

## **August 2018**

Hello! I am excited to be the UIL Biology Director again for the upcoming 2018-2019 UIL season. Below is the list of expanded topics. Most of these are from previous years with a few updates. I may have a few more as I consider questions for the tests throughout the summer. These topics will certainly be finalized prior to the first SAC in September. I look forward to seeing you all again and meeting new coaches! Thank you for all that you do!

### **UIL Biology 2018-2019 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. Basic Human Anatomy & Physiology**

Specialized cells (blood, muscle, and epithelial), tissue types, homeostasis (regulation, effects of imbalance), select organ systems involved in regulation, nutrient absorption, reproduction, and defense

#### **10. Diseases**

Parasitology, microbial pathogenesis, etiologic agents, and diseases  
(HINT: Look up diseases associated with vaccines. Also, diseases in the news.)

## 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. Encourage your students to *read the question prompts carefully* before they look at the possible answers! Also, do 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 biology invitational tests are designed to get students thinking about concepts and will be easier than the district test and probably have more Level 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. (10<sup>th</sup> or 11<sup>th</sup> edition)

MacMillan's *Life* by Sadava et al. (11<sup>th</sup> edition)

### Recommended Online Resources

University of Texas Bio 311C site: <http://bio311.biosci.utexas.edu/>

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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