



# Biotechnology Knowledge Bowl



## 2023-2024

### PURPOSE

Team of 4 students will be tested on their collective knowledge within the biotechnology field. Teams will be judged on accuracy of answering questions in categories including molecular and cell biology, microbiology, data analysis, biomanufacturing, instrumentation use, regulatory affairs, bioethics, employability skills, safety practices, biotechnology current events, communication and teamwork.

### ELIGIBILITY

Open to any registered high school member of SkillsUSA who is in a Health Science or STEM program in which Biotechnology or Science and Mathematics is a career choice.

### CLOTHING REQUIREMENTS

#### **Class B: Healthcare Attire**

- Official SkillsUSA blue scrubs
- White socks or white seamless/nonpattern hose visible above the top of the shoe
- Health-professionals white or black work shoe (no canvas/mesh) and completely enclosed (no open-toe or open-heel). Athletic style shoes that meet the criteria are acceptable.

*OR*

#### **Class E: Business Casual**

- Official SkillsUSA white polo shirt
- Black dress slacks (accompanied by black dress socks, black or skin-tone seamless hose, or no socks/hose) or black dress skirt (knee-length, accompanied by black or skin-tone seamless hose, or no hose).
- Black closed-toe dress shoes

*OR*

### **Class A: SkillsUSA Attire**

- Official SkillsUSA red blazer or official SkillsUSA red jacket
- Button-up, collared, white dress shirt (accompanied by a plain, solid black tie or SkillsUSA black tie), white shirt (collarless or small-collared) or white turtleneck, with any collar not extend into the lapel area of the blazer, sweater, windbreaker, or jacket.
- Black dress slacks or black dress skirt (knee-length at minimum), accompanied by black dress socks, black or skin-toned hose, or no socks.
- Black closed-toe shoes

These regulations refer to clothing items that are pictured and described at: [www.skillsusastore.org](http://www.skillsusastore.org). If you have questions about clothing or other logo items, call 1-888-501-2183.

Note: Due to this being a state level competition, the competitors have more options as to their attire, however, each member of a team should match which class attire they choose to wear. Clothing violation deductions will be assessed to the least number of individuals not matching (example: 3 wear Class B, 1 wears Class A – they are deducted for 1 person having improper attire).

### **OBSERVER RULE**

Observers will be allowed to watch each round of the competition. There will be a designated seating area for observers within the competition room. Once these seats are filled, no additional observers will be allowed in the room unless the Technical Chair and/or judges allow it. In that case, the observers must stay in the area they are provided until further instructions are provided. Observers may only enter and exit the room in between rounds of the competition. The Technical Chair or Judge will notify observers of these times so that the contestants and competition are not disturbed. Observers, at no time, are allowed to converse with any of the teams or team members in any way once the round has started up until the end of that round. Violation may result in the disqualification of a team and removal of the observer.

## EQUIPMENT AND MATERIALS

1. Supplied by the technical committee:
  - a. All tables, chairs, and power cords necessary.
  - b. Projector, laptop, scoring sheets, timer, buzzer system, reference material, and any other materials needed for the presentation of the material.
  - c. Laboratory equipment, safety supplies, and any additional materials needed for hands-on portions of contest (if used).
2. Supplied by the contestants:
  - a. All competitors must create a one-page resume according to the below resume requirement.

### RESUME REQUIREMENT

Competitors must create a one-page resume to submit online. SkillsUSA South Carolina competitors should submit their resume by the deadline published on the competition updates page of our website. Failure to submit a resume will result in a 10-point penalty

Your resume must be saved as a PDF file type using file name format of “Last Name\_First Name.” For example, “Amanda Smith” would save her resume as Smith\_Amanda. If you need assistance with saving your file as a PDF, visit the Adobe website for more information.

Note: Check the Competition Guidelines and/or the updates page on the state website.

### PROHIBITED DEVICES

Cellphones, electronic watches and/or other electronic devices not approved by a competitions national technical committee are NOT allowed in the competition area. Please follow the guidelines in each technical standard for approved exceptions. Technical committee members may also approve exceptions onsite during the SkillsUSA Championships if deemed appropriate.

### Penalties for Prohibited Devices

If a competitor’s electronic device makes noise or if the competitor is seen using it ay time during the competition, an official report will be documented for review by the Director of the SkillsUSA Championships. If confirmed that the competitor used the device in a manner which compromised the integrity of the competition, the competitor’s scores may be removed.

## SCOPE OF THE COMPETITION

### KNOWLEDGE PERFORMANCE

There is no written test for this competition. All competitors will complete the SkillsUSA Professional Development Assessment. This test will be used to seed any bracket or pairings and as a tie breaker if necessary.

### SKILL PERFORMANCE

Teams will demonstrate communication skills, teamwork, problem solving and time management skills by determining and presenting answers to each question, performing a required task, or solving an equation or problem.

