NATHAN D. LANG-RAAD

NEVER STOP ASKING

TEACHING STUDENTS TO BE BETTER CRITICAL THINKERS

JOSSEY-BASS™
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Praise for *Never Stop Asking*

"Dr. Nathan Lang-Raad clearly has the background, research, and experience to detail why our modern education system was never designed to create critical thinkers. *Never Stop Asking* is the book educators have been looking for, with insights and strategies that ensure students today will be the skilled thinkers of tomorrow."

—Barbara Bray,
podcast host, speaker, author, story weaver

"Essential reading for any educator wishing to elevate their understanding of critical thinking in the classroom. Nathan Lang-Raad draws from years of experience, elegantly breaking down powerful learning concepts in a unique and clear-sighted way. His ideas and methods come together to form an accessible, rational, and important guide for 21st-century teaching—a crucial companion piece for the spirited educator."

—Misbah Gedal,
head of engagement, Wakelet

"*Never Stop Asking* performs the real service of giving teachers and administrators a positive and bold vision of what supporting students as critical thinkers really looks like, along with exciting and easy ways to implement it. What if your staff read this book and came together in critical thinking dialogue circles to process it and act on it in the classroom? Highly recommended!"

—Laura Gilchrist,
vice president and teacher, ParentCamp; professional development consultant and coach, Kansas City, Missouri

"A thorough introductory treatment of how to teach critical thinking filled with fun, humility, and facts that create a grounding in what is often an elusive concept. What's more, it properly grounds those facts in an acknowledgment of the importance of knowledge in learning to think critically—all of which makes this a valuable resource for educators."

—Michael Horn,
author of *From Reopen to Reinvent*

"One of the greatest skills necessary for growth and achievement is to view the world through a critical thinking lens. Nathan Lang-Raad's book *Never Stop Asking* inspires readers to reflect on thoughts and actions as they empower students to embrace curiosity, ask questions, and push boundaries of common understanding."

—Tamara Letter,
instructional coach and author of *A Passion for Kindness: Making the World a Better Place to Lead, Love, and Learn*

"This book is a must-read for any teacher who cares about creating a critically thinking classroom and society! Nathan synthesizes research and suggests innovative ways to support critical thinking in a refreshing, captivating, and informative way."

—David Palank,
author of *Classhacker* and principal of San Miguel School

"In the world of disinformation and decentralization, the world needs students and citizens who can critically think and ask questions and find answers using decision-making mechanisms that are research-based and not based on anecdotes, ad hominem, or opinions. Dr. Nathan Lang-Raad takes the research body of how we critically think and creates not only a philosophical argument, but provides strategies of how teachers, schools, and individuals can build and practice critical thinking skills. Dr. Lang-Raad allows us to rethink how we think about critical thinking and gives us all a call to action to bring forth strategies to implement it within the schools and institutions we serve in."

—Matthew Rhoads,
EdD, tech integrationist, professor, and author

"It's never been more important to consider what students need beyond the foundational skills and academics our schools prioritize. *Never Stop Asking* invites educators at all levels to contemplate why and how critical thinking should become a higher educational priority, then equips them with the ideas, scenarios, and frameworks to make it a reality in their classrooms or courses—all in one well-researched volume overflowing with actionable insights."

—Carri Schneider,
EdD., head of editorial and publishing, XQ Institute

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To every learner, be curious, relentlessly curious.

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About the Author

Dr. Nathan D. Lang-Raad is an educator, speaker, and author. Throughout his career, he has served as a teacher, elementary administrator, high school administrator, and university adjunct professor. He was the Director of Elementary Curriculum and Instruction for Metropolitan Nashville Public Schools, as well as education supervisor at NASA's Johnson Space Center. He was also the Chief Education Officer at WeVideo. He serves as a US State Ambassador for the Climate Action Project, a collaboration between the United Nations, World Wildlife Fund, NASA, and the Jane Goodall Institute, and an advisor for TAG (Take Action Global).

