

NEW!

HMH INTERNATIONAL STEM ACADEMY

PRACTITIONERS UNITE



Science • Technology • Engineering • Math

Get STEMatized

STEM Success

What are my first steps to success?
Where do I begin?

Professional Development

What options are available to me to make sure that I am qualified to support a STEM classroom?

Job Readiness

What is needed in the STEM classroom to prepare students for 21st-century jobs? How do I facilitate these institutional changes?

Market Demand

What is the market demand for STEM education and what can I do to remain updated?

STEM Resources

Are there resources to support STEM integration in all areas?

Strategies

What strategies should I be using to be highly impactful?



A STEM-DOMINATED WORLD

Increasingly, jobs in the STEM fields are becoming the center of the job market on a global scale. Jobs of the future will require higher competency in STEM-based areas than ever before, meaning it is crucial to prepare students to not only pass exams but to gain new knowledge and skills in order to excel in these areas. Global trends in education are focusing on development in STEM through hands-on application of knowledge in the classroom, and it is becoming more important than ever before to implement the necessary instructional changes inside the classroom for success in the real 21st-century job market.

Preparing students for success in the real world where STEM is dominating employability demands means that educators must make smarter decisions about how to execute the latest instructional approaches as an integral part of all curriculum-based decisions and classroom actions. Therefore, the first step toward success must be for educators themselves to solidify their knowledge and skills through continuous professional development in all required areas. Only then will they be able to effectively incorporate the necessary elements into their instruction for success in a STEM-dominated world.



PROFESSIONAL DEVELOPMENT FOR STEM

Houghton Mifflin Harcourt® is committed to helping educators navigate the changing educational landscape and embrace the learning transformation. By combining our expertise in curriculum and technology with the best teaching and leadership practices, we are able to offer a STEM solution that will give educators impactful strategies to better prepare their students for an emerging job market that will require STEM education.



HMH International STEM Academy

Introducing the *HMH STEM Academy*. In these sessions, STEM teachers learn innovative strategies that will build instructional strength through inquiry and immersion in the student experience. Become a certified STEM innovator teacher upon completion of your learning experience.

STEM Academy for Elementary

Teachers will launch into an in-depth exploration of STEM through building knowledge and hands-on experiences. Expect to get your hands dirty! This course is highly engaging and follows elementary developmental stages to integrate all subjects. Bring your passion for STEMatizing your classroom and join the tribe of STEM innovators.

STEM Academy for Middle/Secondary

Middle/secondary teachers, are you ready to ignite your students' undiscovered curiosity around how things work and how they relate to their world? This course is designed to support you in implementing innovative Science instructional practices with a strong focus on student collaboration and teacher engagement. We will explore the myriad opportunities to integrate STEM strategies in all classrooms.



STEM ACADEMY ELEMENTARY COURSE

STEM Academy Elementary ISBN - 9781328018809

FULL-DAY COURSE

This engaging one-day course immerses participants in the integrated world of STEM. Participants explore the connection between Bill Daggett's Rigor/Relevance® Framework and the mindset required for effective STEM implementation before diving into three hands-on activities designed to demonstrate the process of STEMatizing any activity. All participants will then be equipped with instructional strategies to bring a STEM mindset to any Science activity or lesson in order to move the teaching and learning cycle to a higher quadrant on the Rigor/Relevance Framework.



LEARNING OBJECTIVES

- Clearly define what STEM is and the key characteristics of STEM in the elementary classroom.
- Understand the importance of STEM and 21st-century careers.
- Define *rigor* and *relevance* as they relate to the elementary developmental stages.
- Identify the purpose of STEM activities and lessons.
- Develop STEM activities and lessons through various strategies.
- Learn how to STEMatize any lesson or activity.



HMH INTERNATIONAL STEM ACADEMY SECONDARY COURSE

STEM Academy Secondary ISBN - 9781328018816

FULL-DAY COURSE

This highly interactive one-day course gives teachers innovative strategies for strengthening instruction through inquiry and making connections to student experiences. Participants are introduced on how the Rigor/Relevance Framework connects to the mindset required for an impactful STEM implementation. This in-depth exploration of STEM engages participants in three hands-on activities that demonstrate the process of STEMatizing any activity. Participants are then equipped with instructional strategies to bring a STEM mindset to any Science activity or lesson in order to move the teaching and learning cycle to a higher quadrant on the Rigor/Relevance Framework.



LEARNING OBJECTIVES

- Clearly define what STEM is and the key characteristics of STEM in the middle and high school classroom.
- Understand the importance of STEM and 21st-century careers.
- Define *rigor* and *relevance* and explore their application in the middle and high school classroom.
- Identify the purpose of STEM activities and lessons.
- Develop STEM activities and lessons through various strategies.
- Learn how to STEMatize any lesson or activity.

