

# COCHIN OLYMPIAD

*An Initiative of Diocese of Cochin*

*A Comprehensive Training for Students at  
High School level*

## Syllabus

### MATHEMATICS - Class VIII

1. Basic Algebra
2. Fundamentals of Algebra
3. Conditional Identities-Surds and Indices
4. Theory of Quadratic Equation
5. Simple Arithmetic

### MATHEMATICS - Class IX

1. Trigonometry and Data Interpretation
2. Trigonometry-Heights and Distances
3. Mensuration-Surface area of Planes-
4. Surface area of Solids
5. Arithmetic Progression
6. Geometric Progression and inter relationships

### MATHEMATICS - Class X

1. Statistics and Geometry
2. Statistics-Geometry-Co-ordinate and Analytic Geometry-
3. Review of all topics from VIII<sup>th</sup> and IX<sup>th</sup> topic and intensive coaching for NTSE.-
4. Miscellaneous Exercises

## **MENTAL ABILITY - Class VIII**

1. Verbal Reasoning
2. Classification-Analogy-Coding –Decoding-
3. Direction Sense Test-
4. Series Completion Test-
5. Arithmetical Reasoning Test-
6. Mathematical Operations-Tests-
7. Alphabet Test-
8. Logical Venn Diagrams Test-
9. Blood Relations-Logical Sequence of words-Verification of Truth of the Statement-
10. Analytical Reasoning-
11. Problems on Clocks-Situation Reaction Test-
12. Logical Reasoning-with sufficient exercises

## **MENTAL ABILITY - Class IX**

1. Non-Verbal Reasoning
2. Classification-Series-Analogy
3. Incomplete Figures
4. Transparent Paper Folding
5. Embedded Figure
6. Dot Fixing Situation
7. Folding Paper Cutting
8. Analytical Reasoning
9. Water images
10. Mirror images
11. Problems on Cubes and Dice-with sufficient exercises

## **MENTAL ABILITY - Class X**

1. Verbal and Non verbal Reasoning.
2. Revision of following topics with advanced level of exercises.-  
Classification-Analogy-Coding –Decoding-Direction Sense Test-Series  
Completion Test--Arithmetical Reasoning Test-Mathematical Operations-  
Tests-Alphabet Test-Logical Venn Diagrams Test-Blood Relations-Logical  
Sequence of words-Verification of Truth of the Statement-Analytical

Reasoning-Problems on Clocks-Situation Reaction Test-Logical Reasoning-Series-Analogy-Incomplete Figures-Transparent Paper Folding-Embedded Figure-Dot Fixing Situation-Folding Paper Cutting-Analytical Reasoning-Water images-Mirror images-Problems on Cubes and Dice-with sufficient exercises

### **CHEMISTRY - Class VIII**

1. Nature of Matter, Structure of Atom & Chemical Bonding
2. Physical Classification
3. General Properties of gases and Gas Laws-Matter-Acids -Bases-pH value
4. Structure of Atoms
5. Cathode rays-electrons-Neutrons
6. Discovery of nucleus-Rutherford's and Bohr's models
7. Isotopes-Periodic properties
8. Mendaleev's periodic table
9. Atomic radius-Ionization Energy.

### **CHEMISTRY - Class IX**

1. Chemical Reactions, Carbon , Atoms II
2. Classification of Chemical Reactions-Redox reactions
3. Classification of Hydrocarbons
4. Concepts of Orbit and Orbital
5. Quantum Numbers-Chemical equilibrium.

### **CHEMISTRY - Class X**

1. Metals and Non Metals-Organic Chemistry-
2. Introduction to Organic Compounds-
3. Functional Groups-Synthetic Compounds-Polymers-
4. Natural Rubber-Synthetic Rubbers
5. Review of all topics from VIII<sup>th</sup> and IX<sup>th</sup> topic and intensive coaching for NTSE.
6. Miscellaneous Exercise

## **Biology - Standard VIII**

### **Crop Production and Management**

1. Agricultural practices
2. Cropping pattern
3. Preparation of soil
4. Sowing
5. Adding manures and fertilizers
6. Irrigation
7. Protection form weed
8. Harvesting and shortage
9. Animal husbandry: Cattle farming
- 10.Poultry farming
- 11.Fish production
- 12.Bee farming

