



Current GKC Science & Engineering Fair Categories & Sub-Categories

1. **Animal Sciences (AS)**
 - ...ologies (mammalogy etc.)
 - Anatomy
 - Development
 - Ecology
 - Husbandry
 - Mendelian Genetics
 - Nutrition & Growth
 - Physiology
 - Systematics
2. **Behavioral & Social Science (BE)**
 - Animal Behavior (Ethology)
 - Anthropology
 - Human Behavior
 - Learning
 - Linguistics
 - Perception
 - Psychology
 - Social Media
 - Sociology
3. **Chemistry (CH)**
 - Analytical
 - Environmental
 - Computational
 - Organic
 - Inorganic
 - Materials
 - Physical
 - Nanomaterials
4. **Chemical Energy (CE)**
 - Alternative Fuels
 - Batteries
 - Chemical Pollution
 - Fluid & Gas Dynamics
 - Fossil Fuels
 - Microbial Fuel Cells
 - Remediation
 - Solar materials
 - Thermodynamics
 - Waste Management
5. **Computational Science, Bioinformatics & Math (Computer Applications) (CM)**
 - Algebraic Analysis
 - Bioinformatics
 - Biomedical Engineering
 - Biomodeling
 - Combinatorics
 - Deductive Study of Numbers
 - Game Theory
 - Genomics
 - Geometry
 - Graph Theory
 - Neuroscience Modeling
 - Probability & Statistics
 - Pharmacology
 - Topology
6. **Computer Systems, Electronics, Robotics (CS)**
 - Algorithms
 - Cognitive & Control Systems
 - Data Analysis
 - Energy Conservation
 - Information Systems – Structure & Processes
 - Integrated Optics, Sensors
 - Machine Learning (AI)
 - Microcontrollers
 - Network Design & Operations
 - Operating Systems
 - Programming Networking, Languages & Data Communications
 - Robotic Mechanics
 - Software Design
 - Systems Design
7. **Earth & Environmental Science (Measurement & Monitoring) (EA)**
 - Atmospheric Science
 - Climatology
 - Geosciences
 - Meteorology
 - Mineralogy
 - Oceanography
 - Populations & Communities
 - Recycling
 - Seismology
 - Waste Management
 - Water Science
 - Aquifers, pollution
8. **Energy & Environmental Engineering (Theoretical, Energy Consumption) (EE)**
 - Acoustics,
 - Bioremediation, Reclamation, Recycling
 - Fluid & Gas Dynamics
 - Hydro Power
 - Magnetism
 - Nuclear Power
 - Optics
 - Particle, Nuclear, Atomic
 - Plasma
 - Pollution Control
 - Renewable Energies
 - Semiconductors
 - Solar Materials
 - Solid State
 - Superconductivity
 - Sustainable Design
 - Thermal, Geothermal Power
 - Thermodynamics
 - Water Resources Management
 - Wind Power
9. **Engineering Mechanics (EM)**
 - Aerospace, Aeronautical
 - Civil Engineering
 - Computational Mechanics
 - Control Theory
 - Industrial Engineering
 - Mechanical Engineering
 - Naval Systems
 - Space Travel – Rockets *et.*
10. **Materials Science (MS)**
 - Biomaterials
 - Ceramics & Glasses
 - Composite Materials
 - Electronic, Optical, Magnetic Materials
 - Nanomaterials
 - Polymers & Plastics
11. **Microbiology (MI)**
 - Antibiotics
 - Antimicrobials
 - Bacteriology
 - Environmental Microbiology
 - Microbial Genetics
 - Prions
 - Prokaryotic Processes and Organelles
 - Virology
12. **Molecular Bio/Chem & Health Sciences (MO)**
 - Biochemistry
 - Cell Physiology
 - Diagnostics
 - Disease
 - Drug Development
 - Epidemiology
 - Eukaryotic Genetics
 - Immunology
 - Neurobiology
 - Nutrition
 - Pathology
13. **Physics & Astronomy (PA)**
 - Astronomical Motion, Composition, Energy
 - Astronomy
 - Atomic, Nuclear Physics
 - Biophysics
 - Celestial Evolution
 - Computational Astrophysics
 - Computational Physics
 - Condensed Matter & Materials
 - Cosmology
 - Electromagnetics
 - Lasers, Masers
 - Mechanics
 - Molecular Physics
 - Optics
 - Plasmas
 - Theoretical Physics
14. **Plant Science (PS)**
 - Agronomy
 - Classification & Systematics
 - Ecology
 - Hydroponics
 - Pathology
 - Physiology
 - Plant Growth
 - Plant Mendelian Genetics
 - Plant Structure
 - Life Cycles
 - Taxonomy
15. **Inventions (grades 4-8 only) (NV)**

Greater Kansas City Science & Engineering Fair Category Descriptions

(Note: Your project may fit more than one category, so choose the best fit)

Animal Science (AS): Study of animals, their life cycles, anatomy, and classification; physiology; animal husbandry; entomology; ichthyology; ornithology; herpetology; mammalogy; development; nutrition and growth; animal Mendelian genetics; ecology; systematics and evolution.

