Integrating Thinking in Science

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Interdisciplinary Units

Thinking

Multiple Intelligences

Bloom's Taxonomy (revised)

Williams' Taxonomy

Co-operative Learning

Personal Learning

Authentic Assessment

Rubrics

HAWKER BROWNLOW
EDUCATION

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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 Science was created for science teachers at the upper primary/ junior secondary level. The high-interest activities, many of which highlight conservation and preservation, cover topics in the major areas of science, including the following:

- Astronomy
- Biology
- Botany
- Chemistry
- Ecology
- Geology
- Medicine
- Meteorology
- Physics
- Zoology

In each of five major sections you will find a comprehensive overview of a particular instructional focus accompanied by exciting 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 great foundations for the design of interdisciplinary units, student worksheets, learning stations and group projects.

USING INSTRUCTIONAL STRATEGIES TO PROMOTE COOPERATIVE 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 on the Solar System.

Finally, A VERY PRACTICAL APPENDIX provides high-interest strategies and activities to integrate humanities, maths and English into the science curriculum; topics for student reports and journal writing; a research outline and blank planning outlines to help in the creation of original lesson plans; and an annotated bibliography. A comprehensive index is invaluable in keeping this wealth of information at your fingertips.

In short, this book is a must for all science educators, 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 science topics. Best of all, its content is fresh, original and of interest to contemporary students.

Secrets of the Periodic Table

VERBAL/LINGUISTIC

In your own words, describe the historical development and the current organisation of the elements found on the periodic table.

LOGICAL/MATHEMATICAL

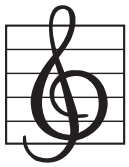
Brainstorm a list of properties, other than mass, that could be used to organise the elements of the periodic table. Use one of these properties to construct a new version of the existing periodic table.

VISUAL/SPATIAL

Copy each square of the existing periodic table on a 7.5 cm x 12.5 cm file card. Classify these cards in some meaningful way and write a paragraph explaining the rationale for your classification system.

BODY/KINESTHETIC

Draw diagrams demonstrating different bonding patterns and then orchestrate a dance showing several different bonding patterns.



MUSICAL/RHYTHMIC

Develop a rhythmic pattern of sounds to represent any ten elements of the periodic table. Teach your pattern of sounds to some peers and have them use it to represent the other elements of the periodic table.

NATURALIST

Most often elements are found mixed in with other elements. List each of the first twenty elements and write beside each one where you would be likely to find each one.

INTERPERSONAL

Work with other members of the class to create a king-sized version of the periodic table for the bulletin board. Ask each student to select two elements from the periodic table and to use a square piece of paper to record the following information for each of the elements: symbol of the element, atomic mass, atomic number and three interesting facts about the element itself.

INTRAPERSONAL

Express your personal opinion of the current organisation of the periodic table. Does it make sense to you? Or would you have organised it differently had you been directing its development?