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Preface

Teachers are meeting the challenge of the 21st century with teaching methods that incorporate a three-fold approach to student learning. These new instructional strategies and organisational procedures are specifically designed to cultivate thinking skills and foster personal qualities in students while they are developing their discipline-based knowledge and literacy skills.

Teachers in the middle years (years 5–8) want to know how to create a positive learning climate for students in early adolescence. This book outlines a repertoire of strategies that are essential for every teacher and delivers practical ways to engage different ways of learning, to encourage co-operative learning, to develop positive personal attitudes to learning and to use authentic assessment both for (and of) learning.

Integrating Instruction in Maths was created especially for maths teachers at the upper primary/junior secondary level. The high-interest activities cover topics in important areas in mathematics, including:

- Applied Mathematics
- General Mathematics
- Statistics/Probability
- Graphing
- Geometry
- Measurement
- Tessellations
- Computers
- Famous Mathematicians
- Careers in Maths

In each of five major sections you will find a comprehensive overview of a particular instructional focus accompanied by stimulating activities that are meant to be used as well as to serve as examples.

USING INTEGRATED INSTRUCTIONAL STRATEGIES TO ACCOMMODATE DIFFERING LEARNING STYLES, ABILITIES AND INTERESTS features guidelines for incorporating the Multiple Intelligences, Learning Stations and Read and Relate tasks into the preparation of high-quality lesson plans and student assignments.

USING INTEGRATED INSTRUCTIONAL STRATEGIES TO DEVELOP PROBLEM-SOLVING AND HIGHER-ORDER THINKING SKILLS offers guidelines for infusing higher-order thinking skills into the educational process through the use of cognitive taxonomies, self-directed investigation cards and calendars. The cognitive taxonomies offer useful foundations for the design of interdisciplinary units, student worksheets, learning stations and group projects.

USING INSTRUCTIONAL STRATEGIES TO PROMOTE CO-OPERATIVE LEARNING AND GROUP INTERACTION presents valuable collaborative processes such as Think/Pair/Share, Three-step Interview, Circle of Knowledge, Team Learning, Round Table and Jigsaw.

USING INTEGRATED INSTRUCTIONAL STRATEGIES TO FACILITATE AUTHENTIC ASSESSMENT shows how to effectively implement product, performance and portfolio assessment practices. Included is a complete sample portfolio based on an interdisciplinary unit in mathematics.

Finally, A VERY PRACTICAL APPENDIX provides high-interest strategies and activities to integrate humanities, science and English into the maths curriculum; topics for student reports and journal writing; blank planning outlines to help in the creation of original lesson plans; and an annotated bibliography. A comprehensive index will make it easy to keep track of this wealth of information.

In short, this book is a must for all maths teachers, for those on interdisciplinary teams as well as those in self-contained classrooms. It offers a collection of instructional strategies that were designed for heterogeneous groups of students in an educational setting that will allow every student to be successful. It clarifies theoretical principles and offers activities that cover a wide range of important topics in maths. Best of all, its content is fresh original and of interest to contemporary students.

The Language of Mathematics



VERBAL/LINGUISTIC

Compile a dictionary of important mathematical terms and their definitions. Put your dictionary in a booklet or file card format.



LOGICAL/MATHEMATICAL

Generate a list of important mathematical terms. Classify your list of words in at least three different ways.



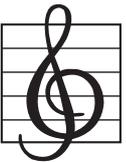
VISUAL/SPATIAL

Create a picture glossary of as many different mathematical terms as you can by drawing examples of the terms rather than giving written definitions. Have others try to guess which concepts you are illustrating.



BODY/KINESTHETIC

Invent a game that teaches mathematical terms to other students. It can be a word game, board game, television game or card game. Be sure to include rules for your game and guidelines for playing the game.



MUSICAL/RHYTHMIC

Develop a mini-poster of musical terms that can also be used as mathematical terms.



NATURALIST

Make a list of terms that have come from the natural world into maths.



INTERPERSONAL

Work with a partner to prepare a series of journal entries that might have been written by a mathematician who is working to make the language or terms of mathematics appealing to students.



INTRAPERSONAL

Illustrate at least three of your favourite maths words in creative or personalised ways.

Getting a Grip on Graphs

REMEMBERING

Make a list of as many kinds of graphs as you can.

UNDERSTANDING

Give brief descriptions of at least five different kinds of graphs.

APPLYING

Construct a list of questions about a topic on which you have a strong opinion. Assuming an impartial attitude, use your list of questions to conduct a survey of your classmates in order to discover their opinions. Show the results of your survey with a colourful graph of your

ANALYSING

Distinguish between a bar graph and a double bar graph. Give an example of a good use of each.

EVALUATING

Defend or criticise this statement as it applies to the use of a pictograph to show comparisons: "One picture is worth a thousand words".

CREATING

Decide which would be the best way to organise findings about consumer spending for a humanities report: a circle graph, a bar graph or a broken-line graph. Justify your decision.