Activity-Based Crash Course for Class 10 Science: Hands-On Activity Workshop

Respected Sir/Madam,

Every institute wants to be distinguished in the way it delivers education. Class-10 Science is the epic of knowledge that we can provide to our students in school academics. Students with a solid foundation and conceptual clarity are better prepared to exceed in competitive environments ahead.

Teachers know that textbooks and classroom teachings alone cannot provide the complete learning. They want to extend it by hands-on activities and experiments. But typically, teachers are constrained by one or more of the following things:

- Time: Difficulty to take out time to go to the laboratory on a frequent basis.
- Material/Setup: Difficulty to get required resources so that every student can do every activity.
- Structured Guideline: Difficulty to map every academic topic to relevant activities.

We can jointly work towards removing these constraints to create an outstanding learning environment for students.

StepsToDo organization has prepared a comprehensive kit for activity-based learning for class 10 students. This kit provides all the required material, instructions, and comprehensive theory notes. Key features of this kit include the following:

- Every student can perform every activity & understand concepts thoroughly through experiments
- Precisely mapped to complete class 10 syllabus
- Prepared by teachers to assist teachers
- Easy to do in classroom setup itself along with ongoing teaching

We can make this activity-based learning available to students in many ways:

1. Enable your teachers to include it in ongoing classroom activities
2. StepsToDo teachers can conduct a workshop at your premises
3. Option for students to purchase and perform activities on their own
4. Customized workshop/kit for selected topics of class 10

Depending on the selected option, the cost of entire class-10 kit will range from Rs. 300 to Rs. 3800 per student.

Apart from the above-mentioned kits, we also sell around 150 Do-It-Yourself kits for small projects of Science and Math. Their prices range from Rs. 40 to Rs. 350. We can discuss the option of making these kits available for individual and optional purchase by students/parents. Additionally, we can help in conducting weekend science-club at your premises.

I request you to provide me an appointment to meet you in person to discuss this further.

List of annexure:

- Brochure
- Summary of DIY Kits & Associated Conceptual Learning/Activities
- Details of DIY Kit wise Conceptual Learning & Activities

For StepsToDo

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Summary of DIY Kits: Associated Conceptual Learning & Activities

Subject	Module	No of Activities	Activity Workshop Duration (In Hours)	No of Pages of Printed Usage Manual/Notes	Cost of a DIY Kit (with Notes/Usage Manual)	Crash Course Fee per Student	Total Amount Paid by Student
Physics Kit 1	Magnetism & Electromagnetism	7	4	16	410	100	510
Physics Kit 2	Optics	32	8	32	660	150	810
Physics Kit 3	Electricity	21	4	20	330	100	430
Biology	Biology	29	4	12	400	100	500
Chemistry Kit 1	Types of Reactions, Metals & Non-metals	12	5	16	370	100	470
Chemistry Kit 2	Acids, Bases and Salts	6	4	12	260	100	360
Chemistry Kit 3	Carbon Compounds	11	4	16	320	100	420
	Sub Total	**118**	**33**	**124**	**2,750**	**750**	**3,500**
	Additional Crash Course Registration Fee (If Any)						300
					2750	750	3800

About Kits:

- Students can purchase all or few of individual kits of their choice
- Kit includes required material, usage manual with notes on related theory
- Individual students can purchase kits and do activities on their own

About Crash Course - Workshop:

- Conducted by a trained teacher in a classroom set up
- Covers all theory concepts in depth by experienced teachers
- Every student performs all specified DIY activities using their own kit
- Fees for the crash course includes three components:
  1) Cost of DIY Kits
  2) Cost Crash Course Fee
  3) One time registration fee for the crash course (If any)
- Crash course is available for all 7 modules or few selected modules of your choice
- Typically every student should have their own DIY kit during the crash course. In a certain scenario, 2 students can share material to save on DIY Kit cost. Note: crash course fee needs be paid by each student. Also, two students should mutually agree on how they are going to share the material after the course.

Partner With Us (For School, Coaching Institutes or Individual)

- We are an educational startup. We welcome you to be a partner with us in spreading this initiative of joyful and meaningful education.
- There are three ways in which you can partner with us:
  1) Spread the word and help us in making these DIY kits available to many students
  2) Organize Class 10 - Crash Course Workshop – Conducted by your teachers
  3) Organize Class 10 - Crash Course Workshop – Conducted by StepsToDo teachers

Contact us to know more about these options and associated financial terms and conditions.

