

Focus Questions

Engineering in Elementary STEM Education

*Curriculum Design, Instruction,
Learning, and Assessment*



Christine M. Cunningham

Focus Questions

for

Engineering is Elementary STEM Education

This resource was designed to prompt deeper reflection, focus your reading, and support your learning. Discuss these questions with colleagues who might stimulate new ideas and insights.

Introduction

- In the introduction, Cunningham recalls a friend who did not want to study science because she believed she would “not [be] allowed to think creatively” (p. 2). Do you agree or disagree with the above statement? If so, why? If not, why do you think this perception exists?

Chapter 1

- Cunningham outlines eight reasons why it’s beneficial to teach engineering in elementary school (pp. 15–19). Of these 8 reasons which most resonates with your goals as an educator? Why?
- Engineering is open-ended, meaning that that there are many possible solutions to a given problem. What challenges might this pose for elementary students? How can you ensure that students are adequately supported as they develop original design solutions? (p. 16)

Chapter 2

- What do you think makes integration between subjects meaningful to students and educators?
- Consider the ways in which the STEM disciplines intersect in everyday life. How can these intersections support students’ understanding of STEM?
- Math and science are the typical foci of STEM curricula. How do you think that impacts students’ access to engineering and technology experiences?

Chapter 3

- Cunningham recommends allowing students to explore materials before they begin an engineering design challenge. How might this process and approach support student learning? (p. 46)
- How might you use the Engineering Design Process to promote a culture of cooperative learning and idea sharing in the classroom?

Chapter 4

- Where do you see the overlap between EiE's Engineering Habits of Mind and the Next Generation Science Standards Engineering Practices? How can this guide your implementation planning?
- Which Engineering Habits of Mind (p. 76) would you most like to see exemplified by your students? Why?
- How can you support your students in their development and practice of these Engineering Habits of Mind?
- How might your students use the skills gained in other disciplines (e.g., science, English Language Arts) to enhance their engineering experiences?

Chapter 5

- Select one or two Curricular Design Principles for Inclusivity (p. 90) that most resonate(s) with you. Reflect on how you would like to integrate these principles into your instruction and how these changes will support student learning.
- Since engineering commonly results in multiple, effective solutions, how can you adjust your assessment methods to account for students' varied approaches? (p. 99)

Chapter 6

- How can you utilize the "common" engineering questions on page 119 in other subjects to further encourage deeper student thinking?
- In this chapter, Cunningham outlines why it's advantageous to downplay competition in elementary engineering. In what other ways could taking this approach support your students? How might you respond to those students who crave competition? (*p. 134)

Chapter 7

- The research summarized in the book indicates several impacts that can result from students' engagement in elementary engineering. Do any of these findings surprise you? Why? What new perspectives have you gained as a result of learning about these findings?
- Research has articulated several roles that educators may take on as their students experience failure through their engineering practice (cheerleader, manager, strategic partner, p. 136). Choose one of the roles and describe an instance where adopting this role would allow you to appropriately support your students.
- How can you use the information in this chapter to inform how you plan to implement engineering education in your setting?

Chapter 8

- What questions can educators, teachers, schools, and districts ask to better define their goals for and approaches to elementary engineering education?
- How can you use the Engineering Design Process to support engineering education in your classroom, school, district, or setting?
- What additional resources, such as funding, staff, family support, etc., will you need to include engineering in your curriculum?
- How has this book supported or changed your thinking about teaching engineering? About teaching and learning?