



I. Topics

- Individual view on approaches and theories to learning (e.g., discovery learning, Gestalt psychology, problem-solving, hierarchical learning structures, constructivism)
- Differences in learning (e.g., gender, mathematical ability)
- Social/Cultural view–situated cognition, language, ethnomathematics
- Impact of teaching and attitudes on student achievement
- Meaning in the teaching of mathematics–learning mathematics with understanding
- Influence of constructivism in mathematics education
- Role of beliefs in learning and teaching
- Concept development
- Understanding, analyzing, and engaging in mathematics education research

II. References

- Carpenter, Dossey, & Koehler (Eds.). (2004). *CI-2.8.7(d)-(h)-C(c)-AC-02-E2A(4)3002-C10.0 Td()TJ TT1 1 Tf*

I. Topics

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- Groth. (2013). *Teaching Mathematics in Grades 9-12: Developing Research-Based Instructional Practices*. Sage.
 - Lester, F. (2010). *Teaching and Learning Mathematics: Translating Research for Secondary School Teachers*. Reston, VA: NCTM.
 - Mathematical Sciences Education Board & National Research Council. (1990). *Reshaping School Mathematics: A Philosophy and Framework for Curriculum*. Washington DC: National Academies Press.
 - [National Assessment of Educational Progress \(NAEP\) Mathematics Framework for High School Mathematics](#)

I. Topics

- Issues concerning algebra and algebraic thinking in state and national curricular standards
- Learning and teaching algebraic thinking
- Assessment and remediation of common errors in algebra
- Exploring the Fundamental Theorem of Algebra and problem solving
- Exploration of content and method relative to all types of functions (e.g., radical, rational, exponential, linear)
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I. Topics

- Exploration into geometric proof, utilizing multiple approaches
- Learning and teaching geometric proof
- Assessment and remediation of common errors in geometry
- Exploration of content and method relative to key concepts in geometry (e.g., lateral area, surface area, volume, Pythagorean Theorem, trigonometric functions)
- Applications of all types of representations (e.g., algebraic expressions, graphing)
- Understanding content and applications of congruency, similarity, coordinate geometry

II. References

- [California Mathematics Framework \(2013, 2023\)](https://www.cde.ca.gov/ci/ma/cf/): <https://www.cde.ca.gov/ci/ma/cf/>
- [California Common Core State Standards for Mathematics \(2010, 2013, 2014\)](https://www.cde.ca.gov/be/st/ss/documents/ccsmathstandarदाug2013.pdf): <https://www.cde.ca.gov/be/st/ss/documents/ccsmathstandarदाug2013.pdf>
- [Common Core State Standards for Mathematics \(2010\)](http://www.corestandards.org/assets/CCSSI_Math%20Standards.pdf): http://www.corestandards.org/assets/CCSSI_Math%20Standards.pdf
- Tomas, D. A. (2002). *Modern Geometry*. Brooks/Cole.
- Select NCTM Publications/Journal articles (e.g., *Navigating through Geometry, Grades 6-8*, 2002; *Navigating through Geometry, Grades 9-12*, 2002)
- Current high school and college geometry texts (e.g., *College Geometry: A Discovery Approach*, 2nd ed., 2001, by D. C. Kay)

I. Topics

- The nature and process of mathematical modeling
- The role of modeling as a scientific endeavor
- The role of modeling in secondary school education
- Modeling curriculum, instructional practices, and student learning
- Linear models and linear regression, line fitting and approximation criteria
- Empirical modeling. Linearizable models
- Polynomial models, multiple regression
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I. Topics

- Issues concerning probability and statistics in state and national curricular standards
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