**12.2 Physics Laboratory**

Physics is that branch of science where experimentation is an integral part of the core subject. Physics laboratory is the place where experiments of physics are carried out.

* Every recognized school has a physics lab, but sophistication varies from institute to institute.
* It is in the laboratory that physics students learn to practice the activities of scientists—asking questions, performing procedures, collecting data, answering questions and thinking of new questions to explore.
* Physics is a vast subject and includes various disciplines in it.
* At school level a student is taught fundamentals of all these disciplines.
* In each of it there is a multitude of experiments to be performed at school level.
* For students to acquire the manual and mental skills associated with learning physics, it is essential that they be fully engaged in laboratory activities.
* This requires sufficient equipment and material.
* The integration of laboratories activities with classroom work requires that the students be able to move smoothly between their desks and the laboratory area and that there is sufficient space for equipment to remain set up.
* At the senior secondary school level it is especially desirable for the laboratory area to be integrated with classroom.
* Although excellent physics learning can take place using the simplest equipments, computers and measuring instruments incorporating modern technology can be powerful tools for learning physics concepts and developing skills of measurement, analysis and processing information.
* Evaluation of student learning in physics should include assessment of skills developed in laboratory activities as well as the knowledge acquired during these activities.
* Effective employment of laboratory activities requires that teachers have adequate and convenient storage for equipment.
* Meaningful learning will occur where laboratory activities are a well-integrated part of a learning sequence.
* The separation of laboratory activities is not desirable in school physics.
* No. of students doing the physics experiment should be small enough for the teacher to supervise the safety of students’ activities and to have sufficient time to actively work with the student or a group of students.
* There is a wide range of equipments from most common ones like magnets, pulleys, pendulums, beakers, lenses, glasses, tuning forks, scales etc. to the sophisticated ones like spectroscope, microscope, electromagnet, ammeter, voltammeter, potentiometer etc.
* Some public schools have a sophisticated physics laboratory with the latest state-of- the art facilities that equip the students to have hands on experience.
* Interactive board and an LCD projector are the other equipments which allow the teacher to incorporate the latest technology in their lessons. It arouses the interest and curiosity of students.
* Microcomputer-based laboratories are one of the most promising perspectives in physics laboratory teaching at higher level.

**Purpose and importance of physics laboratory**

* A physics lab aids a student in establishing the relevance of the theory.
* It brings clarity in the minds of students regarding the basic concept of the subject.
* Students understand the difference between the theory and application of it through experiments.
* Physics laboratory helps students in improving their approach towards the subject.
* Experiments carried out in the laboratory help them in learning how to keep patience and be careful while taking observations and calculating inferences.
* Physics labs at school level motivate students to carry out research at higher level.
* Working in a physics laboratory actually puts a fundamental slab for them.
* It provides an experimental foundation for the theoretical concepts introduced in the lectures. It is important that the students have an opportunity to verify some of the ideas for themselves.
* It familiarizes students with experimental apparatus, the scientific method and the methods of data analysis, so that they will have some idea of the inductive process by which the ideas were originated.
* It teaches how to make careful experimental observations and how to think about and draw conclusions from such data.
* To learn how to write a technical report, this communicates scientific information in a clear and concise manner.
* Practical ability to do experiments and analyze data is usually acquired through practice and experience. Practice is very important in learning any discipline.
* Practice is important for being able to make the connection between theory and practical experience.
* There are different procedures of different experiments in physics and then there are some basic behavioral rules in a laboratory, a student needs to be aware of all this.

**Functions of physics laboratory**

* Functions of physics laboratory are different for different levels. At school level the laboratory is aimed in enabling the students to learn physics theories in a more elaborative manner with the involvements of its application. Experiments carried out are mostly ones in coherence with the curriculum.
* For higher studies the objective is to carry out researches and studies relevant to the contemporary industry of science.