### **Conservation of Plants and Animals**

1. Deforestation and its causes and consequences
2. Conservation of wildlife, sanctuary, national park, zoo, forest reserves
3. Flora and Fauna
4. Endemic species
5. Endangered species and red data book
6. Migration
7. Reforestation

### **Structure of cell**

1. Prokaryotic cell and eukaryotic cell
2. Comparison of plant and animal cell
3. Cell wall and cell membrane
4. Nucleus
5. Cytoplasm
6. Cell organelles
7. Plastids
8. Mitochondria
9. Vacuoles
- 10.Endoplasmic reticulum
- 11.Golgi apparatus
- 12.Lysosomes

## **Biology - Standard IX**

### **Tissues**

1. Definition of tissues. Cell grade and tissue grade organisation
2. Plant Tissue: meristamatic and permanent tissues in plants
3. Epithelial Tissue, connective tissue, muscular tissue, nervous tissue

### **Diversity in living organism**

1. Basis of classification
2. The hierarchy of classification- group
3. Five Kingdom Classification
4. Monera, Protista, Fungi
5. Plantae- Basis classification.
6. Animalia- Classification upto Phylum
7. Nomenclature

### **Health and Diseases**

1. Food and Nutrition
2. Nutrients and deficiency diseases
3. Communicable and non-Communicable diseases
4. Principle of treatment and prevention

### **Natural Resources and their Management**

1. Air, water, soil
2. Air for respiration, for combustion, for moderating temperatures
3. Movement of air and Rain
4. Air pollution, Water pollution
5. Mineral riches in the soil
6. Ecosystem- food chain
7. Biogeochemical cycles -Water cycle- Nitrogen cycle- Carbon cycle, Oxygen cycle
8. Greenhouse effect
9. Ozone layer

# **Biology - Standard X**

## **Life Processes**

1. What are life processes
2. Nutrition- Respiration- Transportation- Excretion- Excretion in plants and animals.

## **Nutrition**

1. Types of Nutrition
2. Nutrition in human beings
3. Nutrition in Plants

## **Excretion and locomotion**

1. Excretion in human
2. Structure of Kidney
3. Locomotion
4. Tendon- Ligament
5. Structure and Classification of Bones
6. Structure and Classification of Cartilage
7. Types of Muscles

## **Transportation and Respiration**

1. Transport in Plants – Vascular tissue
2. Physiology Of transport- Diffusion, Osmosis, Turgor Pressure.
3. Circulation in Animals.
4. Composition of Blood
5. Blood group
6. Structure of Heart
7. Blood vessels
8. Heart beat
9. Blood Pressure
- 10.ECG
- 11.Respiratory mechanism, Breathing, Respiratory abnormalities

## **Control and Coordination**

1. Animals: Nervous system

2. Human brain
3. Coordination in plants: immediate response to stimuli
4. Plant hormones
5. Hormones in animals

### Reproduction and growth

1. Asexual reproduction- Different types
2. Sexual reproduction in plants
3. Sexual reproduction in animals
4. Reproduction in human beings
5. Reproductive health

### Heredity and Evolution

1. Discretion of terms
2. Heredity
3. Law of inheritance: Mendel's contribution
4. Determination of sex
5. Chromosomes- basic structure, number
6. DNA
7. Transgenic organisms
8. Evidences of evolution
9. theories of Evolution
10. Speciation

## Physics – Standard VIII

### Force and Pressure

1. Idea of Force : A push or a pull
2. Force and Motion – Change in State of Motion
3. Force – Interaction of Forces and Change in Shape due to Force
4. Contact Force – Friction, Applied Force and Normal Force
5. Non-Contact Force – Gravitational Force, Electrostatic Force and Magnetic Force.
6. Laws of Motion- Momentum- Impulse-Law of conservation of momentum.

