Record Nr. UNINA9910818452203321 Improving indicators of the quality of science amd mathematics **Titolo** education in grades K-12 // Richard J. Murnane and Senta A. Raizen. editors; Committee on Indicators of Precollege Science and Mathematics Education, Commission on Behavioral and Social Sciences and Education, National Research Council Washington, D.C., : National Academy Press, 1988 Pubbl/distr/stampa **ISBN** 1-280-22152-6 9786610221523 0-309-59570-3 0-585-14328-5 Edizione [1st ed.] Descrizione fisica x, 220 p Altri autori (Persone) MurnaneRichard J RaizenSenta A Disciplina 507/.1073 Soggetti Science - Study and teaching - United States - Evaluation Mathematics - Study and teaching - United States - Evaluation Lingua di pubblicazione Inglese **Formato** Materiale a stampa Livello bibliografico Monografia Note generali Bibliographic Level Mode of Issuance: Monograph Nota di bibliografia Includes bibliographical references and index. Nota di contenuto Improving Indicators of the Quality of Science and Mathematics Education in Grades K-12 -- Copyright -- Preface -- Contents -- 1 Summary and Recommendations -- INDICATORS OF SCIENCE AND MATHEMATICS EDUCATION -- RECOMMENDATIONS -- Indicators of Learning in Science and Mathematics -- Indicators of Student Behavior -- Indicators of Teaching Quality -- Indicators of Curriculum Quality --Indicators of Financial and Leadership Support -- 2 Science and Mathematics Education -- SCIENTIFIC AND MATHEMATICAL LITERACY -- Literacy in Science -- The Nature of the Scientific World View -- The Nature of the Scientific Enterprise -- Scientific Habits of Mind --Science and Human Affairs -- Literacy in Mathematics -- Practical Literacy in Mathematics -- Civic Literacy in Mathematics -- Using

Mathematics as a Tool -- Cultural Literacy in Mathematics -- A

and Teachers -- Incentives and Constraints -- The Distribution of

CONCEPTION OF SCHOOLING -- Schooling as the Behavior of Students

Excellence -- 3 What Are Indicators? -- DEFINING INDICATORS -- INTERPRETING INDICATORS -- Choice of Variables -- Problems of Aggregation -- Aggregation Effects and the Ecological Fallacy -- Inconsistent Aggregation and Self-Selection -- Problems of Scale -- INDICATORS FOR WHOM? -- COLLECTING INFORMATION -- Comparability Versus Depth of Information -- Timing -- Design of Expert Panels for Assessment -- Rater Variability -- Validity and Reliability -- Coordination of Strategies for Collecting Data -- 4 Indicators of Learning in Science and Mathematics -- AN APPRAISAL OF CURRENT TESTS OF STUDENT ACHIEVEMENT -- Purposes of Testing -- Evaluation of Student Learning -- Improving Instruction -- Criticisms of Current Testing -- Multiple-Choice Tests Penalize Creative Thinking -- Multiple-Choice Tests Are Not Representative of Real-Life Problem Situations.

