DIRECTORATE OF SCHOOL EDUCATION, GOVERNMENT OF TAMILNADU, CHENNAI - 600 006.
BIOLOGY - ZOOLOGY SYLLABUS

I Human Physiology

STANDARD XII

Expected Specific Outcomes of Learning	Contentent in terms of Concepts	Curriculum Transactional Strategies	Illustrations	Evaluation	Suggested No. of Periods
1	2	3	4	5	6
1. Recalls various nutritive methods in animals 2. Recollects types of carbohydrates, proteins and fats 3. Knows the importance of vitamins in the diet. 4. Knows the calorine value of carbohydrates and Lipids 5. Understands the cause for obesity 5. Realises the role of hormones in Glucose metablosim	**1.1. Nutrition** **1.1.1 Carbohydrates** **1.1.2 Proteins** **1.1.3 Lipids** **1.1.4 Vitamins** **1.1.5 Minerals** **1.1.6 Water** **1.1.7 Balanced diet** **1.1.8 Calorie values (ICMR standards)** **1.1.9 Obesity** **1.1.10 Hyperglycemia, Hypoglycemia, Diabetes mellitus** **1.1.11 Malnutritious**	1. Charts	1. Diagrams showing sources of nutrients 2. Suitable tables related to vitamins and minerals.	1. Name any 3 polysacharides 2. What are essential amino acids? 3. What is 'PUFA"? 4. What is the calorie requirement of an Indian? 5. Write notes on Diabetes mellitus	

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STANDARD XII

Expected Specific Outcomes of Learning	Contentent in terms of Concepts	Curriculum Transactional Strategies	Illustrations	Evaluation	Suggested No. of Periods
1	2	3	4	5	6
1. Recalls the importance of oral hygiene 2. Understands the cause for peptic ulcer. 3. Knows the causes for liver damage 4. Recollects the processes of digestion of Carbohydrates, Proteins and Lipids.	**1.2. Digestion - Enzymes and enzyme action. Brief account of following :** **1.2.1. Pyorrhoea** **1.2.2. Dental caries - Root canal therapy** **1.2.3. Peptic ulcer** **1.2.4. Hernia** **1.2.5. Appendicitis** **1.2.6. Gall bladder stone** **1.2.7. Liver cirrhosis** **1.2.8. Hepatitis**	Using charts and diagrams	1. Diagrams showing dental caries and other illnesses	1. Desribe the process of diagestion of lipids. 2. Name the carbohydrate digesting enzymes 3. What is root canal treatment? 4. What is viral hepatitis? 5. What is endoscopy?	3 periods

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STANDARD XII

Expected Specific Outcomes of Learning	Contentent in terms of Concepts	Curriculum Transactional Strategies	Illustrations	Evaluation	Suggested No. of Periods
1	2	3	4	5	6
1. Recalls the importance of oral hygiene 2. Understands the cause for peptic ulcer 3. Knows the causes for liver damage 4. Recollect the processes of digestion of carbohydrates, proteins and lipids.	**1.3. Bones and Joints (Major types)** **1.3.1. Fractures** **1.3.2. Dislocations** **1.3.3. Arthritis** **1.3.4. Rickets and osteomalasia** **1.3.5. Orthopaedics** **1.3.6. Gout**	Using charts and diagrams	1. Relevant pictures	1. Give an account of various types of fractures 2. Differentiate Rickets and Osteomalacia 3. What is Gout? 4. Mention the various types of bone joints with suitable examples. 5. What is Orthopaedics?	2 periods

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I Human Physiology

STANDARD XII

Expected Specific Outcomes of Learning	Contentent in terms of Concepts	Curriculum Transactional Strategies	Illustrations	Evaluation	Suggested No. of Periods
1	2	3	4	5	6
1. Recalls the mechanism of muscle action 2. What is the role actin and myosin in muscle contraction? 3. Knows the importance of physical exercise	**1.4. Muscles** **1.4.1. Muscle action** **1.4.2. Muscle tone, Rigor mortis** **1.4.3. Muscle Pull (Hernia)** **1.4.4. Isometric and aerobic exercises (Body building)** **1.4.5. Myasthenia gravis**	Charts	Relevant diagrams or Photographs	1. What is rigor mortis? 2. What is Myopathy?	2 periods

