DAVCAE Olympiad

Registration for ICT, General Science and Math's Olympiads.

We are pleased to inform you that we have decided to conduct ICT, Math's and Science Olympiad for the Academic session 2021-22.

1. ICT Olympiad

ICT Olympiad will be organized/conducted at two levels. (age group)

Age Group I: **Students from grade V to VIII.**

Age Group II: **Students from grade IX to XII.**

Objective of conducting ICT Olympiad is to motivate students to strive for better and deeper understanding of the subject and enhance their **reasoning**, **analytical and problem solving skills**. You all will agree that the Olympiads are conducted to find **WIZARD in the subject concerned** and not limited by any syllabus or curriculum prescribed for age group.

It will be an **on-line Multiple Choice Question Test**. The ICT Olympiad for both the groups will not be based on text book syllabus. However in order to provide direction to students the syllabus for group I and group II will be forwarded to school subsequently.

2. General Science and Maths Olympiad for Class VIII & IX:

It has been decided to conduct four Olympiads one each in the subject of General Science and Maths for Classes VIII and IX respectively. It will be an online Multiple choice Question Test.

Objective of organizing Maths & Science Olympiad is to encourage students to develop competitive spirit, work hard to excel, sharpen their mental ability and enhances the analytical reasoning ability in a child. It increases the thinking capability, problem solving skills, confidence and helps in the overall development of a child.

3. Registration and Fees :

- A nominal fee of Rs. 50/- per student per subject will be charged for ICT, Science and Maths Olympiad.

4. Participation :

- Students can give the exam from School Computer Laboratory

ICT Olympiad

Group I: Detailed Syllabus

Web Browser and Networking

- Web terminologies and Web Browsers
- Protocols
- Transmission Media
- Networking devices
- History of internet
- Emails, Social media
- Virus & Antivirus concept
- Cyber World
- E-commerce
- Search Engines

HTML and Gaming

- HTML Tags and attributes
- Concept of URL
- Links and Hyperlinks
- Tables
- Lists
- Various Games and related levels and details

Hardware and Software

- Types of computers
- Generations of computers
- Components of CPU, (system unit), Microprocessors and chips
- Booting process
- Peripheral devices
- Types of storage
- Units of memory
- Inventions and Abbreviations
- Operating System
- Printers
- Input / Output devices

GIMP

- Tools
- Interface, File extension and shortcut keys
- Commands and filters

LOGO

- LOGO Screen and its parts
- ALL LOGO commands
- Primitives and procedures

Open Office and MS Office

- Licensed, Proprietary, Open Source software etc.
  Writer: Creating, Saving, formatting and printing documents, printing with various options Mail Merge, short cut keys, various tool bars, etc.
- CALC : Concept of cell, cell address, formula etc, formatting cells, various tool bars and options etc.
- Impress:Concept of slide, transitions, various PowerPoint views, Short cut keys, all tool bars, printing, saving opening, closing presentations etc.

Tux Paint and MS Paint

- Brushes, Tools, File extensions
- Paint tools, opening, saving and creating files,
- Working with images and photos in Paint

Scratch

- Tools
- Concept of sprite, Scratch window
- Blocks and shapes
- Screen layouts
- Sound, costumes and background
- File formats supported and used

ICT Olympiad
Group II: Detailed Syllabus

Adobe Pagemaker and Photoshop

Short Keys
Tools of toolbar
Blending Modes
Layers and Brushes
Style sheets
File extensions
Filters

Cloud and Mobile Computing

Concept of cloud computing
Benefits of cloud computing
iOS and Android features
File extensions
Abbreviations

GIMP and Flash

Key Frames, types of images
File extensions
Short Keys
Tool Bars and various Tools
Concept of layers
Frames, Panels, Tweens, Masking and Stages
Views and all related topics

Hardware

Computer Generations, History of computer
Abbreviations
Ports, External and Internal Devices
Orgnisation (parts) of computer
Storage devices, storage units
Networking devices,
Memory types and uses

HTML

Body of HTML code,
Various Tags and their uses
Tables, Forms,
File extensions
Links, Attributes

OFFICE

Licensed, Proprietary, Open Source software etc.
Word: Creating, Saving, formatting and printing documents, printing with various options
Mail Merge, short cut keys, various tool bars, etc.
Excel : Concept of cell, cell address, formula etc, formatting cells, various tool bars and options, formulas used in Excel , etc.
PowerPoint:Concept of slide, transitions, various PowerPoint views, Short cut keys, all tool bars, printing, saving opening, closing presentations etc.
Access : concept of database etc.

