Thermo Fisher Scientific Junior Innovators Challenge, a program of Society for Science
2022/2023 Project Categories

As a nominee, you will select one category from the list below within the application. To help choose your project category, you are encouraged to think about what type of expert would best understand your project, regardless of topic. For example, if your research topic was related to COVID-19, but you developed a computer program or application for your actual project, you may want a Computer Science & Software Engineering expert to read your project. You are encouraged to discuss with a teacher or project mentor if you have questions. Project Category will determine the expertise of the initial review only. The Top 300 Junior Innovators and 30 finalists are selected without regard to the category; therefore, winners may not be proportional across categories.

Animal Science: 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: Projects in this category address the science or study of the thought processes and behavior of humans in their interactions with the environment studied through observational and experimental methods. Examples of investigations include those involving psychology, neuroscience, sociology, anthropology, archaeology, ethology, ethnology, linguistics, learning, perception, public opinion surveys, educational testing, etc.

Biochemistry: Biochemistry is 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. This category includes studies involving mechanisms of molecular biology and genetics, enzymes, photosynthesis, blood chemistry, protein chemistry, food chemistry, hormones, etc. and studies that seek to understand life and cellular processes specifically at the molecular level.

Chemistry: This category includes studies exploring the science of the composition, structure, properties, and reactions of matter not involving biochemical systems. This includes physical chemistry, organic chemistry (other than biochemistry), inorganic chemistry, plastics, fuels, pesticides, metallurgy, soil chemistry, etc.

Computer Science & Software Engineering: Projects in this category involve the study and development of computer hardware, mobile apps, internet networking and communications, graphics (including human interface), simulations/virtual reality or computational science (including data structures, encryption, coding, and information theory), etc. This category also includes the development of software, information processes or methodologies to demonstrate, analyze, or control a process/solution.

Energy, Sustainability: Studies/processes involving the production and/or storage of energy. Sustainability projects utilize natural, renewable resources or focus on resource conservation to encourage a healthy environment. This category includes environmental engineering projects 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.

Engineering: This category includes projects that directly apply scientific principles to manufacturing and practical uses – civil, mechanical, aeronautical, chemical, and electrical engineering; electronic, sound, automotive, heating and refrigeration, transportation. This category also includes projects that apply engineering principles to biology or medicine, such as bodily aids or replacements, medical/diagnostic devices, drugs or other therapies using engineering to address a biological problem.

Environmental & Earth Sciences: 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.

Mathematics: 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.

Materials Science: The scientific study of the properties and applications of materials of construction or manufacture (such as ceramics, metals, glasses, polymers, and composites). This category includes projects that investigate how the properties of such materials are determined by a material's composition and structure.

Medicine & Health Sciences: This category includes the study of diseases and health – pharmacology, physiology, pathology, ophthalmology, oncology, cardiology, nephrology, endocrinology, pediatrics, dermatology, allergies, speech and hearing, nutrition, dentistry, etc.

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

Physics (includes Air/Space Science): Physics is the science of matter and energy and of interactions between the two. Physics includes the study of forces, vibrations and flows on solid, liquid, and gaseous materials. Projects in this category also include aeronautics and rocketry. Space science refers to anything in the universe beyond the Earth, including the study of celestial bodies, their positions, motions, nature and evolution– astronomy, astrometry, celestial mechanics, etc.

Plant Science: 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 and Intelligent Machines: Robotics is the design, construction, and use of machines (**robots**) to perform tasks done traditionally by human beings. This category includes studies on machine learning and studies/apparatus that operate similarly to the ways humans think and process information (artificial intelligence).