Syllabus for the International Junior Science Olympiad

1. Science Skills and Safety :
Understanding scientific methods and working in the laboratory.
Identify and use basic laboratory equipment
Draw scientific diagrams of apparatus
Follow instructions in the laboratory
Follow safety techniques when using equipment
Measure temperature and volume
Make observations using the five senses
Make inferences based on observations
describe the scientific method
record a science experiment using standard headings
collect, represent and interpret data in tables and graphs
use scientific language

2. Pushes and Pulls :
Understanding of what forces are and what they can do
Describe what forces are and what they can do
Measure forces using a spring balance
Carry out experiments with friction, gravity and density.
Calculate the density of an object
Explain the difference between mass and weight
Explain things in terms of the pull of gravity
Say what friction is and explain how it can be helpful or a nuisance.

3. Survival in the Environment :
Understanding of how physical and behavioral adaptations help animals survive.
List characteristics that help an organism survive
Define the terms habitat and adaptation
distinguish between an animal's living and physical environment
list the physical conditions that affect aquatic animals
classify adaptations as structural or behavioral
make inferences from observations
research, carry out and write up a study of a particular environment

4.Solid, Liquids & Gases:
Understanding of the differences between solids, liquids and gases.
describe the three states of matter
recall the boiling point of water and the melting point of ice
measure the temperature of melting ice
draw simple graphs
measure mass using a balance
calculate the density of materials
use a particle model

5. Responding:
Understanding of how our bodies senses help us respond to our environment.

describe the various senses in our body
define the terms stimulus and respond and how they relate
describe how nerves carry massages
explain how muscles move arms and legs
investigate the senses
investigate how fast our muscles react

6. Energy:
Understanding of the different types of energy and energy changes.
describe what energy is and where it comes from
identify and describe the various forms of energy
understand how sound is caused
explain the difference between stored energy in action
explain everyday happenings in terms in energy changes
understand that fossil fuels are a non-renewable resource
conduct an experiment involving energy changes
use different forms of energy to make an object move

7. How Life Begins:
understanding of how new life is created in humans.
describe the differences between animal and plant cell
describe the sex cell of humans
describe the human reproductive organs
understand the changes that take place in boy's and girl's bodies during puberty
observe the development of a baby during pregnancy

8. Solving Problems in Science:
understanding the scientific method.
describe the scientific method
write up report of experiments
write hypothesis
design an experiment using the scientific method
test a hypothesis by doing an experiment

9. Acids and bases:
understanding what are acids and bases.
describe the properties of acids and bases
understand ph and its practical uses define neutralization
use and make indicators
use ph paper to check acidity
use acids and bases safely
apply knowledge of acids and bases to everyday situations
to be aware of the formation and effect of acid rain

10. interdisciplinary "Space" Studying the Universe:
understanding our solar system and space exploration.
know the order of the planets
describe key features of each planet
distinguish between comet, asteroids and meteors

describe spiral, elliptical and irregular galaxies
explain the significance of star color
identify major constellations
be aware of the impact of space exploration
make scale model of planets
design and make a space mobile or building from recycled materials
plot positions of stars

11. Materials from the Earth:
Understanding natural resources, where they are found and what they are used for.
name useful substances made from natural materials eg glass and concrete
understand what natural resources are
find out whether or not natural resources are renewable
present information on renewable resources
understand how fossil fuels, uranium and water are used to provide energy
understand how materials and rocks are mined and how they are used
map the locations of various mineral resources around the world

12. Science & Technology:
Understanding of how technology has been used to solve problem.
explain the the difference between science and technology
find out about some inventors and inventions
be aware of inventions
design a test to solve an everyday problem
carry out a science fair experiment
research to fined relevant information

