

**Course Title: Developing *Proportional Reasoning*  
Grades 6-8**

**Instructor's Name: Sheldon Erickson, AIMS Education Foundation**

**Course Number: MAT 943**

**Number of Credit Units: 3 semester units**

**Course Content/Description:**

This course seeks to build a foundation for teaching and Proportional Relationships. It is supported by classroom lessons written and compiled within the *AIMS* publication *Proportional Reasoning* which forms the nucleus of the course. Alignment of State and National Standards to the Learning Goals is also an integral part of this course.

The book itself contains hands-on experiences designed to build the necessary foundation for developing meaning and understanding of proportions including these basic ideas:

1. A well-understood sense of equivalent fractions
2. An ability to translate ratios into and between numeric forms of fractions, percents, and decimals
3. An ability to recognize proportional relationships and identify corresponding attributes
4. An ability to apply proportional relationships to similarity, enlargement, scales, rates
5. A recognition that proportional relationships can be represented in multiple ways including numbers, graphs, and equations

The lessons include both those for conceptual development and practice, and those that broaden understanding through application.

**Primary Learning Outcomes**

**Students will:**

1. Participate in opportunities for implementation and sustained use of hands-on experiences in mathematics in a classroom setting
2. Engage in reflective practice through the use of instructional planning, focused questions, and reflective response
3. Make connections for conceptual understanding by showing alignment of instructional experiences with national reform documents and state content standards for mathematics
4. Develop positive attitudes and confidence in teaching and learning
5. Expand their knowledge base of mathematics education
6. Will make connections to professional literature regarding content, theory and practice
7. Will identify State or National Standards that apply to the selected AIMS activities by aligning learning goals with State or National Content Standards

## Course Materials

*AIMS* Book – *Proportional Reasoning*

**Manipulatives** for one class to be used with lessons from text.

Plastic Pattern Blocks  
Fraction Pattern Blocks

**An Overview of AIMS** (online- PDFs;

<http://www.aimsedu.org/downloads/pdf/download.php?file=sps.pdf>)

with required reading and application of ideas from the following:

*A Model of Learning*

*The Skills for Thinking*

(If Internet is not available to download the pdfs, AIMS can mail copies of these pages. Please email [spscourses@AIMSedu.org](mailto:spscourses@AIMSedu.org) or call 1-888-733-2467 ext 120 to request copies.)

Focus questions and guidelines for responses based on understanding and application of materials and ideas.

Overall plan for Implementation

Summary of Alignment with State Content Standards

Application of the Model of Mathematics

Application of Thinking Skills and Alignment with Standards and Learning Goals

Reflective Response and Focus Questions

Integrated Curriculum Form

Professional Growth and Reflection: A Response to Articles and Experience

## Course Requirements/Schedule of Topics and Assignments

1. Students will read completely the related *AIMS* publication, *Proportional Reasoning*.
2. Students will read the selected articles in **An Overview of AIMS** (online- PDFs; <http://www.aimsedu.org/downloads/pdf/download.php?file=sps.pdf>) with required reading and application of ideas from the following:  
*A Model of Learning*  
*The Skills for Thinking*  
(If Internet is not available to download the pdfs, AIMS can mail copies of these pages. Please email [spscourses@AIMSedu.org](mailto:spscourses@AIMSedu.org) or call 1-888-733-2467 ext 120 to request copies.)
3. Students will design a plan for implementation of ten (10) experiences from *Proportional Reasoning* including a summary of and rationale for the selection of *AIMS* lessons.
4. Students will choose one lesson from *Proportional Reasoning* and describe how it addresses the four learning environments of the **Model of Mathematics/Learning**.
5. Students will implement ten (10) lessons in the classroom with students over a three to four week period.

6. Prior to teaching each lesson, students will apply the *Skills for Thinking* to the design of tasks and discussion questions reflecting important concepts, skills and processes integral to each lesson. Students will record these on pages labeled **Applying Thinking Skills**. Students will also record the Learning Goal and appropriate State Standards on pages labeled Applying Thinking Skills.
7. After each lesson, students will reflect upon their teaching by responding to the Reflective Response focus questions.
8. Show summary of alignment of learning goals with **State Content Standards**. Content Standards for each state may be found at this Web-site address:  
US Department of Education has links to the state department of education for each state.  
[http://wdcrobcolp01.ed.gov/Programs/EROD/org\\_list.cfm?category\\_ID=SEA](http://wdcrobcolp01.ed.gov/Programs/EROD/org_list.cfm?category_ID=SEA)
9. Complete a **Professional Growth and Reflection** form describing how the selected articles (see number 2 above) and the teaching experience impacted you and your teaching.

#### **Method of Assessment:**

Provide evidence of the design, implementation, evaluation and reflection of the collective experiences by returning the completed assignments.

Unless otherwise indicated, students successfully completing this course will earn a Credit/No credit grade or where a letter grade is requested by checking the appropriate box on the Fresno Pacific University grade form, a letter grade of B will be issued. In order to earn a letter grade of A, additional work beyond what is described will be required.

The discernment between an A or a B is at the discretion of the instructor of record based on the quality of the evidence submitted.

#### **Additional requirement for an earned letter grade of A**

1. Adapt, modify, or use one of the investigations in the book as a final performance assessment of understanding of proportional reasoning.
2. Submit a summary of how the activity was used and/or modified explaining the rationale for using the activity in this way.
3. Include at least four examples of student work on the final performance assessment, which demonstrate the variety of student successes.
4. Include a scoring rubric and a written analysis of what you learned about student understanding from looking at the included examples of students' work. Reflect on how what you learned from the assessment might change your instruction in the future.

#### **University Policy on Plagiarism**

All people participating in the educational process at Fresno Pacific University are expected to pursue honesty and integrity in all aspects of their academic work. Academic dishonesty, including plagiarism, will be handled according to the procedures set forth on page 8 of the Fresno Pacific University Catalogue.