Behavioral and Social Sciences (BE): Study of human & animal behavior; social & community relationships; psychology (cognitive, physiological, social); sociology; anthropology; linguistics; learning; perception; reading problems; educational testing; social media dynamics.

Chemistry (CH): Study of the composition, structure, properties, and reactions of matter. Includes all forms of chemistry investigations – analytical; environmental; computational; inorganic; organic; materials; physical; and nanomaterials.

Chemical Energy (CE): Alternative fuels; fossil fuel energy, fuel cells and battery development; microbial fuel cells (also **MI**); solar materials; fluid and gas dynamics; thermodynamics; remediation; waste management; chemical pollution.

Computational Science, Bioinformatics and Mathematics (CM): *Applications of computers to analyze a particular problem – see CS below for computer systems.* **Biological applications of computers:** biomedical engineering; various computer applications, including pharmacology, biomodeling, bioinformatics; evolutionary biology; neuroscience, and genomics. **Mathematics:** the study of measurement; properties and relationships of quantities and sets; using numbers and symbols; deductive study of numbers, geometry, various abstract constructs, sets or structures; algebra analysis; combinatorics; graph theory; game theory; topology; number theory; probability and statistics.

Computer Systems, Electronics, Robotics (CS): **Computers include:** the study of information processes including structures, process procedures, implementation of processing systems; systems analysis and design; data analysis; network design and operations; application and system software design; programming; data center operations; networking and data communications; algorithms. **Electronics:** circuits; microcontrollers; integrated optics; sensors; signal processing; energy conservation. **Robotics:** biomechanics; cognitive systems; control theory; machine learning (includes AI); robotic kinematics; algorithms; databases; operating systems; programming languages.

Earth and Environmental Sciences (EA): *EA differs from EE by measuring/monitoring these areas, not applying a solution to problem.* **Earth Science:** the study of science related to plant earth to include geosciences; mineralogy; water science; physiography; oceanography; meteorology; speleology; seismology; geography. **Ecology:** populations, communities; ecosystems. **Environmental Science** *defined Man's interaction with the ecosystem:* climatology; atmospheric science; environmental effects on ecosystems; geosciences, (mining, fracking etc.); water sciences (aquifers, pollution); recycling; waste management; water resources management.

Energy and Environmental Engineering (EE): **Energy:** solar; Power including hydro, nuclear, solar, thermal, geothermal, wind; sustainable design; renewable energies – also includes the theories, principles and laws governing energy and the effect of energy on matter – solid state; optics; acoustics; particle; nuclear; atomic; plasma; superconductivity; fluid and gas dynamics; thermodynamics; semiconductors; magnetism; quantum mechanics; biophysics. **Environmental Engineering:** *EA differs from EE by applying science to solve a problem* and includes bioremediation, land reclamation, pollution control, recycling and waste management; water resources management.

Engineering Mechanics (EM): Engineering including aerospace and aeronautical, civil, mechanical; computational mechanics; control theory; ground vehicle systems; industrial engineering-processing; naval systems; space travel equipment such as rockets, etc.

Materials Science (MS): Biomaterials; ceramics and glasses; composite materials; computation and theory (as applied to materials) electronic materials; optical materials; magnetic materials; nanomaterials; polymers; plastics.

Microbiology (MI): Antimicrobials; antibiotics; bacteriology; applied microbiology; environmental microbiology; microbial genetics; virology; prions; study of prokaryotic cell processes and organelles.

Molecular Bio/Chem & Health Sciences (MO): Study of vital processes occurring in living macromolecular systems (Eukaryotic) including the processes by which these substances enter into, or are formed in the organisms (chemically and/or genetically), and/or react with each other and the environment; biochemistry (analytical, medicinal, structural); disease diagnostics and treatment: drug development and testing; epidemiology; nutrition; physiology; pathology; cell physiology; eukaryotic genetics; immunology; neurobiology; pathophysiology.

Physics and Astronomy (PA): **Physics:** atomic, molecular, optical, biological, computational, nuclear and particle physics, theoretical; condensed matter and materials; instrumentation; magnetism – electromagnetic and plasmas; mechanics; optics, lasers, and masers. **Astronomy:** Anything in the universe beyond Earth such as the positions, dimensions, distribution, motion, composition, energy, & evolution of celestial bodies and related phenomena; astronomy; cosmology; computational astrophysics.

Plant Science (PS): Study of plants and their life cycles; structure; growth; macro processes, classification; evolution; agronomy; macro genetics; development; pathology; physiology; organics; GMO's; taxonomy; ecology; hydroponics.

Inventions (NV): (Grades 4-8 only) Creation or modification of devices or processes that solve or alleviate challenges in our lives.