STEM Education Seminar
Scientific Literacy I - Definition

Arons, A.B., 1997, Chapter 12: Achieving wider scientific literacy: in Teaching Introductory Physics, pp. 344-374. (this was based on an earlier 1983 Daedalus article).


Excellent review of the evolution of science education. Provides a good summary of the reasons offered to justify science education in public education. Also provides discussion of contrast of defining scientific literacy based on process and content. Reviews some criticisms of the scientific literacy concept.


This paper attempts to articulate a clear definition for scientific literacy within a historical context. The author emphasizes the important role of democratic participation in scientific literacy. The paper provides detailed lists of the essential concepts and characteristics held by the scientifically literate.


Second part of a point/countercpoint type feature. Defines literacy from dictionary as being able to read. From this standpoint, argues that requires vocabulary to read, i.e. teach content. Calls for quantitative measurement tool to measure biological literacy. Interesting the author is NSF funded to develop a biological concept inventory, similar to physics’ Force Concept Inventory.


Discusses quantitative and qualitative data about how first year university students attain scientific literacy. Suggests results from intertwining three different dimensions: enduring and important scientific terms and concepts; nature of science; and interaction of science
and society. Introduces rope metaphor to illustrate concept. Suggests this happens best in holistic learning environments driven by socially relevant contexts.


Shamos, M.H. (1996). The myth of scientific literacy. Liberal Education 82(3): 44-49. Argues that the crises in science education was an attempt to restore education funding cuts at the federal level. Claims social scientists pushed expansion of the definition of scientific literacy to unattainable goal. Advocates teaching science to: 1) develop appreciation and awareness of it, e.g. equivalent of music appreciation; 2) focus on technology; and 3) emphasize proper use of scientific experts who should provide guidance on social-science issues. Cites testimony of Edward Teller to Senate Armed Services Committee (1957) as guideline of what U.S. students need in terms of science education (‘nuf said).

Wright, R.L., 2005, Undergraduate biology courses for nonscientists: toward a lived curriculum. Cell Biology Education 4: 189-196. First part of a point/counterpoint type feature. This paper argues for the importance of teaching process over content. Although the discussion concentrates on biology, it has much greater applicability. The author argues our science courses should “do no harm”.

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