

**DOMINICAN
UNIVERSITY**
of CALIFORNIA
School of Liberal Arts and Education

**Exploring with Squares and Cubes
(Investigations of Area and Volume)**

Teaching Elementary Mathematics
Using Concrete Materials to Explore Abstract Concepts

EDUO 9552 1-3 Semester Credit(s)/Unit(s)

Instructor: Ron Kremer

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You must be currently teaching students to successfully complete this course.

Note: This is a Public syllabus of the course. For a full detailed syllabus please email the instructor.

Public Syllabus

Course Overview

Through the hands-on activities in this course students become independent investigators. They learn how to pose questions and tackle problems the way mathematicians and scientists do. Since mathematics is a branch of science, mathematicians also use the scientific method. In addition to the mathematical content there is another important aspect here... *building an authentic community of mathematicians!*

Course Objectives

The teacher will:

- Collect and prepare materials needed for the interactive activities (experiments, model building, and art projects).
- Conduct brainstorming sessions with the students, creating a playful, “risk-taking” atmosphere for exploratory mathematics.
- Provide opportunities for students to engage in concrete, open-ended, hands-on explorations.
- Guide students in the use of “scientific method” (observing, collecting and organizing data, looking for patterns, using those patterns to make predictions and extrapolations).

Course Relation to CCS or other Professional Standards

This course aligns to the standards for: *K-12 California’s Common Core Content Standards for Mathematics:*

- **Grade Three** – Geometric Measurement (Area)
5. Recognize area as an attribute of plane figures and understand concepts of area measurement.
Geometric Measurement (Perimeter)
8. Solve... mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths...
- **Grade Four** – Operations and Algebraic Thinking
Generate and Analyze Patterns
5. Generate a number or shape pattern that follows a given rule
- **Grade Five** – Measurement and Data

Geometric Measurement

3. Recognize volume as an attribute of solid figures and understand concepts of volume measurement.

Course Assignments

A1 Staff Training Component

There are two illustrated sections on scientific method and the importance of concrete experience to read and a number of questions to answer.

A2 Introductory Activity

Students will post verbs on a bulletin board that describe the behaviors of a scientist.

B1 Student Activities

There are thirty-three activities/explorations arranged sequentially, so that each activity builds and expands upon what students learned in the previous one. Students need to begin at the first activity of either: area or volume and follow the sequence of activities for maximum effectiveness. (Please see full syllabus for the requirements for earning one, two, or three units.)

Reflections

For a number of activities you will need to write a paragraph reflecting on your experiences in teaching each of those activities.

Course Assessment Rubric

Excellent: Meets or exceeds course requirements

Acceptable: Majority of work meets course requirements

Not Acceptable: Needs considerable improvement

A to A-	B+ to B-	Unacceptable/Resubmit
Staff training components completed. Answers are specific to the content of the components.	Staff training components completed, with a number of answers that are generalities, not specific to the content of the components.	Staff training components incomplete or missing.
Introductory activity completed with an abundance of posted data as shown by photo-documentation.	Introductory activity completed with a minimum of posted data as shown by photo-documentation.	Introductory activity missing.
All explorations completed with good photo-documentation of student work.	All explorations completed with partial photo-documentation of student work.	Explorations missing and/or incomplete. No photo-documentation.
Complete heading at the top of each completed assignment.	Incomplete or incorrect headings at the top of several assignments.	Missing headings at the top of assignments.
Followed directions for organization of assignments with a completed checklist at the top.	Poor organization of assignments. Checklist incomplete and/or not placed at the top of the submission.	Unorganized submission- did not follow directions. No checklist included.
Clear, relevant, detailed, and thoughtful reflections.	Relevant reflections, but lacking detail and insight.	Missing reflections, or reflections are irrelevant.
Submission is free of spelling and/or grammatical errors.	Submission has several spelling and/or grammatical errors.	Submission has many spelling and/or grammatical errors.

- You are allowed 9 months to complete the course.
- For questions involving your registration please contact us at support@dominicanCAonline.com or call (800) 626-5080. To change your address, link to your Dominican Store account at https://www.dominicanaonlinestore.com/store/index.php?main_page=login
 - For Dominican Self-Guided course information, link to <http://dominicancaonline.com/Dominican-CA-Online-FAQ>