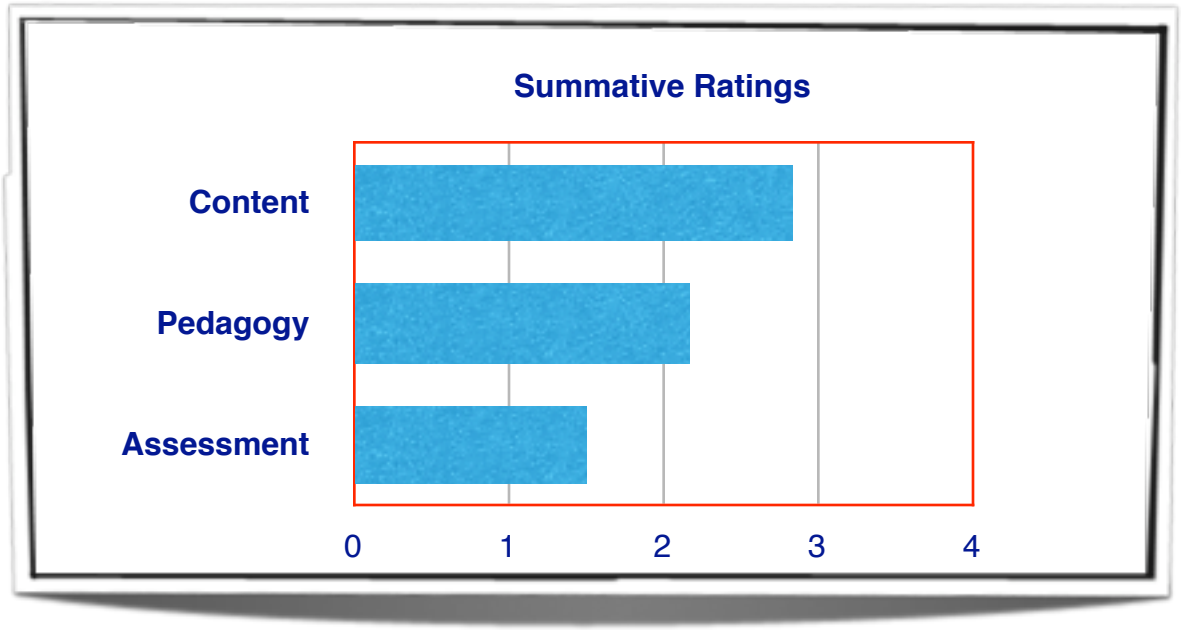
Curriculum Materials Review
Delaware Mathematics Coalition

Name:	*Carnegie Learning Algebra*
Authors:	Hadley, Pflueger, & Covatto
Publisher:	Carnegie Learning
Copyright:	2nd Edition, 2009-2010



☑ Not recommended
☐ Recommended

	Commentary
Rationale	*Carnegie Learning* created quite a bit of buzz in the industry a decade or so ago when they decided to marry the Cognitive Tutor, developed at Carnegie Mellon University by cognitive scientist John Anderson, with innovative curriculum materials created by Bill Hadley, a high school math teacher in the Pittsburgh public schools. While both components were judged by our committee to be innovative, bringing these two components together in practice has been experienced as a major challenge by schools and districts that seek to implement the full "blended program." The Cognitive Tutor tutorials, which are quite expensive to lease per student per year, typically play out at the student's own pace. While this may have considerable merit, self-paced student work on Cognitive Tutor may not articulate well with the textual lessons themselves. The costs required to fully implement the "blended program" are quite high and the committee had concerns that the textual materials, while tending to support an investigative approach to learning, were not among the strongest in that regard and hence not recommended as a stand-alone program of study.

