

Introduction

Welcome to the *Math for All* professional development program! This book contains all the handouts, worksheets, and curriculum materials that you, as a participant, will need to complete the five workshops that are part of this program. *Math for All* may be different from other professional development you have participated in previously, so below we describe the main goals and activities of the program to give you a better sense of what to expect.

GOALS AND PURPOSES

The *Math for All* workshop series will introduce you to a process for collaborative lesson planning that will support you in your efforts to make math lessons accessible to all students, including those with disabilities. Key components of this lesson planning process include

- analyzing the mathematical goals of the lesson you are planning for and understanding how these goals relate to the mathematics that your students studied prior to this lesson and that they will study in the future;
- analyzing the demands of the lesson;
- thinking about the strengths and needs of individual students in your classroom and how they will respond to the demands of the lesson; and
- selecting instructional strategies that address the strengths and needs of individual students in your class to make the lesson more accessible without changing the mathematical goals.

As part of the professional development, you will learn about neurodevelopmental theory (see sidebar for more detail) and how to use it as a lens to better understand the demands of math activities and individual students' strengths and needs.

Throughout the five workshops, you will be working collaboratively with one or more colleagues. Ideally, you will be working in a team that consists of at least one classroom teacher and one special education teacher who serve the same

The Neurodevelopmental Framework

Neurodevelopmental theory is based on the assumption that learning is not a one-dimensional process, but rather involves eight different neurodevelopmental systems or functions, which interact to enable students to acquire certain knowledge and skills, or to

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accomplish school tasks. The eight neurodevelopmental functions are

- Higher thinking
- Language
- Spatial ordering
- Sequential ordering
- Memory
- Attention
- Psychosocial/social thinking
- Motor coordination

Students must utilize these functions to varying degrees in order to succeed at different learning activities, including mathematical tasks. Each learner has a unique **neurodevelopmental profile**, a pattern of strengths and weaknesses in different neurodevelopmental functions. His or her profile can be more or less matched to the requirements or demands of different kinds of learning activities, which will influence his or her success at the task at hand. A learner's neurodevelopmental profile changes over time—each of his or her neurodevelopmental functions can grow in effectiveness, level off, or deteriorate. Many factors shape a learner's profile, including genetic factors, family factors, cultural values, environmental influences, educational experiences, physical health, peer influences, and emotional factors. Close observation and description of students' strengths and weaknesses are necessary to understand their neurodevelopmental profiles.

To effectively support individual students, teachers should aim for **management by profile**. This means taking into consideration individual students' strengths and weaknesses rather than focusing on isolated weak spots. Management by profile has multiple components. It involves **demystification** (helping students to understand their strengths and weaknesses), **accommodations** (building on students' strengths to bypass their weaknesses), and **interventions** at the breakdown points (strengthening a student's area of weakness). Teachers should take special care to strengthen students' strengths and affinities and to protect them from humiliation in an effort to nurture their sense of self-worth and efficacy.

children. The purpose of working in these teams is for teachers to benefit from each other's expertise and perspectives about their students.

Math for All places a strong emphasis on collaborative lesson planning, because we believe that making math lessons accessible to all students requires teachers to engage in an ongoing process of problem solving, decision making, and reflection. Often, there is not one single approach that will work for all students. Instead, teachers need to think about how the neurodevelopmental demands of a math lesson interact with individual students' strengths and needs, and carefully adapt and select materials, activities, and instructional strategies that are consistent with the original goal of the lesson and that help to make it accessible to students with various strengths and needs. Different students may need different types of support to reach the same goals. This does not mean that you need to create individual lesson plans for each student in your class. Instead, by focusing on a few students with different strengths and needs and planning adaptations based on their neurodevelopmental profiles, you will find that your lessons will become more accessible to many students in your classroom.

CONTENT AND FORMAT OF THE PROFESSIONAL DEVELOPMENT

In the morning of each workshop you will spend time examining videos and printed materials from a specific case lesson. Each workshop will focus on a different case lesson from different grade levels and with different math content (pre-algebra, data analysis, geometry, number and operations). You will work with the members of your team, applying parts of the lesson planning process to better understand how the case lessons were adapted. You will analyze the demands of the math activity of the case lesson, observe a focal child from the lesson engage in this activity to better understand his or her strengths and needs, review curriculum materials to understand the

mathematical goals of the lesson, and examine the instructional strategies and teaching practices that the teacher in the case lesson uses to get a sense of how he or she adapted it to make it more accessible for the focal student and other students in the class.

In the second part of each workshop, you will have time to work with your team to apply what you learned earlier in the day while planning for a lesson that you will teach in between workshop sessions. The goal for your planning is to adapt the lesson to ensure that students with different strengths and needs in your classroom will be successful in meeting its goals. As with the case lesson, you will examine the math goals for your lesson, analyze its neurodevelopmental demands, consider the strengths and needs of one or more focal children, and select instructional strategies and teaching practices that will make the lesson accessible to the focal student(s) without changing the mathematical goals of the lesson.

You will leave each workshop with some assignments to complete before the next session. In addition to doing some reading, you will also be asked to work with the members of your team to carry out the adapted lesson and reflect on the success of the adaptations for your focal student(s) and other students in your classroom. You will be asked to share what you learned, and have an opportunity to find out what other teams have learned, at the following workshop. The assignments also offer opportunities for you and the facilitators of the professional development to have a private dialog around your work. The facilitators will give you feedback on your assignments. Reading about your experiences with implementing the adapted lessons in your classroom will help them to fine-tune the professional development based on your situation and needs.

The assignments are a key component of the *Math for All* program. They will allow you to apply what you learned to your classroom, and will allow your students to benefit from your professional development. You will have a chance to try out different approaches for making math accessible to all your students and to reflect on what works and what doesn't. This work is demanding, but you will be able to draw on the expertise and support of your colleagues and facilitators.

ONGOING LESSON PLANNING

We hope that the five workshops will allow you to experience enough of the results and benefits of the collaborative lesson planning process that you will continue to engage in it with your colleagues on an ongoing basis after the workshops end. Common prep times, grade level meetings, or faculty meetings may provide venues for doing so. While it is probably unlikely that you can collaboratively co-plan each and every lesson with a colleague, meeting with your team once a week or even once a month to work on a key lesson can make a big difference. In the appendices you will find copies of the lesson planning tools that you may duplicate to support

you in your ongoing lesson planning. Ultimately, we hope that the process for planning accessible math lessons that *Math for All* is introducing you to will become a habit of mind that you will carry out in the natural course of your work.

Thank you for your commitment and efforts in improving the math education of all students!