RESOURCES
For Mathematics and Science Teaching and Learning

by TERC — curricula, activities, software, and professional development books and services
Resources

Years of research go into TERC’s products—innovative classroom materials for students, cutting-edge research and professional development publications, web-based resources that enrich traditional materials, games and software for out-of-school-learners, and web-based and mobile assistive technologies for individuals with disabilities.

The following pages highlight some of the products and services developed by TERC. For a complete list of resources, visit www.terc.edu.

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Investigations in Number, Data, and Space

Authors: Lucy Wittenberg (Director, Grades 3-5), Karen Economopoulos (Director, Grades K-2), Virginia Bastable (Summermath for Teachers, Mt. Holyoke College), Katie Hickey Bloomfield, Keith Cochran, Darrell Earnest, Arusha Hollister, Nancy Horowitz, Erin Leidl, Megan Murray, Young Oh, Beth W. Perry, Susan Jo Russell, Deborah Schifter (Education Development Center), Kathy Sillman

Investigations is a complete K-5 mathematics curriculum. It is designed to help all children understand fundamental ideas of numbers and operations, geometry, data, measurement, and early algebra.

The curriculum is designed to:

• Support students to make sense of mathematics and learn that they can be mathematical thinkers.
• Focus on computational fluency with whole numbers as a major goal of the elementary grades.
• Provide substantive work in important areas of mathematics—rational numbers, geometry, measurement, data, and early algebra—and connections among them.
• Emphasize reasoning about mathematical ideas.
• Communicate mathematics content and pedagogy to teachers.
• Engage the range of learners in understanding mathematics.

Underlying these goals are three guiding principles:

• Students have mathematical ideas. The curriculum must support all students in developing and expanding those ideas.
• Teachers are engaged in ongoing learning about mathematics content and about how students learn mathematics. The curriculum must support teachers in this learning.
• Teachers collaborate with the students and curriculum materials to create the curriculum as enacted in the classroom. The curriculum must support teachers in implementing it in a way that accommodates the needs of their particular students.

Based on extensive classroom testing, Investigations takes seriously the time students need to develop a strong conceptual foundation and skills based on that foundation. Therefore, each curricular unit focuses on an area of content, in depth, providing 2 to 5 1/2 weeks for students to develop and practice ideas across a variety of activities and contexts that build on each other. The units also address the learning needs of real students in a wide range of classrooms and communities. The investigations are carefully designed to invite all students into mathematics—girls and boys; members of diverse cultural, ethnic, and language groups; and students with a wide variety of strengths, needs, and interests. The development of the curriculum was supported in part by the National Science Foundation (ESI-0095450).
Astrobiology: An Integrated Science Approach

Authors: Jeffrey F. Lockwood, Jodi E. Asbell-Clarke, Daniel W. Barstow, Teon E. Edwards, James L. Larsen, Christopher H. Randall, Brian Drayton

Astrobiology: An Integrated Science Approach is a full-year genuinely integrated science curriculum that weaves its way through the disciplines of biology, chemistry, physics, astronomy, and Earth science, as well as sociology, ethics, and the psychology of human thought and behavior. It kindles interest and curiosity in students and offers an exciting entry into high-school science.

The curriculum propels students to consider:

• Is there life elsewhere in the universe?
• What is life?
• What makes a planet habitable?
• What is an “extremophile?”
• How do we search for life?
• What is the future of life on Earth?

Materials include:

In the Student Guide:

• Each chapter assesses student preconceptions. “Challenge” sections provide performance assessments that evaluate depth of students’ understanding of science concepts. Additionally, clear instructions include explicit criteria for success that guide students as they work to complete Challenges.
• “What’s the Story?” activity sections provide readable, student-friendly background, delivered in manageable bites. Embedded assessment questions help monitor student progress. Every activity links back to the Challenge, helping students synthesize a rich array of science concepts.
• Alternate assessments forge connections between content areas and inspire student reflection on big ideas. Each chapter builds math and science inquiry skills through activities and reflection. As they generate and analyze scientific data, students do science instead of simply reading about it.

In the Teacher’s Guide:

• Answer Keys, Blackline Masters, Transparencies, and Color Images: resources that help teachers deliver best practice instruction.

The Astrobiology curriculum was conceived, developed, and written by leading educators and classroom teachers with the participation of NASA and with funding from the National Science Foundation (ESI-9730728).
Physics That Works

This year-long high school physics curriculum situates standards-based science learning in authentic contexts. Students undertake extended workplace-related projects where they acquire and apply science knowledge and skills. The curriculum is based on the principle that all students learn better and more deeply when they learn in context, and on the belief that such an approach offers students who have not been engaged by abstract science the opportunity to achieve on a par with their peers. Units include:

- Unit 1 Kinematics: Toys in Motion
- Unit 2 Forces and Motion: On the Road Again
- Unit 3 Electricity and Simple Circuits: Restoring a Heartbeat
- Unit 4 Generators and Diodes: Building a Better Bike Light
- Unit 5 Energy: Live from WPTW!

