Idaho State University | Albion Center for Professional Development

The Brain and Learning Mathematics

Course Syllabus

Course Description

This course will explore topics related to neuroscience and the development of number sense from preschool to adolescence. Students will learn how working memory and the importance of meaningful experiences in math class contributes to deeper understanding of mathematical concepts. Students will reflect on a variety of instructional practices centered on the development of number sense to learn complex mathematical operations. Students will learn why meaningful mathematics experiences that are exciting and relevant with purposefully planned lessons support the Idaho Content Mathematics Standards.

This course enhances classroom teaching effectiveness and supports improved student outcomes by introducing new knowledge in how neuroscience supports the development of number sense, the role of working memory in mathematical understanding, and strategies for designing purposeful, developmentally appropriate math instruction aligned to student cognitive growth.

Course Objectives

At the end of this course you should be able to:

1. Describe number sense and the degrees to which it can be taught and strengthened.
2. Describe how conceptual structures about numbers progress in elementary aged students.
3. Describe the functions of working memory and the impact teaching styles have in learning mathematics.
4. Describe strategies that teachers can use to help young children build their subitizing, sorting, and classifying skills.
5. Describe the important learning elements when constructing a math lesson to develop mathematical reasoning in preadolescents.
6. Explain how neuroscience and the progression of mathematical concepts provide clarity and purposeful planning.

Modules

- Module 1: Developing Number Sense, Quiz 1
- Module 2: Learning to Calculate, Quiz 2
- Module 3: Elements of Learning, Quiz 3
- Module 4: Teaching Mathematics in Preschool and Kindergarten, Quiz 4
- Module 5: Teaching Mathematics in Elementary School, Quiz 5
- Module 6: Planning For Meaningful Experiences, Quiz 6

Grading

Each quiz must be passed at an 80% or higher (three attempts allowed).

Format

This is a self-paced, asynchronous (no required live meetings) course. Throughout the PD course, you will find it helpful to take notes along the way to assist with the quizzes. Within each module, you will find reflection assessments that are not graded but will help in your journey through the course. There is an interactive forum in the course to help you connect with peers and instructors, share ideas, and collaborate on best practices throughout your learning journey.