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I Human Physiology

STANDARD XII

1.5. Respiration

Expected Specific Outcomes of Learning	Contentent in terms of Concepts	Curriculum Transactional Strategies	Illustrations	Evaluation	Suggested No. of Periods
1	2	3	4	5	6
1. Knows the mechanism of pulmonary respiration. 2. Becomes familiar with alveolar structure and exchange of gases. 3. Knows about nervous control of respiration. 4. Understands the importance of yoga.	**1.5. Respiration** **1.5.1. Process of pulmonary respiration** **1.5.2. Inspiration - Expiration** **1.5.3. Exchange of gases at alveolar level** **1.5.4. Control of respiration** **1.5.5. Pneumonia** **1.5.6. Pleurisy** **1.5.7. Tuberculosis** **1.5.8. Bronchitis** **1.5.9. Beathing exercises - Yoga, Transcendental meditation**	1. Bell-Jar and baloons expt. 2. Practicing breathing exercises	1. Diagrams showing inspiration and expiration	1. How does exchange of gases happen at the alveolar surface? 2. What is pleurisy? 3. What is the treatment for Tuberculosis? 4. What is the importance of Transcendental meditation?	3 periods

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I Human Physiology

STANDARD XII

1.6. Circulation

Expected Specific Outcomes of Learning	Contentent in terms of Concepts	Curriculum Transactional Strategies	Illustrations	Evaluation	Suggested No. of Periods
1	2	3	4	5	6
1. Recalls the functioning of human heart. 2. Understands the importance of coronary blood vessel 3. Becomes familiar with various types of heart ailments. 4. Understands the importance of blood pressure. 5. Knows the mechanism of blood clotting.	**1.6. Circulation** **1.6.1. Functioning of heart** **1.6.1.1. Origin and conduction of heart beat. Artificial pacemaker** **1.6.1.2. Coronary blood vessel and its significance** **1.6.1.3. Myocardial infarction, Angina pectoris** **1.6.1.4. Angiogram, angioplasty and coronary bipass surgery** **1.6.1.5. Atherosclerosis - Heart attack.** **1.6.1.6. Heart block** **1.6.1.7. ECG and Echo cardiograph** **1.6.1.8. Heart valves** **1.6.1.9. Rheumatic Heart Disease (RHD)** **1.6.1.10. ICCU** **1.6.2. Arterial and venous systems** **1.6.2.1. Blood pressure** **1.6.2.2. Pulse rate** **1.6.2.3. Heart transplantation** **1.6.2.4. Resuscitation in Heart attack (First Aid)** **1.6.2.5. Blood components - Functions** **1.6.2.6. Plasma** **1.6.2.7. Corpuscles** **1.6.2.8. Blood clotting - Anticoagulants - Thrombosis** **1.6.2.9. Embolism** **1.6.2.10. Blood related diseases like Polycythemia Leukemia, Anaemia etc.** **1.6.2.11. Blood donation, Blood banks** **1.6.2.12. Lymph fluid - Physiological role**	Charts, Diagrams models, Video clipping	1. Structure of heart showing SA node, AV node and bundle of his. 2. ECG	1. What is an artificial pacemaker? 2. What is heart attack? 3. What is myocardial infarction? 4. Why is RHD caused? 5. What is the role of lymph?	4 Periods