### COMPETITION GUIDELINES

1. A school may enter two teams of 4 registered SkillsUSA members, each of whom is or has been enrolled in a course in Health Science or STEM during the current academic year.
2. At the competition orientation, any bracket or groupings will be revealed. The exact make-up may not be head to head and portions of the competitions may be scored correct for both teams. No effort is made to separate teams from the same school, as the technical chair and judges complete this process using only the team letter and SkillsUSA Professional Development Assessment scores.
3. The competition will be split into multiple rounds or sections with the potential of a mix between knowledge-based trivia and hands-on requirements.
4. While the format, based on the number of teams entered, may narrow the number of teams during a preliminary round, going into a finals round, where teams may know their final results in advance, it is also possible that the top three teams will not know their placement or where they ended in total points. Additional information regarding the complete format will be provided in the competition updates on the state website.
5. During portions of competition in which the competitors must get out of their seats, rules regarding spectators/observers will be reiterated, along with any rules regarding assistance from teammates.
6. Any trivia related questions using a buzzer system will have time limits based on the questions and material. Any person on a team may answer if anyone buzzes in. Correct answer will garner a single point and incorrect answers will garner a quarter point deduction. If answering incorrectly, other teams may have the opportunity to answer. The Technical Chair and/or Judges will determine what answer is a 'final answer' in the case that a team is discussing an answer.

## STANDARDS AND COMPETENCIES

**BKB 1.0** – Demonstrate fundamental knowledge of scientific principles (molecular biology, cell biology, genetics, microbiology, mathematical concepts, etc.) used to conduct effective biotechnology research and development of products.

**BKB 2.0** – Demonstrate basic understanding of biotechnology techniques (recombinant DNA, genetic engineering, PCR, Gram staining, biomanufacturing, Western blot, ELISA, SDS-PAGE, chromatography, bioinformatics, etc) used to conduct biotechnology research and development.

**BKB 3.0** – Demonstrate knowledge of standard laboratory protocols and procedures (solution preparation, sterile techniques, contamination control, use and calibration of laboratory instruments, documentation, lab management, etc.).

**BKB 4.0** – Describe methods to maintain a safe laboratory environment using biosafety protocols that align with OSHA standards.

**BKB 5.0** – Demonstrate an understanding of the biotechnology product development process, including regulatory affairs and appropriate use of laboratory animals.

**BKB 6.0** – Summarize and explain the larger ethical moral and legal issues related to biotech research, product development and use in society.

**BKB 7.0** – Demonstrate communication skills, teamwork, problem solving and time-management skills.

- 7.1 Speak clearly and listen effectively to team members in a time sensitive situation.
- 7.2 Use conflict resolution techniques to bring the group to consensus about an answer.
- 7.3 Maintain awareness of time remaining to answer a question.

**BKB 8.0** – Wear appropriate clothing for the state contest.

- 8.1 Display clothing that meets state standards for competition.
- 8.2 Demonstrate good grooming in dress and personal hygiene.

**BKB 9.0** – Demonstrate knowledge of SkillsUSA related materials during the SkillsUSA Professional Development Assessment.

**BKB 10.0** – SkillsUSA Framework

The SkillsUSA Framework is used to pinpoint the Essential Elements found in Personal Skills, Workplace Skills and Technical Skills Grounded in Academics. Students will be expected to display or explain how they used some of these Essential Elements. Please reference the graphic, as you may be scored on specific elements applied to your project or competition. For more, visit: [www.skillsusa.org/who-we-are/skillsusa-framework/](http://www.skillsusa.org/who-we-are/skillsusa-framework/).



## **COMMITTEE IDENTIFIED ACADEMIC SKILLS**

The technical committee has identified that the following academic skills are embedded in this competition.

### **Language Arts**

- Organize oral and written information
- Comprehend key elements of oral and written information.
- Evaluate oral and written information for accuracy.
- Predict potential outcomes and/or solutions.

### **Mathematics**

- Demonstrate knowledge of basic arithmetic operations.
- Demonstrate use of relational expressions such as greater than, etc.
- Apply data and measurements to solve a problem.
- Analyze mathematical problem statements for missing data.
- Construct charts/tables/graphs from functions and data.

### **Science**

- Evaluate scientific constructs including conclusions, conflicting data, controls, data, inferences, limitations, questions, sources of errors, and variables.
- Perform qualitative and quantitative analysis, data gathering, direct and indirect observation, predictions, and problem identification.

### **Reading and Communication**

- Demonstrate use of content, technical concepts and vocabulary.
- Interpret information, data, and observations.
- Communicate information, data, and observations.
- Conveying ideas and information: Employ verbal skills when obtaining and conveying information.
- Active Listening: Interpret a given verbal message/information.
- Critical Thinking: Analyze elements of a problem to develop creative solutions.
- Create Ideas, proposals, and solutions to problems.
- Evaluate ideas, proposals, and solutions to problems.
- Guide individuals through the process of making informed decisions.
- Identify alternatives using problem-solving and critical thinking skills.

**Safety**

- Identify safety hazards common to workplaces.
- Identify safety precautions to maintain a safe worksite.
- Select appropriate personal protective equipment as needed.

**Emergency Procedures**

- Use knowledge of First Aid procedures as necessary.
- Use knowledge of CPR procedures as necessary.
- Describe proper use of safety equipment as necessary

**Leadership**

- Exhibit traits such as empowerment, risk, communication, problem solving, and investment individuals when leading a group in solving a problem.
- Exhibit traits such as enthusiasm, creativity, conviction, etc.

**Teamwork**

- Work with others to achieve objectives in a timely manner  
Promote team members' individual talents and skills.
- Demonstrate a positive attitude towards team goals.
- Take responsibility for shared group and individual work tasks.
- Negotiate effectively to arrive at decisions.

**Employability**

- Demonstrate flexibility and willingness to learn knowledge and skills.