This work was supported in part by the National Science Foundation (ESI-9618149).

Investigating Astronomy

Authors: Jodi E. Asbell-Clarke, Jeffrey F. Lockwood, Erin M. Bardar, Teon E. Edwards

Investigating Astronomy is the first comprehensive astronomy textbook written specifically for high school students. This book includes all the major topics in an astronomy course with material to engage students in hands-on investigations and tools to help students learn in interactive and meaningful ways. The book also focuses on scientific inquiry; the process of making scientific claims and supporting them with evidence; and using scientific reasoning to justify and revise those claims.

Each unit has a series of Explorations based on an Essential Question that guides learning. The Explorations prepare students for the unit Challenge, a project that makes use of all information presented in the unit.

Investigating Astronomy provides a Web-Based Data Center. The Investigating Astronomy Data Center, used in many of the curriculum activities, gives students a sense of working with real data using tools that are similar to those astronomers use, but with an interface that does not require a steep learning curve.

This work was supported by the National Science Foundation (DRL-0352180).
Science by Design

Launch a new generation of students into catapult- and boat-building—plus glove- and greenhouse-making—with this newly refreshed resource. Four sets of well-loved activities have been repackaged in one convenient volume that seamlessly combines hands-on experience with intriguing engineering concepts. Perfect for inspiring interest in STEM topics, the activities encourage high school classes to learn by doing and to successfully develop and carry out product design. The activities will get your students fully engaged in meaningful explorations of concepts such as

- buoyancy and friction (through boats);
- torsion and elasticity (catapults);
- heat transfer and insulation (gloves); and
- plant biology, thermodynamics, and energy transfer (greenhouses).

Best of all, Science By Design is written with the needs of time-starved teachers in mind. Each of the four units provides thorough explanations, materials lists, cost and timing estimates, and teaching suggestions. There are also ideas for assessment and student portfolios, plus lists of connections to national standards. Bonus resources called “side roads”—off-the-beaten-path investigations that let teachers and students delve further into the links between inquiry and design.

EMPower™

Authors: Mary Jane Schmitt, Myriam Steinback, Tricia Donovan, Martha Merson, Donna Curry

EMPower (Extending Mathematical Power) is a mathematics curriculum for non-traditional students enrolled in adult basic education, pre-GED, GED, and transitional courses to college, as well students in alternative high schools, workplace settings, or corrections programs. EMPower

- Fosters mathematical reasoning included in the Common Core State Standards and the NCTM’s Principles and Standards for School Mathematics.
- Engages learners with student-centered activities relevant to everyday life.
- Works well alongside Contemporary mathematics products such as Number Power ® and Math Problem Solver.
- Prepares students for a deeper level of math proficiency necessary to successfully handle everyday problems as well as mathematics tests like the GED or college placement exams.
- Embeds teacher support and promotes a learning community in which students communicate ideas orally and in writing, and discover multiple strategies for solving problems.

The full curriculum is comprised of eight non-sequential units emphasizing whole numbers, fractions, decimals, percents, proportions, geometry and measurement, algebra, and data and graphs. EMPower was developed and field tested with support from the National Science Foundation.
Developing Mathematical Ideas

*Developing Mathematical Ideas* (DMI) is a curriculum designed to help teachers think through the major ideas of K-6 mathematics and examine how children develop those ideas. At the heart of the materials are sets of classroom episodes (cases), illustrating student thinking as described by their teachers. The curriculum offers teachers opportunities to explore mathematics content, to analyze student thinking about that content in written and video cases, to share and discuss the work of their own students, and to read overviews of related research. Each unit provides 24 hours of instruction focused on specific mathematics content.

Five units are available:

- Numbers and Operations, Part 1: Building a System of Tens
- Numbers and Operations, Part 2: Making Meaning for Operations
- Measuring Space in One, Two, and Three Dimensions
- Examining Features of Shape
- Working with Data

The materials were developed by Education Development Center (EDC), Summermath for Teachers at Mt. Holyoke College, and TERC, through a grant to EDC from the National Science Foundation.

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Ten-Minute Math

*Authors:* Cornelia Tierney, Susan Jo Russell

This book is drawn from the K-5 mathematics curriculum, *Investigations in Number, Data, and Space*. In that program, suggestions for quick explorations known as ‘ten-minute math’ are woven throughout the units to support and balance the in-depth work of each unit. In addition, the curriculum includes several math games that can be repeated often for skill-building work. This single, easy-to-access collection is a valuable resource for all teachers, Investigations users or not, and integrates activities into three major areas of the elementary mathematics curriculum: 1) Numbers; 2) Data Analysis; and 3) Two and Three Dimensional Space (geometry).