Nathan is also the author of *Everyday Instructional Coaching*, *The New Art and Science of Teaching Mathematics* (co-authored with Dr. Robert Marzano), *WeVideo Every Day*, *Mathematics Unit Planning in a PLC at Work*, *The Teachers of Oz* (co-authored with Herbie Raad), *The Boundless Classroom* (co-authored with James Witty), and *Instructional Coaching Connection*.

Nathan received a Bachelor of Arts in general science-chemistry from Harding University in Searcy, Arkansas; a Master of Education in administration and supervision from the University of Houston-Victoria; and a Doctor of Education in learning organizations and strategic change from David Lipscomb University in Nashville, Tennessee.

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Introduction

I was sitting in the seat of the flight director at the Mission Control Center (the one used in the Apollo missions) at the Johnson Space Center in Houston. I was the only one in the room, and I looked up at the screens, imagining what life must have been like in the 1960s, the graphs and plots that were compiled and displayed as scientists and engineers were pioneering feats never before accomplished in space flight. I thought about Katherine Johnson's curiosity and brilliance with mathematics that led to the successful space flights of Alan Shepherd and John Glenn. I thought about the tremendous amount of teamwork and critical thinking involved right here in this room as Apollo 13 went from lunar mission to rescue mission. The water conservation, the carbon dioxide syphoning, the navigational decisions, and the multistage burns all 200,000 miles from Earth.

The gravity of the moment (pun intended) sparked the pure awe and wonder of how much we've accomplished as humans, and all this possible through science. And while we're on the topic of possibilities, I hadn't known it was possible that a teacher could work at NASA. But I am here to tell you that they can, and I did. I was a high school chemistry and physics teacher when I was asked to lead student design challenges at the NASA Johnson Space Center during the summer. And then one day they asked me to work full time at NASA. I eventually led a team of

educators, called NASA's Digital Learning Network. This role gave me opportunities to work alongside scientists, astronauts, and engineers with the purpose of inspiring students to pursue STEM-related fields, but most importantly, to develop critical thinking skills. I also had the honor of leading the protocol team that escorted VIPs through Mission Control, and so I spent many hours immersed in science history. Sitting in the flight director chair, thinking about the accomplishments of humankind that got us to this moment, I had an epiphany: my purpose as an educator is to help students think independently and critically, assess the evidence, and disagree with me. Not only will this endeavor help promote critical thinking that will lead to more innovations and better solutions, but I have confidence in my students, and I know that if they are given the proper encouragement to think for themselves about all of the information that is currently available, they will be in the best position to lead lives that are happy, satisfied, and free.

One of the most disheartening things to be learned from history is that if we are fed false information for a sufficiently long period of time, we have a tendency to disregard any evidence that points out the falsehood. We lose interest in learning the truth about the situation. The trickery has us in its grip to the point where we don't want to admit that we've been taken advantage of in any way. Even as new methods and evidence emerge, people often continue to use the old ones, rooted in the comfort of their unchanging perspective. We are now living in the digital age, which has brought about an abundance of information. According to the findings of various studies, the brain enjoys taking shortcuts. This can, at times, make it difficult to differentiate between what we feel and what we know. Why engage in laborious thought when we can simply avoid effort and look something up on Google? Why bother reading a book when all we need to do is scan the headline of a post that's been circulated on social media?

We live in an age where it is common to hear, "I researched it." Most people do not "research" in the true definition of the word. How many people check the source of a social media post to find out who wrote it and whom they wrote it for? How often do we critique the article for inaccuracies and misinformation? Research entails compiling a full literature review, triangulating sources and data points. Research in universities involves testing your hypothesis, collecting a random sample of sources, and performing independent probability statistics on the reported results. How often do we scroll down to the bottom to look at footnotes and references and apply the same source of scrutiny to them? The answer to these questions is probably "rarely." The process for most of us usually follows the same predictable course: we are exposed to something in our algorithmic, manipulated social media feed that resonates with our implicit biases; we then, subconsciously, apply the layers of our own experience and emotional filters, and call it evidence. We are flooded with information, and at the same time find ourselves in a thinking drought. With all of this information, we'll have to do much more than seek to attain knowledge.

