# INTERNATIONAL FSP SCIENCE CONTEST

# COURSE OUTLINE

## Vibrant Youngsters Level (Grade I & II)

### 1. Human Body

- We have a head, body, arms, and legs.
- Our senses help us see, hear, smell, taste, and feel.
- We need to take care of our body by eating well, exercising, and sleeping.

### 2. Plants

- Plants are living things that grow in the ground.
- They need water, sunlight, and air to grow.
- Plants give us oxygen, food, and shade.

### 3. Animals

- Animals are living things that move and eat.
- They have different homes, like nests, cages, or dens.
- Animals need food, water, and air to survive.

### 4. Our Universe

- The universe is everything around us, including stars, moon, and sun.
- The Earth is our home planet, and it rotates around the sun.
- We see different things in the sky, like clouds, birds, and airplanes.

### 5. Matter

- Matter is anything that takes up space and has weight.
- Examples: toys, books, chairs, and even YOU!

### 6. Light

- Light is what makes things visible.
- We get light from the sun, moon, and lamps.
- Light helps us see and read.

### 7. Sound

- Sound is what we hear.

- We make sounds by talking, clapping, or playing music.
- Sounds can be loud or soft.

## 8. Air

- Air is all around us, and we need it to breathe.
- Air is invisible, but we can feel it when it moves (wind).
- We need air to live.

### 9. Water

- Water is a liquid that we need to drink and wash.
- We find water in rivers, lakes, and oceans.
- Water is essential for plants and animals too.

## 10. Weather

- Weather is what's happening outside, like sunshine, rain, or wind.
- We have different seasons, like summer, winter, autumn, and spring.
- Weather affects our daily lives.

## 11. Measuring Units

- We use units to measure things, like length (cm, m), weight (kg, g), and time (hours, minutes).
- Measuring helps us compare and understand things better.

### 12. Living and Non-Living Things

- Living things move, grow, and need food and water (plants, animals, humans).
- Non-living things don't move, grow, or need food and water (toys, chairs, rocks).

# Vibrant Youngsters Level (Grade III & IV)

## 1. The Human Body

- Our body is made up of different systems (skeletal, muscular, nervous).
- We have five senses (sight, hearing, taste, smell, touch).
- We need to take care of our body by eating healthy, exercising, and sleeping well.

## 2. Plants and Animals

- Plants make food from sunlight, water, and air.
- Animals need food, water, and shelter to survive.
- We can classify plants and animals into different groups.

## 3. Food and Nutrition

- We need nutrients (carbohydrates, proteins, fats) to stay healthy.
- Fruits, vegetables, whole grains, and lean proteins are healthy food choices.
- We should drink plenty of water and limit sugary drinks.

## 4. Matter and its States

- Matter can be solid, liquid, or gas.
- Examples: ice (solid), water (liquid), steam (gas).
- Matter can change state when heated or cooled.

## 5. Force, Work, and Energy

- A force is a push or pull that can make things move.
- Work is done when a force is applied to move an object.
- Energy is the ability to do work (e.g., running, cycling).

## 6. Transport and Communication

- We use different modes of transport (walking, cycling, cars, buses).
- Communication helps us share ideas and messages (talking, writing, drawing).
- We can use technology (phones, computers) to communicate.

## 7. Our Environment

- Our environment includes living and non-living things (plants, animals, air, water).
- We need to take care of our environment to keep it clean and healthy.
- We can reduce, reuse, and recycle to help protect the environment.

## 8. Electricity

- Electricity is a form of energy that powers devices (lights, computers).
- We use electrical circuits to connect devices to a power source.
- We should be careful when using electricity and follow safety rules.

## 9. Air and Water

- Air is essential for breathing and living.
- Water is vital for drinking, washing, and growing plants.
- We should conserve water and keep the air clean.

# Vibrant Youngsters Level (Grade V & VI)

## 1. The Human Body: Anatomy - Facts and Functions

- The human body is made up of systems (skeletal, muscular, nervous, circulatory).
- Each system has specific functions (e.g., skeletal system provides support).
- Organs work together to maintain overall health.

## 2. Structure and Functions of Plants

- Plants have roots, stems, leaves, and flowers.
- Roots absorb water and nutrients, stems provide support, leaves make food through photosynthesis.
- Plants undergo photosynthesis, respiration, and transpiration.

## 3. Classification of Plants and Animals

- Plants are classified into groups (monocots, dicots, gymnosperms).
- Animals are classified into groups (vertebrates, invertebrates, mammals, birds).
- Classification helps us understand relationships and characteristics.

## 4. Pollution

- Pollution is the contamination of air, water, or land.
- Types of pollution: air (smog, greenhouse gases), water (chemicals, waste), land (litter, waste).
- We can reduce pollution by recycling, conserving resources, and using eco-friendly products.

## 5. Force and Motion

- A force is a push or pull that can cause motion.
- Types of forces: friction, gravity, magnetism.
- Motion can be described in terms of speed, velocity, and acceleration.

## 6. Simple Machines

- Simple machines are devices that make work easier (lever, pulley, wheel and axle).
- Machines can change the direction or amount of force.
- Examples: wheelbarrow, bicycle, elevator.

## 7. Work and Energy

- Work is done when a force is applied to move an object.
- Energy is the ability to do work (kinetic, potential, thermal).
- Energy can be transferred from one form to another.

## 8. Light

- Light is a form of energy that travels in waves.
- Light behaves as both a wave and a particle (photon).
- Reflection, refraction, and diffraction are properties of light.

