1. Record Nr. UNINA9910815160803321

Autore	Isoda Masami
Titolo	Mathematical Thinking : How to Develop It in the Classroom
Pubbl/distr/stampa	Singapore, : World Scientific Publishing Company, 2012
ISBN	1-280-66949-7 9786613646422 981-4350-85-0
Edizione	[1st ed.]
Descrizione fisica	1 online resource (318 p.)
Collana	Monographs on Lesson Study for Teaching Mathematics and Sciences
Altri autori (Persone)	KatagiriShigeo
Disciplina	510.71
Soggetti	Effective teaching Mathematical ability Mathematics -- Study and teaching Mathematics - Study and teaching (Primary) Mathematics Physical Sciences & Mathematics Elementary Mathematics & Arithmetic Mathematics Teaching & Research
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di contenuto	Preface to the Book; Preface to the Series; Acknowledgements; Contents; Introductory Chapter: Problem Solving Approach to Develop Mathematical Thinking; 1.1 The Teaching Approach as the Result of Lesson Study; 1.1.1 Learning mathematics by/for themselves; 1.1.2 The difference between tasks and problems (problematic); 1.1.3 Teachers' questioning, and changing and adding representations; 1.1.4 Extending the ideas which we have already learned; 1.2 Setting the Activities for Explaining, Listening, Reflecting, and Appreciating in Class; 1.2.1 Structure of Problem Solving Approaches 1.2.2 Diversity of solutions and the objective of the class1.2.3 Comparison based on the problematic; 1.2.4 Using the blackboard for illustrating children's thinking process; 1.3 The Roles of the Curriculum and Textbooks; 1.4 Perspectives for Developing Mathematical Thinking; 1.4.1 Mathematical thinking: a major research topic of lesson study;

1.4.2 Mathematical thinking: a bird's-eye view; References; Part I Mathematical Thinking: Theory of Teaching Mathematics to Develop Children Who Learn Mathematics for Themselves; Chapter 1 Mathematical Thinking as the Aim of Education
1.1 Developing Children Who Learn Mathematics for Themselves1.2 Mathematical Thinking as an Ability to Think and to Make Decisions; 1.3 The Hierarchy of Ability and Thinking; Chapter 2 The Importance of Cultivating Mathematical Thinking; 2.1 The Importance of Teaching Mathematical Thinking; 2.1.1 The driving forces in pursuing knowledge and skills; 2.1.2 Achieving independent thinking and the ability to learn independently; 2.2 Example: How Many Squares Are There?; 2.2.1 The usual lesson process; 2.2.2 Problems with this method; 2.2.3 The preferred method
2.2.4 Mathematical thinking is the key ability hereChapter 3 The Mindset and Mathematical Thinking; 3.1 Mathematical Thinking; 3.1.1 Focus on the mindset: attitude and disposition; 3.1.2 Three variables for thinking mathematically; 3.1.3 Importance of Denotative understanding of mathematical thinking; 3.1.4 Mathematical thinking is the driving force behind knowledge and skills; 3.2 Structure of Mathematical Thinking; Chapter 4 Mathematical Methods; 4.1 Inductive Thinking; Meaning; Examples; Important aspects about teaching inductive thinking; 4.2 Analogical Thinking; Meaning; Examples Important aspects about teaching analogical thinking4.3 Deductive Thinking; Meaning; Examples; Important aspect about teaching deductive thinking; 4.4 Integrative Thinking; Meaning; Type I integration (high-level integration); Type II integration (comprehensive integration); Type III integration (extensional thinking); Example for type I; Example 2 for type II; Example 3 for type III; Important aspects about teaching integrative thinking; 4.5 Developmental Thinking; Meaning; Examples; Important aspects about teaching developmental thinking; 4.6 Abstract Thinking (Abstraction); Meaning
Examples

Sommario/riassunto

Developing mathematical thinking is one of major aims of mathematics education. In mathematics education research, there are a number of researches which describe what it is and how we can observe in experimental research. However, teachers have difficulties developing it in the classrooms. This book is the result of lesson studies over the past 50 years. It describes three perspectives of mathematical thinking: Mathematical Attitude (Minds set), Mathematical Methods in General and Mathematical Ideas with Content and explains how to develop them in the classroom with illuminating examples.