Operating System

Concept of operating systems
Architecture and system calls
Types of operating system, GUI
Algorithms, flow charts etc.
Compilers and Interpreters
Utility software, application software and system software
LINUX, UNIX
FIFO, GIGO etc.
Storing and retrieving data, system calls

Web Browser and Net Working

Concept of web browser,
Various web browsers and their features
IP addresses and MAC addresses
History of networking
Transmission media, transmission of signals,
Digital and analog signals, packets
Encryption, protocols,
Networking devices,
Abbreviations
Network security, Viruses, Worms, Trojans, Horses,
Social media and e-various apps

Syllabus
MATHEMATICS
Class IX

UNIT I: NUMBER SYSTEMS

1. REAL NUMBERS

1. Review of representation of natural numbers, integers, rational numbers on the number line. Representation of terminating / non-terminating recurring decimals onthe number line through successive magnification. Rational numbers as recurring/ terminating decimals. Operations on real numbers.

2. Examples of non-recurring/non-terminating decimals. Existence of non-rational numbers (irrational numbers) such as $\sqrt{2}$, $\sqrt{3}$ and their representation on the number line. Explaining that every real number is represented by a unique point on the number line and conversely, viz. every point on the number line represents a unique real number.

3. Definition of nth root of a real number.

4. Rationalization (with precise meaning) of real numbers of the type $\frac{1}{a+b\sqrt{x}}$ and $\frac{1}{\sqrt{x}+\sqrt{y}}$ and their combinations) where x and y are natural number and a and b areintegers.

5. Recall of laws of exponents with integral powers. Rational exponents with positive real bases (to be done by particular cases, allowing learner to arrive at the general laws.)

UNIT II: ALGEBRA

1. POLYNOMIALS

Definition of a polynomial in one variable, with examples and counter examples. Coefficients of a polynomial, terms of a polynomial and zero polynomial. Degree of a polynomial. Constant, linear, quadratic and cubic polynomials. Monomials, binomials, trinomials. Factors and multiples. Zeros of a polynomial. Motivate and State the Remainder Theorem with examples. Statement and proof of the Factor Theorem. Factorization of $ax^2 + bx + c$, $a \neq 0$ where a, b and c are real numbers, and of cubic polynomials using the Factor Theorem.

Recall of algebraic expressions and identities. Verification of identities:

$(x + y + z)^2 = x^2 + y^2 + z^2 + 2xy + 2yz + 2zx$

$(x \pm y)^3 = x^3 \pm y^3 \pm 3xy\,(x \pm y)$

$x^3 \pm y^3 = (x \pm y)\,(x^2 \mp xy + y^2$

$x^3 + y^3 + z^3 - 3xyz = (x + y + z)\,(x^2 + y^2 + z^2 - xy - yz - zx)$

and their use in factorization of polynomials.

2. LINEAR EQUATIONS IN TWO VARIABLES

Recall of linear equations in one variable. Introduction to the equation in two variables. Focus on linear equations of the type ax+by+c=0. Explain that a linear equation in two variables has infinitely many solutions and justify their being written as ordered pairs of real numbers, plotting them and showing that they lie on a line. Graph of linear equations in two variables. Examples, problems from real life, including problems on Ratio and Proportion and with algebraic and graphical solutions being done simultaneously.

UNIT III: COORDINATE GEOMETRY

COORDINATE GEOMETRY

The Cartesian plane, coordinates of a point, names and terms associated with the coordinate plane, notations, plotting points in the plane.