Details of DIY Kit wise Conceptual Learning & Activities

Physics Kit 1 - Magnetism & Electromagnetism

Topics	Activities
• Magnetic effects of current: Magnetic field, field lines, field due to a current carrying conductor, field due to current carrying coil or solenoid • Force on current carrying conductor • Fleming's left hand rule. Electromagnetic induction. Induced potential difference • Induced current. • Fleming's Right Hand Rule, Direct current and Alternating current Frequency of AC. Advantage of AC over DC. Domestic electric circuits.	1. Making a solenoid 2. Making of Hand Operated Electricity Generator 3. Explore Magnetic lines of forces using iron filings. 4. Making of an electromagnet. 5. Explore Magnetic lines of forces in conducting coil 6. Making of Simple DC Motor 7. Make demonstration of Wireless Power Transfer

Details of DIY Kit wise Conceptual Learning & Activities

Physics Kit 2- Optics

Topics	Activities
• Reflection of light at curved surfaces, Images formed by spherical mirrors, Centre of curvature, principal axis, principal focus, focal length, mirror formula (Derivation not required), magnification. • Refraction; laws of refraction, refractive index. • Refraction of light by spherical lens, Image formed by spherical lenses, Lens formula (Derivation not required), Magnification. Power of a lens. • Functioning of a lens in human eye, defects of vision and their corrections, applications of spherical mirrors and lenses. • Refraction of light through a prism, dispersion of light, scattering of light, applications in daily life.	**Activity Set 1: REFLECTION** 1. Image in the Plane Mirror (using glass plate) 2. Observe lateral inversion 3. Reflection From A Plane Mirror 4. Preparing Ray box 5. Reflection from plane mirror using ray box. 6. Spherical Mirrors 7. Divergence of rays in Convex mirror 8. Reflection from Convex Mirror 9. Convergence of rays in Concave mirror 10. Foam model to understand focal length of Convex mirror 11. Reflection from Concave mirror 12. Focal length of concave mirror : Simple observation 13. Assembling optical bench 14. Measurement of Focal Length Of Concave Mirror By Object And Image Method 15. Formation of images by concave mirror 16. Reflection From A Cylindrical Mirror 17. Distorted object and corrected image **Activity Set 2: REFRACTION** 18. Passing Light Rays Through A Glass Slab 19. Passing Light Rays Through Prism (Glass Triangle) 20. Convex Lens And Its Focal length (Parallel Beam Method) 21. Measurement Of Focal Length of Convex Lens By using Ray Box. 22. Measurement of Focal Length of Convex Lens by Plane Mirror. 23. Images Through Convex Lens 24. Magnifying Power of a Convex Lens. 25. Concave Lenses 26. Measurement Of Focal Length Of Concave Lens By using Ray Box 27. Find out Focal Length of Concave Lens By using convex lens. **Activity Set 3: REFRACTIVE INDEX (RI)** 28. Refractive Index Of Glass 29. Refractive Index of Liquid Using Convex Lens and Plane Mirror. **Activity Set 4: DISPERSION** 30. Formation of Spectrum through Prism. 31. Formation Of Spectrum Using Water Tray **Activity Set 5: INTERFERENCE and DIFFRACTION** **Activity Set 6: INTENSITY** 32. Inverse Square Law

Details of DIY Kit wise Conceptual Learning & Activities

Physics Kit 3 - Electricity

Topics	Activities
• Electric Charges • Conductors and insulators • Electric potential and potential difference • Electric current and electrical circuits • Circuit Diagrams • Ohm's Law • Factors affecting of resistances of a conductor • Resistance of a system of resistors • Heating Effect of current • Applications of heating effect of current • Electric Power	1. Make a Simple Electric Circuit 2. Make a Simple Electric Circuit with a Switch 3. Make a Short Circuit 4. Make a Fuse 5. Identify Insulator or Conductor 6. Make circuit with two switches for 1 bulb 7. Understand Inside a Battery Cell 8. Make circuit with Combination of Resistors 9. Arrange Cells in series to Increase Voltage 10. Make circuit with Electric Bulbs connected in series 11. Make circuit with Electric Bulbs connected in parallel 12. Verify Ohm's law 13. Make circuit with Rheostat or Variable Resistor 14. Making Electric Heater 15. Arranging Carbon resistors in a circuit 16. Understand how to fix Carbon resistors 17. Resistor connected in simple circuit in series 18. Two Resistors connected in Series with the bulb 19. Resistor connected in Parallel 20. Resistance of Alloys 21. Nichrome wire connected in Series with the bulb

Details of DIY Kit wise Conceptual Learning & Activities

Biology – Life Processes, Control and Coordination, How do Organisms Reproduce?, Heredity and Evolution.

