



Book Series

## *Teaching and Learning Online*

Series Editors

Franklin S. Allaire, *University of Houston-Downtown*; Jennifer E. Killham, *University of La Verne*

The “Teaching and Learning Online” series provides readers with an in-depth look at the current trends, benefits, challenges, and issues of engaging students in online environments. Volumes in the “Teaching and Learning Online” series will serve as textbooks for university teacher preparation courses as well as a wide range of undergraduate/graduate programs and professional development workshops. Edited volumes explore research, theory, and practice at the elementary, secondary, and post-secondary levels. Chapters explore topics and developments related to the use of online technologies, methodologies, and pedagogies for instructors to use as they work to meet the needs of students in online environments. Sections describe experiences and practical strategies that will interest and support PreK-12 and post-secondary educators as well as pre-service teachers, teacher educators, parents, and administrators.

### **Call for Book Proposals**

The expansion of online environments for education poses logistical and pedagogical challenges for PreK-12 and higher education students and teachers. Since the 1990s, the adoption of online coursework across both EC-12 and higher education settings has increased (Darby & Lang, 2019), even during economic downturns, as documented in the report *Grade Increase* (2018) compiled by the Babson Survey Research Group. Yet, teachers and teacher educators report feeling underprepared or overwhelmed by online learning environments. How do we deliver high-quality instruction and experiences to students in an online environment?

#### **TOPICS OF INTEREST:**

The series editors invite volumes focused on engaging PreK-12 students, undergraduate/graduate students, teachers, and teacher educators in online environments. Potential volumes could be single-authored, co-authored, or edited collections of multiple chapters following a common theme in teaching and learning online. All volumes should include attention to the why and how teachers use online environments as well as the methods and strategies for engaging learners in online environments and, where appropriate, lesson plans readers can implement in their classrooms. Topics for volumes might include:

- Exploring specific disciplines (i.e. mathematics, social studies) in online environments
- Social Justice and Technology
- Teacher Education
- Urban or Rural Online Education
- Engaging diverse learners online

#### **PROPOSAL INFORMATION:**

We advise that authors first submit an outline and proposal for consideration in the book series. We welcome a description of the volume mission and vision, possible chapter content,

methodological contribution, and how the volume aligns with the series teaching and learning online. Please also include a description of how the book extends the field of scholarship it enters and the potential audiences for the text.

**CHAPTER SUBMISSION GUIDELINES:**

The proposal and manuscript should include author/editor information, institutional affiliation, professional title, and a brief biographical note about the authors/editors. Please follow APA 7th formatting guidelines for the materials. Submit in word documents only to the series editors, as listed below.

Send inquiries to Franklin S. Allaire and Jennifer E. Killham:  
teachingandlearningonlinebook@gmail.com

**Books in this series:**

- Teaching and Learning Online
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## Teaching and Learning Online Science for Secondary Grade Levels

Franklin S. Allaire, University of Houston-Downtown; Jennifer E. Killham, University of La Verne

2023. Paperback 979-8-88730-127-3 \$72.99. Hardcover 979-8-88730-128-0 \$104.99. eBook 979-8-88730-129-7 \$85.

Science is unique among the disciplines since it is inherently hands-on. However, the hands-on nature of science instruction also makes it uniquely challenging when teaching in virtual environments. How do we, as science teachers, deliver high-quality experiences to secondary students in an online environment that leads to age/grade-level appropriate science content knowledge and literacy, but also collaborative experiences in the inquiry process and the nature of science?

The expansion of online environments for education poses logistical and pedagogical challenges for early childhood and elementary science teachers and early learners. Despite digital media becoming more available and ubiquitous and increases in online spaces for teaching and learning (Killham et al., 2014; Wong et al., 2018), PreK-12 teachers consistently report feeling underprepared or overwhelmed by online learning environments (Molnar et al., 2021; Seaman et al., 2018). This is coupled with persistent challenges related to elementary teachers' lack of confidence and low science teaching self-efficacy (Brigido, Borrachero, Bermejo, & Mellado, 2013; Gunning & Mensah, 2011).