UNIT IV: GEOMETRY

1. INTRODUCTION TO EUCLID'S GEOMETRY

History - Geometry in India and Euclid's geometry. Euclid's method of formalizing observed phenomenon into rigorous Mathematics with definitions, common/obvious notions, axioms/postulates and theorems. The five postulates of Euclid. Equivalent versions of the fifth postulate. Showing the relationship between axiom and theorem, for example:

(Axiom) 1. Given two distinct points, there exists one and only one line through them.
(Theorem) 2. (Prove) Two distinct lines cannot have more than one point in common.

2. LINES AND ANGLES

1. (Motivate) If a ray stands on a line, then the sum of the two adjacent angles so formed is 180^O and the converse.
2. (Prove) If two lines intersect, vertically opposite angles are equal.
3. (Motivate) Results on corresponding angles, alternate angles, interior angles when a transversal intersects two parallel lines.
4. (Motivate) Lines which are parallel to a given line are parallel.
5. (Prove) The sum of the angles of a triangle is 180^O.
6. (Motivate) If a side of a triangle is produced, the exterior angle so formed is equal to the sum of the two interior opposite angles.

3. TRIANGLES

1. (Motivate) Two triangles are congruent if any two sides and the included angle of one triangle is equal to any two sides and the included angle of the other triangle (SAS Congruence).
2. (Prove) Two triangles are congruent if any two angles and the included side of one triangle is equal to any two angles and the included side of the other triangle (ASA Congruence).

3. (Motivate) Two triangles are congruent if the three sides of one triangle are equal to three sides of the other triangle (SSS Congruence).
4. (Motivate) Two right triangles are congruent if the hypotenuse and a side of one triangle are equal (respectively) to the hypotenuse and a side of the other triangle. (RHS Congruence)
5. (Prove) The angles opposite to equal sides of a triangle are equal.
6. (Motivate) The sides opposite to equal angles of a triangle are equal.
7. (Motivate) Triangle inequalities and relation between ‘angle and facing side' inequalities in triangles.

4. QUADRILATERALS

1. (Prove) The diagonal divides a parallelogram into two congruent triangles.
2. (Motivate) In a parallelogram opposite sides are equal, and conversely.
3. (Motivate) In a parallelogram opposite angles are equal, and conversely.
4. (Motivate) A quadrilateral is a parallelogram if a pair of its opposite sides is parallel and equal.
5. (Motivate) In a parallelogram, the diagonals bisect each other and conversely.
6. (Motivate) In a triangle, the line segment joining the mid points of any two sides is parallel to the third side and in half of it and (motivate) its converse.

5. AREA

Review concept of area, recall area of a rectangle.

1. (Prove) Parallelograms on the same base and between the same parallels have equal area.
2. (Motivate) Triangles on the same base (or equal bases) and between the same parallels are equal in area.

6. CIRCLES

Through examples, arrive at definition of circle and related concepts-radius, circumference, diameter, chord, arc, secant, sector, segment, subtended angle.

1. (Prove) Equal chords of a circle subtend equal angles at the center and (motivate) its converse.
2. (Motivate) The perpendicular from the center of a circle to a chord bisects the chord and conversely, the line drawn through the center of a circle to bisect a chord is perpendicular to the chord.
3. (Motivate) There is one and only one circle passing through three given non-collinear points.
4. (Motivate) Equal chords of a circle (or of congruent circles) are equidistant from the center (or their respective centers) and conversely.
5. (Prove) The angle subtended by an arc at the center is double the angle subtended by it at any point on the remaining part of the circle.
6. (Motivate) Angles in the same segment of a circle are equal.
7. (Motivate) If a line segment joining two points subtends equal angle at two other points lying on the same side of the line containing the segment, the four points lie on a circle.
8. (Motivate) The sum of either of the pair of the opposite angles of a cyclic quadrilateral is 180° and its converse.

7. CONSTRUCTIONS

1. Construction of bisectors of line segments and angles of measure 60^o, 90^o, 45^o etc., equilateral triangles.
2. Construction of a triangle given its base, sum/difference of the other two sides and one base angle.
3. Construction of a triangle of given perimeter and base angles.

UNIT V: MENSURATION

1. AREAS

Area of a triangle using Heron's formula (without proof) and its application in finding the area of a quadrilateral.

2. SURFACE AREAS AND VOLUMES

Surface areas and volumes of cubes, cuboids, spheres (including hemispheres) and right circular cylinders/cones.

