015.11.273>.
- Dyg, Pernille Malberg. "Fostering Food Literacy and Food Citizenship through Farm-School Cooperation and Beyond." PhD thesis, Aalborg University, 2014.  
<http://www.forskningsdatabasen.dk/en/catalog/2305625184>.
- Fensham, Peter J. "Increasing the Relevance of Science and Technology Education Fo All Students in the 21st Century." *Science Educational Journal* 15, no. 1 (January 2004): 7–26.  
[http://www.icaseonline.net/sei/15-01-2004/15-01-2004-7\\_26.pdf](http://www.icaseonline.net/sei/15-01-2004/15-01-2004-7_26.pdf).
- Frankenfeld, P.J. "The IMPACTS Curriculum: Education for Creating Citizens in an Expert-Controlled, Changing Technological Society." In *1996 International Symposium on Technology and Society Technical Expertise and Public Decisions. Proceedings*, 177–86. Princeton, NJ, USA: IEEE, 1996.  
<https://doi.org/10.1109/ISTAS.1996.540441>.
- Freer, Tiffany J. "Modernizing the Agricultural Education and Training Curriculum." Project Presentation, 2015. <https://www.agrilinks.org/library/modernizing-agricultural-education-and-training-curriculum>.
- Garfield, Joan, R delMas, Ann Ooms, and B Chance. "Assessment Resource Tools for Assessing Students' Statistical Literacy, Reasoning, and Thinking." *Proceedings of the National STEM Assessment Conference*, October 2006.  
[file:///Users/carolusher/Downloads/Assessment\\_resource\\_tools\\_for\\_assessing\\_students\\_.pdf](file:///Users/carolusher/Downloads/Assessment_resource_tools_for_assessing_students_.pdf).
- Horton, Robert L., and Suzanne Hutchinson. "Nurturing Scientific Literacy among Youth through Experientially Based Curriculum Materials." *Washington, DC: National Network for Science and Technology, Cooperative Extension Service Children, Youth & Family Network CREES-USDA*, 1997, 40.  
[https://ohio4h.org/sites/ohio4h/files/d6/files/4H\\_591%20Nurturing%20Scientific%20Literacy%20Among%20Youth%20Through%20Experientially%20Based%20Curriculum%20Materials.pdf](https://ohio4h.org/sites/ohio4h/files/d6/files/4H_591%20Nurturing%20Scientific%20Literacy%20Among%20Youth%20Through%20Experientially%20Based%20Curriculum%20Materials.pdf).
- Hurd, Paul DeHart. "Scientific Literacy: New Minds for a Changing World." *Science Education* 82, no. 3 (1997): 407–16. [https://doi.org/10.1002/\(SICI\)1098-237X\(199806\)82:3<407::AID-SCE6>3.0.CO;2-G](https://doi.org/10.1002/(SICI)1098-237X(199806)82:3<407::AID-SCE6>3.0.CO;2-G).
- Hutton, Neil. "Interactions between the Formal UK School Science Curriculum and the Public Understanding of Science." *Public Understanding of Science* 5, no. 1 (January 1996): 41–53.  
<https://doi.org/10.1088/0963-6625/5/1/004>.
- Knobloch, Neil A., Anna L. Ball, and Crystal Allen. "The Benefits of Teaching and Learning about Agriculture in Elementary and Junior High Schools." *Journal of Agricultural Education* 48, no. 3 (2007): 25–36.  
<https://eric.ed.gov/?id=EJ840122>.
- Koul, Ravinder, and Thomas M. Dana. "A School Science in India: Curriculum Developers/Textbook Authors' Perspectives." *Electronic Journal of Science Education* 2, no. 2 (January 1, 1997).  
<http://ejse.southwestern.edu/article/view/7579>.

- Lunn, Stephen. "Primary Teachers' Understandings of the Nature of Science and the Purposes of Science Education." PhD thesis, The Open University, 2000. <http://oro.open.ac.uk/id/eprint/19723>.
- Matern, Stefan, and Viola Stauf. "Health Promotion and Nutritional Literacy in School Programs of Primary Schools." *Ernaehrungs Umschau International* 5 (2015): 9. [https://www.ernaehrungs-umschau.de/fileadmin/Ernaehrungs-Umschau/pdfs/pdf\\_2015/05\\_15/EU05\\_2015\\_WuF\\_Matern\\_englisch.pdf](https://www.ernaehrungs-umschau.de/fileadmin/Ernaehrungs-Umschau/pdfs/pdf_2015/05_15/EU05_2015_WuF_Matern_englisch.pdf).
- McCuaig, Louise, Sally Coore, Kristie Carroll, Doune Macdonald, Tony Rossi, Robert Bush, Remo Ostini, Peter Hay, and Rebecca Johnson. "Developing Health Literacy through School Based Health Education : Can Reality Match Rhetoric." Report. Brisbane, QLD: University of Queensland, 2012. [http://www.hms.uq.edu.au/media/194975/reality\\_matching\\_rhetoric\\_report.pdf](http://www.hms.uq.edu.au/media/194975/reality_matching_rhetoric_report.pdf).
- McFarlane, Donovan A. "Understanding the Challenges of Science Education in the 21<sup>st</sup> Century: New Opportunities for Scientific Literacy." *International Letters of Social and Humanistic Sciences* 4 (September 2013): 35–44. <https://doi.org/10.18052/www.scipress.com/ILSHS.4.35>.