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I Human Physiology

STANDARD XII

Expected Specific Outcomes of Learning	Contentent in terms of Concepts	Curriculum Transactional Strategies	Illustrations	Evaluation	Suggested No. of Periods
1	2	3	4	5	6
1. Recalls the functions of various regions of the brain. 2. Understands conditioned reflex 3. Becomes familiar with hormones and their mode of action.	**1.7. Co-ordinating Systems** **1.7.1. Brain -Functioning of different regions** **1.7.1.1. Memory** **1.7.1.2. Sleep** **1.7.1.3. Stroke** **1.7.1.4. Alzhemier's disease** **1.7.1.5. Meningitis / Brain fever** **1.7.1.6. Conditioned reflex** **1.7.1.7. Electro encephalography** **1.7.1.8. Right brain - left brain concept** **1.7.2. Spinal cord - Functioning** **1.7.2.1. Reflex action** **1.7.2.2. CSF** **1.7.3. Chemical co-ordination** **1.7.3.1. Pituitary (Hormones of Adenohypophysis Neurohypophysis and their regulations)** **1.7.3.2. Thyroid, Parathyroidal hormones** **1.7.3.3. Insulin and Glucagan** **1.7.3.4. Hormones of Adrenal cortex and Medulla** **1.7.3.5. Reproductive Hormones** **1.7.3.6. Problems related to Secretion - Non Secretion of Hormones.**	Charts, Diagrams, Pictures, Video clippings.	1. Suitable diagrams. 2. Flow charts for hormonal actions.	1. What is the role of medulla oblongata. 2. What is the role of CSF? 3. Mention the names of Reproductive hormones and their functiions. 4. Mention the importance of Insulin and Glucagon.	5 Periods

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I Human Physiology

STANDARD XII

1.8. Receptor Organs

Expected Specific Outcomes of Learning	Contentent in terms of Concepts	Curriculum Transactional Strategies	Illustrations	Evaluation	Suggested No. of Periods
1	2	3	4	5	6
1. Recalls the functioning of Eye and Ear 2. Becomes familiar with *eye* ailments. 3. Knows the causes for hearing impairments 4. Knows the effects of solar radiations on the skin.	**1.8. Receptor Organs** **1.8.1. EYE** **1.8.1.1. Focussing Mechanism & Photo chemistry of retina** **1.8.1.2. Short sightedness - Long sightedness** **1.8.1.3. Optometry** **1.8.1.4. Retinopathy** **1.8.1.5. Cataract** **1.8.1.6. Lens replacement** **1.8.1.7. Nyctalopia** **1.8.1.8. Eye infections** **1.8.1.9. Conjunctivitis / Glaucoma** **1.8.1.10. Eye care** **1.8.2. EAR** **1.8.2.1. Hearing mechanism - Organ of corti** **1.8.2.2. Hearing impairments and aids** **1.8.2.3. Noise pollution and its importance** **1.8.3. SKIN** **1.8.3.1. Melanin - Functions** **1.8.3.2. Effect of solar radiations / UV** **1.8.3.3. Skin Grafting** **1.8.3.4. Dermatitis** **1.8.4. TONGUE** **1.8.4.1. Gustatory reception**	Charts, Diagrams, Models and Video clippings.	Appropriate diagrams	1. How do we feel what we see? 2. What is Optometry? 3. What are types of the hearing aids available? 4. How should we take care of our *eyes*?	5 periods

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I Human Physiology

STANDARD XII

1.9. Excretion

Expected Specific Outcomes of Learning	Contentent in terms of Concepts	Curriculum Transactional Strategies	Illustrations	Evaluation	Suggested No. of Periods
1	2	3	4	5	6
1. Knows the process of synthesis of urea. 2. Recalls the functioning of Nephrons 3. Knows the influence of diabetes mellitus on the kidney functioning	**1.9. Excretion** **1.9.1. Ureotelism - Urea Biosynthesis (Orninthine Cycle)** **1.9.2. Nephron ultrafiltration, tubular reabsorption and tubular secretion** **1.9.3. Renal failure - Dialysis - Kidney stone - formation** **1.9.4. Kidney Transplantation** **1.9.5. Diabetes**	Charts, Diagrams and Models.	Diagram showing filtration and reabsorption by the nephrons	1. Mention the quantities of substances filtered, reabsorbed and secreted through Nephrons. 2. What are the types of Dialysis? 3. What is dialysis? 4. What are the problems related to kidney transplantation?	3 periods

