Misconception References

- AAAS Project 2061 (n.d.) [Pilot and field test data collected between 2006 and 2010]. Unpublished raw data.
- Abraham, M. R., Williamson, V. M., & Westbrook, S. L. (1994). A cross age study of the understanding of five chemistry concepts. *Journal of Research in Science Teaching*, *31*(2), 147-165.
- Adeniyi, E. (1985). Misconceptions of selected ecological concepts held by some Nigerian students. *Journal of Biological Education*, 19(4), 311-316.
- Ahtee, M., & Varjola, I. (1998). Students' understanding of chemical reaction. *International Journal of Science Education*, 20, 305-316.
- Ametller, J., & Pinto, R. (2002). Students' reading of innovative images of energy at secondary school level. *International Journal of Science Education*, 24(3), 285-312.
- Amsel, E., & Brock, S. (1996). The development of evidence evaluation skills. *Cognitive Development*, *11*, 523-550.
- Anderson, C. W., Sheldon, T., & DuBay, J. (1986). The effects of instruction on college non-majors conceptions of respiration and photosynthesis (Research Series No.164). East Lansing, Michigan: Michigan State University Institute for Research on Teaching.
- Anderson, C.W., Sheldon, T.H., & J. DuBay. (1990). The effects of instruction on college nonmajors' conceptions of respiration and photosynthesis. *Journal of Research in Science Teaching* 27(8): 761-776.
- Anderson, D.L., Fisher, K.M., & Norman, G.J. (2002). Development and evaluation of the conceptual inventory of natural selection. *Journal of Research in Science Teaching*, 39(10), 952-978.

- Andersson, B. (1990). Pupils' conceptions of matter and its transformations (age 12-16). *Studies in Science Education*, *18*, 53-85.
- Andersson, B. R. (1986). Pupils' explanations of some aspects of chemical reactions. *Science Education*, *70*(5), 549-563.
- Arnaudin, M. W., & Mintzes, J. J. (1985). Students' alternative conceptions of the human circulatory system: A cross-age study. *Science Education*, 69(5), 721-733.
- Arnaudin, M. W., & Mintzes, J. J. (1986). The cardiovascular system: Children's conceptions and misconceptions. *Science and Children*, 23(5), 48-51.
- Aron, R.H., Francek, M.A., Nelson, B.D., & Biasrd, W.J. (1994). Atmospheric misconceptions, *The Science Teacher*, 61(1): 30-33.
- Atwood, R. K., & Atwood, V. A. (1997). Effects of instruction on preservice elementary teachers' conceptions of the causes of night and day and the seasons. *Journal of Science Teacher Education*, 8(1), 1-13.
- Banet, E., & Ayuso, E. (2000). Teaching genetics at secondary school: a strategy for teaching about the location of inheritance information. *Science Education*, *84*, 313-351.
- Bar, V. (1989). Children's views about the water cycle. Science *Education*, 73 (4): 481-500.
- Bar, V., & Galili, I. (1994). Stages of children's views about evaporation. International Journal of Science Education, 16(2), 157-174.
- Bar, V., & Travis, A. S. (1991). Children's views concerning phase changes. Journal of Research in Science Teaching, 28(4), 363-382.
- Barak, J., Sheva, B., & Gorodetsky, M. (1999). As "process" as it can get: students' understanding of biological processes.

International Journal of Science Education, 21 (12) 1281-1292.

- Barker, M., & Carr, M. (1989). Teaching and learning about photosynthesis. Part 1: An assessment in terms of students' prior knowledge. International Journal of Science Education, 11 (1), 49-56.
- Barker, M., & Carr, M. (1989). Photosynthesis can our pupils see the wood for the trees? *Journal of Biological Education*, 23(1): 41-44.
- Barker, V., & Millar, R. (1999). Students' reasoning about chemical reactions: What changes occur during a context-based post-16 chemistry course. *International Journal of Science Education*, 21(6), 645-665.
- Barman, C., Stein, M., Barman, N., & McNair, S. (2003). Students' ideas about plants: results from a national study. *Science and Children*, *41*(1), 46-51.
- Baxter, J. (1989). Children's understanding of familiar astronomical events. *International Journal of Science Education*, *11*, 502-513.
- Benson, D. L., Wittrock, M. C., & Baur, M. E. (1993). Students' preconceptions of the nature of gases. *Journal of Research in Science Teaching*, 30(6), 587-597.
- Berkheimer, G. D., Anderson, C. W., Lee, O., & Blaskeslee, T. D. (1988). Matter and molecules teacher's guide: Science book. East Lansing, Michigan: Michigan State University.
- Bishop, B. A., & Anderson, C. W. (1990). Student conceptions of natural selection and its role in evolution. *Journal of Research in Science Teaching*, 27(5), 415-427.
- Bizzo, N.M.V. (1994). From Down house landlord to Brazilian high school students: What has happened to evolutionary knowledge on the way? *Journal of Research in Science Teaching*, *31*(5), 537-556.

- Boo, H. K., & Watson, J. R. (2001). Progression in high school students' (aged 16-18) conceptualization about chemical reactions in solution. *Science Education*, *85*, 568-585.
- Boo, H. K. (1998). Students' understandings of chemical bonds and the energetics of chemical reactions. *Journal of Research in Science Teaching*, 35, 569-581.
- BouJaoude, S. B. (1991). A study of the nature of students' understandings about the concept of burning. *Journal of Research in Science Teaching*, 28, 689-704.
- BouJaoude, S. B. (1992). The relationship between students' learning strategies and the change in their misunderstandings during a high school chemistry course. *Journal of Research in Science Teaching*, 29(7), 687-699.
- Boyes, E., & Stanisstreet, M. (1990). Misunderstandings of "law" and "conservation": A study of pupils' meaning for these terms. *School Science Review*, 72, 51-57.
- Brody, M., & Koch, H. (1989). An assessment of 4th-, 8th-, and 11th-grade students' knowledge related to marine science and natural resource issues. *Journal of Environmental Science*, 16-26.
- Brook, A., & Driver, R. (1984). Aspects of secondary students' understanding of energy: Full report. Leeds, UK: The University of Leeds, Centre for Studies in Science Education and Mathematics Education.
- Brook, A., & Wells, P. (1988). Conserving the circus? An alternative approach to teaching and learning about energy. *Physics Education*, 23, 80-85.
- Brook, A., Briggs, H., Bell, B., & Driver, R. (1984). Aspects of secondary students' understanding of heat: Full report. Leeds, UK: The University of Leeds, Centre for Studies in Science Education and Mathematics Education.