With the activities in these three areas, you can help your students acquire broader mathematical thinking and problem-solving skills. You will also help them increase their strategies for mental calculation, gain confidence in inventing their own approaches for solving problems, and become more fluent in reflecting on and articulating their problem-solving processes.
Signing Math and Science Dictionaries & Pictionarys

For *Signing Math & Science*, TERC and Vcom3D have used the SigningAvatar® assistive technology to develop illustrated, interactive 3D standards-based sign language dictionaries that offer students in grades K-8 and 9-12 who are deaf and hard of hearing increased access to the same learning opportunities that hearing students enjoy.

- Signing Science Dictionary (SSD)—a dictionary of science terms and definitions for grades 4-8.
- Signing Science Pictionary (SSP)—a dictionary of science terms and definitions for grades K-4.
- Signing Math Dictionary (SMD)—a dictionary of mathematics terms for students in the elementary and middle grades.
- Signing Math Pictionary (SMP)—a dictionary of math terms and definitions for grades K-4.
- Signing Earth Science Dictionary (SESD)—a dictionary of Earth science terms for grades 9-12.
- Signing Life Science Dictionary (SLSD) and Signing Physical Science Dictionary (SPSD)—a dictionary of life science terms and a dictionary of physical science terms for grades 9-12.

Software Contact: Available from VCom3D
www.vcom3d.com;
iPhone/iPad/iPod Touch apps for the SSD, SSP, and SMD available from
www.signingapp.com
Type: Software
Topic: Science
Grade Level: K-8, 9-12

The Inquiry Project

The *Inquiry Project* takes a unique approach to a study of matter for grades 3–5, bringing together core ideas, scientific practices, and crosscutting concepts. The curriculum for each grade is built around a network of science concepts relevant to understanding matter and include ideas about material, weight, and volume. As they learn about the core idea of matter, students use scientific practices that are central to inquiry such as reasoning from evidence, building and using models, and developing explanations.

In grade 3, investigations of weight and material are front and center and volume is introduced briefly at the end of the unit. Within their investigations, students learn to use data tables and measure lines to represent weight.

In grade 4, students investigate properties of earth materials. They learn to distinguish and measure weight and volume and investigate their relationships in different solid and liquid materials.

In grade 5, students investigate properties of gases. They deepen their understanding of matter as they investigate phase change and transformations of water as it freezes, melts, evaporates, and condenses.

This material is based on work supported by the National Science Foundation under Grant No. DRL-0628245.

Publisher Contact: TERC
Available on Amazon
http://inquiryproject.terc.edu/
1.617.873.9600
Type: Curriculum
Topic: Science
Grade Level: 3-5

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Investigating Science Outdoors

*Investigating Science Outdoors* engages students in authentic explorations of a study site—a small piece of land near their school. It is a supplementary science curriculum, targeted for grades 7-9 and is appropriate for afterschool and camp programs, as well as in-school use.

The curriculum consists of two chapters. Each chapter consists of six activities, which take 1-2 class periods.

- **Chapter 1: Study Site** — Students select, observe, map, document, and otherwise begin investigating a study site.
- **Chapter 2: Systematic Sampling** — Students systematically investigate their study site, conducting more detailed observations, collecting samples and gathering data, identifying the flora and fauna observed, and share investigation results via the Web.

The *Investigating Science Outdoors* eBook was developed by TERC. It is based on a full-year curriculum, Global Lab, also developed by TERC and funded in part by a grant from the National Science Foundation.

Food Fights, Puzzles, & Hideouts (*MiM*)

*Food Fights, Puzzles, & Hideouts* (*MiM*)

*Author:* Marlene Kliman, Valerie Martin, Nuria Jaumot-Pascual


- All kinds of games: coin, dice, and board; quiet and active; partner and whole group. Play to win or play so everyone wins!
- Build, design, create, and grow with projects and crafts that use everyday materials like paper towel tubes and cardboard boxes.
- Icebreakers, party games, challenges, and contests designed for a crowd.
- Activities to do and games to play wherever you are: in the car, on the bus, in a waiting room, or at the dinner table.
- Things to do on familiar holidays (like July 4), less common holidays (like Backward Day) and any day. Includes a bonus set of ideas for celebrating 100 days.
- Now available in Spanish.

The activities, games, and projects in this book span the key topics in the elementary grades Common Core State Standards for Mathematics. Many of the ideas in this book are interdisciplinary, including topics in engineering, science, social studies, and literacy.
My Kids Can: Making Math Accessible to All Learners, K-5

Author: Judy Storeygard

My Kids Can: Making Math Accessible to All Learners, K-5 is a new practitioners’ guide written by teachers, for teachers. The essays are designed to help K-5 teachers make math accessible for all students—especially focusing on instructional strategies that help students struggling with math advance toward grade-level competency.