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I Human Physiology

STANDARD XII

Expected Specific Outcomes of Learning	Contentent in terms of Concepts	Curriculum Transactional Strategies	Illustrations	Evaluation	Suggested No. of Periods
1	2	3	4	5	6
1. Recalls the stages of spermatogenesis and Oogenesis 2. Understands the methods and importance of birth control. 3. Knows all about the sexually transmitted diseases.	**1.10. Reproductive system** **1.10.1. Brief account of spermatogenesis Oogenesis - Menstrual cycle** **1.10.2. Invitro fertilization** **1.10.3. Birth control** **1.10.4. Sexually Transmitted Diseases (STD), AIDS**	Charts and Diagrams	Diagrams showing invitro fertilisation	1. What is sex hygiene? 2. Describe menstrual cycle 3. Write an essay on AIDS.	2 periods

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BIOLOGY - ZOOLOGY SYLLABUS

II- Microbiology

STANDARD XII

Expected Specific Outcomes of Learning	Contentent in terms of Concepts	Curriculum Transactional Strategies	Illustrations	Evaluation	Suggested No. of Periods
1	2	3	4	5	6
1. Becomes familiar with the pioneering works on medical microbilogy. 2. Knows all about Louis Pasteur 3. Understands the importance of the study of virolgy 4. Knows all about diseases and micro-organisms	**2.1. Introduction** **2.2. History of Medical Microbiology** **2.3. The Influence of Pasteur, Koch and Lister** **2.4. Virology - Structure, Genetics, Culture and diseases** **2.5. AIDS and its control** **2.6. Bacteriology - Structure, Genetics and diseases.** **2.7. Protozoan microbiology - Disease related** **2.8. Larval microbiology - Disease oriented** **2.9. Pathogenecity of Micro - organism** **2.10. Anti microbial resistance** **2.11. Chemotherapy**	Charts, Diagrams, Paper clippings	Relevant diagrams.	1. What was the contribution of Koch and Lister to Microbiology? 2. Give an account of diseases caused by micro-organisms. 3. What is disease resistance?	6 periods

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BIOLOGY - ZOOLOGY SYLLABUS

III Immunology

STANDARD XII

3.1. Immunity

Expected Specific Outcomes of Learning	Contentent in terms of Concepts	Curriculum Transactional Strategies	Illustrations	Evaluation	Suggested No. of Periods
1	2	3	4	5	6
1. Become familiar with immune systems. 2. Knows about natural immunity. 3. Understands acquired immunity.	**3.1. Immunity** **3.1.1. Immune system** **3.1.2. Innate immunity** **3.1.3. Acquired immunity - Humoral**		Appropriate diagrams	1. Define immunity. 2. Differentiate innate and acquired immunity.	2 periods

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BIOLOGY - ZOOLOGY SYLLABUS

III Immunology

STANDARD XII

3.2. Innate imunity

Expected Specific Outcomes of Learning	Contentent in terms of Concepts	Curriculum Transactional Strategies	Illustrations	Evaluation	Suggested No. of Periods
1	2	3	4	5	6
1. Understands the importance of Lymphiod cells in immunity. 2. Knows about immunoglobulins 3. Realises the role of phagocytes.	**3.2. Innate immunity** 3.2.1. Lymphoid cells 3.2.2. Mono nuclear phagocytes 3.2.3. Poly morpho nuclear phagocytes 3.2.4. Cytokines 3.2.5. Structure of Antibody (Ig) 3.2.6. Antigen - antibody reactions	Charts, Diagrams	Relevant diagrams	1. What are mono nuclear phagocytes? 2. What are cytokines? 3. Explain Antigen - antibody reactions.	3 periods

