ENGAGING MINDS IN Science and Math Classrooms

THE SURPRISING POWER OF **JOY**

ERIC BRUNSELL
MICHELLE A. FLEMING

Edited by
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Acknowledgments

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Finally, thank you to our families for adding joy to our lives—Emma, Sam, Melissa, Nathan, William, and Scott.

Introduction

Joy is one of those words that is hard to define, although we know it when we see it. *Joy* is a word heard occasionally in television commercials, but generally not in the course of our daily conversations. With the current emphasis on standardized testing, data, and accountability, joy is rarely part of the professional discourse in schools. But it is important, and joy in learning even more so. From kindergarten until graduation from high school, a child in the United States spends more than 11,000 hours in school. Over the same timespan, the average teacher will have spent more than 15,000 hours teaching. Can you imagine how dismal this would be if joy were completely absent from the classroom environment?

Thankfully, joy is not absent from our schools. We all have had joyful moments, as teachers and as students—magical times where things click, where you are in the zone, times where big smiles and excited chatter reveal an "aha!" moment of understanding. Eric fondly remembers his own experience as a student in a middle school science class, where the smallest person in class lifted the heaviest load using a pulley system and in which he learned about energy and power by sprinting up the stadium steps. Mr. Davis, the teacher, presented challenges to his students, who were expected to work together to figure out how to apply the science. Michelle sentimentally recalls her 9th grade algebra teacher, Mrs. Stephens, who provided multiple algebraic problems situated in real-life contexts and encouraged students

to collaboratively work on solutions; she even used Carl Sagan's astronomy videos to illustrate her contention that "mathematics is the meaning of life!"

In *Engaging Minds in the Classroom: The Surprising Power of Joy* (2014), Michael Opitz and Michael Ford applied Vogt and Shearer's (2010) idea of *principled practice*—the consensus of experts coupled with professional experience—to create a framework for joyful teaching and learning that can be implemented in all content areas, including math and science. This framework comprises motivational generalizations, factors to assess and evaluate when creating a joyful learning environment, and areas in which to promote learning. As we reflect on the moments of joy that we have experienced as teachers and as students, it becomes obvious to us that these joyful learning components are inseparable. Teacher and students can together create a supportive community, activities can be playful and purposeful, and the learning environment can be content-rich and accessible.

In this book, we discuss how to implement the joyful learning framework in the science and mathematics classroom. In Chapter 1, we explore the definition of joyful teaching and learning, specifically as it applies to teaching math and science. This discussion incorporates both evidence from educational research and our own beliefs, based on our professional experience, regarding engagement and motivation.

In Chapter 2, we discuss five elements that can help teachers maximize the benefits of joyful teaching and learning:

- Understanding students as learners,
- Understanding ourselves as teachers,
- Evaluating the relevance of the text and materials we use,
- Determining how assessments can help us improve practice, and
- Understanding how schoolwide configurations influence student learning.

In Chapter 3, the rubber hits the road: we provide a framework for implementing joyful teaching and learning and examples of the framework in action, in mathematics and science activities.

In Chapter 4, we address how the framework for joyful teaching and learning relates to contemporary education initiatives such as Response to

Intervention, the Common Core State Standards, and the Next Generation Science Standards. Another concern for many teachers is how to connect with diverse students, particularly English language learners (ELLs). This is also a focus of the *Engaging Minds in the Classroom* series, so throughout this book, we include teaching tips that suggest specific strategies and highlight research on how to support ELLs in science and math.

Joyful teaching and learning experiences are often described as *magical*. But, as Arthur C. Clarke has been widely quoted as noting, "Magic is just science that we don't understand yet." Our hope is that this book will help you develop an understanding of joyful teaching and learning in science and mathematics. To echo Opitz and Ford (2014),

> We want to help you uncover ways to take this information and apply it to your own unique teaching experience.
>
> Fortunately, this information will fit into your existing classroom routines; much of it is more about your mindset about learners, content, and teaching than it is about adding new content to your already overstuffed curricula. (p. 4)

Our goal is to help you create those magical moments on a regular basis. Because, as author Sidney Sheldon states, "There is magic, but you have to be the magician. You have to make the magic happen" (2004, p. 52).

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Friends and colleagues for more than two decades, Opitz and Ford began working together as a result of their common reading education interests. Through their publications and presentations, they continue to help educators reach readers through thoughtful, purposeful instruction grounded in practical theory.

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