Multiple-Choice Tests Are Undesirably Coachable -- Multiple-Choice Tests Exert Undesirable Influence on the Curriculum -- Multiple-Choice Tests Are Not Based on Theory -- Science Content in Multiple-Choice Achievement Tests is Questionable -- Some Virtues of the Current Testing System -- NEW METHODS OF ASSESSMENT -- Global Assessment -- Assessment of Conceptual Knowledge and Processing Skills -- Speed of Processing -- Pattern Recognition -- Organization of Knowledge -- Skill in Retrieving Information -- Internal Representations of Problems -- Procedural Knowledge -- The Development and Use of New Methods -- Summary --Recommendations -- IMPLICATIONS FOR STATE EDUCATION AGENCIES -- ASSESSING ADULTS SCIENTIFIC AND MATHEMATICAL LITERACY --Desired Attributes of Indicators -- Target Populations for Assessment -- Data Collection Strategies -- Assessing Grasp of Grand Conceptual Schemes -- Recommendation -- 5 Indicators of Student Behavior --STUDENTS AS KEY ACTORS -- STUDENT ACTIVITIES -- In-School Activities -- Out-of-School Activities -- Recommendations --ATTITUDES TOWARD SCIENCE AND MATHEMATICS -- Recommendation -- SCIENTIFIC AND MATHEMATICAL HABITS OF MIND -- Relevant Constructs -- Engagement -- Expectations/Autonomy --Connectedness -- Competence -- Recommendation -- 6 Indicators of Teaching Quality -- TEACHERS AS KEY ACTORS -- Findings from the Literature -- The Professional Teacher -- EDUCATIONAL BACKGROUNDS AND LEVELS OF KNOWLEDGE -- College Education --Subject-Matter Knowledge -- Sampling Strategy -- Needed Research -- Recommendations -- TEACHERS' USE OF TIME -- Time-Use Outside the Classroom -- Time-Use in the Classroom -- Needed Research --Recommendations -- IMPLICATIONS FOR STATE EDUCATION AGENCIES -- WORKING CONDITIONS FOR TEACHING SCIENCE AND MATHEMATICS -- Resources for Teaching Science and Mathematics -- Salaries as Incentives.

Recommendations -- 7 Indicators of Curriculum -- DEFINING THE CONCEPTS -- What Is Meant by Curriculum? -- Indicators for Whom? -- What Kinds of Indicators? -- MEASURES OF CURRICULUM CONTAINED IN OTHER CHAPTERS -- DEVELOPING INDICATORS OF CONTENT COVERAGE -- Curriculum Frameworks -- Establishing Subject-Matter Frameworks -- Obtaining Measures of Content Coverage -- State Guidelines -- Textbook Series -- Tests -- Implemented Curriculum -- Frequency of Mapping -- Recommendations -- DEVELOPING INDICATORS OF CURRICULUM QUALITY -- Depth of Treatment -- Scientific Accuracy and Pedagogic Quality -- Developing Criteria for Assessing Quality -- Recommendations -- IMPLICATIONS FOR STATE EDUCATION AGENCIES -- 8 Indicators of Financial and Leadership Support -- RESOURCES AT THE LOCAL LEVEL -- FEDERAL FINANCIAL

SUPPORT -- Recommendation -- NATIONAL LEADERSHIP --Recommendation -- References -- Appendix A Colloquium on Indicators of Precollege Science and Mathematics Education --PARTICIPANTS -- Testing Group -- Curriculum Group -- Teacher Effectiveness Group -- Science Attitudes/Motivation Group -- Science Literacy Group -- Financial Indicators Group (Special Session) --Observers -- Appendix B Review of Science Content in Selected Student Achievement Tests -- SCIENCE TEST REVIEW PANEL -- Appendix C Summaries of Meetings with Representatives of State and Local Education Agencies -- SUMMARY OF MEETING WITH REPRESENTATIVES OF STATE EDUCATION AGENCIES -- Quality of the Curriculum --Teacher Effectiveness -- Assessment of Learning -- Use of Resources -- Student Attitudes and Motivation -- General Science Literacy --Participants: State Education Agencies -- SUMMARY OF MEETING WITH REPRESENTATIVES OF LOCAL SCHOOL DISTRICTS -- Teacher Effectiveness -- Possible Indicators -- Use of Indicators -- Quality of Curriculum -- Possible Indicators -- Assessment of Learning. Resources -- Scientific Literacy -- Student Attitudes and Motivation --General Suggestions -- Participants: Local School Districts -- Appendix D Current Projects on Indicators -- Development of Indicators from Existing Research and Data Bases -- Studies to Improve Basic Data Collection -- New Survey Data Applicable to Indicators -- Efforts to Develop Indicators of the Quality of Curriculum -- REFERENCES --Appendix E Coordination of Strategies for Collecting Data -- Index.