Using MATLAB® to Teach Computational and Quantitative Thinking Skills in STEM Courses

Mitchell Awalt, Lisa Kempler, and Carol Ormand
Science Education Resource Center, Carleton College; MathWorks

SERC and MathWorks have distilled strategies and recommendations for teaching computation contributed by participants in the Teaching Computation workshops.

Peer-developed resources for educators
Developed by educators who teach and use computation in their courses, Teaching Computation in the Sciences Using MATLAB is a resource to help educators incorporate computation and MATLAB into their classrooms and engage with a community interested in improving the teaching of computational and quantitative skills. The website includes information, resources, and materials contributed through peer-led workshops hosted by SERC and MathWorks.

What is computation and why teach it?
Computation is the use of computers to perform calculations, model data, make predictions, and test hypotheses.

Computational and quantitative skills are key tools of geoscientists and other STEM professionals. Teaching computation can help students reinforce and improve their quantitative skills and gain a deeper understanding of scientific principles.

Building computational skills can help students develop:
- quantitative self-efficacy
- problem-solving
- logic and reasoning
- data control
- science communication
- reproducible research practices

Why MATLAB?
Using MATLAB, students and educators can put the science at the forefront. With a user-friendly interface, diverse functionality, and robust user community, MATLAB is ideally suited to scientific learning and discovery.

Get Involved
Teaching Computation in the Sciences Using MATLAB supports a growing community of faculty in geoscience and other STEM fields interested in improving computation in teaching with MATLAB.

Strategies for Teaching Computation
- Building Self-Efficacy
- Cooperative Learning
- Assessment
- Developing Skills Within a Degree Curriculum

Computational Skills and Techniques
- Computational Thinking
- Data Analysis
- Modeling
- Visualization

Teaching Collections and Materials
Activities, essays, and courses are contributed by workshop participants and community members. All of the contributions make use of MATLAB and cover a variety of STEM topics.

Teaching Activities
Activities will be reviewed by a panel of community members. Well-reviewed submissions will be highlighted in the activities collection and in a separate collection of exemplary materials. Submit an activity by August 15!

Course Curricula

Workshops:
3 day, peer-led events for educators:
- share best practices
- develop curricula
- contribute activities

Sessions include panels, presentations, share fairs, and working groups.

Join the Teaching Computation Interest Group
Participate in the online discussion:
- Ask a question about teaching computation
- Share your experiences teaching computation with MATLAB
- Share your favorite add-ons or supporting resources

Webinars:
Webinar events highlight exemplary peer-authored activities contributed as part of the annual workshops. Hear about the activities and strategies for implementation directly from the authors.

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