

A PRACTICAL FILE ON

Biology Practical File

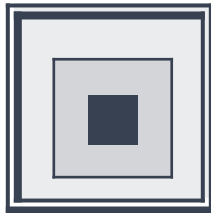
Class XII · CBSE practical record

Submitted in partial fulfilment of the practical examination requirements

CLASS XII (CBSE)

in

Class XII – C



SUBMITTED BY

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Roll No. 12C03

CLASS

Class XII – C

Department of Biology

LAKEVIEW INTERNATIONAL SCHOOL, BHOPAL

Session 2025–26

CERTIFICATE

This is to certify that Ishita Nair, a student of Class XII – C, has satisfactorily completed the practical work in Biology prescribed by the Central Board of Secondary Education (CBSE) during the academic session 2025–26.

The experiments recorded in this file were performed by the student in the laboratory under my supervision, and the observations and results are the student's own.

Dr. Meenal Kulkarni

Subject Teacher

External Examiner

Date: _____

Mrs. Farah Khan

Principal

ACKNOWLEDGEMENT

I would like to express my sincere gratitude to my subject teacher, Dr. Meenal Kulkarni, for guidance and encouragement throughout the practical sessions, and for patiently clearing my doubts in the laboratory.

I am also thankful to Mrs. Farah Khan, Principal, for providing a well-equipped laboratory, and to the laboratory staff for their help in arranging the apparatus for every experiment.

Finally, I thank my parents and classmates for their constant support while I completed this practical file.

Ishita Nair

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Write the page number of each experiment in the remarks column once the file is complete.

Laboratory Safety Rules

- Wear a lab coat and closed shoes
- Never taste or smell chemicals directly
- Report any breakage or spill to the teacher at once
- Switch off and unplug equipment after use
- Wash hands before leaving the laboratory

EXPERIMENT 1: POLLEN GERMINATION ON A SLIDE

Date: 08 Jul 2025**Page No.:** ____**Teacher's sign:** _____

Aim

To study pollen germination on a slide using a nutrient medium.

Apparatus / Materials Required

- Fresh flowers (e.g. Vinca, balsam)
- Cavity slide, cover slip, compound microscope
- Sucrose, boric acid, magnesium sulphate, potassium nitrate, distilled water

Theory

Pollen grains germinate on a suitable stigma and produce a pollen tube that carries the male gametes to the ovule. A sucrose solution with boron provides a similar environment on a slide.

Procedure

1. Prepare the nutrient solution by dissolving 10 g sucrose, 10 mg boric acid, 30 mg magnesium sulphate and 20 mg potassium nitrate in 100 mL of water.
2. Put a drop of the solution on a clean cavity slide.
3. Dust a few pollen grains from a fresh flower onto the drop.
4. Cover with a cover slip and leave for 15–30 minutes.
5. Observe under the low power and high power of the microscope.

Observations

Time after sowing	Pollen grains observed	Grains with tubes	Germination (%)
10 min	40	6	15
20 min	40	17	43
30 min	40	26	65

Observation table (sample readings — replace with your own)

Result

Result

Pollen grains germinated and pollen tubes of different lengths were seen under the microscope; germination increased with time (sample result).

Precautions

- Use fresh, mature flowers.
- Use a clean slide.
- Do not let the drop dry out.

EXPERIMENT 2: WATER-HOLDING CAPACITY OF SOIL SAMPLES

Date: 22 Jul 2025

Page No.: ____

Teacher's sign: _____

Aim

To study the texture and water-holding capacity of soil samples from two different sites.

Apparatus / Materials Required

- Soil samples from a garden and a roadside
- Tin boxes with perforated bottom, filter paper
- Petri dish, weighing balance, water

Theory

Soil texture depends on the proportion of sand, silt and clay. Fine-textured soils with more clay and humus hold more water than coarse sandy soils.

$$\text{Water-holding capacity (\%)} = (W_3 - W_2) / (W_2 - W_1) \times 100$$

Procedure

6. Weigh the empty box with filter paper (W_1).
7. Fill it with dry soil and weigh again (W_2).
8. Place the box in a Petri dish of water until the soil is saturated.
9. Remove, allow excess water to drain and weigh again (W_3).
10. Repeat for the second soil sample and compare.

