

PREFACE

Consider this scenario: An elementary teacher who has successfully taught in a traditional classroom setting for 20 years is approached by her principal. The principal explains that the school will, for the first time ever, have a STEAM lab and asks the veteran teacher to become the STEAM lab teacher. This teacher is apprehensive as she knows she is successful and comfortable in the classroom she's been in for the past twenty years. However, she also knows students are at times disengaged and she's been contemplating whether her instruction is truly preparing students for their future college and/or career path. After all, she is responsible for preparing her students for jobs that do not yet exist. Fast-forward to the next school year. The teacher is now in her second semester as a STEAM lab teacher. Despite a learning curve, she is now experiencing great success in her teaching and her students' learning has transformed. She is implementing authentic, passion-inspiring STEAM inquiries. Students are applying foundational ideas in mathematics and science and deepening their learning and expanding their interests through STEAM. She is learning alongside her students as they solve complex and important problems to improve the world. Students have transformed into powerful advocates, leaders, decisions makers, and problem solvers. Students' mathematics and science learning and achievement show substantial gains. All students are engaged, challenged, and actively participating. Both the teacher and her students feel inspired at the end of each school day. This is STEAM!

Our Unique and Innovative Approach

Our approach to STEAM is to focus on effective and meaningful teaching and learning that has the strong potential to result in improved student learning outcomes in mathematics and science. Our approach to STEAM goes beyond ready-made lessons and makerspaces to drive instruction that is standards-based with special attention to mathematics and science. Moreover, our classroom examples showcase how STEAM learning can be transformative as students integrate disciplines to grapple with and solve problems that extend beyond the walls of the classroom into issues meaningful to the community. We also embed career connections; not every student is going to enter the STEM pipeline, but each and every student needs to be challenged with opportunities to transfer what they are learning in mathematics and science instruction to solve complex problems of today.

This book positions STEAM education in an innovative and unique way by advocating for and placing a strong focus on the following:

- Building foundational STEAM inquiries starting with alignment to key mathematics and science content and practice standards; focusing on teaching and learning through STEAM to deepen students' mathematics and science learning rather than on "making" and "tinkering"
- Placing a much needed (and often forgotten) focus on the *M* in STEAM
- Advocating that STEAM is for each and every student; advocating for all students to have access to STEAM instruction during the school day; strongly believing that STEAM is *not* only for gifted learners or for an after-school program or summer camp
- Empowering teachers and instructional leaders to develop STEAM inquiries built on the foundation of key mathematics and science content and practices rather than providing scripted curriculum; additional materials can be found online at <http://resources.corwin.com/stepintosteam>.
- Teaching STEAM through an approach that seeks to benefit society, local communities, and individuals through students' learning of STEAM

We felt compelled to create this book because our message is critical: **STEAM is for each and every student, STEAM is about mathematics, and STEAM can and should be implemented to deepen student mathematics and science learning**—a message we know is at the forefront of many of the top concerns facing schools and districts.

A Little About Our STEAM Work

In our own work conducting research and facilitating professional development, we have partnered extensively with teachers, instructional coaches, principals, and school district leaders to build STEAM infrastructures, capacities, and sustainability. Through this work, we have witnessed transformational change in classrooms and schools, seen substantial growth in student mathematics and science learning and teacher content and pedagogical content knowledge, and developed a model with strategies and practical applications for others who wish to launch STEAM education in their classrooms, schools, and districts.

The primary challenge this book addresses is a big one: how we create classrooms, schools, and districts focused on preparing students for jobs that don't yet exist, while still teaching key concepts in mathematics and science and meeting the demands of high-stakes testing. Our book addresses this head-on. Equally important, our book advocates for each and every student to have access to high-quality STEAM instruction, which we feel is nonnegotiable.

What's in the Book?

First, this book is focused on student-driven instruction. This book is organized into three parts. In Part 1, we set the stage for STEAM teaching and learning by providing important background information, including our definition of STEAM, preparation for STEAM, and frameworks that guide STEAM instruction. In Part 2, we focus on the design, implementation, and assessment of STEAM inquiries, providing classroom-tested examples to guide your work framed through our STEAM Inquiry Planning Guide. Good news! There is a downloadable template of the STEAM Inquiry Planning Guide available that you can easily edit to align to the standards you use at <http://resources.corwin.com/stepintosteam!> In Part 3, you'll learn about additional exemplars of STEAM inquiries as well as how to create the overall STEAM learning experience and how to gather resources for STEAM.

Is This Book for You?

This book is a guide for teachers, schools, and districts to use to build STEAM infrastructures, capacities, and sustainability in a way that places a key focus on empowering educators to design and implement STEAM inquiries, which are carefully aligned to key mathematics and science content and practices. Through this lens, teachers, schools, and districts approach STEAM as an infrastructure put into place to deepen students' mathematics and science learning—as well as increase engagement and interest.

Specifically, the content in this book will guide readers in conceptualizing STEAM through a standards-based planning, implementation, and assessment approach. Additionally, readers will gain strategies for structuring the classroom experience for STEAM, learn about relevant resources, and discuss and reflect on exemplar STEAM inquiries.

Inspiration to Go

Are you reaching each and every one of your students every day? Do you wonder whether your students can meaningfully apply the foundational mathematics and science content and practices they are learning? Do you want to increase your students' interest, learning, and achievement in mathematics and science and, more broadly, STEAM? Do you want to meaningfully connect your students to real problems in your community and beyond? Do you want to transform the world? Let's embark on this STEAM journey together! Join us!

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