Brown, D. E., & Clement, J. (1987). Misconceptions concerning

Newton's law of action and reaction: The underestimated importance of the third law. In J. Novak (Ed.), *Proceedings of the Second International Seminar: Misconception and educational strategies in science and mathematics, Vol. III* (pp. 39-53). Ithaca: Cornell University.

- Brown, D. E. (1989). Students' concept of force: the importance of understanding Newton's third law. *Physics Education*, 24, 353-358.
- Brumby, M. N. (1984). Misconceptions about the concept of natural selection by medical biology students. *Science Education*, 68(4): 493-503.
- Brumby, M. N. (1979). Problems in learning the concept of natural selection. *Journal of Biological Education*, *13*(2), 119-122.
- Buckley, B. C. (2000). Interactive multimedia and model-based learning in biology. *International Journal of Science Education*, 22(9), 895-935.
- Cañal, P. (1999). Photosynthesis and "inverse respiration" in plants: an inevitable misconception? *International Journal of Science Education*, 21(4), 363-371.
- Cakici, Y. (2005). Exploring Turkish upper primary level pupils' understanding of digestion. *International Journal of Science Education*, 27(1), 79-100.
- Cakmakci, G., & Leach, J. (2005, August). Turkish secondary and undergraduate students' understanding of the effect of temperature on reaction rates. Paper presented at the European Science Education Research Association (ESERA), Barcelona.
- Cakmakci, G., Donnelly, J., & Leach, J. (2003). A cross-sectional study of the understanding of the relationships between concentration and reaction rate among turkish secondary and undergraduate students. Paper presented at the European Science Education Research Association (ESERA) Conference,

Noordwijkerhout, The Netherlands.

- Cakmakci, G., Leach, J., & Donnelly, J. (2006). Students' ideas about reaction rate and its relationship with concentration or pressure. *International Journal of Science Education*, 28(15), 1795-1815.
- Calik, M., & Ayas, A. (2005). A comparison of level of understanding of eighth-grade students and science student teachers related to selected chemistry concepts. *Journal of Research in Science Teaching*, 42(6), 638-667.
- Camacho, M., & Good, R. (1989). Problem solving and chemical equilibrium. *Journal of Research in Science Teaching*, 26, 251-272.
- Carlsson, B. (2002). Ecological understanding 1: Ways of experiencing photosynthesis. *International Journal of Science Education*, 24(7), 681-699.
- Carlsson, B. (2003). Dramatic photosynthesis. Australian Science Teacher's Journal. 49 (1), 26-35.
- Carvalho, G. S., Silva, R., Lima, N., Coquet, E., & Clément, P. (2004). Portuguese primary school children's conceptions about digestion: identification of learning obstacles. *International Journal of Science Education*, 26(9), 1111-1130.
- Catherall, R. W. (1982). Children's beliefs about the human circulatory system: An aid for teachers regarding the role intuitive beliefs play in the development of formal concepts in 7-14-year olds. Vancouver: Educational Research Institute of British Columbia.
- Cavallo, A. M. L., McNeely, J. C., & Marek, E. A. (2003). Eliciting students' understandings of chemical reactions using two forms of essay questions during a learning cycle. *International Journal of Science Education*, 25, 583-603.
- Champagne, A. B., Klopfer, L. E., & Anderson, J. (1980). Factors influencing the learning of classical mechanics. *American*

Journal of Physics 48, 1074-1079.

- Chang, J. Y. (1999). Teachers college students' conceptions about evaporation, condensation, and boiling. *Science Education*, 83, 511-526.
- Chi, M. T. H., Chiu, M.-H., & DeLeeuw, N. (1991). Learning in a non-physical science domain: The human circulatory system.
 Pittsburgh, Pennsylvania: University of Pittsburgh Learning Research and Development Center.
- Clement, J. (1982). Students' preconceptions in elementary mechanics. *American Journal of Physics* 50(1), 66-71.
- Clough, E. E., & Wood-Robinson, C. (1985a). How secondary students interpret instances of biological adaptation. *Journal* of Biological Education, 19(2), 125-130.
- Clough, E. E., & Wood-Robinson, C. (1985b). Children's understanding of inheritance. *Journal of Biological Education*, 19(4), 304-310.
- Cokelez, A., & Dumon, A. (2005). Atom and molecule: Upper secondary school french students' representations in long-term memory. *Chemistry Education Research and Practice*, 6(3), 119-135.
- Contento, I. (1981). Children's thinking about food and eating--a Piagetian-based study. *Journal of Nutrition Education*, 13(1), S86-S90.
- Cuthbert, A. J. (2000). Do children have a holistic view of their internal body maps? *School Science Review*, 82(299), 25-32.
- D'Avanzo, C. (2003). Application of research on learning to college teaching: ecological examples. *BioScience*.53(11), 1121-1128.
- Dahl, J., Anderson, S., & Libarkin, J. (2005). Digging into earth science: alternative conceptions held by K-12 teachers. *Journal of Science Education*, *6*, 65-68.

- Dal, B. (2007). How do we help students build beliefs that allow them to avoid critical learning barriers and develop a deep understanding of geology? *Eurasia Journal of Mathematics*, *Science & Technology Education*, 3(4), 251-269.
- Deadman, J. A., & Kelly, P. J. (1978). What do secondary school boys understand about evolution and heredity before they are taught the topics? *Journal of Biological Education*, 12(1), 7-15.
- DeBoer, G. E., Dubois, N., Herrmann-Abell, C. F., & Lennon, K. (2008, April). Assessment linked to middle school science learning goals: Using pilot testing in item development. Paper presented at the National Association for Research on Science Teaching Annual Conference, Baltimore, MD.
- DeBoer, G. E., Herrmann-Abell, C. F., Wertheim, J. A., & Roseman, J. E. (2009, April). Assessment linked to middle school science learning goals: A report on field test results for four middle school science topics. Paper presented at the National Association for Research in Science Teaching (NARST) Annual Conference, Garden Grove, CA.
- Dove, J. (1998). Alternative conceptions about the weather. *School Science Review*, 79, p. 65-69.
- Dove, J. E. (1998). Students' alternative conceptions in Earth science: A review of research and implications for teaching and learning. *Research papers in education*, *13*(2), 183-201.
- Dreyfus A., & Jungwirth, E. (1988). The cell concept of 10th graders: curricular expectations and reality. *International Journal of Science Education*. 10(2):221-229.
- Dreyfus A., Jungwirth E. (1989). The pupil and the living cell: A taxonomy of dysfunctional ideas about an abstract idea. *Journal of Biological Education*. 23(1):49-55.
- Driver, R., Squires, A., Rushworth, P., & Wood-Robinson, V. (1994). Making sense of secondary science: Research into children's ideas. New York, NY: Routledge.

