**ARGUMENTATION**

**Proof & Prealgebra**

Prealgebra is fertile ground for teaching proof. By having students engage in reasoning and proof-writing (with a focus on the two-column proof that is primarily used in high-school geometry), students are better-prepared for justification in algebra and geometry. Examples are provided to show what the two-column proof looks like with specific prealgebra problems.

Barnes, R., & Hamon, S. (2010). Proof & prealgebra. *The Mathematics Teacher*, *103*(8), 597–602.

**Bridging Algebra & Geometry with n-gram Proofs**

On the premise that, when algebra students advance to geometry, they seldom are exposed to writing proofs, the author uses an activity involving *n*-grams and scaffolds the production of proof with students through the use of “hint cards.”

Craven, J. D. (2010). Bridging algebra & geometry with n-gram proofs. *The Mathematics Teacher*, *103*(9), 676–681.

**Learning from Student Approaches to Algebraic Proofs**

Students have many ways of constructing proofs involving algebraic reasoning. Several methods are analyzed for their structure and approach and provide suggestions on how to scaffold instruction to make more viable proofs.

D’Ambrosio, B. S., Kastberg, S. E., & Santos, J. R. V. dos. (2010). Learning from student approaches to algebraic proofs. *The Mathematics Teacher*, *103*(7), 489–495.

**ProofBlocks: A Visual Approach to Proof**

Under the assumption that teaching students about proof-writing is difficult, ProofBlocks is a visual method of easing students into handling proofs in geometry classes. ProofBlocks appeal to the logic behind flow charts. The author asserts that there is no loss of rigor in constructing geometric proofs using ProofBlocks when comparing the approach to traditional two-column proofs.

Dirksen, J., Dirksen, N., & Cheng, I. (2010). ProofBlocks: a visual approach to proof. *The Mathematics Teacher*, *103*(8), 571–576.

**Using Portfolio Assignments to Assess Students’ Mathematical Thinking**

There is little argument that writing activities should be an integral part of mathematics instruction. However, with all the limitations that exist in the classroom, enriching writing experiences can be difficult to achieve. The authors show how portfolio assignments are one way to elicit writing and create deep mathematical thinking.

Fukawa-Connelly, T., & Buck, S. (2010). Using portfolio assignments to assess students’ mathematical thinking. *The Mathematics Teacher*, *103*(9), 649–654.

**Proof-Related Reasoning in High School Textbooks**

Geometry classes are the typical venue for teaching proof-related reasoning. The authors investigate how proofs are elicited from students in other subjects (specifically algebra and precalculus) in textbooks. Analyses of the textbook in terms of proof-related reasoning leads to teaching implications that best reinforce these strategies.

Johnson, G. J., Thompson, D. R., & Senk, S. L. (2010). Proof-related reasoning in high school textbooks. *The Mathematics Teacher*, *103*(6), 410–417.

**How Technology Can Promote the Learning of Proof**

In this article, the author describes how his students implement Geometer’s Sketchpad to elicit proofs in his geometry class.

Muller, K. O. (2010). How technology can promote the learning of proof. *The Mathematics Teacher*, *103*(6), 436–441.

**Proof in Algebra: Reasoning Beyond Examples**

By analyzing excerpt discourses from a beginning algebra course, the case is made that proofs can be done before geometry, thus providing some foundational skills in the reasoning involved in proofwriting that is a central theme of geometry.

Otten, S., Herbel-Eisenmann, B. A., & Males, L. M. (2010). Proof in algebra: reasoning beyond examples. *The Mathematics Teacher*, *103*(7), 514–518.

**Proofs with out Words: A Visual Application of Reasoning and Proof**

In order to foster the process involved in proving a claim, emphasis is placed in the value of visuals. Two examples are provided (the Law of Cosines and Pythagorean triples) to illustrate how visuals can lead to proof.

Bell, C. J. (2011). Proofs with out words: a visual application of reasoning and proof. *The Mathematics Teacher*, *104*(9), 690–695.

**Making Student Thinking Public**

Mainly a reflective piece, the authors examine the ways teachers display student thinking in the classroom. Classifications are made and descriptions on possible impacts on student learning.

Stockero, S. L., Zoest, L. R. V., Kinzel, M., & Cavey, L. (2011). Making student thinking public. *The Mathematics Teacher*, *104*(9), 704–709.

**Developing Students’ Capacity for Constructing Proofs through Discourse**

By analyzing various ways students construct proofs, the authors provide recommendations on how teacher discourse can enhance skills involved in proof.

Stylianou, D. A., & Blanton, M. L. (2011). Developing students’ capacity for constructing proofs through discourse. *The Mathematics Teacher*, *105*(2), 140–145.

**Not All Opportunities to Prove Are the Same**

In geometry classrooms, students tend to think of proofs as application of theorems just learned instead of arguing mathematical truth. In this article, the authors explore the modes geometry textbooks employ in proofs and their implications on teaching the construction of proofs.

Gilbertson, N. J., Otten, S., Males, L. M., & Clark, D. L. (2013). Not all opportunities to prove are the same. *The Mathematics Teacher*, *107*(2), 138–142. doi:10.5951/mathteacher.107.2.0138

**Why Do We Need Proof?**

This one-page article details one teacher’s approach on answering the question “Why do we [students] need proof?” Through a carefully crafted and thought-provoking problem, the students provide the answer to this question without prompting.

Shiver, J. M. (2013). Why do we need proof? *The Mathematics Teacher*, *107*(3), 240. doi:10.5951/mathteacher.107.3.0240

**PROPORTIONAL REASONING**

**From Proportion to Linear Functions**

The author highlights the transition between representations of proportions to those of linear functions. Examples are given to show the transitions in action. Emphasis is placed on how representations support and reinforce each other

Baltus, C. (2010). Connected Representations: From proportion to linear functions. *The Mathematics Teacher*, *103*(8), 590–596.

**Rate Problem: Thinking across the Curriculum**

Rate problems are not relegated to a particular subject or grade. In fact, rates are seen as far as calculus. This article examines how rates are seen across grades and subjects through focusing on specific examples.

Kimani, P., & Engelke, N. (2013). Rate problem: thinking across the curriculum. *The Mathematics Teacher*, *106*(5), 370–377. doi:10.5951/mathteacher.106.5.0370