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## Chapter 1 : IAP || Book || Second Handbook of Research on Mathematics Teaching and Learning

*Webb, N.L. () Design of Content Alignment Studies in Mathematics and Reading for 12th Grade NAEP and other Assessments to be used Preparedness Research Studies, National Assessment Governing Board, Wisconsin Center of Education Research, University of Wisconsin-Madison.*

Published The audience remains much the same as for the Handbook, namely, mathematics education researchers and other scholars conducting work in mathematics education. This group includes college and university faculty, graduate students, investigators in research and development centers, and staff members at federal, state, and local agencies that conduct and use research within the discipline of mathematics. The intent of the authors of this volume is to provide useful perspectives as well as pertinent information for conducting investigations that are informed by previous work. The Handbook should also be a useful textbook for graduate research seminars. In addition to the audience mentioned above, the present Handbook contains chapters that should be relevant to four other groups: Putting Philosophy to Work: Herbst Method, Alan H. Hill, Laurie Sleep, Jennifer M. Influences on Student Outcomes. Hiebert and Douglas A. Clements and Julie Sarama. Rational Numbers and Proportional Reasoning: Early Algebra, David W. Carraher and Analucia D. Responding to Classroom Realities, Graham A. Langrall and Edward S. Research on Statistics Learning and Reasoning, J. Keeping Learning on Track: Bishop and Helen J. Research on Technology in Mathematics Education: Engineering Change in Mathematics Education: Research, Policy, and Practice, William F. Tate and Celia Rousseau. From Here to Utopia, Mogens Niss.

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Chapter 2 : PPT â€“ Understanding Depth of Knowledge PowerPoint presentation | free to view - id: 1d17fe

*the Alignment of Curriculum Standards and Assessments Norman L. Webb encouraged if the assessment item measures content related to more than one ob-.*

Strategies for Teaching Science to English Language Learners exerpt from chapter 24 In , 42 percent of American public school students were of racial or ethnic minorities, up 22 percent from 30 years before. Most of this increase in diversity was due to immigration from Latin America and Asia, and with this increase in ethnic diversity came a corresponding increase in linguistic diversity. In this section we reference ELL strategies and activities that are found throughout this book. The science classroom is often a frustrating place for English language learners. Science has a complex vocabulary that is difficult even for native English speakers to learn. Difficulty learning English should not be confused with an inability to think scientifically. Many of the strategies that are useful for English language learners are effective for differentiating instruction for other students as well. Use a variety of methods to see which work best with your teaching style and students. What seems normal speed to a native speaker is extremely fast to a language learner or to a student with a hearing impairment. The addition of the complex terms and concepts of science can make learning even more difficult. Write down key terms so students can see them and connect them to the spoken word. Closed Captioning â€" Most science videos are equipped with closed captioning. Turn on the closed captioning so students can see what narrators and actors are saying  This helps English language learners correlate written and spoken English, and helps them see spelling and sentence construction. Closed captioning is also invaluable for the hearing impaired. Although these claims are debatable, it is clear that an English-speaking student can read and understand an equation in a Swahili textbook, and a Greek musician can play a score drafted by a Japanese composer. Regardless of linguistic background, people around the world can interpret mathematical equations and musical scores. In addition, they can also interpret pictures, and with minimal linguistic skills, can interpret charts and graphs. Visual literacy, or the ability to evaluate, apply, or create conceptual visual representation, is relatively independent of language, and is therefore invaluable to learning science and English simultaneously. Graphic Organizers â€" Graphic organizers are a means of introducing and assessing concepts in a manner that encourages meaningful learning. Graphic organizers are diagrams or maps that show the relationship between new and existing concepts, thereby facilitating integration of new and familiar ideas. They require minimal language and are therefore helpful tools when teaching science to English language learners. Use charts, graphs and figures â€" Scatter and line graphs  The layout of such visual aids should be clear and uncluttered. Manual video control â€" Science videos often introduce a variety of new terms and concepts, most of which even native speakers never remember. Pause the video to discuss key concepts. Use the bookmark and video clip features to return to precise sequences for review  Use the step-frame, slow motion, and replay features to focus student attention on key concepts. Such activities provide opportunities for students to exchange, write, and present ideas. Projects use a variety of skills that work together to increase understanding and retention. Partner English learners with strong English speakers â€" The best way to learn something is to teach it. Partnering English learners with strong English speakers benefits both. It may be particularly beneficial to pair English learners with bilingual students who can translate laboratory and activity procedures. Develop your seating chart so English language learners are sitting near the front of class and adjacent to bilingual students who can assist them. Students are often embarrassed by their minimal science knowledge and English skills, and public exposure may make them more uncomfortable and reserved. By contrast, English language learners are often eager to share their ideas in their new language with their peers. Provide students with time to write a response to a thought provoking question, then additional time to discuss it with their neighbor before sharing their conclusion with the class. Encourage participation- Many English learners come from countries in which student participation is not encouraged. They may be reluctant to speak, not only because of their lack of proficiency in English, but also