13. Keeping Healthy:
Understanding the digestive and circulatory systems.
explain what the part of the digestive system do during digestion
use the model to explain how food passes from the small intestine to the bloodstream
describe the importance of fiber in the diet
describe how the blood carries food and oxygen to the body cells
understand the effect of exercise on pulse and breathing rates
investigate the structure and care of teeth
describe the structure of the heart and how to take care of it

14. Batteries and Bulbs:
Understanding of batteries' concept and circuits.
make simple circuits
draw circuit diagrams
know the difference between series and parallel circuits
describe the properties of conductors and insulators
understand about resistance and short circuits
explain how electrical safety device work (fuses and earths)
understand the rules for using electrical safely
know the component of electrical plug

15. Atoms and molecules:

Understanding of atoms, molecules, elements and compounds.
describe the practical theory to explain the properties of solids, liquids and gases
explain that matter is made of atoms and molecules
know the name of some common molecules
understand the basic structure of the atom
describe what elements and compounds are
explain the difference between elements and compounds in term of atoms and molecules
know the first twenty elements and their symbol from the periodic table
know about some of the people who discovered different elements
know the formula of some common compounds
write a simple word equation

16. Cycles in Nature:
Understanding of food chains and webs
use food chains to show the link between animals and plants
describe how bacteria and fungi recycle substances
know the difference between scavengers and decomposers
construct food webs

17. What are Things made of:
Understanding ofe the concept of the periodic table and the elements covered in Year 2 Atoms and Molecules
review particle theory, atoms, molecules, elements and compounds
understand basic patterns of the periodic table
learn the first 20 elements by symbol and name
learn to write simple equation
know the basic structure of the atom, protons, neutrons, electrons
look at where metals and other important materials come from and what they are used for
know about alloy

18. Disease:
Understanding how infections disease is caused and transmitted
describe the microorganisms that cause disease
know which organism cause common diseases
understand how our body fights disease
understand the history of disease and vaccination
understand about how antibiotics are used to fight disease

19. Global Consumer Science:
Understanding of scientific testing of consumer product and the impact of consumer products on our health and environment.
use the steps of scientific testing
understand the difference between objective and subjective testing
calculate the waste from packaging
understand how long different substances take to break down
research recycling
know about the argument surrounding genetically modified foods
understand the impact of consumer products on our environment

20. Science and the Road:

Understanding of Newton's First Law (Inertia), friction, Reaction Time, Acceleration, Car safety.
understand the main reasons for car accidents
know about car safety features
be aware of road safety
calculate speed and acceleration
measure reaction time
list the factors affecting stopping time

21. Interdisciplinary "The Body" Life Goes On:
Understanding of human reproduction and inheritance.
describe the structure and function of the male and female reproductive system
recognize variation in human characteristics
describe the role of genes and chromosomes in human inheritance
use family trees to determine the features of family members
be able to calculate the chance of children being born male or female using model
use grids to predict variation in offspring characteristics
describe genetic engineering and social implications

22. Light and Color:
Understanding of how light and colour are produced.
explain why things are coloured
list the colours of spectrum
describe how lomg and short sightedness can be corrected with lenses
find out how we see colours and why colour blindness occurs
observe how light travels in straight lines
investigate how different colours are made
predict the colour produced when filters are used
investigate how lenses bend light to form images
observe how images from when light reflect from when light reflect from mirror

23. Forensic Science:
Understanding of how science is used in crime detection.
describe the job of a forensic scientist
understand how scientists collect and interpret the physical evidence from a crime
investigate hypothetical crimes
examine fingerprints
use chromatography to examine ink samples
use indicator to detect the presence of certain substances
examine evidence using a microscope
understand about ballistic and genetic evidence
understand about the use of atomic absorption spectrophotometers to examine traces of chemical
construct evidence table and detect patterns
write hypothetical forensic reports

24. Mathematics Ability:
Understanding of the mathematics
Fraction
Statistics
Simple Trigonometry

Simple Geometry
Logarithms
Arithmetic and Geometric Array
Quadratics Equation
Power and square roots