7. Friction – factors affecting friction
8. Sliding and rolling friction
9. Kinetic Friction
10. Advantages and disadvantages of friction for the movement of automobiles.
11. Airplanes and boats/ships : Fluid Friction
12. Friction and Frictional Force – A Necessary Evil
13. The Concept of Pressure
14. Hydro-static Pressure – Pressure Exerted by Fluids
15. Atmospheric Pressure – Hydro-static Pressure exerted by Gases
16. Thrust and pressure
17. Buoyancy
18. Archimedes principle
19. Relative density

### Sound

1. Sound produced by vibrating bodies
2. Sound produced by humans
3. Medium of Propagation
4. How do we hear sound ?
5. Aptitude, Time Period, And Frequency of a vibration
6. Loudness and Pitch
7. Audible and in audible sound
8. Difference between noise and music
9. Noise pollution and its preventive measures

### Chemical Effects of Electric Current

1. Conduction of Electricity: Do Liquids Conduct Electricity?
2. Conduction of Electricity in Liquids – Electrolysis
3. Electrolysis and Electroplating

### Some Natural Phenomena

1. Lightning
2. Charging by rubbing
3. Transfer of Charge
4. The Story of Lightning
5. Lightning Safety
6. Phenomena related to earthquakes
7. Protection against earthquakes



## Light

1. Reflection of Light – The Laws of Reflection
2. Regular Reflection, Diffused Reflection and Multiple Reflection
3. Characteristics of image formed with a plane mirror
4. New Cartesian sign convention
5. Spherical Mirror- Image formation –Convex Mirror- Concave Mirror
6. Mirror equation

## Exploring the Universe

1. Moon
2. Stars
3. Planet
4. Constellations
5. Black Hole- Comets- Meteors- Meteorite
6. Motion of celestial objects in space
7. The Solar System
8. Other Members of the Solar System

# Physics – Standard IX

## Motion

1. Distance-Displacement-
2. Speed-velocity
3. Uniform motion and non uniform motion on along a straight line
4. Acceleration
5. Graphical representation of motion
6. Equation of motion by graphical method
7. Uniform circular motion

## Work and Energy

1. Work
2. Energy
3. Potential energy
4. Kinetic Energy
5. Potential energy of an object at a height
6. Law of conservation of energy
7. Rate of doing work: power

## Force and laws of motion

1. Force and motion
2. First law of motion
3. Second law of motion
4. Inertia and mass
5. Mathematical formulation of second law of motion
6. Third law of motion
7. Conservation of momentum

### Gravitation

1. Gravitation
2. Universal law of gravitation
3. Free fall
4. Mass and weight

### Wave Motion and Sound

1. Simple Pendulum
2. Periodic Motion
3. Simple Harmonic Motion
4. Wave- Transverse wave and Longitudinal wave
5. Production of sound, Propagation of sound
6. Characteristics of sound wave
7. Speed of sound in different medium
8. Reflection of sound
9. Reverberation
10. Application of ultrasound
11. Range of hearing, Structure of human ear

## Physics – Standard X

### Light reflection and refraction of Light

1. Refraction of light
2. Total internal reflection
3. Refraction by spherical lenses
4. Lens formula and magnification – Power of lens
5. Human eye and colourful world
6. The human eye
7. Power of accommodation

8. Why do we have two eyes
9. Defects of vision and its correction: myopia
10. Defects of vision and its correction: Hypermetropia
11. Defects of vision and its correction: Presbyopia
12. Defects of vision and its correction: Astigmatism
13. Refraction of light through prism
14. Dispersion of white light through glass prism
15. Atmospheric refraction
16. Scattering of light

### Electricity

1. Electric current and circuits
2. Electric potential and potential difference
3. Circuit diagram
4. Ohm's law
5. Factors on which the resistance of conductor depends
6. Resistance of a system of resistors

### Heating and Magnetic effect of electric current

1. Heating effect of electric current
2. Electric power
3. Magnetic field and field lines
4. Magnetic field due to current carrying conductors
5. Force on current carrying conductor in electric field
6. Electric motor
7. Electromagnetic induction
8. Domestic electric circuits

### Sources of energy

1. What is a good source of energy
2. Conventional sources of energy: fossil fuels
3. Conventional sources of energy: Hydro power plant
4. Alternate or non- conventional sources of energy: Biomass bio-gas
5. Non Conventional Sources of Energy -Ocean Thermal Energy-Solar Energy - Photo voltaic Cell-Tidal EnergyGeothermal Energy - Ocean Thermal Energy
6. Environmental consequences
7. How long will an energy source last us