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BIOLOGY - ZOOLOGY SYLLABUS

III Immunology

STANDARD XII

3.3. Acquired immunity, 3.4 Infections and immunity

Expected Specific Outcomes of Learning	Contentent in terms of Concepts	Curriculum Transactional Strategies	Illustrations	Evaluation	Suggested No. of Periods
1	2	3	4	5	6
1. Recalls types of acquired immunity 2. Knows the role of monoclonal antibodies. 3. Understands the process of infection.	**3.3. Acquired immunity** **3.3.1. Development of immune system** **3.3.2. T-cell activation** **3.3.3. Monoclonal antibodies** **3.3.4. Cytotoxicity** **3.4. Infections and Immunity**	Charts and Diagrams	Relevant diagrams	1. Describe the process of developement of immunity? 2. What is cytotoxicity?	3 periods

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BIOLOGY - ZOOLOGY SYLLABUS

III Immunology

STANDARD XII **3.5. Immunology of Tissue Transplantation 3.6. Immune deficiency diseases (or) Immunopathology**

Expected Specific Outcomes of Learning	Contentent in terms of Concepts	Curriculum Transactional Strategies	Illustrations	Evaluation	Suggested No. of Periods
1	2	3	4	5	6
1. Knows various types of transplantations. 2. Understands problems related transplantations 3. Realises that diseases become serious due to immune deficiency	**3.5. Immunology of Tissue Transplantation** **3.6. Immune deficiency diseases (or) Immuno - pathology**		Suitable diagrams?	1. What is xeno transplantation ? 2. What are the organs that are transplanted? 3. What is tissue rejection? 4. Name the immune dificiency disesases.	2 periods

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BIOLOGY - ZOOLOGY SYLLABUS

IV Modern Genetics

STANDARD XII

Expected Specific Outcomes of Learning	Contentent in terms of Concepts	Curriculum Transactional Strategies	Illustrations	Evaluation	Suggested No. of Periods
1	2	3	4	5	6
1. Realises the scope of applied genetics 2. Knows about genetic diseases 3. Understands the importance of Human Genome project. 4. Knows the application of Bio-informatics.	**4.1. Introduction - Scope** **4.2. *Human Genetics*** **Karyotyping, Chromosome gene mapping, Recombinant DNA technology and segmenting** **4.3. Genetic diseases** **4.4. Human Genome project** **4.5. Cloning** **4.6. Transgenic organisms - Genetically Modified Organisms (GMO)** **4.7. Genetherapy** **4.8. Bio informatics - application** **4.9. DNA sequencing and protein sequencing and Protein structure. Biological database**	Charts, diagrams, paper clippings	Suitable diagrams, Photographs.	1. What is recombinant DNA technology? 2. What are transgenic organisms? 3. Discuss the importance of genetheraphy.	8 periods

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BIOLOGY - ZOOLOGY SYLLABUS

V Environemtal Sciences

STANDARD XII

Expected Specific Outcomes of Learning	Contentent in terms of Concepts	Curriculum Transactional Strategies	Illustrations	Evaluation	Suggested No. of Periods
1	2	3	4	5	6
1.Understands problems related to human population increases. 2. Recalls the issues related to global warming 3. Understands the significance of waste management 4. Realises that poverty can cause environemental degradation	**5.1. Human population and explosion - Issues** **5.2. Global warming - Crisis - Green House Effect** **5.3. Ozone layer depletion** **5.4. Waste mangement** **5.5. Biodiversity conservation (Biosphere reserves) - Government and Non Govermental organisations involved.** **5.6. Energy crisis and Environmental impact.** **5.7. Poverty and environment** **5.8. Fresh water crisis and management**	Charts, Diagrams, Photographs, Paper Clippings.	Suitable Diagrams	1. How can population increase cause environmental damage? 2. Can we prevent ozone layer depletion? 3. Write an essay on energy requirement and environmental degradation. 4. How can we solve fresh water crisis?	8 periods

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BIOLOGY - ZOOLOGY SYLLABUS

VI Applied Biology

STANDARD XII **6.1. Livestock and Management, 6.2. Poulthy - Farming Techniques 6.3. Piscicultures.**

