

SIM Science & Engineering Fair

JUNIOR/SENIOR DIVISION CATEGORY DESCRIPTIONS

Category	Description
1. Aerodynamics/ Hydrodynamics (Junior Division only)	Studies of aerodynamics and propulsion of air, land, water and space vehicles; aero/hydrodynamics of structures and natural objects. Studies of the basic physics of fluid flow.
2. Alternative Energy (Junior Division only)	Studies of power generation using alternative energy technologies such as solar cells.
3. Applied Mechanics & Structures	Studies concerning the design, manufacture and operation of mechanisms, including characteristics of materials, dynamic response and active/ passive control. Testing for strength and stiffness of materials used to provide structural capability; studies and testing of structural configurations designed to provide improved weight and force loading or stiffness capabilities. <i>Senior Division only:</i> includes aerodynamics, hydrodynamics and fluids projects.
4. Behavioral & Social Sciences	Studies of human psychology, behavior, development, linguistics and the effects of chemical or physical stress on these processes. Experimental or observational studies of attitudes, behaviors, or values of a society or groups within a society and of the influences of society on group behavior. Includes gender and diversity studies, anthropology, archaeology and sociology. Studies may focus on either normal or abnormal behavior. <i>Senior Division only:</i> includes studies of cognition.
5. Biochemistry/ Molecular Biology	Studies at the molecular, biochemical, or enzymatic levels in animals (including humans), plants and microorganisms, including yeast. Studies of biological molecules, <i>e.g.</i> , DNA, RNA, proteins, fats, vitamins, nutrients.
6. Chemistry	Studies in which chemical properties of nonbiological organic and inorganic materials (excluding biochemistry) are observed. Some studies involving physical properties are appropriate, including phase changes, crystal structures and formation, intermolecular and intramolecular forces.
7. Cognitive Science (Junior Division only)	Studies of learning, memory and cognition in humans, using human or animal models for human processes. Studies of the effects of chemical or physical stress on cognition. Includes projects on subliminal perception, optical illusions, recall and observations (<i>e.g.</i> reliability of eyewitnesses), and the interaction of different senses.
8. Earth & Atmospheric Sciences (Junior Division only)	Studies in geology, seismology, physical oceanography, marine geology, coastal processes, atmospheric physics and chemistry, meteorology and climatology including measurements, models and the effects of climate change.
9. Electronics & Electromagnetics	Experimental or theoretical studies with electrical circuits, computer design, electro-optics, electromagnetic applications and antennas.
10. Environmental Engineering	Projects which apply technologies such as recycling, reclamation, restoration, composting and bioremediation which could benefit the environment and/or the effects of pollution on the environment.
11. Environmental Science	Projects surveying, measuring, or studying the impact of natural and man-made changes on the environment. Examples include: floods, fires, biohazardous spills, acid rain, earthquakes, air pollution and water pollution.
12. Mammalian Biology	Studies of growth and developmental biology, anatomy and physiology in all mammals, including humans. Studies of the behavior of all mammals in their natural habitats (or reproductions of them).

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JUNIOR/SENIOR DIVISION CATEGORY DESCRIPTIONS (Continued)

13. Materials Science (Junior Division only)	Studies of materials characteristics and their static (not in motion) physical properties. Includes measurements and comparisons of materials durability, flammability and insulation properties (thermal, electrical, acoustic, optical, electromagnetic, etc.).
14. Mathematics & Computer Science	Studies in mathematics, mathematical modeling, numerical methods, artificial intelligence and the design, improvement, or optimization of algorithms, computer languages, operating systems, or software architecture.
15. Microbiology (General)	Studies of genetics, growth and physiology of bacteria, fungi, protists, algae, or viruses. Includes surveys of bacterial contamination. <i>Senior Division Only</i> : includes projects described within the category Microbiology (Medical).
16. Microbiology - Medical (Junior Division only)	Studies of prevention, diagnosis and treatment of infectious diseases caused by pathogenic bacteria, fungi, or viruses. Includes all antimicrobial studies except testing of commercial antimicrobials.
17. Physics & Astronomy	Studies of the physical properties of matter, light, acoustics, thermal properties, solar physics, astrophysics, orbital mechanics, observational astronomy, planetary science and astronomical surveys. Computer simulations of physical systems are appropriate in this category.
18. Plant Biology	Studies of the genetics, growth, morphology, or physiology of plants. Studies of the effects of fertilizers on plants.
19. Product Science - Biological (Junior Division only)	Comparison and testing of commercial off-the-shelf products for quality and/or effectiveness for intended use in real-world consumer-oriented applications. This category is reserved for experimental methods involving biological sciences and processes.
20. Product Science - Physical (Junior Division only)	Comparison and testing of commercial off-the-shelf products for quality and/or effectiveness for intended use in real-world consumer-oriented applications. This category is reserved for experimental methods involving non-biological, physical sciences and processes.
21. Toxicology	Studies of the effects of the negative effects of chemicals, toxins, medicinal and nutritional factors, prescription drugs, natural remedies, food components (caffeine) and other potentially harmful factors (such as temperature, carbon dioxide, radiation) at the cellular or higher levels on plants and animals.
22. Zoology	Studies of growth and developmental biology, anatomy and physiology in animals other than mammals. Studies of the behavior of all animals (excluding mammals) in their natural habitats (or reproductions of them).