In the essays, teachers share their observations and successful methods for engaging their students who need extra support to learn mathematics. These teachers describe how they use whole-group, small-group, and individual instruction as well as other strategies that hold kids to high expectations while scaffolding content and processes across the math curriculum.

Building on the principles of making mathematical thinking explicit; linking assessment and teaching; building understanding through talk; encouraging autonomous learning; and collaborating with special education staff to improve instruction, this guide includes sample dialogue, teaching moves, and assessment strategies. The accompanying DVD presents classroom footage of their teaching and includes the language and teaching moves you’ll adapt for success with your students. The DVD also contains teacher interviews that answer difficult questions of practice.

Publisher Contact: Available from Heinemann
www.heinemann.com
1.800.225.5800

Type: Book & DVD
Topics: Professional Development; Math
Grade Level: K-5

Say It with Shapes and Numbers (MiM)

Author: Marlene Kliman, Valerie Martin, Nuria Jaumot-Pascual

Play games, build towers, move to the beat, and go on a pretend picnic—all with math! This Pre-K book contains over 200 ways to mix in math with:

- Games for matching colors and numbers, and for comparing, counting, and simple addition and subtraction. Play with a special full-color card deck included in the book.
- Things to build, design, and create with projects and crafts that use everyday materials. Includes English and Spanish words in colorful geometric shapes to use for projects that combine geometry, patterns, and literacy.
- Ideas to investigate and games to play in and around the kitchen and at mealt ime. Icebreakers, party games, and group activities for indoors and out.
- Activities to do and games to play wherever you are: in the car, on the bus, in a waiting room, or at the dinner table.
- Ideas for mixing math into seasons, holidays, and special events all year round.

Aligned to NAEYC Early Childhood Mathematics Position Statement, Pre-K Standards, and where relevant, Common Core Math Standards, grades K.

Publisher Contact: TERC
http://mixinginmath.terc.edu
1.617.873.9600

Type: Book
Topic: Math
Grade Level: Pre-K–1
Creating and Sustaining Online Professional Learning Communities

Authors: Joni K. Falk and Brian Drayton (Eds.), Sasha A. Barab, Bertram (Chip) Bruce, Susan J. Doubler, Soo-Young Lee, Flora McMartin, Jon Obuchowski, Andee Rubin, Rebecca K. Scheckler, Wesley Shumar

This book presents the work of trailblazing researchers and developers of electronic communities for professional learning. It illuminates the essential work behind the scenes in building successful online communities and scaffolding site interactions, including content selection, creation and management, administrative structures, tools and interactive functionalities, the facilitation of discourse and emergent subcommunities, and the development of online leadership. While each of the authors is well versed in Web site design, new technologies, and collaborative Web tools, their work is deeply influenced and informed by scholarship which has unfolded over the last three decades about how professional learning takes place, particularly for math and science educators.

The communities and authors featured provide different forms of online professional development for university professors, K–12 teachers, and administrators, among others. Their insights will be of interest to anyone designing, sustaining, or studying electronic learning environments.

Teaching Science to English Language Learners

Editors: Ann S. Rosebery and Beth Warren

Can a student’s cultural background support and extend learning in science? Can students learn science before they’re proficient in English? Or is concentrating on the specialized vocabulary of science the best way to teach science to English language learners? This book addresses these and other questions, and combines this research with classroom case studies and the perspectives of master teachers. Further, chapter authors strive to support efforts to use diversity as a resource—rather than an obstacle—in the science classroom.

Topics include:

- Building on what students know and recognizing students’ strengths
- Teaching vocabulary for learning
- Supporting the development of academic language
- Challenges associated with learning a second language
- Types of programs for teaching English language learners

Publisher Contact: Available from Teachers College Press

www.tcpress.com
1.800.575.6566

Type: Book, eBook

Topics: Professional Development; Technology, Online Communities

Grade Level: All

Publisher Contact: Available from NSTA Press

www.nsta.org
1.702.243.7100

Type: Book, eBook

Topics: Professional Development; Language, Culture, and Education

Grade Level: All
The Data Coach’s Guide to Improving Learning for All Students

Authors: Nancy Love, Katherine E. Stiles, Susan Mundry, Kathryn DiRanna

The Data Coach’s Guide to Improving Learning for All Students provides detailed guidance for helping schools move away from unproductive data practices and toward examining data as a catalyst for systematic and continuous improvement in instruction and student learning. The authors demonstrate a data model that has been field-tested and proven to be effective in:

- Narrowing achievement gaps between students in all content areas and grade levels
- Achieving strong, steady gains in local and state assessments in mathematics, science, and reading
- Using data as a springboard for powerful conversations about race/ethnicity, class, educational status, gender, and language differences
- Developing shared values and a vision for creating a high-performing, data-informed school culture

This culturally responsive resource benefits staff developers, teachers, and administrators interested in creating change through effective data practices, and includes a CD-ROM keyed to the book, with templates, handouts, PowerPoint slides, resources, and sample goals and agendas.

