Action & Thought in Research-Based Science Education:

Dialogues on research and discovery in science and mathematics
Construction and development of creative scientific projects

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This book paves a dialogic way towards examining nature around us. It offers an intellectual delicacy for all lovers of knowledge, and for those interested in science and in the history and philosophy of science.

We look at nature with awe and wonder. We try to understand why the rainbow is so colorful and why it is circular. We want to know why soap film has so many hues, and how soap can be used to solve real-life mathematical problems without cumbersome formulas and ″without tears″.

Describing natural phenomena and attempting to explain our world is the essence of the study of physics. It is acquired by seeking the simplest possible explanations to describe natural phenomena. In this book we aim to found the study of nature by developing an understanding through dialogue about research and discovery in physics and mathematics, and via constructing and developing creative scientific projects. The learner and the mentor go together on a common journey through the overt and covert paths of nature. This journey is connected to the student's modes of learning and research methods as well as the development of thinking tools and fascinating didactic principles. The building blocks set forth here are experiments and observations, followed by analysis and model construction to explain the phenomenon studied.

In the toolbox that this book opens for us, we can find a fascinating discussion about the similarities and differences between the experimental natural sciences, means empirical sciences - and mathematics and logic, means aprioristic sciences. Other tools of inquiry are presented in the discussion on analogy and simulation:

a comparison between parable and lesson, versus observation and study of our world.

The appendices include more in-depth discussions of physics and mathematics, allowing for a reading that flows, stimulates thinking, and opens a broad perspective, one that is interdisciplinary and creative.