

Course Title: EDU 5 Math: Mastering Multiplication, Division, Addition, Subtraction, Concepts of Fractions and Decimals for Elementary and Middle level Math Programs.

Instructors: Paul Lawrence

Length: 15 hours

Dates: Rolling admissions

Prerequisites: Bachelor Degree

Number of credits: 1

Course Overview:

In the first of a three part session on mastering multiplication and division facts, Paul Lawrence explores how teachers can use arrays and groups of things as effective strategies to help students understand the concept of multiplication. As in previous presentations, Lawrence leads teachers through several exercises that teachers can use with their students. These exercises help ensure that students grasp the concept of multiplication prior to their being asked to memorize and recall multiplication facts. In doing so, he carefully moves from the concrete to the iconic, and then the symbolic. He reminds us that it is important to be sure that students have a firm grasp of a math concept before asking them to memorize the facts related to that concept. And he also stresses that importance of using more than one approach to reach the same end—mastery of the concept. That way, he suggests, you will be sure that all students will master the concept.

Paul Lawrence explores how teachers can help student understand basic addition and subtraction of whole numbers. This topic is covered in two parts. In this, the first of the two parts, the presenter demonstrates how connecting cubes, geoboards, and various templates can be used to help students visualize addition with double-digit whole numbers. He illustrates how using these techniques can also be an effective way of introducing, without calling attention to, basic algebraic concepts. These techniques lay a solid foundation for helping students develop the ability to use mental math to solve addition problems involving double-digit whole numbers. Subtraction is considered in part two of this topic.

He goes on to explore how teachers can help student understand basic addition and subtraction of whole numbers. This topic is covered in two parts. In this, the second of the two parts, the presenter introduces several games that can be used to help students master addition and subtraction with whole numbers—the Win A Flat, the Lose a Flat game, and the Column Addition game. He illustrates how these games help students understand the concepts that underlie addition and subtraction of whole numbers and can also help develop their ability to estimate answers to math problems. Finally, he offers several strategies that students can use when solving mixed sets of multi-digit addition and subtraction problems.

Eight Topics of interest:

- Mastering Multiplication and Division – Basic Facts part 1
- Mastering Multiplication and Division – Basic Facts part 2
- Mastering Multiplication and Division – Beyond Facts part 1
- Mastering Multiplication and Division – Beyond Facts part 2
- Concepts of fractions and decimals part 1
- Concepts of fractions and decimals part 2

-Addition and subtraction of fractions with same denominators and compatible denominators

-Addition and subtraction of fractions with non-compatible and overlapping denominators

Objectives:

1. Knowledge –at the end of this course the student will be able to understand:
 - a. The importance of teaching multiple strategies for solving math problems
 - b. How to use connecting cubes to teach addition and subtraction facts
 - c. How to use arrays to teach multiplication

2. Skills –after this course a student will be able to:
 - a. Teach double digit addition and subtraction using base ten blocks
 - b. Utilize games as teaching tools
 - c. Help students develop their capacity to estimate answers to math problems

3. Dispositions – they will appreciate out of this:
 - a. The importance of using multiple strategies when teaching math concepts
 - b. The importance of moving from the concrete to the iconic and then the symbolic when helping students master math concepts
 - c. How to help students learn to use mental math with basic addition and subtraction up to double digits

Instructor Overview

Knowledge Delivery Systems maintains a online platform that automatically grades their pre and post assessments, monitors their participation in the lecture, and awards them credit when they complete the program. KDS also employs a team of educators to monitor the progress and quality of work students provide.

David Reynolds:

David is an experienced historian and professor with a B.A. and M.A. in History from SUNY Buffalo and a Ph.D in History from the University of Wisconsin. He was a distinguished professor of History at Marist College from 1986-1992 and has worked as a educational consultant for New School Vision and Continuous Learning Corporation. He currently works for KDS as a course developer and educational consultant and is working with the state of Florida to optimize their education system and resources.