STEM Resources

for Use in Your Classroom

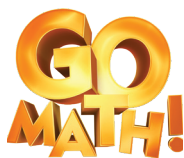
HMH® core Science programs, **HMH Science Dimensions®** and **ScienceFusion®**, are based on the latest Science standards, including NGSS, and provide specific support for STEM.



HMH Leveled Readers, including **Science & Engineering Leveled Readers**, are the perfect resource to develop STEM-based literacy in your students while learning about and reinforcing new concepts.



HMH world-class core Math programs—**GO Math!®**, **Algebra**, **Geometry**, and **Algebra II**—are the ideal base for strong mathematics instruction, a vital part of STEM education.



ELL Strategies for Systems and Classrooms

HMH programs provide extensive support for English Language learners as well as resources to ensure that these students achieve all program goals and maximize their learning.

HMH digital offerings, such as **Global Learning Platform**, **Science Dimensions**, and **HMH Field Trips**, provide highly interactive content, including virtual reality, while using 21st-century tools inside and outside of the classroom to transport students into a world of learning.



Heinemann Professional Books for educators are grounded in proven best practices, a deep research base, and a passion for child-centered instruction.



Our **HMH STEM Workshop** allows teachers to use STEM content as a seamless supplement to their traditional Science and Math classrooms—or simply as a standalone curriculum for a technology or engineering course.



STEM Classroom Activities

Start Implementing STEM Education into Your Classroom Today!

STEM Activity for Elementary School

Float Your Boat!

When you cross a river, you probably use a bridge. In places where there are no bridges, boats may take cars across rivers. Have you ever wondered how a boat carrying heavy loads stays afloat? Even though the boat and load are very heavy, the boat doesn't sink. That's because it has a special shape that makes it float.

OBJECTIVES:

- Use the five steps of the engineering design process to design a floating boat using a simple natural resource.
- Apply the scientific concept of buoyancy.

PREP AND PLANNING TIPS:

- Obtain waterproof clay from an art supply store. Gather plastic bowls or similar vessels, one for each group. If you choose to make this a class activity, teams of students can design and build boats and then test them in front of the class.
- Collect photographs of different kinds of boats, including a canoe, a rowboat, a sailing ship, and a modern cargo vessel.
- Clear surfaces of papers, books, and any other items. Then cover surfaces with paper towels or newspapers to absorb spills.

PROCEDURE:

1. Roll a small piece of clay into a ball.
2. Fill a bowl with water. Place the clay ball on the water's surface. What happens?
3. Reshape the clay into a small boat. What happens now?
4. How many pennies can this boat support?
5. Keep improving your design to increase the number of pennies your boat can carry.
6. Draw and describe your design!

EXPECTED RESULTS:

Students will discover that the ball of clay sinks but that shaping the clay into a hollow boat shape allows it to float. Students will also discover that wider, flatter boat shapes can hold more mass.

STEM Activity for High School

Design It: Parachute

Joe Kittinger, an Air Force captain, helped design parachutes to protect airplane crews forced to eject at high altitudes. He tested the parachute by jumping from a hot air balloon from an altitude of 31 km. During his jump, his parachute deployed automatically and streamed out behind him. The parachute trapped air inside it, creating air resistance and slowing Kittinger's fall.

OBJECTIVE:

Design and model processes, materials, and equipment that might be used to construct a parachute that maximizes air resistance.

PROCEDURE:

1. Brainstorm how you can use the materials provided to construct a model of a parachute that maximizes air resistance. Consider how the model's shape, size, material, and tie lines will affect drag.
2. Come up with a plan. Develop a diagram for your proposed parachute. Label all the parts. Include a list of supplies that is limited to the supplies available. Consult with your teacher to make sure that your plan is appropriate.
3. Write out a procedure for testing your prototype. As you plan the procedure, make the following decisions:
 - Decide how you will maximize the air resistance of your parachute.
 - Decide what construction techniques you will use to build your parachute.
 - Decide how you will measure or determine whether your model is a success.
 - Select the materials and technology that you will need for your experiment from those that your teacher has provided.
 - Decide what safety procedures are necessary.
4. Have your teacher approve your plans.
5. Obtain your materials and set up any apparatus you will need.
6. Take appropriate safety precautions.
7. Construct your parachute.
8. Test your model using the method outlined in your plan. Make changes to your model to correct any flaws you observe.
9. Create a labeled diagram of your prototype, including any measurements.
10. Improve your design and test it.

POSSIBLE MATERIALS MAY INCLUDE:

- | | | | |
|------------------------|-------------------------|-------------------------|-------------------------|
| • Fabric, various | • Garbage bags, plastic | • Grocery bags, plastic | • Paper, large sheets |
| • Ruler or meter stick | • Scissors | • Stopwatch | • String, various kinds |
| • Tape | • Tape measure | • Thread | • Toy figure |
| • Twist ties | • Aluminum foil | • Newspaper | • Video camera |



HMH INTERNATIONAL STEM ACADEMY

The International Center for Leadership in Education's mission is to challenge, inspire, and equip leaders and teachers to prepare students for lifelong success.

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