Teaching and Learning Online: Science for Secondary Grade Levels comprises three distinct sections: Frameworks, Teacher's Journeys, and Lesson Plans. Each section explores the current trends and the unique challenges facing secondary teachers and students when teaching and learning science in online environments. All three sections include alignment with Next Generation Science Standards, tips and advice from the authors, online resources, and discussion questions to foster individual reflection as well as small group/classwide discussion. Teacher's Journeys and Lesson Plan sections use the 5E model (Bybee et al., 2006; Duran & Duran, 2004). Ideal for undergraduate teacher candidates, graduate students, teacher educators, classroom teachers, parents, and administrators, this book addresses why and how teachers use online environments to teach science content and work with elementary students through a research-based foundation.

**CONTENTS:** Introduction: Teaching and Learning Online: Science for Secondary Grade Levels, *Franklin S. Allaire and Jennifer E. Killham*. **PART I: FRAMEWORKS.** Inquiry and Nature of Science in Digital Spaces, *John L. Pecore and Lisa Martin-Hansen*. Crosscutting Concepts: The Common Thread Often Hidden, *Patrick Enderle, Scott Cohen, and Marissa Murdock*. Issues of Diversity, Equity, and Inclusivity in Online Secondary STEM Education, *Anne Mangahas*. Empowering Secondary Teachers to Use EQUIP Rubric to be Critical Conscious Users of Online Science Curricular Materials, *Amal Ibourk and Tina Cheuk*. Engineering Design as a Framework for Virtual Education in Inclusive Science Classrooms, *Amanda L. Mazin and Jessica F. Riccio*. Bridging the Gap: Empowering Adolescent Girls in STEM Through Online Learning and Mentoring, *Leslie Ekpe and Sarah Toutant*. Supporting Claim-Evidence-Reasoning in Linguistically Diverse Secondary Science Classes, *Preetha K. Menon*. Giving Online Learning the Personal Touch: The Promoting Evidentiary Reasoning and Self-Regulation Online (PERSON) Framework, *Robert B. Marsteller and Alec M. Bodzin*. **PART II: TEACHER'S JOURNEYS.** Using Educational Technology to Foster High School Students' Online Presence and Engagement as Becomings: An Integrated Stem Lesson on Trebuchets and Parabolas, *Sophia Jeong and Stephen T. Lewis*. A PhET Simulation Inquiry Lab on Energy Conservation: Modified for Remote Learning in High School, *Trish Loeblein and Katherine Perkins*. Active Learning at Home: Using 3D Virtual Reality Viewers to Explore the Human Heart for High School Students, *Rebecca Hite, Gina Childers, and M. Gail Jones*. Citizen Science to Engage Youth in Pollinator Conservation for the Social Good, *Rita Hagevik and Kaitlin Campbell*. Where Did My Food's Food Come From? Nature Journaling as a Tool For Meaning-Making In Photosynthesis, *Kelly Feille and Stephanie Hathcock*. Design Thinking and Mini-Maker Kits in Science Education: Frameworks for Creative Problem-Solving in Transitions to Online and Hybrid Learning, *Helen Douglass and Isaiah Darden*. **PART III: LESSON PLANS.** Exploring Regional Climates with 360-Degree Photo Spheres, *Matthew Clay*. Scientific Modeling in a Virtual Setting: Floating and Sinking Pennies! *Sophia Jeong and David Pauli*. Digging Into Rocks & Minerals Through Science Olympiad's MY SO Program, *Lucas Gobel, John Loehr, and Katrina Pavlik*. A Look Inside the Atom: The Basic Building Block of Matter and the Foundation in an Online Science Course, *Natasha Hillsman Johnson and Sophia Jeong*. When Things Move With Constant Velocity and Acceleration, *Philomena N. Agu*. Using Scaffolding to Develop Evidentiary Reasoning: A Simulation-Based Approach to Teaching Biological Evolution Online, *Robert B. Marsteller and Alec M. Bodzin*. Climate Crisis Issues in Our Community, *Amy Vo*. Exploring Digital Inclusive Pedagogy in Action in a High School Physics Class: Analyzing and Interpreting Force and Motion, *Jessica Riccio, Amanda Mazin, and Ibrahim Dincer*. Stability and Change: Wildfires and Ecosystem Succession, *Marissa Murdock, Scott Cohen, and Patrick Enderle*. How Does CO<sub>2</sub> Interact With Water To Make It More Acidic? *Lorna Otero, Juliet Octavius, Amanda Mazin, and Jessica Riccio*. A Case of Violet's GLUT1: What is Wrong with Violet? *Sophia Jeong, Jennifer Yauck, Sarah Robinson, Patricia Zagallo, and Paula Lemons*. Biographies.