- Driver, R., Newton, P., & Osborne, J. (2000). Establishing the norms of scientific argumentation in classrooms. *Science Education*, 84(3), 287-312.
- Duit, R. (1981, September). Students' notions about the energy concept -- before and after physics instruction. Paper presented at the Conference on Problems Concerning Students' Representation of Physics and Chemistry Knowledge, Ludwigsberg, Germany.
- Duit, R. (1984). Learning the energy concept in school empirical results from the Philippines and West Germany. *Physics Education*, 19, 59-66.
- Duit, R. (1985). Work, force, and power--words in everyday language and terms in mechanics. In P. L. Lijnse (Ed.), *The* many faces of teaching and learning mechanics. Conference on physics education (pp. 227-233). Utrecht: GIREP/SVO/UNESCO.
- Duit, R., & Haeussler, P. (1994). Learning and teaching energy. In P. J. Fensham, R. F. Gunstone, & R. T. White (Eds.), *The content* of science: A constructivist approach to its teaching and learning (pp. 185-200). New York, NY: Routledge.
- Ebenezer, J. V., & Erickson, G. L. (1996). Chemistry students' conceptions of solubility: A phenomenography. *Science Education*, *80*, 181-201.
- Eilam, B. (2002). Strata of comprehending ecology: looking through the prism of feeding relations. *Science Education*, *86*, 645-671.
- Eilks, I., Moellering, J., & Valanides, N. (2007). Seventh-grade students' understanding of chemical reactions: Reflections from an action research interview study. *Eurasia Journal of Mathematics, Science & Technology Education*, 3(4), 271-286.
- Ekborg, M. (2003). How student teachers use scientific conceptions to discuss a complex environmental issue. *Journal of Biological Education*, 37(3) 126-132.

Erickson, G., & Hobbs, E. (1978). The developmental study of

student beliefs about force concepts. Paper presented at the Annual Convention of the Canadian Society for the Study of Education. London, Ontario.

- Erickson, G., & Tiberghien, A. (1985). Heat and temperature. In R. Driver, E. Guesne, & A. Tiberghien (Eds.), *Children's ideas in science* (pp. 52-84). Philadelphia: Open University Press.
- Finegold, M., & Trumper, R. (1989). Categorizing pupils' explanatory frameworks in energy as a means to the development of a teaching approach. *Journal of Research in Science Education*, 19(1), 97-110.
- Fischbein, E., Stavy, R., & Ma-Naim, H. (1987). The psychological structure of naive impetus conceptions. In J. Novak (Ed.), *Proceedings of the 2nd International Seminar on Misconceptions and Educational Strategies in Science and Mathematics, Vol. III* (pp. 143-151). Ithaca: Cornell University.
- Fischbein, E., Stavy, R., & Ma-Naim, H. (1988). The psychological structure of naive impetus conceptions. *International Journal of Science Education* 11(1), 71-81.
- Fisher, K., Anderson, K., Becvar, L., Noland, C., Anderson, A., Sandifer, C., & Goessling, C. (2000, April). Evolution as an experimental science: Implications for developing and assessing students' conceptions. In *Conceptual understanding in biology*. Symposium conducted at the annual meeting of the National Association for Research in Science Teaching, New Orleans.
- Flores F., Tovar, M. E., & Gallegos, L. (2003). Representation of the cell and its processes in high school students: An integrated view. *International Journal of Science Education*. 25(2):269-286.
- Ford, B., & Taylor, M. (2006). Investigating students' ideas about plate tectonics. *Science Scope*, *30*(1), 38-43.
- Ford, D. J. (2003). Sixth graders' conceptions of rocks in their local environments. *Journal of Geoscience Education*, *51*(4), 373-

377.

- Gale, D. L., Monaghan, D. L., MaKinster, J. G., & Stockton, J. D. (2001). Changing children's conception of burning. *School Science and Mathematics*, 101, 439-451.
- Gallegos, L., Jerezano, M., & Flores, F. (1994). Preconceptions and relations used by children in the construction of food chains. *Journal of Research in Science Teaching*, 31(3), 259-272.
- Garnett, P. J., Garnett, P. J., & Hackling, M. W. (1995). Students' alternative conceptions in chemistry: A review of research and implications for teaching and learning. *Studies in Science Education*, 25, 69-95.
- Gayford, C.G. (1986) Some aspects of the problems of teaching about energy in school biology, *European Journal of Science Education*, 8(4), pp. 443-450.
- Gellert, E. (1962). Children's conceptions of the content and functions of the human body. *Genetic Psychology Monographs*, 65, 293-411.
- Gilbert, J. K., Watts, D. M., & Osborne, R. (1982). Students' conceptions of ideas in mechanics. *Physics Education* 17(2), 62-66.
- Gobert, J.(2000). A typology of causal models for plate tectonics: inferential power and barriers to understanding. *International Journal of Science Education*, 22, 937-977.
- Goldring, H., & Osborne, J. (1994). Students' difficulties with energy and related concepts. *Physics Education*, 29(1), 26-32.
- Good, R., Trowbridge, J., Demastes, S., Wandersee, J., Hafner, M., & Cummins, C. (Eds.). (1993). Proceedings of the 1992 evolution education research conference. Baton Rouge, LA: Louisiana State University.
- Gopal, H., Kleinsmidt, J., & Case, J. (2004). An investigation of tertiary students' understanding of evaporation, condensation,

and vapour pressure. International Journal of Science Education, 26(13), 1597-1620.

