

# Preface

Some teachers don't truly end their day when the last school bell sounds. For them, that last bell denotes time they can dedicate towards reflecting on the day's events; including what worked in their teaching practice, as well as what can be improved. They might use the time to confer with colleagues about the best ways to differentiate instruction for the wide range of learners in their class each period, or discuss method in which they can work collaboratively across disciplines. These teachers also consider what tools might enhance student learning and engagement, and thoughtfully consider how the intersection of technology, pedagogy, as well as their content knowledge interplays during their lessons. This book is aimed towards that reflective educator.

STEM educators in the Chicago Public Schools wrote this book. These educators were selected by the College of Education at Michigan State University, in partnership with Wipro, to participate in an innovative, integrated year-long graduate certificate experience aimed at building STEM teachers' capacity to lead and inspire innovative practices in urban K-12 schools. Participants in the program were selected through a rigorous process based on criteria which including commitment to teaching in urban schools, deep knowledge of content, and prior achievement and evidence of promise within the field.

This book is a unique resource for educators. It provides 25 STEM lessons for teaching a wide range of content. While this book is primarily geared towards K-12 educators in the STEM fields, it offers ideas for teachers across disciplines. The reader of this book is provided with a plethora of ideas and resources for expanding the lesson to individualized context.

## How this book came to be

In creating this book, each of the STEM educators in the program selected a lesson from their own teaching repertoire, aimed at showing their best work. Following the selection of this lesson plan, every teacher delivered a 30 minute condensed version of the lesson to a small group of fellow class members and educators. This offered an opportunity to solicit extensive peer feedback, as well as a unique chance to share ideas and dialogue after the presentation of each lesson.

The feedback from peers was particularly focused on looking at the learning experience through the lens of several themes, including:

- *Teachers As Learners* (Considering the lesson from the eyes of a student)
- *Elements of Pretty Good Practice* (Promising practices from the lesson)
- *Extensions and Adaptations* (Identifying adaptations and extensions for alternative settings and/or for longer durations)
- *Questions Arisen* (Questions that come up about the content, the pedagogical approach, the use of technology, or any other questions).

This extensive process of sharing best work provided an opportunity to be exposed to new ideas in regards to pedagogical approaches and content approaches – then examine them collectively and methodically. After this iterative process, each teacher assembled their ideas together into a consistent format, that includes key descriptive aspects of their lesson, along with the themes above, feedback received, as well as bibliographic and reference details.

Each of the lessons given here is distinct in that it not only represents the best lesson of the teacher who selected and presented it to their peers, but it also reflects the ideas and takeaways of the other teachers who provided feedback on it. In fact, the peer teachers went beyond giving feedback, but also explored the possibilities for modifying the lessons and pursuing them in other teaching contexts. Therefore, a nice range of teaching perspectives (from educators across different STEM content areas, age/grade levels, and school contexts) is contained within each lesson here. The results of their collective effort have been collated into this book. In this way, it is a labor of love describing some of their best approaches and lessons for STEM teaching and learning which they have graciously shared in the pages to follow.

Please e-mail your comments or questions related to this book to [msuurbanstem@gmail.com](mailto:msuurbanstem@gmail.com). All feedback is welcome, especially information about what you found most helpful, as well as what you would like to see included in future editions.