

## About Us:

**YARD SCIENCES** is a company that focuses on bringing hands-on science education to kids of all ages with an interest in exploring STEM. From chemistry to biomolecular and genetical engineering, from human anatomy and physiology to surgical subspecialties, and from earth science to meteorology, Yard Sciences is for students in 3rd grade all the way through 12th grade. Our goal is to help students discover their love for science!

### Dr. AJ Rastogi, MD

Co-Founder of North American Medical Associates. He received his medical education at the University of Virginia in Charlottesville, VA, where he served on the pre-medical admissions committee. He completed his residency and fellowship training at the University of Pennsylvania. He is an advisor to the Harvard & Cleveland Clinic Fellowship Programs. He has been involved in multiple clinical trials and published peer reviewed articles. Education of students of all ages has been his passion throughout his career.

### Dr. Yajamana Ramu, PhD

Holds a PhD in biological sciences and has led a robust multi-platform lab at the University of Pennsylvania for over 20 years. His lab produced high profile results and peer reviewed articles in the fields of Cystic Fibrosis, Diabetes, & Ion Channels. His work has been showcased in Nature, Cell, PNAS, JGP, etc. He is an imaginative, knowledgeable, and dedicated research scientist devoted to pursuing novel therapeutic applications for multiple diseases. For the last four years, he has mentored high school students in the fields of microbiology, pharmacology, biotechnology, and ecology. His students have won multiple awards in local and regional science fairs, partaken in the Regeneron International Science and Engineering Fair, and received several lucrative college scholarships.

## The Ultimate **STEM** Playground for Kids



**INDULGE YOUR CHILD'S PASSION FOR SCIENCE**  
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## INDIVIDUAL SCIENCE CLASSES

## MIDDLE SCHOOL COURSES

## HIGH SCHOOL COURSES



### LEVEL 1: BEGINNER (3RD GRADE AND UP)

- Exploring Our Weather
- Survivor: Plant Edition
- Molecule Madness
- Microscopic Discoveries



### LEVEL 2: INTERMEDIATE (3 GRADE AND UP)

- Delving into DNA
- Soil Science
- ABC's of Acids, Bases, and Concentrations
- Understanding Genetics



### LEVEL 3: ADVANCED (3RD GRADE AND UP)

- Concentrating on Acid-Base Concentrations
- Yeast: A Microbial Fuel
- Voltaic Cell Wars
- Mechanisms of Movement: Osmosis and Diffusion



### LEVEL 4: HIGH SCHOOL (9TH GRADE AND UP)

- Exothermic and Endothermic Reactions
- Separation Techniques: Taking it All Apart
- The Practical Power of Enzymes
- Engineering a Drug Delivery System

### INTRO TO CHEMISTRY (6 GRADE AND UP)

In this 3-day introduction to chemistry course, students will cover laboratory safety and participate in experiments and hands-on activities that investigate topics such as atomic theory and the trends present on the periodic table. Buffer systems and human biochemistry will also be discussed. Students will learn to measure pH, calibrate a pH meter, and more!

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### Ask us about:

Medical Writing  
Science Fair Mentoring  
Field Trips  
Corporate Events  
School Assemblies

### INTRO TO MOLECULAR BIOLOGY (6TH GRADE AND UP)

In this 2-day biology course, students will learn lab safety and proper use of equipment, how to use an autoclave to sterilize bacterial culture media, how to make petri dishes with agar for bacterial culture, and how to inoculate GFP plasmid for overnight growth. They will be performing a GFP Plasmid mini prep, running bacterial cells through a centrifuge, and will be isolating and purifying plasmid DNA. They will make and run agarose gel electrophoresis for confirmation of DNA isolation and view their results on a transilluminator.

### PRE-MED/SURGICAL (9TH GRADE AND UP)

This 8-day course is for students interested in anatomy, physiology, surgical specialties, and biomedical engineering. In a hands-on setting, students will progress through the Surgery Basics & Suturing Workshop, Pulmonology Part 1, Anesthesiology Part 1, Interventional Spine & Spine Surgery, Orthopedic Surgery, and Vascular Surgery modules

### CHEMISTRY (9TH GRADE AND UP)

In this 4-day chemistry course, students will gain proficiency in topics such as atoms, the periodic table, ions, acids, bases, buffer systems, and organic molecules. By utilizing hands-on lab facilities students will also become well-versed in laboratory safety and experimental techniques. A strong emphasis is placed on real world application of these laboratory procedures and the potential careers that can result through the study of chemistry.

### MOLECULAR BIOLOGY (9TH GRADE AND UP)

This 8-day lab course is for students interested in biological sciences, genetic engineering, and laboratory research/experiments. In a hands-on setting, students will learn Molecular Cloning, Bacterial Plating, Plasmid Mini-Prep, Gel Electrophoresis, Primer Design, Polymerase Chain Reaction (PCR), DNA Sequencing, and Mutation Analysis.

### CRISPR CAS 9 GENOME EDITING (9TH GRADE AND UP)

In this 3-day CRISPR course, students will learn about genetic modification, the mechanics of DNA and related enzymes, and CRISPR's real world uses such as curing diseases. CRISPR Cas-9 is cutting edge technology used to cut out and replace fragments of DNA in order to change a gene. Using hands-on lab facilities, students will grow bacteria, edit the lac-z gene of E. coli, and observe the changes on bacterial plates. They will evaluate whether or not the gene will still be displayed under different circumstances.