

Certificate of Experimental Skills

An Initiative of

Nehru Science Centre & Bombay Association for Science Education

Guidelines for Students – Level 1

As the tests are designed for evaluation of experimental skills of candidates, all the students are expected to

READ THE INSTRUCTIONS CAREFULLY,

FULLY UNDERSTAND THE TASK GIVEN,

MAKE A MENTAL PLAN OF PERFORMING THE TASK WITHIN THE GIVEN TIME

They are also expected to be familiar with the ideas of

1. **Use of all the components in a compass/ geometrical instrument box**
2. **Geometrical constructions, like calculations of perimeters, surface areas, volumes of all regular bodies etc.**
3. **Least count and range of instruments,**
4. **Selection of proper instruments for measurement of a particular quantity,**
5. **Proper Setting up of apparatus.**
6. **Making observations at eye level - and Proper recording of readings.**
7. **Apply the knowledge of the topics and draw conclusion from the experimental findings**

Instruments and concepts for the event:

Simple measurements of all fundamental quantities –

Length – use of meter scale, foot ruler, measuring tape, vernier callipers, Micrometre screw gauge etc.

Mass – use of weighing scales balances etc for measurement of mass/ weight,

Time – use of different types of digital and analogue clocks, watches, stop clock, stop watches etc.

Temperature – use of clinical and laboratory thermometers,

Angle – use of protractor, compass etc.

Area –determination of area of a surface using a graph paper, scale, protractor etc.

Volume – calculation from measurements of regular bodies, use of measuring flasks, burettes, pipets, use of conical flasks, use of droppers and syringes and other indirect means.

Tracing of light rays for –

Reflection on a mirror, locating image of an object due to reflection on a plane mirror by tracing two rays, removing parallax,

Refraction through a transparent medium – glass slab, liquid in a container,

Measurement of angle of incidence, reflection, refraction etc.

Use of glassware in experiments especially burettes, pipettes, measuring cylinders, syringes, volumetric flasks etc.

Simple volumetric analysis using titration method

Identification of physical properties of given substances/ compounds.

Identification and classification of chemical elements from atomic structures.

Concept of pH, use of pH papers/pH indicators,

Types of chemical reactions, Types of salts, Acids and Bases.

Physics, Chemistry and Biology in everyday life eg. Kitchen Biology, Chemistry, Physics.

Identification of food grains, pulses, different cooking oils etc – kitchen items – by smell, touch etc (food items are included in schools and kitchen is one of the best laboratories)

Identification of plants from seeds, leaves,

Identification of animal form body parts

Classification from roots, animal families etc.

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- Before starting the experiment (Planning):
 - Be sure about:
 - What you are measuring
 - Plan of Action
 - Apparatus needed and if it's available
 - Time management
 - Objectives and are they realistic?
 - Proper alignment
 - During the experiment
 - Arrangement of the apparatus
 - Be honest in recording your observations
 - Strictly follow the precautions (especially while handling chemicals).
 - Tidiness and care of the apparatus
 - Work ethics
 - After the experiment:
 - Reporting the results
 - Rearranging everything back
 - You have successfully completed an experiment when,
 - You are crystal clear about the science behind it
 - You are confident about your observations
 - This does not mean that you must get *“right”* answer
 - You can explain how and why for each part of the experiment to a third person
 - You are aware about limitations of your experiment.
 - Made an ordered report of your experiment
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