Using Data to Improve Learning for All: A Collaborative Inquiry Approach

Author: Nancy Love

Presenting a conceptual framework and practical methods, this resource combines a powerful collaborative inquiry process, reflective dialogue, and rigorous use of data to improve outcomes for all students. The book includes detailed examples of schools that have demonstrated dramatic gains by building collaborative cultures, nurturing ongoing inquiry, and using data systematically. The editor and chapter contributors show school and district leaders how to:

- Implement collaborative inquiry to meet accountability mandates
- Build and support a high-performing data culture
- Establish a school climate characterized by collective responsibility for student learning and a respect for students’ cultures

Publisher Contact: Available from Corwin Press
www.corwin.com
1.800.233.9936

Type: Book & CD
Topics: Professional Development; Data Literacy
Grade Level: All
Talking Mathematics: Resource Package

Authors: Rebecca B. Corwin, Judith Storeygard, Sabra L. Price

Doing mathematics provides unlimited opportunities for children to communicate their ideas. When students talk about math, they pose questions, take risks, and pursue their own investigations. Teachers who have not experienced ‘good’ mathematical discourse, however, may find it difficult to encourage it in their classrooms. This resource of videotapes and print materials helps staff developers and college instructors create an environment where teachers do mathematics together and develop excitement about students’ mathematical learning and thinking.

The package includes:

• Videotape Program
• Talking Mathematics: Resources for Developing Professionals
• Talking Mathematics: Supporting Children’s Voices
• Introductory videotape, Talking Mathematics: Supporting Classroom Discourse

Count Me In! K-5: Including Learners with Special Needs in Mathematics Classrooms

Author: Judy Storeygard

Between the pressure to meet standards and the overwhelming number of different learning needs that students have, planning lessons has become more complex. Judy Storeygard provides proven approaches to understanding the behaviors of children with special needs and effectively teaching all students.

Using research-based and field-tested methodology, this book’s teaching strategies include differentiated instruction, with an emphasis on co-teaching between general educators and special educators. Included are examples from teachers who have put these techniques into practice and guidelines for reproducing their successes in your classroom. Key topics include:

• Strategies for teaching students with autism, ADHD, and various learning disabilities
• Ways to develop students’ cognitive flexibility
• How to help learners plan, organize and self-monitor in mathematics class
• A new focus on mathematical strengths and learning abilities rather than on deficits and labels.
Connecting Arithmetic to Algebra: Strategies for Building Algebraic Thinking in the Elementary Grades

Authors: Susan Jo Russell, Deborah Schifter, Virginia Bastable

Connecting Arithmetic to Algebra is a new professional development guide that invites readers to learn about a crucial component of algebraic thinking: investigating the behavior of the operations. Nationally-known math educators Susan Jo Russell (TERC), Deborah Schifter (EDC), and Virginia Bastable (SummerMath for Teachers) and a group of collaborating teachers describe how elementary teachers can shape their instruction so that students learn to: notice and describe consistencies across problems; articulate generalizations about the behavior of the operations; and develop mathematical arguments based on representations to explain why such generalizations are or are not true.

Through such work, students become familiar with properties and general rules that underlie computational strategies—including those that form the basis of strategies used in algebra—strengthening their understanding of grade-level content and at the same time preparing them for future studies. Each chapter is illustrated by lively episodes drawn from the classrooms of collaborating teachers in a wide range of settings. These provide examples of posing problems, engaging students in productive discussion, using representations to develop mathematical arguments, and supporting both students with a wide range of learning profiles.

Connecting Arithmetic to Algebra Course Facilitator’s Guide

Authors: Susan Jo Russell, Deborah Schifter, Virginia Bastable, Mt. Holyoke College

Available online, the Course Facilitator’s Guide for Connecting Arithmetic to Algebra provides leaders with tools and resources for implementing a workshop or preservice course.

Publisher Contact: Available from Heinemann
www.heinemann.com
1.800.225.5800
Type: eDoc
Topic: Professional Development
Grade Level: 1-6
Mixing in Math™ (MiM) Games

MiM is a set of activities and resources for after-school educators, librarians, camp counselors, parents, and others who spend time with children in grades K-6. Aligned with the Common Core Math Standards K-5, MiM builds children’s skills in geometry, measurement, arithmetic, estimation, time, data, patterns, and algebra.

MiM Card and Game Deck (Jump Ship & Other Card Games)
Fast-paced games combining logic, strategies, arithmetic, and probability. Ideal for ages 4–12. Fun for teens and adults too!
- 54 durable playing cards, 0–10 in four suits plus wild cards
- 9 card games which include competitive, cooperative, and easier/harder versions for 22 ways to play
- Also available in Spanish

MiM Game Boards (Blockade & Other Board Games)
Board games that mix spatial thinking, strategies, and logic.
- eight dry erase board games, with markers, eraser, and game instructions
- competitive, cooperative, and easier/harder versions for 28 ways to play
- Also available in Spanish

Ladybug Card Deck with Games
Card games for matching and sorting by number and color, for counting and comparing, and for basic adding and subtracting. Card deck is especially designed for preschoolers. Game instructions are in English and Spanish.