- Griffard, P., & Wandersee, J. (2001). The two-tier instrument on photosynthesis: what does is diagnose? *International Journal of Science Education*, 23 (10), 1039 - 1052.
- Griffiths, A. K., & Preston, K. R. (1992). Grade-12 students' misconceptions relating to fundamental characteristics of atoms and molecules. *Journal of Research in Science Teaching*, 29(6), 611-628.
- Griffiths, A., & Grant, B. (1985). High school students' understanding of food webs: identification of a learning hierarchy and related misconceptions. *Journal of Research in Science Teaching*, 22(5), 421-436.
- Grosslight, L., Unger, C., Jay, E., & Smith, C. L. (1991). Understanding models and their use in science: Conceptions of middle and high school students and experts. *Journal of Research in Science Teaching*, 28(9), 799-822.
- Gunstone, R. F., & Watts, D. M. (1985). Force and motion. In R. Driver, E. Guesne, & A. Tiberghien (Eds.), *Children's ideas in science*. Milton Keynes: Open University Press.
- Ha, M., & Cha, H. (2008). Suggestion of a new strategy to teach evolution. *Proceedings of the NARST Annual Meeting*, Baltimore, MD.
- Hackling, M. W., & Garnett, P. J. (1985). Misconceptions of chemical equilibrium. European Journal of Science Education, 7, 205-214.
- Hackling, M. W., & Treagust, D. (1984). Research data necessary for meaningful review of grade ten high school genetics curricula. *Journal of Research in Science Teaching*, 21(2), 197-209.
- Haidar, A. H. (1997). Prospectice chemistry teachers' conceptions of the conservation of matter and related concepts. *Journal of Research in Science Teaching*, *34*, 181-197.

- Hall, J. R. (1973). Conservation concepts in elementary chemistry. Journal of Research in Science Teaching, 10(2), 143-146.
- Happs, J. (1982). Some aspects of student understandings of two New Zealand landforms. New Zealand Science Teacher, 32, 4-12.
- Happs, J. C. (1983). Using socio-cognitive conflict to establish an understanding of the scientific meaning of rock. *Research in Science Education*, 13(1), 61-71.
- Happs, J.C. (1982). Mountains: Working paper no. 202 for the Learning in Science Project. Hamilton, New Zealand: University of Waikato.
- Haslam, F., & Treagust, D.F. (1987) Diagnosing secondary students' misconceptions of photosynthesis and respiration in plants using a two-tier multiple choice instrument, *Journal of Biological Education*, 21(3), pp. 203-211.
- Herrmann-Abell, C. F., & DeBoer, G. E. (2007, April). Probing middle school students' knowledge of thermal expansion and contraction through content-aligned assessment. Paper presented at the National Association for Research in Science Teaching (NARST) Annual Conference, New Orleans, LA.
- Herrmann-Abell, C. F., & DeBoer, G. E. (2008, April). An analysis of field test results for assessment items aligned to the middle school topic of atoms, molecules, and states of matter. Paper presented at the National Association for Research in Science Teaching (NARST) Annual Conference, Baltimore, MD.
- Herrmann-Abell, C. F., & DeBoer, G. E. (2009, April). Using contentaligned assessment to probe middle school students' understanding of ideas about energy. Paper presented at the National Association for Research in Science Teaching (NARST) Annual Conference, Garden Grove, CA.
- Herrmann-Abell, C. F., & DeBoer, G. E. (2010, February). Uncovering middle and high school students' understanding of

the forms of energy using content-aligned assessment items. Paper presented at the American Association of Physics Teachers (AAPT) Winter Meeting, Washington, DC.

- Herrmann-Abell, C. F., DeBoer, G. E., & Roseman, J. E. (2009, November). Using Rasch modeling to analyze standards-based assessment items aligned to middle school chemistry ideas.
 Paper presented at the National Science Foundation DR-K12 Program Principal Investigators Meeting, Washington, DC.
- Hesse, J. J., & Anderson, C. W. (1992). Students' conceptions of chemical change. *Journal of Research in Science Teaching*, 29, 277-299.
- Hewson, P. W. (1985). Epistemological commitments in the learning of science: Examples from dynamics. *European Journal of Science Education 7*, 163-172.
- Hogan, K. (2000). Assessing students' systems of reasoning in ecology. *Journal of Biological Education*, 35(1), 22-28.
- Holding, B. (1985). Aspects of secondary students' understanding of elementary ideas in chemistry: Summary report. *Children's Learning in Science Project*. Crown: Leeds, England.
- Horizon Research, Inc. (n.d.) [Misconceptions identified for the ATLAST project]. Unpublished material.
- Hwang, B. T., & Hwang, H. W. (1990). A study of cognitive development of the concepts of solution. Research report. Taipei, Republic of China: National Science Council.
- Johnson, P. (1998a). Children's understanding of changes of state involving the gas state, part 1: Boiling water and the particle theory. *International Journal of Science Education*, 20(5), 567-583.
- Johnson, P. (1998b). Children's understanding of changes of state involving the gas state, part 2: Evaporation and condensation below boiling point. *International Journal of Science Education*, 20(6), 695-709.

- Johnson, P. (1998c). Progression in children's understanding of a "basic" particle theory: A longitudinal study. *International Journal of Science Education*, 20(4), 393-412.
- Johnson, P. (2000a). Children's understanding of substances, part 1: Recognizing chemical change. *International Journal of Science Education*, 22, 719-737.
- Johnson, P. (2000b). Developing students' understanding of chemical change: What should we be teaching? *Chemistry Education: Research and Practice in Europe*, 1, 77-90.
- Johnson, P. (2002). Children's understanding of substances, part 2: Explaining chemical change. *International Journal of Science Education*, 24, 1037-1054.
- Jungwirth, E. (1987). Avoidance of logical fallacies: A neglected aspect of science education and science-teacher education. *Research in Science and Technological Education*, 5, 43-58.
- Jungwirth, E., & Dreyfus, A. (1990). Identification and acceptance of a posteriori causal assertions invalidated by faulty enquiry methodology: An international study of curricular expectations and reality. Tallahassee, FL: Florida State University.
- Jungwirth, E., & Dreyfus, A. (1992). After this, therefore because of this: One way of jumping to conclusions. *Journal of Biological Education*, 26, 139-142
- Kargbo, D. B., Hobbs, E. D., & Erickson, G. L. (1980). Children's beliefs about inherited characteristics. *Journal of Biological Education*, 14(2), 137-146.
- Kesidou, S., & Duit, R. (1993). Students' conceptions of the second law of thermodynamics—An interpretive study. *Journal of Research in Science Teaching*, 30(1), 85-106.
- Kikas, E. (1998). The impact of teaching on students' definitions and explanations of astronomical phenomena. *Learning and Instruction*, 8(5), 439-454.

