

September 2023

Hello! Welcome to all the new contestants and coaches! Welcome back to all the returning contestants and coaches! The 2023-2024 UIL season is upon us and I am looking forward to another fantastic year competition and learning.

Below is the list of ten expanded topics. Most of these are from previous years and there are no major updates this year except for diseases, which will be Gram-negative *Enterobacteriaceae* (*Salmonella*, *Escherichia*, *Klebsiella*, etc.). I look forward to seeing you all again and meeting new coaches and contestants. Thank you for all that you do!

UIL Biology 2023-2024 List of Main Topics

1. Relationship Between Structure and Function

Basic biochemistry, cell biology, biological membranes, membrane transport, structure and function of organic macromolecules

2. Cellular and Acellular Replication

Cell cycle, regulation of the cell cycle, DNA replication, genome structure, meiosis and sexual reproduction, viral replication

3. Energy Transformations

Metabolism, cellular respiration, photosynthesis, enzymes

4. Gene Expression

Protein synthesis, regulation of gene expression, effects of mutations

5. Genetics and Inheritance

Mendelian inheritance, non-Mendelian inheritance, genetic crosses, DNA technology

6. Evolution

Natural selection, reproductive success, microevolution (selection, mutation, recombination migration, genetic drift, gene flow), evidence of macroevolution (speciation, extinction), evidence for unity in diversity

7. Origin and Diversity of Life on Earth

Phylogeny, taxonomy, domains of life, animal and plant behavior, biological hierarchy

8. Ecology and the Environment

Population biology, community dynamics, organism relationships, biogeochemical cycles, ecosystem stability

9. Human Anatomy & Physiology

Tissue types and corresponding cell types, homeostasis (regulation, effects of imbalance), organ systems (any of them!)

10. Diseases

Eukaryotic diseases, viral diseases, bacterial diseases, pathogenesis, etiologic agents, disease signs or symptoms (differential diagnosis)

(HINT: The focus this year for the diseases question will be Gram-negative *Enterobacteriaceae*. As always, there will be an 'in the news' question.)

Exam Layout and Student Preparation Suggestions

Each contest will encompass all ten main biological topics with increasing level of difficulty as we progress from the Invitational to the State tests. Invitational B will be most similar in terms of difficulty to the District test. Encourage your students to *read the question prompts carefully* before they look at the possible answers. Also, students should not be discouraged by the length of the question. In some cases, students will need to sift through information that is not relevant. In other cases, enough background information must be provided to successfully answer the question.

Participants should expect three levels of questions. About 75% of the biology exam will consist of questions from Levels 1 and 2; with 25% from Level 3 questions, but this will be dependent on the exam tier. The relative difficulty will increase with each exam tier. The invitational tests are designed to get students thinking about concepts and will probably have more Levels 1 and 2, than Level 3. The state test may have a few more Level 3 questions (probably 2-3 more Level 3 questions). The levels are indicated below.

1. **Knowledge and Comprehension:** Advanced recall and identification of subject matter.
2. **Application and Analysis:** Demonstration of quantitative reasoning using and generating graphs and data.
3. **Synthesis and Evaluation:** Using information and prior content knowledge to formulate conclusions and generate hypotheses.

Recommended Textbook Resources

Pearson's *Biology* by Campbell et al. (10th or 11th edition)
MacMillan's *Life* by Sadava et al. (11th edition)

Recommended Online Resources

Learn Genetics University of Utah: <http://learn.genetics.utah.edu/>
Paul Anderson Bozeman Science <http://www.bozemanscience.com/about/>
Centers for Disease Control and Prevention <https://www.cdc.gov>
World Health Organization <http://www.who.int>

Best wishes for your UIL endeavors this academic year.

Cheers,



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