UNIT VI: STATISTICS & PROBABILITY

1. STATISTICS

Introduction to Statistics: Collection of data, presentation of data — tabular form, ungrouped / grouped, bar graphs, histograms (with varying base lengths), frequency polygons. Mean, median and mode of ungrouped data.

2. PROBABILITY

History, Repeated experiments and observed frequency approach to probability.
Focus is on empirical probability. (A large amount of time to be devoted to groupand to individual activities to motivate the concept; the experiments to be drawn from real - life situations, and from examples used in the chapter on statistics).

SYLLABUS

SCIENCE

CLASS IX

Theme: Materials

Unit I: Matter-Nature and Behaviour

Definition of matter; solid, liquid and gas; characteristics - shape, volume, density; change of state-melting (absorption of heat), freezing, evaporation (cooling by evaporation), condensation, sublimation.

Nature of matter: Elements, compounds and mixtures. Heterogeneous and homogenous mixtures, colloids and suspensions.

Particle nature, basic units: Atoms and molecules, Law of constant proportions, Atomic and molecular masses. Mole concept: Relationship of mole to mass of the particles and numbers.

Structure of atoms: Electrons, protons and neutrons, valency, chemical formula of common compounds. Isotopes and Isobars.

Theme: The World of the Living

Unit II: Organization in the Living World

Cell - Basic Unit of life : Cell as a basic unit of life; prokaryotic and eukaryotic cells, multicellular organisms; cell membrane and cell wall, cell organelles and cell inclusions; chloroplast, mitochondria, vacuoles, endoplasmic reticulum, Golgi apparatus; nucleus, chromosomes - basic structure, number.

Tissues, Organs, Organ System, Organism:

Structure and functions of animal and plant tissues (only four types of tissues in animals; Meristematic and Permanent tissues in plants).

Biological Diversity: Diversity of plants and animals-basic issues in scientific naming, basis of classification. Hierarchy of categories / groups, Major groups of plants (salient features) (Bacteria, Thallophyta, Bryophyta, Pteridophyta, Gymnosperms and Angiosperms). Major groups of animals (salient features) (Non-chordates upto phyla and chordates upto classes).

Health and Diseases: Health and its failure. Infectious and Non-infectious diseases, their causes and manifestation. Diseases caused by microbes (Virus, Bacteria and Protozoans) and their prevention; Principles of treatment and prevention. Pulse Polio programmes.

Theme: Moving Things, People and Ideas

Unit III: Motion, Force and Work

Motion: Distance and displacement, velocity; uniform and non-uniform motion along a straight line; acceleration, distance-time and velocity-time graphs for uniform motion and uniformly accelerated motion, derivation of equations of motion by graphical method; elementary idea of uniform circular motion.

Force and Newton's laws : Force and Motion, Newton's Laws of Motion, Action and Reaction forces, Inertia of a body, Inertia and mass, Momentum, Force and Acceleration. Elementary idea of conservation of Momentum.

Gravitation: Gravitation; Universal Law of Gravitation, Force of Gravitation of the earth (gravity), Acceleration due to Gravity; Mass and Weight; Free fall.

Floatation: Thrust and Pressure. Archimedes' Principle; Buoyancy; Elementary idea of Relative Density.

Work, energy and power: Work done by a Force, Energy, power; Kinetic and Potential energy; Law of conservation of energy.

Sound: Nature of sound and its propagation in various media, speed of sound, range of hearing in humans; ultrasound; reflection of sound; echo and SONAR. Structure of the Human Ear (Auditory aspect only).

Theme: Natural Resources: Balance in nature

Unit IV: Our Environment

Physical resources: Air, Water, Soil. Air for respiration, for combustion, for moderating temperatures; movements of air and its role in bringing rains across India.

Air, water and soil pollution (brief introduction). Holes in ozone layer and the probable damages.

Bio-geo chemical cycles in nature: Water, Oxygen, Carbon and Nitrogen.

Theme: Food

Unit V: Food Production

Plant and animal breeding and selection for quality improvement and management; Use of fertilizers and manures; Protection from pests and diseases; Organic farming.