

September 2025

Hello, everyone! I'm Meghan Pavlicek, and I am beyond excited to step into the role of UIL Biology Director for the 2025-2026 season. I'm looking forward to meeting you at the Student Activities Conferences this fall and kicking off a great year together!

A bit about me: I'm in my ninth year of teaching at Blinn College, where I split my time between the Brenham and Schulenburg campuses. The courses I teach include Biology for Science Majors I, Biology for Non-Science Majors I, Anatomy & Physiology I and II, Microbiology, and Genetics.

This season, my goal is to keep the contest experience as familiar as possible by continuing the excellent practices established by my predecessor, Dr. Michelle McGehee. I've made a few minor updates, noted below, and added a couple of textbook and website recommendations for those who may find them useful. Dr. McGehee and I have worked closely in the past on course and exam development at Blinn College, and we'll continue collaborating throughout this UIL season to ensure consistency and a smooth transition.

You'll find the list of ten expanded topics for the exam below. Minor changes are noted in italics, and the only major change this year is in the Diseases category. This season's featured disease is Whooping Cough (Pertussis).

I'm looking forward to working with coaches and contestants this year, and I truly appreciate everything you do to make these contests possible!

UIL Biology 2025-2026 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, *mitosis*, meiosis and sexual reproduction, viral replication

3. Energy Transformations

Metabolism, cellular respiration, photosynthesis, enzymes

4. Gene Expression

Protein synthesis (*transcription, translation, mRNA processing*), regulation of gene expression, effects of mutations (*at the molecular level, chromosomal level, or within operons*).

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)

The focus this year for the diseases questions will be Whooping Cough (Pertussis). As always, there will be an 'in the news' question.

Exam Layout and Student Preparation Suggestions

Each contest will include 20 questions for the biology section, with 2 questions drawn from each of the 10 main topics listed above. Each main topic contains several subtopics, so no two questions from the same topic will cover the same subtopic on a single test. The difficulty of the questions increases as we move from the Invitational to the State contests.

Encourage your students to read each question all the way through before looking at the answer choices and remind them not to be discouraged by longer questions or answer choices. A longer question isn't necessarily more difficult, sometimes there's extra information they don't need while other times the background details are important for determining the correct answer. Working through past UIL exams can also be helpful, as some questions build on concepts from previous tests.

Participants can expect three levels of questions. About 75% of the biology portion will consist of questions from Levels 1 and 2, with 25% from Level 3 questions, though the exact distribution will depend on the exam tier. The Invitational tests are designed to get students thinking about concepts and will generally have more questions from Levels 1 and 2 than Level 3. The State test may have a few additional Level 3 questions (probably 2-3 more Level 3 questions).

The Question 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

None of the textbooks listed below are required for exam preparation, as test questions are never taken directly from any book. There are many other excellent resources available beyond those listed here—these are simply suggestions. The books below are ones I am familiar with and/or use in my own classes at Blinn College. Newer editions include the most up-to-date information on recent findings, especially in areas like DNA technology, but most of the core material can also be found in older editions. As my colleague Dr. Brian Anderson says, the best textbook or website is the one that makes the most sense to each student.

- **Pearson's Biology** by Campbell et al. (10th, 11th, or 12th edition)
- **MacMillan's Life** by Sadava et al. (11th or 12th edition)
- **McGraw Hill's Biology: Concepts and Investigations** by Hoefnagels (4th or 5th edition)
- **OpenStax Biology 2e** by Clark et al. (free online)

Recommended Online Resources

These websites are great for reviewing concepts, exploring new topics, or checking up-to-date information:

Learn Genetics University of Utah: <https://learn.genetics.utah.edu>

Paul Andersen Bozeman Science: <https://www.bozemanscience.com>

Khan Academy: <https://www.khanacademy.org>

Amoeba Sisters: <https://www.amoebasisters.com>

Centers for Disease Control and Prevention: <https://www.cdc.gov>

World Health Organization: <https://www.who.int>

I'm really looking forward to a great season and to connecting with both coaches and contestants at the SACs this fall. Thank you for all that you do to support your students and make the UIL Biology contests such a meaningful experience. Best wishes for all your UIL endeavors this season!

Warm regards,

Meghan Pavlicek, M.S.