- Kikas, E. (2000). The influence of teaching on students' explanations and illustrations of the day/night cycle and seasonal changes. *European Journal of Psychology of Education, XV*(3), 281-295.
- Klahr, D., Fay, A., & Dunbar, K. (1993). Heuristics for scientific experimentation: A developmental study. *Cognitive Psychology*, 25, 111-146.
- Kruger, C. (1990). Some primary teachers' ideas about energy. *Physics Education*, 25(2), 86-91.
- Kruger, C., Palacino, D., & Summers, M. (1992). Surveys of English primary teachers' conceptions of force, energy, and materials. *Science Education*, 76(4), 339-351.
- Kuech, R., Zogg, G., Zeeman, S., & Johnson, M. (2003, March). Technology rich biology labs: Effects of misconceptions. Paper presented at the National Association from Research in Science Teaching (NARST) Annual Conference, Philadelphia, PA.
- Kuhn, D. (1992). Thinking as argument. *Harvard Educational Review*, 62, 155-178.
- Kuhn, D., & Phelps, E. (1982). The development of problem-solving strategies. In H. Reese (Ed.), *Advances in child development and behavior*, *17*, 1-44.
- Kuhn, D., Amsel, E., & O'Loughlin, M. (1988). *The development of scientific thinking skills*. San Diego, CA.
- Kuhn, D., Black, J., Keselman, A., & Kaplan, D. (2000). The development of cognitive skills to support inquiry learning. *Cognition and Instruction*, *18*, 495-523.
- Kuiper, J. (1994). Student ideas of science concepts: Alternative frameworks? *International Journal of Science Education* 16(3), 279-292.
- Kusnick, J. (2002). Growing pebbles and conceptual prismsunderstanding. *Journal of Geoscience Education*, 50(1), 31-39.

- Langford, J. M & Zollman, D. (1982, November). *Conceptions of dynamics held by elementary and high school students*. Paper presented at the American Association of Physics Teachers (AAPT) Annual Meeting, San Francisco.
- Lawson, A. E. (1988). The acquisition of biological knowledge during childhood: Cognitive conflict or tabula rasa? *Journal of Research in Science Teaching*, 25(3), 185-199.
- Lawson, A. E., & Thompson, L. D. (1988). Formal reasoning ability and misconceptions concerning genetics and natural selection. *Journal of Research in Science Teaching*, 25(9): 733-746.
- Leach, J., Driver, R., Scott, P., & Wood-Robinson, C. (1992). *Progression in understanding of ecology concepts by pupils aged 5 to 16*. CLIS (Children's Learning in Science Research Group, Centre for Studies in Science and Mathematics Education), Leeds: University of Leeds.
- Leach, J., Driver, R., Scott, P., & Wood-Robinson, C. (1996).
 Children's ideas about ecology 2: ideas found in children aged 5-16 about the cycling of matter. *International Journal of Science Education*, 18(1), 19-34.
- Leach, J., Driver, R., Scott, P., & Wood-Robinson, C. (1996).
 Children's ideas about ecology 3: ideas found in children aged 5-16 about the interdependency of organisms. *International Journal of Science Education*, 18(2), 129-141.
- Leather, A. (1987). Views of the nature and origin of earthquakes and oil held by seventeen year olds. *Geology Teaching*, 12, 102-108.
- Lee, O., Eichinger, D. C., Anderson, C. W., Berkheimer, G. D., & Blaskeslee, T. D. (1993). Changing middle school students' conceptions of matter and molecules. *Journal of Research in Science Teaching*, *30*(3), 249-270.
- Lee, Y.J., & Diong, C.H. (1999). Misconceptions in the biological concept of food: Results of a survey of high school students. In

M. Waas (Ed.), Enhancing learning: challenge of integrating thinking and information technology into the curriculum. Singapore: Education Research Association.

- Leggett, M. (2003). Lessons that non-scientists can teach us about the concept of energy: A human-centered approach. *Physics Education*, 38(2), 130-134.
- Lewis, E. L., & Linn, M. C. (1994). Heat energy and temperature concepts of adolescents, adults, and experts: Implications for curricular improvements. *Journal of Research in Science Teaching*, 31(6), 657-677.
- Lewis, J., & Kattmann, U. (2004). Traits, genes, particles and information: Re-visiting students' understandings of genetics. *International Journal of Science Education*, 26(2), 195-206.
- Lewis, J., & Wood-Robinson, C. (2000). Genes, chromosomes, cell division and inheritance—do students see any relationship? International Journal of Science Education, 22(2), 177-195.
- Lewis, J., Leach, J., & Wood-Robinson, C. (2000). What's in a cell? young people's understanding of the genetic relationship between cells, within an individual. *Journal of Biological Education*, 34(3), 129-132.
- Libarkin, J. C., Anderson, S. W., Dahl, J., Beilfuss, M., & Boone, W. (2005). Qualitative analysis of college students' ideas about the Earth: Interviews and open-ended questionnaires. *Journal of Geoscience Education*, 53, 17-26.
- Lie, S., Sjoberg, S., Ekeland, P., & Enge, M. (1985). Ideas in mechanics. A Norwegian study. In P. L. Lijnse (Ed.), *The many faces of teaching and learning mechanics in secondary and early tertiary education: Proceedings of a conference on physics education* (pp. 255-276). Utrecht: GIREP/SVO/UNESCO.
- Linn, M., & Swiney, J. (1981). Individual differences in formal thought: Role of cognitions and aptitudes. *Journal of Educational Psychology*, 73, 274-286.

- Linn, M., Clement, C., & Pulos, S. (1983). Is it formal if it's not physics? The influence of content on formal reasoning. *Journal* of Research in Science Teaching, 20, 755-776.
- Liu, X., & Tang, L. (2004). The progression of student conceptions of energy: A cross-grade, cross-culture study. *Canadian Journal of Science, Mathematics, and Technology Education, 4*(1), 35-49.
- Loverude, M. E. (2004, August). Student Understanding of Gravitational Potential Energy and the Motion of Bodies in a Gravitational Field. Paper presented at the Physics Education Research Conference, Sacramento, CA.
- Maloney, D. P. (1985). Rule-governed physics: Some novice predictions. *European Journal of Science Education*, 7, 295-306.
- Marbach-Ad, G. (2001). Attempting to break the code in student comprehension of genetic concepts. *Journal of Biological Education*, 35(4), 183-189.
- Marmaroti, P., & Galanopoulou, D. (2006) Pupils' understanding of photosynthesis: a questionnaire for the simultaneous assessment of all aspects, *International Journal of Science Education*, 28(4), 383-403.
- Marques, L., & Thomson, D. (1997). Misconceptions and conceptual change concerning continental drift and plate tectonics among Portuguese students aged 16-17. *Research in Science & Technological Education, 15*, 195-222.
- Mas, C. J., Perez, J. H., & Harris, H. (1987). Parallels between adolescents' conception of gases and the history of chemistry. *Journal of Chemical Education*, 64(7), 616-618.
- McCloskey, M. (1983). Intuitive physics. *Scientific American*, 248(4), 114-122.
- McComas, W. F. (2002). The ideal environmental science curriculum: History, rationales, misconceptions & standards.

