ZIMBABWE SCIENCE FAIR
ADVANCING SCIENCE REWARDING TALENT

1. AGRICULTURAL SCIENCES (AGR) •
Animal Production
• Aquaculture
• Crop Sciences

2. ANIMAL SCIENCES (ANI) •
Animal Behaviour
• Animal Genetics
• Animal Physiology
• Aquatic Animals
• Entomology
• Wildlife Management
• Zoology

3. BIOMEDICAL AND MEDICAL SCIENCES (BIO)
• Diseases and Illnesses
• Food Science and Technology
• Health Care
• Human Genetics
• Human Physiology
• Medical Science
• Microbiology
• Pharmacology
• Sports Sciences
• Veterinary Sciences

4. CHEMISTRY AND BIOCHEMISTRY (CHB)
• Analytical Chemistry
• Biochemistry
• Inorganic Chemistry
• Organic Chemistry
• Polymer Chemistry

5. COMPUTER SCIENCES AND SOFTWARE DEVELOPMENT (COM) •
Data Management
• Data Sciences
• Networking
• Software Systems

6. EARTH SCIENCES (EAR)
• Atmospheric Sciences
• Climate Sciences
• Geography
• Geology
• Limnology
• Oceanography
• Soil Sciences
• Water Sciences

7. ENERGY (ENP)
• Energy Productivity
• Non-Renewable Energy
• Renewable Energy

8. ENGINEERING (ENG)
• Biomedical Engineering
• Chemical Engineering/Process Engineering • Civil & Industrial
• Electrical, Electronics and Embedded Systems • Mechanical & Aeronautical
• Mining & Metallurgical

9. ENVIRONMENTAL STUDIES (EVS) •
Biological Control
• Bioremediation
• Ecology
• Environmental Management
• Sustainability
• Sustainable Development

10. MATHEMATICS (MAT)
• Algebra
• Game Theory
• Geometry
• Number Theory
• Statistics and Probability

11. PLANT SCIENCES (PLA)
• Aquatic Plants
• Botany
• Plant Genetics
• Plant Pathology
• Plant Physiology

12. PHYSICS, ASTRONOMY & SPACE SCIENCES (PHY)
• Astronomy and Space Sciences
• Material Sciences
• Matter and Materials
• Mechanics
• Mechatronics and Robotics
• Optics
• Theoretical Physics

13. SOCIAL SCIENCES (SOC) •
Anthropology
• Education Studies
• Human Behaviour
• Human Settlements
• Psychology

CATEGORY DESCRIPTIONS

1. AGRICULTURAL SCIENCES (AGR)

The study of farming methods used to raise and take care of plants and animals (livestock and wildlife)

Animal Production is concerned with improving conditions, processes and production systems for livestock to increase yield for human consumption

Aquaculture - cultivating fish, crustaceans, molluscs, algae under controlled conditions mostly for commercial purpose

Crop Sciences concerned with producing and using plants for food, fuel, etc. and includes plant breeding, horticulture and soil management, for example, innovative crop solutions to increase productivity

2. ANIMAL SCIENCES (ANI)

The study of animals

Animal Behaviour is the study of animal behaviour with emphasis on the behavioural patterns that occur in a natural environment.

Animal Genetics is the study of genetic variation, genes and heredity in animals. Mechanisms of hereditary transmission and variation of inherited characteristics

Animal Physiology is the scientific study of the internal physical and chemical functions of animals

Aquatic Animals Is the study of animals (vertebrates or invertebrates) that live in water for most or all of their lifetime.

Entomology is the branch of zoology which is the scientific study of insects

Wildlife Management is the study of the conservation of wildlife, including endangered animals

Zoology is the scientific study of the behaviour, structure, physiology, taxonomy and distribution of animals

3. BIOMEDICAL and MEDICAL SCIENCES (BIO)

Biomedical Sciences is the scientific understanding of how cells, organs and systems function and it is relevant to the understanding of human diseases and treatment. It is the application of science to knowledge, technology and interventions regarding healthcare and medicine.