Methods of instruction:

Percentage of Course

Credit

Methods of instruction will include:

- | | |
|------------------------------------|----------------|
| • 8 individual sections (15 hours) | |
| • 8 pre assessments | 0% |
| • 8 graded post assessments | 40% |
| • 8 Video Lectures | 15% |
| • Polling questions | part of videos |
| • 8, 60-100 pages Study guides | 5% |
| • Handouts | |
| • Written Paper | 40% |

Passing: Students must earn a 70% or higher to receive a passing grade

Texts (included in program)

- 520 page study guide provided in the program

Assignments

- 40 pre assignment
- 64 post assignments

Grading criteria/system and evaluation activities:

A course administrator will be reviewing students' answers and providing feedback. Students will be evaluated on their creativity and ability to incorporate techniques from the lecture into examples and lesson plans.

- Graded Paper

Due dates of major assignments, projects, and examinations: Online self running programs can be started and completed at the participants own leisure within 2 months from the day they begin the course.

Plans for transferring skills into the work setting:

Culminating Course Assignment

This written project with consist of two parts; the need for change and the literature review to support your argument.

The Culminating Assignment for this course is an applied project in the work setting, "The Capstone Experience." The project will be designed to bring about Change for Improvement. The student will identify a need within their classroom and/or school and design a project with a focus on change for improvement.

The student will report the results of the applied project by writing an 8-10 page Change Paper. Within the Change Paper, the student will incorporate further learning experiences appropriate to course material by conducting a formal review of the related literature. The review of related literature is a requirement within the Change Paper. Guidelines and helpful hints for the review of related literature are provided.

Guidelines for Writing the Culminating Paper

Part 1: Change paper

The student will create a document that contains evidence of a need for change, with recommendations for new strategies that will improve an area of concern. For the change paper, the paradigm shift recommended for your workplace should be within your knowledge base and should relate directly to the course taken through Knowledge Delivery Systems and the exploration of additional resources related to course content.

The Change Paper will contain the following information, in this order, to establish your framework.

- A description of the workplace setting: the kind of facility, purpose of the facility, number of employees in major categories, length of establishment, culture or atmosphere, etc. and the writer's position there.
- An explanation of the area being considered for improvement. Select an area you identify as an area of needed improvement within your school. Present a rationalization for the need to make a change or to respond to an emerging need. Identify the stakeholders who would receive the benefit of the change.

- Write a review of the related literature on the topic to be improved (refer to Writing a Literature Review for further instructions). Use 4-6 scholarly articles from the literature that include theory, practice, and applied research.
- Recommend strategies to achieve the improvement. Example: Select a strategy from the literature reviewed. Explain how this could be accomplished and by whom. Project the learning outcomes that would support your paradigm shift and the expected timeline for completing the change.
- Conclude on the concept with reference to relative literature in this document that would insure success of the change.

Part 2: Literature Review, Supporting your argument

A review of the literature is a standard procedure that is followed in writing scholarly papers. The review informs the student what scholars and researchers have learned about the problem. It is an opportunity for the student to examine what solutions have been tried and implemented to correct a specific discrepancy or to solve a problem. The review of literature also informs the reader that the topic or the problem is a legitimate one, recognized by the educational community.

The steps in organizing a review of the literature are simple. After the search of abstracts is completed, follow these steps.

- Review abstracts to remove obviously unrelated or inappropriate material. If information is scant, or most of the information appears to be inappropriate to the student's topic, perhaps the concern should be restated in more appropriate terms.
- Determine whether the available research is on theory, strategies, or solutions. Individuals working on a change paper are not encouraged to test new methodologies never tried by anyone else. Rather, they are to consider existing solutions in new and innovative ways to improve the situation.
- Obtain full text of each selected research study relevant to the topic. Check the bibliography of the research for possible connections to other authors.
- Write a summary of each selected research study using the full article as a guide for your notes. Build a framework from information in the collected articles to support your argument that the problem exists. Writing a review from abstracts will result in an incomplete analysis.
- Look at your collection of summaries to find subtopics from among them. Organize them by concept to create a verbal picture of viable solutions.
- Put them all together starting with a brief description of the issues or problem area found in this literature. This should require only a few sentences.
- At the end, add your idea of how to make improvements that are supported in this research. This is a possible solution strategy.
- Conclude with one or two paragraphs relating the final set of information to the idea being addressed.