InspireData™ is the visual way to explore and understand data! Build critical data literacy skills and engage students with the more than 100 content-rich databases. The e-Survey tool and database templates jumpstart data collection as students actively explore and analyze data using dynamic Venn diagrams and bar, stack, pie and axis plots to interpret information and draw conclusions. Teachers use InspireData to identify classroom trends and support data-driven decision making.

NEW! Expanded teacher and classroom support
- Standards-based lesson plans and classroom projects include instructions for achieving key data literacy standards, corresponding database templates and exemplars
- Learn-to-Use Handouts provide easy-to-follow instructions for quickly learning and using InspireData
- Web Resources provide access to additional support materials
Zoombinis

TERC is bringing back the award-winning puzzle game Zoombinis. The modern remake, due out this summer, will make full use of touch-screen technology and vibrant graphics to deliver the classic characters and their puzzled-filled journey.

As their guide, players create Zoombinis with varying characteristics of hair, eyes, noses, and feet, and in groups of 16, lead them through sets of challenges, working to get them to the promised land of Zoombiniville. The challenges increase in difficulty as more packs make their way through. Depending on players’ skill levels, a few Zoombinis may be stopped along the way, but they can always go back for them later!

The game features wonderful artwork and music, funny and endearing characters, and subtle building of the player’s math and logic skills along the way. Challenges include the Allergic Cliffs, Stone Cold Caves, Pizza Pass, Captain Cajun’s Ferryboat, Titanic Tattooed Toads, Stone Rise, Fleens, Hotel Dimensia, Mudball Wall, The Lion’s Lair, Mirror Machine, and Bubblewonder Abyss.

EdGE at TERC

The Educational Gaming Environments group (EdGE) at TERC is a research design and development team that is investigating the possibilities—and challenging the assumptions—of game-based learning environments. EdGE is designing compelling game experiences that gamers like to play where the game mechanics are embedded in fundamental science education concepts. EdGE works at the forefront of the ‘Games for Good’ and ‘Serious Games’ movements—supporting and measuring engagement in productive scientific collaboration, public science learning, and crowdsourcing in games.

- **Impulse**—Propel particles, avoiding destruction as you make your way to the goal! Take it fast, take it slow, just don’t crash!
- **Quantum Spectre**—Use mirrors, lenses, and more to guide laser beams through mazes to reach colored targets in this scientifically accurate and wildly cool laser game.
- **STEMLandia**—The Nature’s Apprentice Geocaching Adventure begins April 2, 2014 and runs through June. Discover the world of nature at the Arnold Arboretum (Boston, MA) while you hunt for 10 hidden geocaches.
- **Ravenous**—Get from here to there, find what you need to survive, avoid predators, and hook up with that special “somebird.” Coming soon to computer browsers, iPads, iPhones, and Android devices!
CLEAN (Climate Literacy and Energy Awareness Network)

CLEAN’s primary effort is to steward a collection of educational resources around energy and climate topics and foster a community that supports learning about climate and energy topics. The activities of CLEAN include:

- **CLEAN Collection**—This is a collection of high-quality digital educational resources, including learning activities, visualizations, videos, and short demonstrations/experiments, that addresses climate and energy literacy.

- **Teaching Climate and Energy**—These pages are designed to help the user understand the big ideas of climate and energy. They provide summaries of each principle, possible challenges for educators in teaching the topics, suggested pedagogic approaches for each grade level.

- **CLEAN Community**—The CLEAN Community includes educators and learners, resource developers, project partners, and the CLEAN Network of individuals that represent a wide range of professionals and citizens who are stakeholders in improving climate and energy literacy.

CLEAN is led by the science education expertise of TERC, the Cooperative Institute for Research in Environmental Science (CIRES) at the University of Colorado Boulder, the Science Education Resource Center (SERC) at Carleton College, and NOAA.

CLEAN is funded by grants from the National Oceanic and Atmospheric Administration (NA12OAR4310143, NA12OAR4310142), the National Science Foundation (DUE-0938051, DUE-0938020, DUE-0937941) and the Department of Energy.

The Inquiry Project / Talk Science

**Inquiry Curriculum Implementation Workshops**

Onsite Implementation Workshops are grade–specific and designed for teachers new to the Inquiry Project curriculum. These workshops help teachers to become familiar with the curriculum’s goals, central concepts, investigations, and materials. Participants gain firsthand experience doing the investigations to get a feel for how students learn through inquiry. By the end of the workshop, participants have a solid grasp of the curriculum’s overarching conceptual story and core teaching strategies.