Diseases and Illnesses refers to conditions of the living animal or plant or of one of its parts that impairs normal functioning, and is typically manifested through distinguishing signs and symptoms. Studies are concerned with infectious and communicable diseases, including the clinical aspects such as the use and effect of antimicrobial and antibiotic substances

Food Science and Technology is the study of the nature of foods. The causes of food deterioration, and the principles underlying food processing as well as the selection, preservation, processing, packaging and distribution of food. This includes nutrition and dietary needs.

Health Care is the provision of services, the processes for the prevention of illnesses and injuries as well as the promotion and awareness of wellbeing.

Human Genetics is the study of genes, genetic variation, and heredity in humans and how they are can cause certain
diseases? An understanding of genetic diseases may influence treatment.

Human Physiology is the study of the physical and biochemical functioning of the human body and different organ systems. It includes an understanding of cell physiology, immunology and organ systems.

Medical Science is the science concerned with the diagnosis, treatment, and prevention of diseases and illnesses. This includes translational medicine, which is the discovery of new diagnostic tools and treatments, using a multi-disciplinary bench-to-bedside approach.

Microbiology is the study of the structure, function, uses and modes of existence and the associated diseases of microscopic organisms such as eukaryotes (fungi and protists) and prokaryotes (bacteria and algae) and viruses. This includes the use of microorganisms for medical applications such as treatments. This sub-category focuses on:

> ***Bacteriology*** is the study of the biology of bacteria as well as the associated diseases. It includes the study of the biochemistry, physiology, molecular biology, ecology, evolution and clinical aspects of diseases caused by bacteria.
>
> ***Virology*** is the study of the biology of viruses as well as the associated diseases. It includes the study of biochemistry, physiology, molecular biology, ecology, evolution and the clinical aspects of diseases caused by viruses.
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> ***Mycology*** is the study of fungi as well as associated diseases. It includes the study of the biochemistry, physiology, molecular biology, ecology, evolution and clinical aspects of fungal diseases.

Pharmacology is the science of drugs, concerned with the uses, effects and modes of actions of drugs, on living tissues and systems and their effects on health and wellbeing, as well as the treatment of illnesses.

Sports Sciences is a multidisciplinary field concerned with the understanding and enhancement of human performance in exercise and sport. It includes the knowledge, methods and applications of the sub-disciplines of human movement studies (i.e. exercise physiology, biomechanics, motor control and motor development, exercise and sports psychology), as well as how they interact

Veterinary Sciences is concerned with animal pathology and healthcare, specifically with the prevention, diagnosis and treatment of diseases in animals (domesticated and wild).

4. CHEMISTRY AND BIOCHEMISTRY (CHB)

Chemistry is the branch of science concerned with the composition, structure and properties of substances and the transformations they undergo. Biochemistry is the branch of science that explores the chemical processes within and related to, living organisms.

Analytical Chemistry is the study of the composition, separation, identification and quantification of chemical components of materials.

Biochemistry is a laboratory-based science, which brings together biology and chemistry. It explores the chemical processes within and related to living organisms at a molecular level

Inorganic Chemistry is the study of the structure, synthesis, properties and reactions of all chemical elements and compounds, which includes metals and minerals, other than organic compounds.

Organic Chemistry is the study of the structure, properties, composition, reactions, and synthesis of organic compounds, which by definition contain carbon.

Polymer Chemistry is the study of the synthesis, characterization and properties of monomers, polymer molecules or macromolecules whether natural or synthetic.

5. COMPUTER SCIENCES AND SOFTWARE DEVELOPMENT (COM)

Computer Science is the study of computational systems and information technology, specifically the theory, design, development, and application of these systems. This includes artificial intelligence, computer systems and networks, security, database systems, human computer interaction, vision and graphics, numerical analysis, software systems and languages, bioinformatics and the theory of computing.

Data Management focuses on collecting, validating, storing, protecting, and processing data usually using databases

Data Sciences is the field that uses scientific methods, processes, algorithms and systems to extract knowledge and insights from data in various forms, including data mining. This requires data management (collection, validating, storing, protecting, and processing data) and data analysis.