Observations

Sample	W_1 (g)	W_2 (g)	W_3 (g)	WHC (%)
Garden soil	18.0	118.0	166.0	48.0
Roadside soil	18.0	118.0	139.0	21.0

Observation table (sample readings — replace with your own)

Result

Result

Garden soil has a higher water-holding capacity (48%) than roadside soil (21%) because of its higher humus content (sample result).

Precautions

- Soil should be completely dry before weighing.
- Let excess water drain fully before the final weighing.

EXPERIMENT 3: MITOSIS IN ONION ROOT TIP

Date: 05 Aug 2025

Page No.: ____

Teacher's sign: _____

Aim

To prepare a temporary mount of onion root tip and study the stages of mitosis.

Apparatus / Materials Required

- Onion bulb, beaker of water
- Watch glass, slide, cover slip, blade, forceps
- Acetocarmine stain, 1N HCl, burner, microscope

Theory

Mitosis occurs in the meristematic cells at the tip of the root. The stages — prophase, metaphase, anaphase and telophase — can be seen in a squash preparation after staining the chromosomes.

Procedure

11. Grow onion roots by placing the bulb on a beaker of water for 3–6 days.
12. Cut 2–3 cm of the root tips and fix them in a mixture of alcohol and acetic acid.
13. Warm a root tip in acetocarmine with a drop of 1N HCl for a few seconds.
14. Place it on a slide, cut off the tip, add a drop of stain and put a cover slip.
15. Tap gently to spread the cells, then observe under the microscope.

Observations

Stage	Key feature observed
Prophase	Chromatin condenses into visible chromosomes
Metaphase	Chromosomes line up at the equator
Anaphase	Chromatids move to opposite poles
Telophase	Nuclear membrane re-forms; cell plate appears

Observation table (sample readings — replace with your own)

Result

Result

Different stages of mitosis were observed in the onion root tip cells.

Precautions

- Do not overheat the root tip.
- Squash gently to avoid breaking the cover slip.

EXPERIMENT 4: ISOLATION OF DNA FROM PLANT MATERIAL

Date: 19 Aug 2025

Page No.: ____

Teacher's sign: _____

Aim

To isolate DNA from available plant material such as spinach, green pea seeds or banana.

Apparatus / Materials Required

- Plant material, mortar and pestle
- Detergent, common salt, cold ethanol
- Test tube, filter, glass rod

Theory

Detergent breaks down cell and nuclear membranes, releasing DNA. Salt helps the DNA strands clump together, and because DNA is insoluble in cold alcohol it precipitates at the interface as white threads.

Procedure

16. Grind the material with a little water, salt and detergent.
17. Filter the mixture into a test tube.
18. Gently pour ice-cold ethanol down the side of the tube to form a layer.
19. Wait a few minutes; white threads of DNA appear at the junction.
20. Spool the threads onto a glass rod.

Result

Result

DNA was isolated as fine white threads at the alcohol–water interface.

Precautions

- Use ice-cold ethanol.
- Pour the alcohol slowly without mixing the layers.

EXPERIMENT 5: PLANT POPULATION DENSITY BY THE QUADRAT METHOD

Date: 02 Sep 2025**Page No.:** ____**Teacher's sign:** _____

Aim

To study plant population density and frequency using the quadrat method.

Apparatus / Materials Required

- Quadrat (1 m × 1 m) made of string and pegs
- Notebook, pencil, measuring tape

Theory

The quadrat method is a sampling technique used to estimate the number of individuals of a species per unit area (density) and the percentage of quadrats in which the species occurs (frequency).

$$\text{Density} = \text{total individuals} / \text{number of quadrats studied}$$

$$\text{Frequency (\%)} = \text{quadrats with the species} / \text{total quadrats} \times 100$$

Procedure

21. Select a grassland area and lay ten quadrats at random.
22. Count the individuals of each species in every quadrat.
23. Record the data in a table.
24. Calculate density and frequency for each species.

Observations

Species	Total individuals	Quadrats with species	Density (per m ²)	Frequency (%)
Species A (grass)	86	10	8.6	100
Species B	24	6	2.4	60
Species C	9	3	0.9	30

Observation table (sample readings — replace with your own)

Result

Result

Species A is the most abundant and most widely distributed in the sampled area (sample result).

Precautions

- Lay quadrats randomly.
- Count each plant only once.

BIBLIOGRAPHY

- Laboratory manual issued by the department / school.
- Prescribed textbook for the subject (latest edition).
- Class notes and practical demonstrations by the subject teacher.