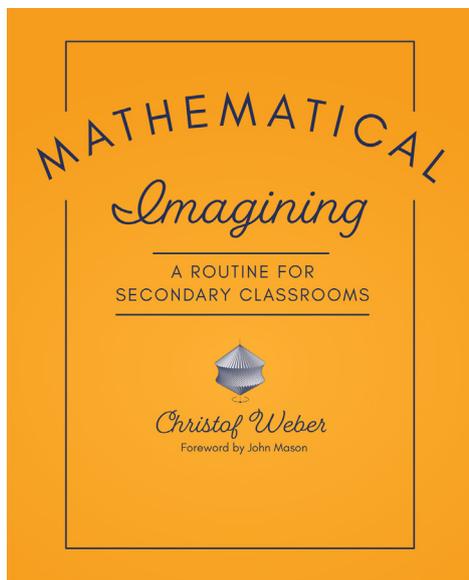# Book Review: 'Mathematical Imagining: a Routine for Secondary Classrooms' by Christof Weber

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'- Imagine that you are drawing a horizontal line segment that is about as long as your forearm is wide. . . .
- Divide your line segment into three sections that all have the same length - and then *delete* the section that is in the middle. . . . Now you have two sections left over: the first one and the third one. . . .
- Now *divide* each of your two remaining sections into three equally long sections. And once again, *delete* the section in the middle. . . .
- Now repeat this process of dividing into three sections and removing the middle third. . . . Keep doing this *over* and *over* and over again. . . .'

This book excerpt on 'Constructing the Cantor Set' is one of over thirty exercises on mathematical imagining to begin a lesson with. The author Christof Weber, an experienced high school teacher himself, has used them all with his students and explains what their benefits are besides grasping the student's attention after the bell. Most intriguing to me was the vast number of links to other topics. On the three pages that follow the above exercise we learn why the self-similarity of the Cantor set becomes a possible by-product of the visualization process and why the 'dimension' of the Cantor set is between zero and one (namely about 0.63). Furthermore, this exercise on level of difficulty three (out of three) may serve as a motivational example for the topics of fractals, non-decimal numeral systems and uncountable sets.

The imagining exercises are not categorized according to the standard high-school mathematics curriculum but according to the main type of mathematical activity involved (complete with overview tables): construction, problem-solving, reasoning and investigating paradoxes. This reflects an overall idea of the book: Even though a few concepts from the standard curriculum are discussed (e.g. by moving building blocks to calculate 35·35), you are motivated to study possible mental images when challenged with geometric and non-geometric concepts. Therefore, this book provides a helpful tool to further improve your skills to connect to the mathematical ideas which students develop. Keys for success and potential challenges on this path are discussed in concise language and general guidelines on how to develop your own imagining exercises are provided.

This book, which is the translation of the originally published German version from 2010 by Friedrich Verlag ('Mathematische Vorstellungsübungen im Unterricht' by the same author), will be of great interest for teachers of bilingual mathematics classes. You may study a single exercise in roughly 20 minutes (maybe over your lunch break?) but be aware that you will often find yourself browsing for even more activity-related content. The motivation to try out as many imagining exercises in your class as possible will grow with every minute you spend with the book!

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