The American Biology Teacher, 64(9), 665-672.

- Millar, R. (2005). *Teaching about energy*, Research Paper 2005/11 (p. 21). York: Department of Educational Studies, University of York.
- Minstrell, J., & Stimpson, G. (1986). Students' belief in mechanics: cognitive process frameworks. 5th Conference on Reasoning and Higher Education. Center for the Study of Thinking, Boise, Idaho.
- Minstrell, J. (1982). Explaining the "at rest" condition of an object. *The Physics Teacher*, 20, 10-14.
- Mitchell, I. and Gunstone, R. (1984). Some student conceptions brought to the study of stoichiometry. *Research in Science Education*, 14, 78-88.
- Moyle, R. (1980). *Weather*. Learning in Science Project, Working Paper 21. Hamilton, New Zealand: University of Waikato.
- Munson, B. (1991). Relationships between an individual's conceptual ecology and the individual's conceptions of ecology. (Unpublished doctoral thesis). The Graduate School of the University of Minnesota, Minneapolis.
- Nakhleh, M. B., & Samarapungavan, A. (1999). Elementary school children's beliefs about matter. *Journal of Research in Science Teaching*, 36(7), 777-805.
- Nakhleh, M. B., Samarapungavan, A., & Saglam, Y. (2005). Middle school students' beliefs about matter. *Journal of Research in Science Teaching*, 42(5), 581-612.
- Nakhleh, M. B., Samarapungavan, A., Saglam, Y., & Duru, E. (2006). A cross-cultural study: Middle school students' beliefs about matter. Proceedings of the Annual Conference of the National Association of Research in Science Teaching (NARST), San Francisco, CA.

Nehm, Ross H. & Leah Reilly. (2007). Biology majors' knowledge and

misconceptions of natural selection. *BioScience*, 57(3): 263-272.

- Neto Vaz, A., Carola, M. H., & Neto, A. J. (1997, March). Some contributions for a pedagogical treatment of alternative conceptions in biology: An example from plant nutrition. Paper presented at the National Association for Research in Science Teaching (NARST) Annual Conference, Oak Brook, IL.
- Newell, A., & Ross, K. (1996). Children's conception of thermal conduction--Or the story of a woollen hat. *School Science Review*, 78(282), 33-38.
- Novak, J. D., & Musonda, D. (1991). A twelve-year longitudinal study of science concept learning. *American Educational Research Journal*, 28, 117-153.
- Novick, S., & Nussbaum, J. (1978). Junior high school pupils' understanding of the particulate nature of matter: An interview study. *Science Education*, 62(3), 273-281.
- Novick, S., & Nussbaum, J. (1981). Pupils' understanding of the particulate nature of matter: A cross-age study. *Science Education*, 65(2), 187-196.
- Nussbaum, J. (1985). The Earth as a cosmic body. In R. Driver, E. Guesne, & A. Tiberghien (Eds.), *Children's ideas in science*. Milton Keynes: Open University Press.
- Osborne, J., Wadsworth, P., Black, P., & Meadows, J. (1994). SPACE research report: The Earth in space. Liverpool: Liverpool University Press.
- Osborne, R. (1980). *Force* (LISP Working Paper #16). Hamilton, New Zealand: Science Education Research Unit, University of Waikato.
- Osborne, R. (1985). Building on children's intuitive ideas. In R. Osborne & P. Freyberg (Eds.), *Learning in Science. The implications of childrens' science* (pp. 41-50). Auckland, New Zealand: Heinemann.

- Osborne, R. J., & Cosgrove, M. M. (1983). Children's conceptions of the changes of state of water. *Journal of Research in Science Teaching*, 20(9), 825-838.
- Ozay, E., & Oztas, H. (2003). Secondary students' interpretations of photosynthesis and plant nutrition. *Journal of Biological Education*, 37(2), 68-70.
- Ozmen, H., & Ayas, A. (2003). Students' difficulties in understanding of the conservation of matter in open and closed-system chemical reactions. *Chemistry Education Research and Practice*, 4(3), 279-290.
- Papadimitriou, V., & Londridou, P. (2001, April). A cross-age study of pupil's conceptions concerning the movement of air masses in the troposphere. Paper presented at the IOSTE Symposium in Southern Europe.
- Papadouris, N., Constantinou, C. P., & Kyratsi, T. (2008). Students' use of the energy model to account for changes in physical systems. *Journal of Research in Science Teaching*, *45*(4), 444-469.
- Passmore, C., & Stewart, J. (2002). A modeling approach to teaching evolutionary biology in high schools. *Journal of Research in Science Teaching*, 39, 185-204.
- Pelaez, N. J., Boyd, D. D., Rojas, J. B., & Hoover, M. A. (2005). Prevalence of blood circulation misconceptions among prospective elementary teachers. *Advances in Physiology Education*, 29(3), 172-181.
- Penner, D. E., Giles, N. D., Lehrer, R., & Schauble, L. (1997). Building functional models: Designing an elbow. Journal of Research in Science Teaching, 34(2), 125-143.
- Pfundt, H. (1982). Pre-instructional conceptions about substances and transformations of substances. The International Workshop on Problems Concerning Students' Representation of Physics and Chemistry Knowledge, Pedagogische Hochschule

Ludwigsburg, Germany.