Networking is the use of computers and infrastructure to create networks and the study of how these networks communicate. This includes the practice of transporting and exchanging data between nodes over a shared medium in an information system comprising of hardware and protocols (wired and wireless technology)

Software Systems primarily focus on the interface between the hardware and users, the development of unique applications and the different programming languages used. Examples include programming applications for mobile devices, social media platforms, office suites, gaming applications, and educational software

6. EARTH SCIENCES (EAR)

Natural sciences related to planet earth.

Atmospheric Sciences is the study of the dynamics and chemistry of the layers of gas that surround the Earth, for example, a study of ozone depletion, greenhouse gases.

Climate Sciences is the scientific study of climate, scientifically defined as weather conditions averaged over time.

Geography is the study of science that deals with the description, distribution, and interaction of the diverse physical, biological, and cultural features of the earth's surface.

Geology involves studying the materials that make up the earth, such as rocks and the features and structures found on earth as well as the processes that act upon them.

Limnology is the study of the physical, chemical and biological properties of freshwater.

Oceanography is the study of the physical, chemical and biological properties of the ocean. For example, studying ocean currents, waves.

Soil Sciences includes researching soil classification, formation, chemistry and also interactions with living things.

Water Sciences looks at the distribution and quality of ground and surface water and includes management of water resources, and water security.

7. ENERGY (ENP)

Study of energy systems and various aspects including productivity, generation using renewable and non-renewable sources, as well as the efficient and sustainable use of energy

Energy Production is the total value gained from using a unit of energy and is concerned with new or improved processes and technologies at all stages of production? For example, acquiring and processing raw materials (coal, natural gas, nuclear, petroleum) storage, transmission and distribution of energy.
Energy efficiency is the part of Energy Productivity focusing on minimising energy wastage, reducing costs, reducing energy consumption or some combination of these (e.g. using energy-efficient light bulbs)

Non-renewable Energy is the study and design of energy systems from non-renewable resources, such as fossil fuels (coal, petroleum, and natural gas).

Renewable Energy is the study and design of energy systems using renewable resources (naturally replenished), forn example, sunlight, wind, rain, tides, waves, bio-energy, etc.

8. ENGINEERING (ENG)

The use of scientific theories, mathematical methods and computer sciences to solve problems within society.

Biomedical Engineering is the study, design, control and application of medicine, biology and technology for healthcare
purposes such as prosthetics and diagnostic equipment

Chemical /Process Engineering is the study, design, control, and application of systems and processes to convert input substances into desired output substances.

Civil & Industrial Engineering *Civil* Engineering is concerned with the planning, design, construction and maintenance of structures. *Industrial* engineering is about the optimization and streamlining of complex processes, systems or organizations to reduce wastage of time, money and other resources and materials

Electrical, Electronics and Embedded Systems is the study, design, control and application of electricity, electronics, circuits, devices, microcontrollers and electromagnetism to solve problems.

Mechanical & Aeronautical Engineering *Mechanical* Engineering is the study, design, control and application of mechanics, specifically for machines such as engines. *Aeronautical* Engineering uses similar principles, specifically for aircrafts.

Mining & Metallurgical Engineering
Mining engineering applies science and technology to the extraction of minerals from the earth.
Metallurgical engineering deals with the processes used to extract metals from their ores, purify, alloy,and create useful objects from metals.

9. ENVIRONMENTAL STUDIES (EVS)

Deals with the components, process and preservation of nature and aspects of human interactions with the environment, in interest to solving complex problems.

Biological Control is the intentional use of a specific organism or its metabolic by-products to limit the harmful impact of an invasive species

Bioremediation is the waste management technique that involves the use of organisms to remove or neutralize pollutants from a contaminated site

Ecology is the branch of biology that deals with the relations of organisms to one another and their physical surroundings, including biodiversity

Environmental Management is the management of the interaction and impact of human activities on the natural environment.

Sustainable Development is defined as a process of meeting human development goals while sustaining the ability of systems to continue to provide the natural resources and ecosystem services upon which the economy and society depends.

