



# Physics Olympiad Program Level 1

**Cheenta Academy for Olympiad & Research**

**cheenta.com**

Since 2010

**Passion for Mathematical Science & Research**

This program is useful for introducing children to Physical Sciences and Astronomy using problem-solving and virtual labwork.

# Success Stories Since 2010



## Aryan Kalia

Top 1% globally in American Math Competition,

Attended Math Olympiad Program and School Research Program at cheenta

Attended Student internship program at cheenta

**Harvard University in 2022**



## Sambuddha Majumdar

Scotland Math Olympiad Awardee

Attended Math Olympiad Program at cheenta

Attended Student internship program at cheenta

**University of Edinburgh**



## Anushka Aggarwal

Youngest Indian National Math Olympiad awardee, European Girls Math Olympiad awardee

Attended Math Olympiad Program at cheenta

Attended Student internship program at cheenta

**MIT (Massachusetts Institute of Technology) in 2022**



## Akshaj Kadaveru

American Math Competition, AIME and USAJMO awardee

Attended Math Olympiad Program at cheenta

**MIT (Massachusetts Institute of Technology)**

# Curriculum 48 week program, 8 modules

## Module 1



### Mechanics Preliminary

7 Lessons



Displacement, Velocity, Elementary Graphing



Acceleration



Uniform Acceleration



Non-Uniform Acceleration



Acceleration By Change in direction.



Relative Motion and Graphs



Review and Evaluation

# Module 2



## Basic Kinematics and Motion in a plane

7 Lessons



Understanding Motion in Two Dimensions



Introduction to Projectile motion and Trigonometry



Projectile motion: Finding range using complementary angles.



Projectile



Circular Motion



Relative Motion and Graphs



Review and Evaluation

# Module 3



## Newton Laws of Motion

6 Lessons



Idea of Forces, Newton's Laws



Types of Forces



More on Newton's Laws of Motion



Idea of Pseudo Force and Non - Inertial Frame



Application Problems on Pseudo Force (Lift and man problem)



Review and Evaluation

# Module 4



## Application of Newton Laws

5 Lessons



Idea of Contact Forces - Normal and Friction Force



Friction on an Incline Plane



Constraint Relations Block over Block Problem



Application of Pseudo forces in curved path  
(Banking)



Review and Evaluation

# Module 5



## Mechanics - Rotational - 1

6 Lessons



Idea of Angular Variables (Angular displacement, acceleration, velocity)



Applying Newton's Law - Atwood's Machine



Circular Motion - Introduction (Centripetal and centrifugal forces)



Center of Mass



Motion on a Vertical Circle and Moment of Inertia



Review and Evaluation

# Module 6



## Conservation Laws

5 Lessons



Work Energy And Conservation



Application of Work Energy And Conservation



Momentum Impulse and Collisions - 1D  
Inelastic



Momentum Impulse and Collisions - 1D Elastic



Review and Evaluation

# Module 7



## Gravitation

6 Lessons



Newton's Law of Gravity



Gravitational constant and force



Variation of  $g$  and motion of Planets



Gravitational potential and Kepler's Laws



Escape Velocity , orbital velocity and Revision



Review and Evaluation

# Module 8



## Wave Motion

4 Lessons



Wave Motion Velocity and Energy of Waves



Sound Waves and Velocity



Idea of Simple Harmonic Motion (SHM)



Review and Evaluation

# Research Projects

(Here are some ideas of Research Projects)



Lung's Model



Electrostatic Toothpick



Splitting of Water



Hologram



Baking Soda Powered Boat



Balancing Fork



Electromagnet



Pinhole Camera



Moving Hot and Cold Water



Graphite Circuit



Electric Card



Anti gravity funnel



Pascal Bag

# Research Projects



DC Motor



Homopolar Motor



Kaleidoscope



Levitating Pen



Total Internal Reflection



Density Tower



Newton's Disc



Electromagnetic Induction



Ice-water



Hydraulic Lift



Solar Cell Project

# Taught by Olympians and Researchers from leading universities

Since 2010 Cheenta has evolved into a Gurukul. Our students are in leading universities in India such as Indian Statistical Institute, Chennai Mathematical Institute, TIFR, IITs and universities abroad such as Harvard, MIT, Oxford, Edinburgh to name a few. Some of them returned as teachers for the next generation of learners. And the pursuit of excellence continues.

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Cheenta Team has 40+ members. Here are some of the leaders.



**Srijit Mukherjee**

BStat and MStat from  
Indian Statistical  
Institute (India)  
Director at Cheenta



**Dr. Ashani Dasgupta**

PhD from University of  
Wisconsin-Milwaukee (USA)  
Founder - Director at  
Cheenta



**Tanumoy Banerjee**

Bachelor of Science (Hons) in Physics  
from Delhi University  
Faculty of Physics and Mathematics

# Cheenta Academy for Olympiad & Research

Outstanding Mathematical Science Programs. Since 2010.



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