- Quiggin, V. (1977). Children's knowledge of their internal body parts. *Nursing Times*, 73(30), 1146-1151.
- Rea-Ramirez, M. A., & Nunez-Oviedo, M. C. (2002, January). Discrepant questioning as a tool to build complex mental models of respiration. Paper presented at the Proceedings of the Annual International Conference of the Association for the Education of Teachers in Science, Charlotte, NC.
- Reiner, M., & Eilam, B. (2001). Conceptual classroom environment a system view of learning. *International Journal of Science Education*, 23(6), 551-568.
- Renstrom, L., Andersson, B., & Marton, F. (1990). Students' conceptions of matter. *Journal of Educational Psychology*, 82(3), 555-569.
- Roald, I., & Mikalsen, O. (2001). Configuration and dynamics of the Earth-Sun-Moon system: An investigation into conceptions of deaf and hearing pupils. *International Journal of Science Education*, 23(4), 423-440.
- Ross, K. E. K., & Shuell, T. J. (1993). Children's beliefs about earthquakes. *Science Education*, 72(2), 191-205.
- Roth, K.J., & Anderson, C. W. (1987). The power plant teacher's guide, Occasional Paper No. 112. Institute for Research on Teaching, Michigan State University, East Lansing, MI.
- Sadanand, N., & Kess, J. (1990). Concepts in force and motion. *The Physics Teacher* 28(8), 530.
- Salierno, C., Edelson, D., & Sherin, B. (2005). The development of student conceptions of the earth-sun relationship in an inquiry-based curriculum. *Journal of Geoscience Education*, 53(4), 422.
- Samaragungavan, A. S., Vosniadou, S., & Brewer, W. (1996). Mental models of the earth, sun, and moon: Indian children's cosmologies. *Cognitive Development 11*(4): 491-522

- Schauble, L., & Glaser, R. (1990). Scientific thinking in children and adults. *Contributions to Human Development*, 21, 9-27.
- Schollum, B. (1983). Arrows in science diagrams: Help or hindrance for pupils? *Research in Science Education*, *13*, 45-59.
- Schwartz, C., & White, B. (2005). Meta-modeling knowledge: Developing students' understanding of scientific modeling. *Cognition and Instruction*, 23(2), 165-205.
- Sewell, A. (2002). Cells and atoms—Are they related? *Australian Science Teachers Journal*, *48*(2), 26-30.
- Seymour, J., & Longden, B. (1991) Respiration—that's breathing isn't it? *Journal of Biological Education*, 25(3), 177-183.
- Sharp, J. G. (1996). Children's astronomical beliefs: A preliminary study of year 6 children in south-west England. *International Journal of Science Education*, *18*(6), 685-712.
- Simpson, M., & Arnold, B. (1982). The inappropriate use of subsumers in biology learning. *European Journal of Science Education*, 4,173-182.
- Singh, C., & Rosengrant, D. (2001). Students' conceptual knowledge of energy and momentum. Proceedings of the Physics Education Research Conference, Rochester, NY.
- Singh, C., & Rosengrant, D. (2003). Multiple-choice test of energy and momentum concepts. *American Journal of Physics*, 71(6), 607-617.
- Sjoberg, S., & Lie, S. (1981). *Ideas about force and motion among Norwegian pupils and students*. Centre for School Science, University of Oslo, Oslo, Norway.
- Smith, C. L., Maclin, D., Houghton, C., & Hennessey, M. G. (2000). Sixth-grade students' epistemologies of science: The impact of school science experiences on epistemological development. *Cognition and Instruction*, 18(3), 349-422.

- Smith, C., Maclin, D., Grosslight, L., & Davis, H. (1997). Teaching for understanding: A study of students' preinstruction theories of matter and a comparison of the effectiveness of two approaches to teaching students about matter and density. *Cognition and Instruction*, 15, 317-393.
- Smith, C., Wiser, M., Anderson, C. W., Krajcik, J., & Coppola, B. (2004). Implications of research on children's learning for assessment: Matter and atomic molecular theory. Committee on Test Design for K-12 Science Achievement, Center for Education. Washington, DC: National Research Council.
- Smith, E. L., & Anderson, C. W. (1986, April). *Alternative student conceptions of matter cycling in ecosystems*. Paper presented at the National Association of Research in Science Teaching (NARST) Annual Conference, San Francisco, CA.
- Sneider, C., & Pulos, S. (1983). Children's cosmographies: Understanding the Earth's shape and gravity. *Science Education*, 67(2), 205-221.
- Solomon, J. (1983). Messy, contradictory and obstinately persistent: A Study of children's out-of-school ideas about energy. *School Science Review*, 65(231), 225-229.
- Solomon, J. (1985). Teaching the conservation of energy. *Physics Education*, 20(4), 165-170.
- Solomonidou, C., & Stavridou, H. (2000). From inert object to chemical substance: Students' initial conceptions and conceptual development during an introductory experimental chemistry sequence. *Science Education*, *84*, 382-400.
- Stavridou, H., & Solomonidou, C. (1998). Conceptual reorganization and the construction of the chemical reaction concept during secondary education. *International Journal of Science Education*, 20(2), 205-221.
- Stavy, R. (1990a). Children's conceptions of changes in the state of matter: From liquid (or solid) to gas. *Journal of Research in*

Science Teaching, 27, 247-266.

- Stavy, R. (1990b). Pupils' problems in understanding conservation of matter. International Journal of Science Education, 12(5), 501-512.
- Stavy, R. (1991). Children's ideas about matter. School Science and Mathematics, 91(5), 240-244.
- Stavy, R., Eisen, Y., & Yaakobi, D. (1987). How students aged 13-15 understand photosynthesis. *International Journal of Science Education*, 9(1), 105-115.
- Stead, B. (1980). Energy, Working Paper No. 17. In Learning in Science Project. Hamilton, New Zealand: Science Education Research Unit, University of Waikato.
- Stern, L. (2004, April). How does resistance to antibiotics develop in bacteria?: The use of benchmarks and national standards to evaluate assessment tasks aimed at natural selection. Paper presented at the National Association of Research in Science Teaching (NARST) Annual Conference, St. Louis, MO.
- Stern, L., & Hagay, G. (n.d.) High school students' conceptions related to speciation and common descent. Manuscript in preparation. Haifa, Israel: Department of Education in Technology and Science, Technion-ITT.
- Stern, L., & Roseman, J. E. (2004). Can middle-school science textbooks help students learn important ideas? Findings from Project 2061's curriculum evaluation study: Life Science. Journal of Research in Science Teaching, 41(6), 538-568.
- Summers, M., & Kruger, C. (1993). Long term impact of a new approach to teacher education for primary science. Paper presented at the Annual Meeting of the British Educational Research Association, Liverpool, England.
- Tamir, P. (1989) Some issues related to the use of justifications to multiple-choice answers. *Journal of Biology Education*, 23(4), 285-292.