- Meichtry, Yvonne J. "The Impact of Science Curricula on Student Views about the Nature of Science." *Journal of Research in Science Teaching* 30, no. 5 (May 1993): 429–43. <https://doi.org/10.1002/tea.3660300503>.
- Mein, Erika, Brenda Fuentes, Francisco Soto Más, and Andrés Muro. "Incorporating Digital Health Literacy into Adult ESL Education on the US-Mexico Border." *Rhetoric, Professional Communication, and Globalization* 3, no. 1 (December 2012): 162–74. <https://www.ncbi.nlm.nih.gov/pubmed/23730533>.
- Millar, R. "Taking Scientific Literacy Seriously as a Curriculum Aim." *Asia-Pacific Forum on Science Learning and Teaching* 9, no. 2 (December 2008): 1–18. [https://pure.york.ac.uk/portal/en/publications/taking-scientific-literacy-seriously-as-a-curriculum-aim\(c49c4b87-3ac0-4648-90f2-650fcb593b12\).html](https://pure.york.ac.uk/portal/en/publications/taking-scientific-literacy-seriously-as-a-curriculum-aim(c49c4b87-3ac0-4648-90f2-650fcb593b12).html).
- Millar, Robin. "Designing a Curriculum for Public Understanding of Science." *Education in Science*, no. 166 (1996): 8–10. <https://eric.ed.gov/?id=EJ523650>.
- Norton, Emma. "Relearning Food: Agricultural Literacy in the Elementary School Science Curriculum of Nova Scotia." Bachelor thesis, Dalhousie University, 2012. <https://DalSpace.library.dal.ca//handle/10222/14861>.
- O'Doherty, Terersa, Jim Gleeson, Keith Johnston, Oliver McGarr, and Janet Moody. "Computers and Curriculum - Difficulties and Dichotomies." Research Report. Dublin, Ireland: National Council for Curriculum and Assessment (NCCA), 2004. [https://www.ncca.ie/media/1785/computers\\_and\\_curriculum\\_difficulties\\_and\\_dichotomies\\_rr4.pdf](https://www.ncca.ie/media/1785/computers_and_curriculum_difficulties_and_dichotomies_rr4.pdf).
- Ontario. *The Ontario Curriculum. Science. 2008*. Canada, 2008. [http://www.edu.gov.on.ca/eng/curriculum/secondary/science910\\_2008.pdf](http://www.edu.gov.on.ca/eng/curriculum/secondary/science910_2008.pdf).
- Park, Mira, Do-Yong Park, and Robert E. Lee. "A Comparative Analysis of Earth Science Curriculum Using Inquiry Methodology between Korean and the U.S. Textbooks." *Eurasia Journal of Mathematics, Science and Technology Education* 5, no. 4 (December 22, 2009): 395–411. <https://doi.org/10.12973/ejmste/75289>.
- Powell, David, David Agnew, and Cary Trexler. "Agricultural Literacy: Clarifying a Vision for Practical Application." *Journal of Agricultural Education* 49, no. 1 (2008): 85–98. <https://eric.ed.gov/?id=EJ839874>.
- Powell, David V., and David M. Agnew. "Assessing Agricultural Literacy Elements of Project Food Land and People in K-5 Using the Food and Fiber Systems Literacy Standards." *Journal of Agricultural Education* 52, no. 1 (2011): 155–70. <https://eric.ed.gov/?id=EJ955684>.

- Ridgway, Jim, James Nicholson, and Sean McCusker. "Developing Statistical Literacy in Students and Teachers." In *Teaching Statistics in School Mathematics-Challenges for Teaching and Teacher Education*, 14:311–22. Dordrecht: Springer Netherlands, 2011. [https://doi.org/10.1007/978-94-007-1131-0\\_30](https://doi.org/10.1007/978-94-007-1131-0_30).
- Stern, Luli, and Andrew Ahlgren. "Analysis of Students' Assessments in Middle School Curriculum Materials: Aiming Precisely at Benchmarks and Standards." *Journal of Research in Science Teaching* 39, no. 9 (November 2002): 889–910. <https://doi.org/10.1002/tea.10050>.
- Trna, Josef, and Eva Trnova. "The Current Paradigms of Science Education and Their Expected Impact on Curriculum." *Procedia - Social and Behavioral Sciences* 197 (July 2015): 271–77. <https://doi.org/10.1016/j.sbspro.2015.07.135>.
- Vallera, Farah L., and Alec M. Bodzin. "Knowledge, Skills, or Attitudes/Beliefs: The Contexts of Agricultural Literacy in Upper-Elementary Science Curricula." *Journal of Agricultural Education* 57, no. 4 (2016): 101–17. <https://eric.ed.gov/?id=EJ1132909>.
- Wise, Sarah B. "Climate Change in the Classroom: Patterns, Motivations, and Barriers to Instruction Among Colorado Science Teachers." *Journal of Geoscience Education* 58, no. 5 (November 2010): 297–309. <https://doi.org/10.5408/1.3559695>.
- Wolf, Peter, Fred Evers, and Art Hill. *Handbook for Curriculum Assessment*. Ontario: University of Guelph, 2016. <http://www.ntu.edu.vn/Portals/96/Tu%20lieu%20tham%20khao/Phuong%20phap%20danh%20gia/cu%20riculum%20assessment%20handbook.pdf>.