because of they are uncomfortable in an environment where they are asked to share their ideas. A positive and supportive environment has a significant influence on student comfort level, participation, and success. Requiring English language learners to speak in front of class may be counter-productive and cause great anxiety. Structure Consistent routines â€" English learners are freer to concentrate on new concepts if they are familiar with classroom routines. Use organizational structures when teaching earth and space science 8. This will help ELL students know where you are, and where you are going with your lesson. Relate to prior knowledge â€" Make use of student background knowledge of science concepts. Discover what your students already know about a given topic and build upon this knowledge. Laboratory Hand-on activities â€" Kinesthetic learning events provide an excellent learning environment for English language learners. Demonstrations Clear, procedural steps â€" The science laboratory can be a confusing and potentially dangerous setting for English language learners. Present procedures clearly using flow charts, pictures, and outlines. Model laboratory activities â€" Demonstrate activities in front of class to ensure that English language learners can see the procedures before engaging in an activity. Pictorial guide â€" Provide a visual reference to glassware and other materials used in experiments and activities. Review safety symbols and post them in the room and in the lab handout. Reading and Writing Journaling â€" Students become better writers by writing. Require English language learners to keep science journals 3. Science reading comprehension activities â€" Cloze 2. Instruction Wait time â€" Teachers are often uncomfortable with silence and either call on the first student to raise their hand, or answer questions themselves, thereby short-circuiting the thought processes of most students, particularly English language learners who are trying to translate terms while formulating an explanation. Let students know that you expect all to be mentally engaged, and for this reason you provide wait-time sufficient for the majority to develop an answer before calling on any individual. Analogies â€" Use analogies to relate new concepts to previously learned concepts  Vocabulary Language-based science games â€" Reinforce vocabulary with Science Bingo  These games require minimal spoken language and provide an excellent review of science vocabulary. Picture glossary â€" One of the best ways to learn the vocabulary of a new language is with pictorial flash cards. A picture of the concept is on one side while the term in the language to be learned is on the reverse. The student learns to correlate concepts directly with words, eliminating the need for translation. Common lexicon â€" People construct understanding by integrating new ideas with pre-existing knowledge. Ask students what they already know, then develop a common classroom vocabulary that can be used to develop new understandings. Root words â€" A knowledge of Greek and Latin prefixes, suffixes, and roots can greatly enhance student understanding of scientific terms and facilitate a better understanding of English and other European languages. Learning scientific root words thereby helps one understand the vocabulary of a variety of languages, particularly English 1. Cognates â€" Many science terms are used internationally. Identify such terms 2. This helps build your knowledge of cognates words that are similar in two or more languages so you can help future learners master science vocabulary. Mathematics translation â€" English language learners find word problems much more challenging than symbolic math problems. The English language is exceedingly complex, with numerous nuances that must be learned. Students need to be able to translate common words to math symbols  The activities in this book help students develop such skills. Word wall â€" Post new vocabulary terms on the wall in an organized, grouped manner. For example, you may wish to post new biology terms in columns according to the level of organization cell, tissue, organ, etc.

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## Chapter 3 : Table of contents for Second handbook of research on mathematics teaching and learning

*Mathematics Content Specification in the Age of Assessment, Norman L. Webb. Reflections on the State and Trends in Research on Mathematics Teaching and Learning: From Here to Utopia, Mogens Niss. About the Contributors.*

Table of contents for Second handbook of research on mathematics teaching and learning: Bibliographic record and links to related information available from the Library of Congress catalog. Contents data are machine generated based on pre-publication provided by the publisher. Contents may have variations from the printed book or be incomplete or contain other coding. Putting Philosophy to Work: Coping With Multiple Theoretical Perspectives Theory in Mathematics Education Scholarship Herbst, University of Michigan 3. Teachers and Teaching 4. Hill, Laurie Sleep, Jennifer M. The Mathematical Education and Development of Teachers Sowder, San Diego State University 6. Understanding Teaching and Classroom Practice in Mathematics Infl uences on Student Outcomes 8. How Curriculum Infl uences Student Learning Hiebert, University of Delaware Douglas A. Grouws, University of Missouri  Culture, Race, Power, and Mathematics Education Students and Learning  Early Childhood Mathematics Learning Whole Number Concepts and Operations Rational Numbers and Proportional Reasoning: Toward a Theoretical Framework Lamon, Marquette University  Schliemann, Tufts University  Problem Solving and Modeling The Development of Geometric and Spatial Thinking Battista, Michigan State University  Responding to Classroom Realities Mooney, Illinois State University  Research on Statistics Learning and Reasoning Michael Shaughnessy, Portland State University  Mathematics Thinking and Learning at Post-secondary Level Keeping Learning on Track: Classroom Assessment and the Regulation of Learning High Stakes Testing in Mathematics Large-scale Assessment of Mathematics Education Issues and Perspectives  Issues in Access and Equity in Mathematics Education Forgasz, Monash University  Research on Technology in Mathematics Education: The Perspective of Constructs Dick, Oregon State University  Engineering Change in Mathematics Education: Research, Policy, and Practice Tate, Washington University in St. Louis Celia Rousseau, University of Memphis  Educational Policy Research and Mathematics Education Mathematics Content Specifi cation in the Age of Assessment Webb, University of Wisconsin, Madison  Library of Congress Subject Headings for this publication: Mathematics -- Study and teaching -- Research.

## Chapter 4 : WebbAlign: Resources

*Table of Contents for Second handbook of research on mathematics teaching and learning: a project of the national council of teachers of mathematics / Frank K. Lester, Jr., editor, available from the Library of Congress.*

## Chapter 5 : Strategies for English Language Learners

*Mathematics Content Specification in the Age of Assessment by Norman L. Webb Reflections on the State and Trends in Research on Mathematics Teaching and Learning: From Here to Utopia by Mogens Niss About the Contributors.*