**Talk Science Professional Development**

Talk Science PD is a blend of web-based study, opportunities to try ideas in the classroom, and face-to-face study group meetings designed to help teachers increase the effectiveness of classroom science discussions. In the program, participants deepen their understanding of important science concepts, develop a vision of the role of discussion in science meaning making, and develop nine strategies that support productive discussion. A rich collection of video cases, aligned with the Inquiry Curriculum, provide just-in-time, contextualized support.
EMPower Professional Development Workshops

EMPower Professional Development Workshops are an exciting opportunity for adult numeracy teachers interested in maximizing the quality of mathematics instruction for adults and out-of-school youth. EMPower workshops are designed to make math accessible to teachers at all levels of "math comfort"—from the skittish to the confident. Together, teachers will expand their ideas of what it means to do math, focusing on reasoning, communication, and problem solving (in adult contexts) with a variety of approaches and strategies—not just rote memorization of procedures.

Workshop Features:
• Multi-day intensive sessions
• ‘Hands-on, minds-on’ mathematical investigations
• Reflection on practice
• Connection with current math education research and standards
• Suitable for ABE, preGED and GED classrooms
• Can be customized to other populations (e.g., alternative high schools, college developmental programs, workplaces, or corrections)

Workshop Offerings
• Algebraic Thinking; Data and Graphs; Geometry and Measurement;
  Proportional Reasoning; Fractions, Decimals, & Percents; Number & Operation Sense

TIAN (Teachers Investigating Adult Numeracy) Workshops

This full-year professional development program for adult basic educators of mathematics engages teachers in inquiry and reflective learning to design and implement effective mathematics instructional approaches.

Already used in 4 states, the TIAN programming is comprised of 3, 2-day institutes, regional meetings, and teacher discussions designed to:
• Increase knowledge
• Expand instructional power and approaches
• Connect to the ABE mathematics/numeracy standards
• Increase statewide capacity and support teacher leadership

The TIAN mathematical content focuses on two strands of mathematical proficiency: algebra and data. Participating teachers and their students learn by investigating the patterns and mathematical information found in real-life situations.
Investigations Workshops & Institutes

The Investigations Workshops group offers a variety of professional development opportunities, each supporting the implementation of the K-5, *Investigations in Number, Data and Space* curriculum. The audience for the face-to-face workshops and institutes, online courses, and on-site professional development includes elementary school teachers, math specialists, math leaders, and principals who are also implementing the Common Core State Standards.

**Face-to-Face Offerings**
The workshops offer participants opportunities to explore mathematics—to examine children’s thinking, to hear their strategies, see their work, and assess their learning. The mathematics sessions allow participants to deepen their own learning while focusing on the content of Investigations. They involve a combination of hands-on activities and discussions. Current offerings are:

- Investigations in the Classroom K-5 (5 days)
- Building Computational Fluency K-5 (5 days)
- Algebraic Reasoning K-5 (5 days)
- Counting and Computation K-2 (3 days)
- Fractions and Decimals, 3-5 (3 days)
- Principals’ Institute (2 days)

**Online Courses**
The online courses are asynchronous—which means there is no set time to be online with others on the course. Each person decides on their own weekly schedule, making sure to engage in conversation with fellow participants through the Discussion Forum as they share, collaborate and reflect on their learning. The courses’ interactive sessions include readings, doing math, watching classroom video clips, and looking at and sorting student work.

In addition, participants share, collaborate and reflect on the key learning of each session with other educators in the Discussion Forum.

Current online courses are:

- Making Sense of Fractions (7 weeks)
- Implementing Investigations (8 weeks)
- Computational Fluency and the Common Core (7 weeks)

**Certificate of Completion and/or Graduate Credit**
Participants receive a Certificate of Completion indicating the course clock hours when they complete any of our offerings. Graduate credit through Framingham State University is available for our offerings.

**Customized Professional Development**
On-Site customized professional development days are available throughout the school year for teachers and school leaders. Work with teachers includes facilitating grade level meetings; looking at student work; observing and providing support in classrooms; and planning for parent sessions. Work with school leaders includes refining implementation plans; thinking about district or state-specific needs; and planning for professional development to support teachers.
Using Data Professional Development Workshops

TERC’s Using Data provides professional training and consultation to develop effective data plans, data leaders, data coaches, and data teams with the goal of improving teaching and learning in all classrooms. A range of professional development programs provide instruction in our Using Data Process, developed and tested by the researchers at TERC.

On-site Professional Development

Using Data Institute
The Using Data process is designed for data coaches and teams and offers a sustainable model delivered in six full-day workshops sequenced over a calendar year. The workshops build a district-wide culture of collaborative inquiry led by the data coaches and data teams. The intended result of participating in this rigorous training is a strong local capacity within each district and school to regularly engage with data from multiple sources in a meaningful and collaborative way in order to improve teaching and learning.

