

# Mathematics Learning Materials in Israeli Middle Schools, the PISA Conceptual Framework and the Five-Unit Curriculum

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Abstract based on a survey by the Israel Center for Excellence through Education

Most secondary schools in Israel span over six-years and include middle school (grades 7-9) and high school (grades 10-12) together. Despite the two schools being in close physical proximity to one another, they often operate as independent units. Generally, their curriculum is developed separately, the teachers are trained at different institutions, they belong to separate professional associations, and school ownership differs as well. Therefore, one of the challenges is to create a smooth transition between the two divisions in order to facilitate a successful learning continuum for the students.

On the surface, it would seem that this structure is less relevant for the field of mathematics, which is taught in middle school in ability groups, as a preparation for the division to study units that takes place in high school. Middle school textbooks have three goals in mind; the first is the curriculum, the second is preparing students for the next level, and the third is to align with global standards. The Israel Center for Excellence through Education analyzed the customary mathematics textbooks, which are in general use by Israeli middle schools and presented findings and insights.

## **Main findings**

1. All textbooks include tasks at a high level of abstract thinking required for the five-unit test. However, the extent to which teachers actually use these type of assignments is unclear. It is unclear because such tasks require profound knowledge and dedicated teaching time. The textbooks do not provide the necessary incremental progress that would bring students to the high levels. Therefore, teachers tend to use other commercial textbooks (such as those by Benny Goren) for this purpose.
2. It is undoubted that the when writing the textbooks, the authors did not specifically have in mind the PISA conceptual framework. The books do relate to it, directly or indirectly, and do not offer any independent interpretation as well. Except for one book, no assignments at the PISA high levels of applied thinking (5-6) were found. There is however a repository of 280 literacy tasks on the Ministry of Education's website, nevertheless almost none at the 5-6 levels.
3. Three textbooks were specifically prepared to be taught at excellence classes. They include tasks that aim to deepen and enrich knowledge relevant to the five-unit track. In order for teachers to be able to use them more effectively, one would recommend to present them in a graduated difficulty, and to offer a richer integration of real world contexts and use of data.