	Commentary
Content	*Carnegie Learning Integrated Mathematics* does seem to take the use of context in the development of mathematical ideas seriously. As one panel member noted, "the lessons are promoted in a nice contextual manner," and another approved of the fact that, in her opinion, "the context is removed at the right time." Others were not sure that the contexts were always likely to connect with adolescent sensibilities, describing one central context as "only mildly interesting." There was general agreement, however, that the authors wanted the learning goals to be developed through active engagement on the part of the students. This was summarized by one reviewer as follows: "Because students develop the rules instead of being told the rules they should have more of an ability to recall the rules and apply them appropriately in new situations. They are really not being asked to memorize the rules but rather to make sense of patterns that they can investigate themselves." But another panelist had the question, "Are there enough instances for strong generalizations to actually arise? The role of technology in *Carnegie Learning* is both central and controversial and is addressed below.
Pedagogy	The review panel was of several minds on the pedagogical imperatives of the *Carnegie Learning* materials. Wrote one reviewer, "there is not much of a need to work together or communicate in these lessons. There are also not many opportunities for creative or unique solutions to be explored." In fact, in order to achieve an effective implementation of *Carnegie Learning* and take advantage of the opportunities for exploration that do exist, attention to the teacher resources is probably imperative. So, for example, "the resources were detailed for when and where group discussion should be halted to allow the teacher to focus the lesson." This gave rise to the concern that, absent attention to the pedagogical guidance provided in the teacher resources, implementation might be impoverished, but there also seemed to be some risk inherent in the fact that "the teacher notes are quite directive, in fact, they are so spelled out that the lessons could become canned and dull if not executed with passion and some level of individuality." There was also some disagreement about the role of the Cognitive Tutor software as integral (or not) to the use of these materials. There was concern about the sometimes awkward juxtaposition of the textbook and the software program, about the cost of a site license for the software ($50 per student per year), and about the time needed for the recommended level of use of the Cognitive Tutor (a 60/40 classroom-to-computer time ratio). One reviewer found the software "tedious to use."
Assessment	The summative assessments for Carnegie were judged by a panel member to be "somewhat lacking in terms of depth. The questions, almost across the board, are simple procedural problems in which a student would have no need to understand the math. The few problems that call for an explanation are simply asking for a definition to be repeated back." While context was used quite extensively and effectively in *developing* important concepts throughout the lessons according to our panel, the use of context was not exploited in the summative assessments. Most assessment questions were characterized as being "lower level" and requiring little or "no comprehension on the part of the students."

	Commentary
Support	The *Carnegie Learning* program includes a consumable textbook and a separate software program. Students work through lessons on the computer program that is geared towards targeted individual learning goals. The software program can be motivational for some students in that students attempt to earn gold bars to show demonstration of proficiency for concepts they are learning. If a student asks for more hints, the consequence is to complete more problems. Each lesson within the print materials includes formative assessment questions, a lesson wrap-up, and a range of support materials. Some of the most notable supports include the "K-12 Community" which provides digital access to all of the materials. Teachers can share materials using this platform and post questions and comments on a discussion board. Teachers can create customized pre- and post- data reports and there is a "Homework Helper" resource for the students. There is also a support guide for parents. Research on the effectiveness of the program can be accessed at: **http://www.carnegielearning.com/approach_research_reports.cfm** **http://www.carnegielearning.com/products.cfm**
Organization	*Carnegie Learning* offers their materials in two standard formats, either the Algebra I-Geometry-Algebra II sequence or an "Integrated" version, and has been willing to customize the organization of their curriculum materials for the buyer. This flexibility, while perhaps first seen as an asset, struck our committee as ultimately problematic. It was the majority opinion that organization matters and that lessons cannot simply be "swapped around" to please the customer. In a well-designed set of curriculum materials, lessons build one upon another, as concepts and skills are articulated into a carefully designed learning trajectory. Clearly, reorganizing lessons to suit the customer's tastes, flies in the face of this ideal of a carefully-designed curriculum. There is further evidence that the publisher is willing to "customize" their materials given the rather cavalier manner in which the Cognitive Tutor computer tool is marketed as either a) a stand alone "adaptive learning" resource, b) an essential aid to the textual materials, or c) a non-essential component that can be added or not as the buyer sees fit. In fact, the Cognitive Tutor, the aspect of *Carnegie Learning's* offerings that created the excitement about these products in the first place, continues to represent the biggest challenge to a successful implementation of this blended curriculum due to a variety of issues from teacher comfort with the self-paced nature of the technology to finding enough computers to support an entire class of students on a regular basis.