Data Leadership Academy
A two-day Academy is designed for district and school administrators to precede the Comprehensive workshop. This seminar engages leaders in the Using Data Process and asks them to identify school-based data coaches and data teams for training. The DLA introduces leaders to the concepts of the Using Data process and prepares them to support this work in their district.

Customized Implementations and Technical Assistance
For learning communities who need more comprehensive implementations and/or technical support over a number of years or who wish to introduce the Using Data process, we offer custom implementations, consultations, and pricing.

One-day Workshop
New offerings include:
• Effective Use of Classroom Data
• Data Empowered Students: Informed - Motivated - Successful
• Effective, Continuous Data Use Requires Prepared Leadership
• Using Data’s Instructional Leadership Four-Part Series

Using Data for Meaningful Change: An Online Course
The Using Data Online Course is offered periodically throughout the year. The course runs for fifteen weeks and is composed of fifteen sessions. Individuals or teams may attend the course. For an additional fee, the online course may be taken for three college graduate credits.

Using Data Professional Development Resources
Participants in the Using Data workshops and online course will receive the following materials:
• The Data Coach’s Guide to Improving Learning for All Students: Unleashing the Power of Collaborative Inquiry
• Data Coach’s Kit
• Causal Analysis Cards

Contact:
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617.873.9600 x608

Type: Professional Development, Service
Topic: Adult Numeracy
Grade Level: All

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**STEM Education Evaluation Center (SEEC) at TERC**

**Quality Evaluation for Evolving Education**

Building on our own and our colleagues’ many years of experience in STEM education, TERC Evaluators can help you develop a more effective project, and clearly demonstrate the impact of your work.

**What does TERC bring as an Evaluator?**

Various Roles: TERC’s evaluation work is tailored to meet your specific needs at any project stage:

- Conducting front-end evaluation to assess the interests and preferences of future learners, or to identify potential obstacles to address in a project
- Providing formative feedback about an innovation as it is being developed or implemented
- Offering oversight for complex projects through process evaluation
- Assessing the impact of a finished (or nearly finished) product or intervention through summative evaluation

**Project Support:** Throughout a project, we can help you clarify the logic model for your innovation: identifying its core components, and key intended outcomes, goals, and strategies. Once these are clarified, we can develop rigorous and creative ways to gather information to assess them.

**Multiple Methods:** We use a range of methods in our work including rich, qualitative descriptions of program activities and outcomes, as well as varied quantitative analyses. When appropriate, we also develop and implement experimental and quasi-experimental designs to test impact. Data might come from observations, individual and group interviews, surveys, logs and journals, artifacts, tests and assessments, automatically generated log files or transcripts of online interactions, and existing records and documents.

**Study of Place**

*Study of Place* is an eBook collection of two, approximately two-week-long science modules for middle-school students (grades 5-8).

- *Antarctic Exploration* explores the relationship between the expanse of sea ice and seasonal change, framed by the story of Sir Ernest Shackleton’s expedition to Antarctica.
- *Oceans Currents Exploration* explores the mysterious Gulf Stream, framed by the story of Benjamin Franklin’s quest to explain why English ships carrying mail to the American colonies took two weeks longer to cross the Atlantic than colonial merchant ships going the other way.

Both the Teacher Guide and Student Guide will be available soon from the Apple iBook Store. Developed by TERC under grant NSF ESI#9911224 from the National Science Foundation.
**Biocomplexity and the Habitable Planet**

This curriculum engages students in understanding Biocomplexity, the complex fabric of relationships between humans and the environment. It incorporates an integrated framework to study the myriad relationships and reciprocal interactions that link human economic and social systems to natural systems of the planet. The curriculum consists of inquiry-based investigations designed around cases in urban, agricultural, tropical and polar systems.

*Biocomplexity and the Habitable Planet* builds on
- ecology,
- environmental science,
- human ecology,
- geography,
- economics, and
- anthropology

and helps students understand environmental land and resource use challenges increasingly confronting society. Because of its strong emphasis on science practices, disciplinary content, and cross-cutting concepts, the curriculum is very well aligned with the Framework for the Next Generation Science Standards.

Purchase of the text will also include access to the Teacher Guide, an electronic version of the Student materials, and extensive additional resources online.

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**EMPower™**

**New EMPower lessons and updated facilitator notes.**

New lessons align three books from EMPower’s number sequence to the Career and College Readiness Standards. The new materials explicitly link mathematical properties with everyday number sense. New Activities, Math Inspections, and Practice sheets connect the mathematical properties and conceptual understanding of whole numbers and rational numbers to the “standard” algorithms.

The new complete lessons are intended to follow the lesson sequence in Using Benchmarks: Fractions, Decimals, and Percents. Available for purchase in late 2014.