## 9. Sound

- Sound is a form of energy that travels in waves.
- Sound waves have frequency, amplitude, and wavelength.
- We can produce sound through vibration (speaking, music).

## 10. Magnetism

- Magnetism is a force that attracts or repels objects.
- Magnets have north and south poles.
- Electromagnets are temporary magnets made by coiling wire around a core.

## 11. Air and Water

- Air is essential for breathing and living.
- Water is vital for drinking, washing, and growing plants.
- We should conserve water and keep the air clean.

# Vibrant Youngsters Level (Grade VII & VIII)

## 1. Human Anatomy

- Study of the human body structure and functions.

- Systems: skeletal, muscular, nervous, circulatory, respiratory, and digestive.

2. The Cell

## - Basic unit of life.

- Cell structure: cell membrane, cytoplasm, nucleus, and organelles.

- Cell functions: metabolism, growth, reproduction, and response to stimuli.

## 3. Movement in Living Things

- Types of movement: voluntary (muscular), involuntary (nervous), and autonomic (automatic).

- Muscular system: skeletal and smooth muscles.

## 4. Nutrition in Plants and Animals

- Autotrophic nutrition (plants): photosynthesis.
- Heterotrophic nutrition (animals): ingestion, digestion, absorption, and assimilation.

## 5. Microorganisms

- Types: bacteria, viruses, fungi, and protozoa.
- Importance: decomposition, fermentation, and disease causation.

## 6. Elements and Compounds

- Elements: pure substances (e.g., hydrogen, oxygen).
- Compounds: combinations of elements (e.g., water, carbon dioxide).

## 7. Air and its Constituents

- Composition of air: nitrogen, oxygen, carbon dioxide, and other gases.
- Importance of air: breathing, combustion, and industrial processes.

## 8. Acids, Bases, and Salts

- Acids: substances that donate H+ ions (e.g., hydrochloric acid).
- Bases: substances that accept H+ ions (e.g., sodium hydroxide).
- Salts: compounds formed from acids and bases (e.g., sodium chloride).

## 9. Metals and Non-Metals

- Properties of metals: malleability, ductility, conductivity, and reactivity.
- Properties of non-metals: brittleness, non-conductivity, and low reactivity.

## 10. Friction

- Force that opposes motion between surfaces.
- Types: static, kinetic, and rolling friction.

## 11. Thermodynamics

- Study of heat, temperature, and energy transfer.
- Laws of thermodynamics: zeroth, first, second, and third.

## 12. Electricity and Magnetism

- Electricity: flow of electrons, circuits, and devices.

- Magnetism: magnetic fields, forces, and properties of magnets.

# Vibrant Youngsters Level (Grades IX & X)

## 1. Biology and Technology

- Application of biology in technology (genetic engineering, biotechnology).

- Impact of technology on biology (medical advancements, environmental monitoring).

## 2. Cell Biology

- Cell structure: cell membrane, cytoplasm, nucleus, and organelles.

- Cell functions: metabolism, growth, reproduction, and response to stimuli.

- Cell division: mitosis and meiosis.

## 3. Microorganisms

- Types: bacteria, viruses, fungi, and protozoa.

- Importance: decomposition, fermentation, and disease causation.

- Immune system: defense mechanisms against microorganisms.

## 4. Classification

- Taxonomy: classification of living organisms (Kingdom, Phylum, Class, Order, Family, Genus, Species).

- Characteristics of different kingdoms (Monera, Protista, Fungi, Plantae, Animalia).

## 5. Environment

- Ecosystems: interactions between living and non-living components.

- Ecological balance: importance of conservation and sustainability.

- Human impact on the environment: pollution, deforestation, climate change.

## 6. Heredity

- Mendel's laws of inheritance: segregation, independent assortment, and dominance.

- Genetic traits: dominant, recessive, and codominant.

- DNA structure and replication.

## 7. Natural Resources

- Types: renewable (solar, wind, water) and non-renewable (fossil fuels, minerals).
- Conservation and management of natural resources.

## 8. Structure of Atom

- Atomic number, mass number, and electron configuration.
- Periodic table: arrangement of elements based on atomic number.

## 9. Periodic Classification

- Classification of elements: metals, non-metals, and metalloids.
- Periodic trends: atomic radius, electronegativity, and ionization energy.

## 10. Chemical Reactions

- Types: synthesis, decomposition, displacement, and combustion.
- Chemical equations: balancing and stoichiometry.

## 11. Electrochemistry

- Electrolysis: decomposition of substances using electricity.
- Electrochemical cells: galvanic and electrolytic cells.

## 12. Organic and Inorganic Chemistry

- Organic compounds: hydrocarbons, functional groups, and biomolecules.
- Inorganic compounds: acids, bases, salts, and minerals.

## 13. Newton’s Laws of Motion

- First law (inertia): objects at rest or in motion remain so unless acted upon.
- Second law (force and acceleration): force = mass x acceleration.
- Third law (action and reaction): every action has an equal and opposite reaction.

## 14. Work, Energy, and Power

- Work: transfer of energy from one object to another.
- Energy: kinetic, potential, thermal, and electrical.
- Power: rate of doing work or transferring energy.

## 15. Simple Machines

- Types: lever, pulley, wheel and axle, inclined plane, wedge, and screw.
- Mechanical advantage: ratio of output force to input force.

## 16. Electrostatics

- Electric charges: positive, negative, and neutral.
- Electric fields: force per unit charge.
- Electric potential: potential difference between two points.

## 17. Current Electricity

- Electric current: flow of electrons.
- Resistance: opposition to electric current.