



Harvard Undergraduate Science Olympiad India 2024

Open Round

Biology Syllabus: 9th - 10th

Reference Material: A Chi-square table, Chi-square formula, and logistic/exponential growth equations will be provided for reference.

Potential Topics Covered on the Exam:

The content below mirrors content found on the INBO exam.

1. Biochemistry:
 - a. Carbon and the Basis of Life
 - b. Biological Macromolecules
2. Cell Biology:
 - a. Tour of the Cell, Cell Membrane
 - b. Cellular Respiration, fermentation, metabolic regulation
 - c. Photosynthesis + plant connections
 - d. Cell Cycle, Mitosis and Meiosis
 - e. Cell Signaling
3. Genetics:
 - a. Mendelian genetics
 - b. Non-mendelian genetics, epistasis
 - c. DNA Structure and Replication
 - d. Transcription and Translation
 - e. Regulation of Gene Expression
 - f. Basic statistical tests
 - g. Biotechnology
 - h. Bacteria and Viruses
4. Evolution:
 - a. Natural selection, Phylogeny
5. Plant Anatomy & Physiology:
 - a. Plant Structure and Growth
 - b. Plant Reproduction
 - c. Plant Hormones

- d. Plant Nutrition
- 6. Animal Anatomy & Physiology:
 - a. Intro to animals & homeostasis
 - b. Digestive system
 - c. Animal Reproduction and Development
 - d. Endocrine System
 - e. Nervous system and neurons
 - f. Immune System
 - g. Cardiovascular System
 - h. Respiratory System
 - i. Excretory System and osmoregulation
 - j. Sensory Systems, Musculoskeletal System
- 7. Biosystematics:
 - a. Plant diversity and life cycles: vascular and nonvascular plants
 - b. Animal diversity: vertebrates and invertebrates
 - c. Fungal diversity and life cycles

Preparation for Exam:

- **Campbell Biology:** Gold standard textbook for general biology knowledge. Most knowledge tested on the exam will be based on information from this textbook.
 - Each chapter also comes with a review summary and practice questions.

Note that reading Campbells is not the only way to prepare. Other possible methods to prepare include watching relevant biology videos on YouTube and doing practice problems (see below).

Sample Questions:

Example questions of comparable difficulty can be found on Biology Olympiad questions from past INBO and USABO exams:

- See [past INBO](#) and [past USABO](#) exams.