



ITL PUBLIC SCHOOL

Active Engagement of Young Minds during summer vacations 2026

Class XI

BIOLOGY

Summer vacations are a time to relax, refresh, and explore learning beyond the classroom. Biology, as the study of life, helps us understand the living world around us through observation, investigation, and scientific thinking. The purpose of this holiday homework is to encourage students to develop curiosity, creativity, and research skills while connecting biological concepts with real-life applications.

This assignment has been specially designed according to the CBSE curriculum for Grade 11. In today's rapidly evolving world, Biology is closely linked with technology, Artificial Intelligence (AI), and Computational Thinking. Therefore, students are encouraged to use digital tools responsibly for research, data analysis, graph preparation, pattern recognition, and presentation of findings. This interdisciplinary approach will help you understand how modern science uses technology to solve biological problems.

Instructions for Students

1. Design your project using apps like **Canva** for creating presentations, **Google Docs** for writing the report, and **Lab4Biology** or Embibe for virtual experiments and data collection
2. Include relevant diagrams, photographs, charts, data tables, and references.
3. Computational Thinking and AI tools must be used ethically and meaningfully.
4. Submission should include:
 - Written report
 - Data analysis
 - AI-assisted observations
 - Conclusion and bibliography

Assessment Criteria - Content Accuracy, Creativity & Presentation , Research & Analysis, AI & Computational Thinking Integration, Viva/Explanation

Part A: Investigatory Project

Students must prepare **ONE investigatory project** integrating:

- Biology concepts
- Computational Thinking
- Artificial Intelligence tools

The project should include:

1. Aim
2. Hypothesis
3. Materials Required

4. Methodology
5. Data Collection
6. AI/Technology Used
7. Observations
8. Analysis
9. Result
10. Conclusion
11. Bibliography

Guidelines for Computational Thinking Integration

Students should demonstrate:

- Pattern Recognition
- Data Collection and Organization
- Logical Analysis
- Graph Interpretation
- Problem Solving
- Prediction/Inference using AI tools

Suggested AI Tools

Students may use:

- Google's [Google Gemini](#)
- [ChatGPT by OpenAI](#)
- [Canva AI Tools](#)
- [Google Sheets AI Features](#)
- [Teachable Machine by Google](#)

Examples of Investigatory Projects

Project Example 1

“AI-Based Study of Plant Growth under Different Conditions”

Aim

To investigate the effect of sunlight, water, and soil conditions on plant growth using AI-based data analysis.

Biology Concepts

- Photosynthesis
- Plant physiology
- Growth factors

Computational Thinking Integration

- Recording daily plant height data
- Identifying growth patterns
- Comparing variables

- Creating graphs and predictions

AI Integration

Students can:

- Use AI tools to generate growth graphs
- Predict future growth trends
- Analyze plant images for leaf color and health

Possible Observations

- Plant growth in sunlight vs shade
- Water quantity effects
- Soil type comparison

Expected Outcome

Students understand environmental effects on plant growth and learn basic AI-assisted biological analysis.

Project Example 2

“AI-Assisted Survey on Lifestyle and Health Patterns in Teenagers”

Aim

To study the relationship between sleep, screen time, exercise, and health among students.

Biology Concepts

- Human physiology
- Health and wellness
- Biological rhythms

Computational Thinking Integration

- Survey design
- Data classification
- Pattern recognition
- Statistical interpretation

AI Integration

Students can:

- Use AI tools to summarize survey responses
- Generate charts automatically
- Identify health trends and correlations

Data Collection

Survey at least 20 students on:

- Sleep duration
- Daily screen time
- Physical activity
- Eating habits

Expected Outcome

Students learn how biological health indicators can be analyzed using AI and data science approaches.

Part B: Biology Enrichment Work

1. Chapter Revision Charts-Prepare colorful concept maps/flowcharts for the following topics:

- The Living World
- Biological Classification
- Plant Kingdom

2. Case Study Analysis- Read any one recent biological issue and prepare a 2-page report on:

- Climate Change and Biodiversity
- Antibiotic Resistance
- AI in Healthcare
- Genetic Engineering in Agriculture

It should include:

- Causes
- Effects
- Biological significance
- Possible solutions

Part C: Practicals to be done in file:

1. Study of osmosis by potato osmometer.
2. Study of distribution of stomata on the upper and lower surfaces of leaves.
3. Test for the presence of sugar, starch, proteins and fats in suitable plant and animal materials.
4. Separation of plant pigments through paper chromatography.
5. Parts of a compound microscope.
6. Specimens/slides/models and identification with reasons - Bacteria, *Oscillatoria*, *Spirogyra*, *Rhizopus*, mushroom, yeast, liverwort, moss, fern, pine, one monocotyledonous plant, one dicotyledonous plant and one lichen.
7. Virtual specimens/slides/models and identifying features of - *Amoeba*, *Hydra*, liverfluke, *Ascaris*, leech, earthworm, prawn, silkworm, honey bee, snail, starfish, shark, rohu, frog, lizard, pigeon and rabbit.

Submission Date

Submit the complete holiday homework in the first week after summer vacations.

“Biology is not just about memorizing facts; it is about understanding life through observation, analysis, and innovation.”