

Robotics ^{And} Beyond...

*Cultivating young minds in science, technology,
engineering, design ... and critical thinking!*

*STEM and Design-Related
Professional Development.
At your school or our space at
30 Bridge St., New Milford, CT*

- Workshops with hands-on training
- Connected and engaging activities
- Lessons for immediate implementation in the classroom
- CT certified, local organization and local instructors.

Lower the fear factor. Raise the fun factor.

Project-based activities

- Wheeling Through Geometry and Mathematics
- Tower and Table Design Engineering Projects
- States of Matter, Change of States, and Density
- The Nature of Sound and Dangers of Hearing Loss

Robotics and Beyond
30 Bridge St. Suite 204, New Milford CT 06776
www.roboticsandbeyond.com
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Wheeling Through Geometry and Mathematics:

PDA instruction time: 90 min.

Grades: 4-10

Time requirement in the classroom: 40-80 minutes per session depending on the grade level and difficulty; amenable to multiple sessions.

Activity Description: How can students have fun applying their knowledge of radius, diameter, circumference, proportion, estimation, and measurement? How can they determine how far a robot travels without physically measuring the distance? One method is to work in small groups to brainstorm ideas and use simple vehicles to investigate the relationship between wheel size and distance traveled. This activity can be adapted to fit the curriculum of different grade levels depending on the concepts being taught. It can be made more difficult by having students determine the perimeter of different shapes and angles of turns. For advanced lower grades or higher grades, this activity is easily extended by adding robotic vehicles and very simple programming to navigate shapes or rooms. A workshop for the robotics-based approach is being developed and will be available in the near future.



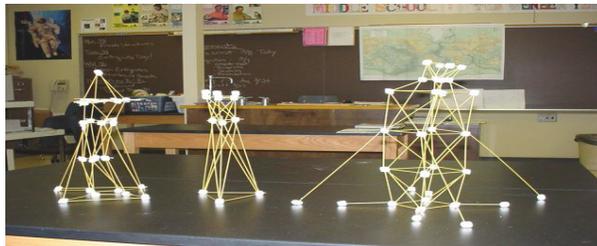
Spaghetti Tower Engineering Design Project:

PDA instruction time: 90 min.

Grades: 4-10

Time requirement in the classroom: 40-80 minutes depending on the grade level and difficulty.

Activity Description: Let your students' creativity shine as they work in small groups to design and build a tower made from uncooked spaghetti and marshmallows. The structure must be free standing and able to support a ping pong ball. This activity can be adapted to fit the curriculum of several grade levels depending on the rigor of the math, science or engineering concept. Difficult can be modified by constraints such as a materials limit or budget, time, minimum height or support requirement such as a ping-pong ball or weight. Amenable to the design of tables in similar challenges.



States of Matter, Change of States, and Density:

PDA instruction time: 90 min.

Grades: 2-8 (and 9-12 for Academic level classes)

Time requirement in the classroom: 40-80 min. depending on ages and level, and can be extended to two periods.

Activity Description: This workshop provides hands-on opportunities to observe and experiment with all states of matter (solids, liquids, gases), changes of state (evaporation, condensation, melting, freezing, sublimation), density and relative density (between solids, liquids and gases, and between solids, between liquids and between gases). For example, the concept of density is explored by using a golf ball and ping pong ball, and also by sink-float experiments using a column of oil and water with various common objects.

The Nature of Sound and Dangers of Hearing Loss

PDA instruction time: 90 min.

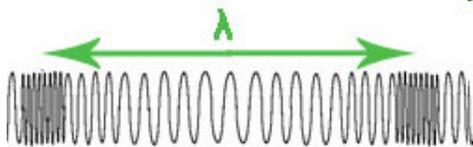
Grades: 4-12

Time requirement in the classroom: 40-80 minutes depending on the grade level and difficulty. Easily adapted to multiple class sessions.

Activity Description: Sound, as a wave pulse of air molecules, is made clear by the use of a “Slinky” and simple but highly effective, inexpensive and entertaining “air pulsers” made from plastic bottles and balloons.

Sound waves as power and extension to loudness, with examples of the loudness (power) of common sounds and common situations and environments such as a whisper, city traffic, lawnmowers and music from ear buds. Frequency, with examples of the lowest and highest frequency sound levels that humans can hear, as well as of different animals. How humans hear sounds and how excessive sound power or noise can permanently damage hearing, especially in young people.

For the higher grade levels, lesson extensions delve deeper into sound, power measured in decibels and wattage, the anatomy of the ear and the dangers of hearing loss from excessive noise such as from personal listening devices (earbuds, headphones, etc.).



SOUND DETECTED (by ears)

Human	-----	25 – 20,000 Hz
Cat	-----	60 – 60,000 Hz
Robin	-----	250 – 20,000 Hz
Bat	-----	1,000 – 200,000 Hz
Dolphin	-----	150 – 200,000 Hz

Robotics And Beyond...

Who we are and what we do...

Robotics And Beyond is a 501(c)3 dedicated to providing opportunities for discovery and learning in STEM and Design related fields for students and educators. We were founded in 2004 by professionals with nearly 50 years of combined experience in STEM and Design disciplines. Our staff has 30+ years of experience working with K-College students and shares a common passion for encouraging and supporting the next generation of technologists, scientists and creative thinkers. In addition to providing exceptional learning opportunities for students, our goal is also to enhance and supplement the material, resources, and guidance for teaching professionals.

In all Professional Development workshops, Robotics And Beyond attendees will receive a package of curriculum resources which will enable them to conduct the projects with their students over a range of levels with options to broaden and reinforce the subject.

Resources provided:

- Background/Introduction of topic
- Objectives and standards
- Materials required, sources and cost (if any)
- Procedure
- Worksheets and discussion topics
- Suggestions for assessments
- Extension activities for broadening or reinforcing the subject matter.

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