Expected Specific Outcomes of Learning	Contentent in terms of Concepts	Curriculum Transactional Strategies	Illustrations	Evaluation	Suggested No. of Periods
1	2	3	4	5	6
1. Recalls livestock management 2. Becomes familiar with breeds of cattle 3. Knows the value of exotic varieties 4. Knows about "White Revolution" 5. Understands the basic principles of fish farming. 6. Becomes familiar with local fishes.	**6.1. Livestock and Management** **6.1.1. Dairy** **6.1.2. Breeds of cattle** **6.1.3. Miltch breed** **6.1.4. Draught breed** **6.1.5. Dual purpose** **6.1.6. Common diseases and control** **6.1.7. Exotic and cross breds** **6.1.8. Techniques adapted in caltle breeding** **6.2. Poultry - Farming techniques** **6.2.1. Breeds** **6.3. Pisciculture** **6.3.1. Fish farming** **6.3.2. Edible fishes of Tamilnadu**	1. Visit to dairies and Aquaculture farms 2. Seeing actual and preserved edible fishes of Tamilnadu.	Diagrams of various breeds.	1. What is the importance of cross breds? 2. What are the common diseases of cattle? 3. Mention the names of edible fishes of Tamilnadu?	7 periods

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BIOLOGY - ZOOLOGY SYLLABUS

VI Applied Biology

STANDARD XII

6.4. Medical Lab-Techniques

Expected Specific Outcomes of Learning	Contentent in terms of Concepts	Curriculum Transactional Strategies	Illustrations	Evaluation	Suggested No. of Periods
1	2	3	4	5	6
1. Knows the basic principle involved in the functioning of BP apparatus. 2. Understands the "PQRST" wave in ECG. 3. Knows the application of CT Scan	**6.4. Medical Lab - Techniques** **6.4.1. Stethescope** **6.4.2. Sphygmomono meter** **6.4.3. Heamocytometer** **6.4.4. Urine - Sugar analysis** **6.4.5. ECG - 'PQRST' wave** **6.4.6. CT Scan** **6.4.7. Endoscopic (Laproscopic) techniques** **6.4.8. Artificial pacemaker** **6.4.9. Auto analyser**	1. Visit to a medical laboratory 2. Visit to an hospital 3. Showing an electrocardio graph	Relevant picturer	1. What is the use of a stethescope? 2. Mention the method for finding sugar in the urine? 3. What is CT Scan? 4. What are auto analysers?	7 periods

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VII Theories of Evolution

STANDARD XII

Expected Specific Outcomes of Learning	Contentent in terms of Concepts	Curriculum Transactional Strategies	Illustrations	Evaluation	Suggested No. of Periods
1	2	3	4	5	6
1. Becomes familiar with the theories of evolution. 2. Understands the basic idea of evolution provided by Lamarck and Darwin. 3. Realises the importance of isolating mechanisms in maintenance of a species.	**7.1. Lamarckism** **7.2. Neolamarckism** **7.3. Darwinism** **7.4. Neo Darwinism / Modern Concept of Natural selection** **7.5. Species concept** **7.6. Origin of species and Isolating Mechanisms**		Appropriate diagrams	1. What is Neolamarckism? 2. Write an essay on modern concept of natural selection? 3. Define species 4. What are the various isolating mechanisms?	9 periods

SYLLABUS FOR PRACTICAL

ZOOLOGY - (Short Version)

STANDARD - XII

1. **Qualitative test for carbohydrates, proteins and lipids - 1 test each**
2. **Test of urea in urine of a mammal**
3. **Rate of activity of human salivary amylase in relation to temperature and pH**
4. **Study of prepared slides - Entamoeba, Scolex of tapeworm, mature proglottid, Red blood corpuscles, white blood corpuscles**
5. **Models and spicimens - Mammalian Brain / model, Eye model, Ear model, Mammalian Kidney - Nephron model, Heart model**
6. **Instruments / Drugs -**
    1. Stethescope
    2. Sphygmomonometer
    3. An eye drop bottle having antibiotic fluid
    4. Eye lotion
    5. Bifocal eye lens
7. **Project Report**
    1. Visit to Medical Laboratory / Hospital / Research Laboratory
    2. Visit to a Dairy / Polutry / Fish farm
    3. Visit to a site having rain water harvesting