Topics	Activities
• Revision of anatomy flash cards • Revision of botany flash cards • working of lungs • Working of Eye • Photosynthesis.	**Activity Set 1: Flash Cards for Anatomy** 1. Revise digestive system with colorful graphic and mind map 2. Revise components circulatory system with flow chart 3. Revise respiratory System with pictorial mind map chart 4. Do photographic revision of Urinary System 5. Revise complete nervous system with mind map. 6. Revise brain and endocrine system with pictorial mind map **Activity Set 2: Flash Cards on Life science and Botany** 7. Life processes, Mode of nutrition, Photosynthesis 8. Photosynthesis, steps, necessary conditions 9. Heredity and Evolution, all definitions 10. Heredity and Evolution, Mendelian genetics 11. How do traints get expressed? sex determination 12. Evolution, its evidence, Darwin's theory of evolution 13. Environment, Ecosystem, ecosystem components 14. Food chain, Food web, transfer of energy in food chain 15. Transportation in plants, Xylem and Phloem vessels 16. Types of transport, Osmosis, Respiration in animals 17. Reproduction in organisms, Asexual - Sexual 18. Vegetative reproduction - by roots, stem and leaves 19. Sexual Reproduction in flowers 20. Artificial propagation of plants 21. Hormones in plants and plant growth 22. Plant movements, Types of tropism, Lymphatic system 23. Respiration, Respiration in different parts of plant 24. Managing natural resources. **Activity Set 3: Working of lungs (model making kit)** 25. Prepare working model of lungs. Observe expansion and contraction of lungs and role of diaphragm during process of respiration. **Activity Set 4: Working of eye (model making kit)** 26. Prepare working model of eye. Understand eye functioning by forming image onto paper screen using lens to mimic image formation onto retina. **Activity Set 5: Photosynthesis (experimental kit)** 27. Learn how to verify, starch is production in leaves by photosynthesis. 28. Perform experiment to show that light is necessary for photosynthesis 29. Perform experiment to show that Carbon Dioxide is necessary for photosynthesis

Details of DIY Kit wise Conceptual Learning & Activities

Chemistry Kit 1: Types of Reactions, Metals & Non-metals

Topics	Activities
• Chemical equation • Balanced chemical equation, • Implications of a balanced chemical equation • Types of chemical reactions: • Combination • Decomposition • Displacement • Double displacement, precipitation, neutralization, oxidation and reduction.	1. Study heat of Reactions 2. Combination Reaction 3. Decomposition reaction – Electrolysis of water 4. Single displacement reaction 5. Double displacement reaction 6. Oxidation-Reduction reaction 'blue bottle' reaction 7. Metals and Non-metals 8. Physical Properties of metals and non-metals 9. Oxides of Metals and Non Metals 10. Oxides of metals and non-metals 11. Reaction of Metals with Solutions of other Metal Salts 12. Modern Periodic Classification of elements

Chemistry Kit 2 - Acids, Bases and alts

Topics	Activities
• Acids, bases and salts: Their definitions in terms of furnishing of H+ and OH- ions. • General properties, examples and uses of acids and bases • Concept of pH scale(Definition relating to logarithm not required) • Importance of pH in everyday life • Preparation and uses of sodium hydroxide, Bleaching powder, Baking soda, Washing soda and Plaster of Paris.	1. Testing different acids and bases sample provided in the kit using Litmus paper, pH paper, Methyl Orange indicator 2. Reaction of acid and base with a metal 3. Reaction of metal carbonate with acids 4. Neutralization reaction 5. Reaction of metal oxides with acids 6. Types of salts and their properties

Details of DIY Kit wise Conceptual Learning & Activities

Chemistry Kit 3- Carbon compounds

Topics	Activities
• Covalent bonding in carbon compounds. • Versatile nature of carbon. • Homologous series • Nomenclature of carbon compounds containing functional groups (halogens, alcohol, ketones, aldehydes, alkanes and alkynes), difference between saturated hydrocarbons and unsaturated hydrocarbons. • Chemical properties of carbon compounds (combustion, oxidation, and addition and substitution reaction). • Ethanol and Ethanoic acid (only properties and uses), soaps and detergents.	1. Make molecular model of Beryllium chloride ($BeCl_2$) 2. Make molecular model of Aluminum chloride ($AlCl_3$) 3. Make molecular model of Methane (CH_4) 4. Make molecular model of Ethane (C_2H_6) 5. Make molecular model of Ethylene (C_2H_4) 6. Make molecular model of Ammonia (NH_3) 7. Make molecular model of Water (H_2O) 8. Make molecular model of Acetylene (C_2H_2) 9. Making molecular model of Benzene (C_6H_6) 10. Perform chemical reaction for oxidation of alcohol 11. Perform chemical reaction to prepare a polymer