

# SENIOR DIVISION CATEGORIES

## GRADES 9-12

*SUBCATEGORIES CAN BE FOUND [HERE](#)*

### **ANIMAL SCIENCES**

**CODE: ANIM**

This category includes all aspects of animals and animal life, animal life cycles, and animal interactions with one another or with their environment. Examples of investigations included in this category would involve the study of the structure, physiology, development, and classification of animals, animal ecology, animal husbandry, entomology, ichthyology, ornithology, and herpetology, as well as the study of animals at the cellular and molecular level which would include cytology, histology, and cellular physiology.

### **BEHAVIORAL & SOCIAL SCIENCES**

**CODE: BEHA**

The science or study of the thought processes and behavior of humans and other animals in their interactions with the environment studied through observational and experimental methods.

### **BIOCHEMISTRY**

**CODE: BCHM**

The study of the chemical basis of processes occurring in living organisms, including the processes by which these substances enter into, or are formed in, the organisms and react with each other and the environment.

### **BIOMEDICAL & HEALTH SCIENCES**

**CODE: BMED**

This category focuses on studies specifically designed to address issues of human health and disease. It includes studies on the diagnosis, treatment, prevention or epidemiology of disease and other damage to the human body or mental systems. Includes studies of normal functioning and may investigate internal as well as external factors such as feedback mechanisms, stress or environmental impact on human health and disease.

### **BIOMEDICAL ENGINEERING**

**CODE: ENBM**

Projects that involve the application of engineering principles and design concepts to medicine and biology for healthcare purposes including diagnosis, monitoring and therapy. Prominent biomedical engineering applications include the development of biocompatible prostheses, various diagnostic and therapeutic medical devices ranging from clinical equipment to micro-implants, common imaging equipment such as MRIs and EEGs, regenerative tissue growth, pharmaceutical drugs and therapeutic biologicals.

### **CELLULAR & MOLECULAR BIOLOGY**

**CODE: CELL**

This is an interdisciplinary field that studies the structure, function, intracellular pathways, and formation of cells. Studies involve understanding life and cellular processes specifically at the molecular level.

### **CHEMISTRY**

**CODE: CHEM**

Studies exploring the science of the composition, structure, properties, and reactions of matter not involving biochemical systems.

### **COMPUTATIONAL BIOLOGY & BIOINFORMATICS**

**CODE: CBIO**

Studies that primarily focus on the discipline and techniques of computer science and mathematics as they relate to biological systems. This includes the development and application of data-analytical and theoretical methods, mathematical modeling and computational simulation techniques to the study of biological, behavior, and social systems.

### **EARTH & ENVIRONMENTAL SCIENCES**

**CODE: EAEV**

Studies of the environment and its effect on organisms/ systems, including investigations of biological processes such as growth and life span, as well as studies of Earth systems and their evolution.

## **EMBEDDED SYSTEMS**

**CODE: EBED**

Studies involving electrical systems in which information is conveyed via signals and waveforms for purposes of enhancing communications, control and/or sensing.

## **ENERGY: SUSTAINABLE MATERIALS & DESIGN**

**CODE: EGSD**

Studies/processes involving the production and/or storage of energy.

## **ENGINEERING TECHNOLOGY: STATICS & DYNAMICS**

**CODE: ETSB**

Studies that focus on the science and engineering that involve movement or structure. The movement will be a result of forces; the structure will be stable due to the equilibrium of forces.

## **ENVIRONMENTAL ENGINEERING**

**CODE: ENEV**

Studies that engineer or develop processes and infrastructure to solve environmental problems in the supply of water, the disposal of waste, or the control of pollution.

## **MATERIALS SCIENCE**

**CODE: MATS**

The study of the integration of various materials forms in systems, devices, and components that rely on their unique and specific properties. It involves their synthesis and processing in the form of nanoparticles, nanofibers, and nanolayered structures, to coatings and laminates, to bulk monolithic, single-/poly-crystalline, glassy, soft/hard solid, composite, and cellular structures. It also involves measurements of various properties and characterization of the structure across length scales, in addition to multi-scale modeling and computations for process-structure and structure-property correlations.

## **MATHEMATICS**

**CODE: MATH**

The study of the measurement, properties, and relationships of quantities and sets, using numbers and symbols. The deductive study of numbers, geometry, and various abstract constructs, or structures.

## **MICROBIOLOGY**

**CODE: MCRO**

The study of micro-organisms, including bacteria, viruses, fungi, prokaryotes, and simple eukaryotes as well as antimicrobial and antibiotic substances.

## **PHYSICS & ASTRONOMY**

**CODE: PHYS**

Physics is the science of matter and energy and of interactions between the two. Astronomy is the study of anything in the universe beyond the Earth.

## **PLANT SCIENCES**

**CODE: PLNT**

Studies of plants and how they live, including structure, physiology, development, and classification. Includes plant cultivation, development, ecology, genetics and plant breeding, pathology, physiology, systematics and evolution.

## **ROBOTICS & INTELLIGENT MACHINES**

**CODE: ROBO**

Studies in which the use of machine intelligence is paramount to reducing the reliance on human intervention.

## **SYSTEMS SOFTWARE**

**CODE: SOFT**

The study or development of software, information processes or methodologies to demonstrate, analyze, or control a process/solution.

## **TECHNOLOGY ENHANCES THE ARTS**

**CODE: TECA**

The use of technology to ignite new concepts, visualization tools and/or media to enhance our enjoyment of the arts.

## **TRANSLATIONAL MEDICAL SCIENCE**

**CODE: TMED**

Projects that aim to improve human health and longevity by translating novel discoveries in the biomedical sciences into effective activities and tools for clinical and public health use. Bi-directional in concept, projects can be those developed through basic research moving toward clinical testing (bench-to-bedside) or projects that provide feedback about the applications of new treatments and how they can be improved (beside-to-bench).