## Teaching and Learning Online Science for Elementary Grade Levels

Franklin S. Allaire, University of Houston-Downtown; Jennifer E. Killham, University of La Verne

2022. Paperback 978-1-64802-874-8 \$52.99. Hardcover 978-1-64802-875-5 \$94.99. eBook 978-1-64802-876-2 \$85.

Science is unique among the disciplines since it is inherently hands-on. However, the hands-on nature of science instruction also makes it uniquely challenging when teaching in virtual environments. How do we, as science teachers, deliver high-quality experiences in an online environment that leads to age/grade-level appropriate science content knowledge and literacy, but also collaborative experiences in the inquiry process and the nature of science?

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Teaching and Learning Online: Science for Elementary Grade Levels comprises three distinct sections: Frameworks, Teacher's Journeys, and Lesson Plans. Each section explores the current trends and the unique challenges facing elementary teachers and students when teaching and learning science in online environments. All three sections include alignment with Next Generation Science Standards, tips and advice from the authors, online resources, and discussion questions to foster individual reflection as well as small group/classwide discussion. Teacher's Journeys and Lesson Plan sections use the 5E model (Bybee et al., 2006; Duran & Duran, 2004). Ideal for undergraduate teacher candidates, graduate students, teacher educators, classroom teachers, parents, and administrators, this book addresses why and how teachers use online environments to teach science content and work with elementary students through a research-based foundation.

**CONTENTS:** Introduction: Teaching and Learning Online: Science for Elementary Grade Levels, *Franklin S. Allaire and Jennifer E. Killham*. **PART I: FRAMEWORKS** Strategies and Tips for Teaching Nature of Science Lessons in Online Settings, *Omah M. Williams-Duncan*. Issues of Diversity, Equity, and Inclusivity in Online Elementary STEM Education, *Anne Mangahas*. Integrating Social Justice Pedagogy in an Online Elementary Science Classroom, *Tonya D. Jeffery, Emily A. Jackson-Osagie, and Justina A. Ogodo*. Science Language Routines for Online Settings: Supporting Science Learning for English Learners in Elementary Grades, *Preetha K. Menon*. Using TPACK and T3 Lenses to Promote and Support Science Online Learning Experiences in Early Childhood, *Kheng Ly-Hoang, Valerie Y. Sun, and Sharon H. Ulanoff*. Strategies and Tools for Success in Inquiry-Based Online Collaborative Learning Environments, *Sahar Alameh, Sagan Goodpaster, and Christopher Preece*. Let's Talk Science: Using Questioning to Foster Discussion in the Online Elementary Classroom, *Jennifer C. Stark, Shim Lew, and John L. Pecore*. Adapting to the New Science Classroom: Leveraging the 5Es in Online Settings, *L. Octavia Tripp and Victoria Cardullo*. **PART II: TEACHER'S JOURNEYS.** Exploring Media Use in Online Hands-On 2nd Grade Bridge Unit, *Maike Bouwmeester and Shilpa Sahay*. Plants, Plants, What Do You Need? An Online Second-Grade Science Lesson, *Tynetta Jenkins and Jami C. Friedrich*. Empowering Elementary Students Through Interactive Nature Journaling, *Tina Cheuk*. Getting Hands On In-Person and Online with Science Olympiad's 'Save the Ice!', *Katrina A. Pavlik, Shari J. Haug, Jennifer A. Kopach, and John F. Loehr*. **PART III: LESSON PLANS.** Flowing Charges, *Philomena N. Agu*. Testing Properties of Matter: Which Facemask Materials are Most Effective for Preventing the Spread of Disease? *Jessica L. Chen*. Integrating Satellite Imagery and 360-Degree Photo Spheres to Teach: Environmental Science Online for Elementary Students, *Matthew Clay*. Tracking Clouds in the Cloud, *Sagan Goodpaster and Sahar Alameh*. Hurricanes and the Incredible Mystery of Disappearing Land, *David Steele, Tamar More, Sharon Sherman, Janet Stramel, and Sophia Jeong*. Saving The World, One R At a Time! *Roxana Yanez Gonzalez, Christine D. Tippett, and Todd M. Milford*. Investigating Speed and Energy with Balloon Rockets, *Amy Vo*. Using Chromatography to Identify Properties of Matter, *Amy Vo*. Biographies.



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