To be successful and flourish in this life, we'll have to be better at synthesizing, recognizing patterns, and creatively piecing together the right information at the right time, thinking critically about it, and making important choices with more wisdom. It takes science to prove that observable patterns are linked. We look at factors and circumstances repeatedly and look for other factors to disprove the link between patterns. This is the foundation of science. We begin with observable data and measurements, analyze possible explanations, and systematically confront each explanation with the facts. When we do science, we engage in critical thinking. When a new idea arrives on the scene, we scrutinize it with science, with our brains via critical thinking. In the words of Carl Sagan, "Critical thinking is the means to

construct, and understand, a reasoned argument and recognize a fallacious or fraudulent argument. The question is not whether we like the conclusion that emerges out of a train of reasoning, but whether the conclusion follows from the premise or starting point and whether that premise is true" (Sagan, 2011).

If the thinking process must be capable of changing both the thinker and the context around the thinker, then critical thinking is vital. Thought calls into question our presuppositions about what is possible and creates the roadmap for reasoning, logic, and creativity. Critical thinking is a prerequisite for decision-making. Does it matter what realm of critical thinking one is engaged in? Does it always have to be a problem rooted in science or math? It doesn't. What matters is that information, facts, surprises, and data are considered, and a decision is made to change the course of our direction or decide on a new approach. Critical thinking doesn't limit us with rigid or prescriptive steps but instead paves the way for freedom and progress into the world of human decision-making. As an informed citizen or teacher, you know critical thinking is vital. But as our attention spans shorten and the need for immediate gratification increases, some of the skills necessary to elicit the most excellent quality and quantity of information are waning.

Since the early 1960s, educators and politicians, from local schools to Congress, have been emphasizing the significance of graduating students who are capable of engaging in critical thinking. The volume of knowledge that teachers once had to cram into their students' heads can now be accessed with the swipe of a finger on a smartphone, but in order to make sense of the data, one must be able to think critically about it. To be fair, our modern education system was never designed to create critical thinkers. The current system is a slightly updated version of the postindustrial education system, built on scalability, efficiency, and productivity. It was built to train a large workforce, which

favors an education system centered around compliance, grades, and passing tests. Over the course of the past half-century, there has been undeniable advancement in the teaching of critical thinking. Courses specifically devoted to the topic can be found in the catalogs of a number of different colleges and universities, while the most recent generation of academic standards for grades K–12 places an emphasis not only on the subject matter but also on the skills necessary to think critically about the subject matter. Despite this progress, 75 percent of employers claim that the students they hire after 12, 16, or more years of formal education lack the ability to think critically and solve problems. This is the case despite the fact that nearly all educators claim that they place a priority on assisting students in the development of these very skills.

Is there a tool or framework we can employ to support students with critical thinking? The purpose of this book is to help you in this endeavor. We will begin with the heuristics our brains create to shortcut critical thinking. Then I'll equip you with the strategies needed to support all learners in critical thinking effectively. How will you know that your students are successful?

- They will be able to identify their own biases.
- They will question their own belief systems.
- They will be able to evaluate their own ideas.
- They will be able to confidently ask open-ended questions.
- They can parse data and classify it as reliable and credible.
- They develop the intrinsic desire to research based on their own curiosity.
- They will employ the proper channels of research.
- They will be able to see a throughline in their problem-solving and reasoning ability.

- They will be able to clearly see cause-and-effect relationships.
- They will learn a sense of being present and content.

As you review the list above, you might ask yourself why these things are not already part of the educational experience. Why are these considered lofty goals? Because of the way classrooms are currently structured, there is a push for speed, consumption, productivity, standardization, and grades. These facets of education don't inherently create conditions for critical thinking. There is a misalignment between what critical thinking demands and the current structure of our school systems. Given the increasing dangers, many of which are attributable to insufficient critical thinking about the topics that are most important, it is abundantly clear that we need to do more to ensure that the students of today will be the skilled thinkers of tomorrow. We are, fortunately, in a position to do so without having to completely overhaul the existing structure of education. It begins with you. It begins in your classroom, or with the principal leading the school building. I wrote this book for you, to support you in your journey of cultivating critical thinkers and problem solvers.