Sustainability is the systematic approach to finding practical ways for saving water, energy, and materials, as well as reducing negative environmental impacts

10. MATHEMATICS (MAT)

The study of quantities, structures, space and change. Statistics is the branch of mathematics that deals with the collection, analysis, interpretation, and presentation of numerical data. Probability is the mathematical representation of the likelihood of an event occurring.

Algebra is the study of the properties and relationships of abstract entities (such as complex numbers, matrices, sets, vectors, groups, rings, or fields), arithmetically using symbols e.g. x, y, π. These symbols **represent** numbers and quantities in formulae and equations to solve them.

Game Theory is the branch of applied mathematics that provides the tools for the analysis of strategies for dealing with competitive situations where choices are required.

Geometry the area of mathematics relating to the study of space. It Involves the measurement (shape and size),

properties, and relationships of points, figures, spaces, lines, angles, surfaces, and solids

Number Theory is the study of the set of whole numbers where the main goal is to discover interesting and unexpected relationships between sets of numbers, for example, the Fibonacci Sequence.

Statistics and Probability Statistics is concerned with collecting, organising, analysing, interpreting and presenting data.
Probability is the study of chance i.e. calculating the likelihood or "odds" of something happening in the future and can be expressed as a fraction, decimal or percentage.

11. PLANT SCIENCES (PLA)

The study of plants.

Aquatic Plants is the study of plants that grow in an aquatic environment (freshwater or saltwater), whether rooted or floating, including the study of algae (Phycology).

Botany is the study of plant behaviour, structure, taxonomy and distribution

Plant Genetics is the study of genetic variation, genes and heredity in plants, particularly mechanisms of hereditary transmission and variation of inherited characteristics.

Plant Pathology is the study of organisms and environmental conditions that cause disease in *plants*. The mechanisms by which this occurs, the interactions between these causal agents and the *plant* (effects on *plant* growth, yield and quality), and the methods of managing or controlling *plant* disease.

Plant Physiology is the study of the physical, chemical and biological functioning of plants.

12. PHYSICS, ASTRONOMY AND SPACE SCIENCES (PHY)

Physics is the study of matter, energy, motion and forces. Astronomy and Space Sciences is the study of the universe and beyond, including its origins and the properties of objects in space.

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Material Sciences is the scientific study of the properties and applications of materials of construction or manufacture (such as ceramics, metals, polymers, and composites).

Matter and Materials is the study of the property of the different phases of matter and their macroscopic properties which includes topics such as superconductivity, semiconductors, thin films and complex fluids.

Mechanics is the branch of science that explains how masses behave when subjected to the effects of force and displacement. It includes Kinematics, Projectiles, Velocity and acceleration, Newton's Laws, Collisions, Rotational Motion and Fluid Mechanics.

Mechatronics and Robotics integrates electronics, control and mechanics in the study and design of electromechanical systems, such as robots, to solve problems.

Optics is the study of a part of the electromagnetic spectrum (specifically the infrared, visible, and ultraviolet light) as well as the devices used to measure, detect and produce this spectrum, for example, photometers and lasers.

Theoretical Physics is the description of natural phenomena in mathematical form.

13. SOCIAL SCIENCES (SOC)

A branch of science that deals with the study of humans; their behaviour, interpersonal relationships, institutions and functioning within society.
Anthropology is the study of people, their evolutionary history; as well as how they behave and adapt to different environments; communicate and socialise with one another
Human Behaviour relates to how humans act and interact based on factors such as culture, tradition, values, attitudes, etc. It looks at human interpersonal relationships and interactions.
Human Settlements *Ekistics* is the study of the various types of human settlements, including regional, city, community planning and dwelling design. This study draws from the vast areas of geography, ecology, human psychology, anthropology, culture, and aesthetics. Settlements can be as small as one house or large as a megacity.
Psychology is the study of the mind and our behaviour. It integrates science, theory, and practice to understand, predict and relieve problems whilst promoting adaption, and personal development. There are several fields of psychology such as Clinical psychology, Child psychology and Developmental psychology, Cognitive psychology, Social psychology and Educational psychology.