- Teixeira, F. M. (2000). What happens to the food we eat? Children's conceptions of the structure and function of the digestive system. *International Journal of Science Education*, 22(5), 507-520.
- Thomaz, M. F., Malaquis, I. M., Valente, M. C., & Antunes, M. J. (1995). An attempt to overcome alternative conceptions related to heat and temperature. *Physics Education*, *30*(1), 19-26.
- Tomasini, G., & Balandi, P. (1987). *Teaching strategies and children's science: An experiment on teaching about "hot and cold"*. Paper presented at the 2nd International Seminar on Misconceptions and Educational Strategies in Science and Mathematics, Ithaca, NY.
- Treagust, D. F., Chittleborough, G. D., & Mamiala, L. T. (2002). Students' understanding of the role of scientific models in learning science. *International Journal of Science Education*, 24, 357-368.
- Trend, R. (1998). An investigation into understanding of geological time among 10-and 11-year old children. *International Journal of Science Education*, 20(8), 973-988.
- Tretter, T. R., Jones, M. G., Andre, T., Negishi, A., & Minogue, J. (2006). Conceptual boundaries and distances: Students' and experts' concepts of the scale of scientific phenomena. *Journal* of Research in Science Teaching, 43(3), 282-319.
- Trumper, R. (1990). Being constructive: An alternative approach to the teaching of the energy concept—Part one. *International Journal of Science Education*, 12, 343-354.
- Trumper, R. (1993). Children's energy concepts: a cross-age study. International Journal of Science Education, 15(2), 139-148.
- Trumper, R. (1997a). The need for change in elementary school teacher training: The Case of the energy concept as an example. *Educational Research*, *39*(2), 157-174.

- Trumper, R. (1997b). A survey of conceptions of energy of Israeli pre-service high school biology teachers. *International Journal* of Science Education, 19(1), 31-46.
- Trumper, R. (1998). A longitudinal study of physics students' conceptions of energy in pre-service training for high school teachers. *Journal of Science Education and Technology*, 7(4), 311-318.
- Trumper, R., & Gorsky, P. (1993). Learning about energy: The influence of alternative frameworks, cognitive levels, and closed-mindedness. *Journal of Research in Science Teaching*, 30(7), 637-648.
- Tschirgi, J. E. (1980). Sensible reasoning: A hypothesis about hypotheses. *Child Development*, *51*, 1-10.
- Twigger, D., et al. (1994). The conception of force and motion of students aged between 10 and 15 years: An interview study designed to guide instruction. *International Journal of Science Education* 16(2), 215-229.
- Valanides, N. (2000). Primary student teachers' understanding of the particulate nature of matter and its transformations during dissolving. *Chemistry Education Research and Practice*, 1(2), 249-262.
- Van Driel, J. H. (2002). Students' corpuscular conceptions in the context of chemical equilibrium and chemical kinetics. *Chemistry Education: Research and Practice in Europe*, *3*, 201-213.
- Van Driel, J. H., De Vos, W., Verloop, N., & Dekkers, H. (1998). Developing secondary students' conceptions of chemical reactions: The introduction of chemical equilibrium. *International Journal of Science Education*, 20, 379-392.
- Vaz, A.N., Carola, M.H., & Neto, A.J. (1997, March) Some contributions for a pedagogical treatment of alternative conceptions in biology: An example from plant nutrition. Paper

presented at the National Association for Research in Science Teaching (NARST) Annual Conference, Oak Brook, IL.

- Venville, G., Gribble, S. J., & Donovan, J. (2005). An exploration of young children's understandings of genetics concepts from ontological and epistemological perspectives. Science Education, 89(4), 614-633.
- Viennot, L. (1979). Spontaneous reasoning in elementary dynamics. European Journal of Science Education 1(2), 205-221.
- Viennot, L. (1980). Spontaneous reasoning in elementary dynamics.
 In W. F. Archenhold. R. Driver, A. Orton, & C. Wood-Robinson (Eds.), Cognitive development research in science and mathematics: Proceedings of an international seminar (pp. 273-274). Leeds: University of Leeds.
- Vosniadou, S. (1991). Conceptual development in astronomy. In S.M. Glynn, R. H. Yeany, & B. K. Britton (Eds.), *The psychology of learning science*. New Jersey: Lawrence Erlbaum.
- Vosniadou, S., & Brewer, W. F. (1994). Mental models of the day/night cycle. *Cognitive Science*, 18, 123-183.
- Wandersee, J. H. (1983, June). Students' misconceptions about photosynthesis: a cross-age study. Paper presented at the Proceedings of the International Seminar: Misconceptions in Science and Mathematics, Ithaca, NY.
- Watts, D. M., & Gilbert, J. K. (1983). Appraising the understanding of science concepts: "Force". Guildford: Educational Studies.
- Watts, D. M. (1983). A study of schoolchildrens' alternative frameworks of the concept of force. *European Journal of Science Education* 5(2), 217-230.
- Watts, D. M. (1983). Some Alternative Views of Energy. *Physics Education*, *18*(5), 213-217.
- Watts, M., & Zylbersztajn, A. (1981). A survey of some children's ideas about force. *Physics Education 16*, 360-365.

- Webb, P., & Boltt, G. (1990). Food Chain to food web: a natural progression? *Journal of Biological Education*, 24(3), 187-190.
- White, P. (1997). Naive ecology: Causal judgments about a simple ecosystem. *British Journal of Psychology*, 88, 219-233.
- Wiser, M. (1986). The differentiation of heat and temperature: An evaluation of the effect of microcomputer teaching on students' misconceptions. Cambridge, MA: Harvard Graduate School of Education
- Wollman, W. (1977a). Controlling variables: Assessing levels of understanding. *Science Education*, 61, 371-383.
- Wollman, W. (1977b). Controlling variables: A neo-Piagetian developmental sequence. *Science Education*, *61*, 385-391.
- Wollman, W., & Lawson, A. (1977). Teaching the procedure of controlled experimentation: A Piagetian approach. *Science Education*, *61*, 57-70.
- Zimmerman, C. (2000). The development of scientific reasoning skills. *Developmental Review*, 20, 99-149.
- Zimmerman, C. (2005) The development of scientific reasoning skills: What psychologists contribute to an understanding of elementary science learning.Report to the National Research Council, Committee on Science Learning Kindergarten through Eighth Grade.Washington, DC: National Research Council.

Zimmerman, C., & Glaser, R. (2001). Testing positive versus negative claims: A preliminary investigation of the role of cover story in the assessment of experimental design skills (Tech. Rep. No. 554). Los Angeles, CA: UCLA National Center for Research on Evaluation, Standards, and Student Testing (CRESST).