Curriculum Matters
Учебно съдържание, планове, програми и стандарти

'SCIENTIFIC DISCIPLINES' AWARENESS QUESTIONNAIRE

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Abstract. Interesting direct questions related to common science branches with a specialized knowledge is presented as an additional learning material for the benefit of young minds with a spirit of inquiry. This questionnaire is a mix of the right technical words used to describe scientific fields and some specific logical analysis, designed to develop basic awareness, enrich scientific thinking process and enhance understanding of the true meaning of the terms used. The answers to this practice quiz of 162 diverse questions on scientific disciplines are listed at the end of the text. This is an attempt to awaken the natural curiosity of young minds and help in engraving the keywords used in describing the branches of science.

Keywords: interdisciplinary education, science branches, self-directed learning, supplementary material, active learning

Background information

Science is a quest to understand how the world works and the scope is vast, ranging from microscopic subatomic particles to macroscopic clusters of galaxies. There are numerous examples of how we unconsciously or consciously use our knowledge of science everyday throughout our lives. It is important to attract some of the best minds in the science field to make real progress towards leading-edge research resulting in scientific breakthroughs and real world applicability. The trend of active preference for specific subfields based on informed choice and further study in super-specialization based on the scenario presented to them is essential in the higher educational landscape. A rapid change in work-habits, healthcare and higher education, enhanced knowledge gained by research, training in special skills and professional production capacity are essential to transform scientific dreams into reality. Learning key terms coined, developing scientific temper and understanding of scientific concepts can help in building our confidence and develop basic problem-solving and reasoning-skills. The knowledge about the principles of working of nature, inventions inspired by nature, discovery of real world phenomena, and developing new gadgets-keeps on expanding rapidly.

Further, understanding the science of everyday life from modern medical engineering to rocket science makes the world a better place to live in. It is important to understand the concept of scientific classes that can, to a large extent, help develop a broad outlook towards science. In this context, it is important to make the smart choice of the branch for study. Each of these branches has their own characteristic features. The key is to ensure that they select appropriate discipline from multiple opportunities to achieve their scientific goals, pursue diverse career goals and shape their destiny. Identifying a suitable option depends on an array of factors like future returns, flexibility, skill development, nature of the subject, current global scenario and scope of academic, industrial or research careers at different capacities. Other factors that influence decision making include risk-benefit evaluation, thought discipline, and individual intentions, temperaments, perception and thoughts.

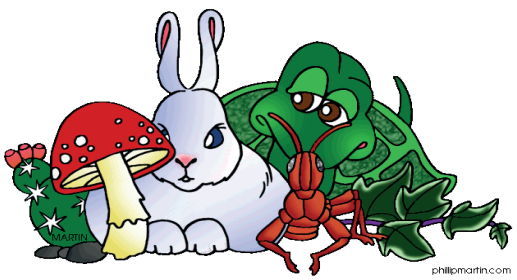
The overall objective of this paper is to enable the student to select and pursue appropriate subjects to solve scientific problems through logical thinking. This questionnaire has been designed to serve all the key terms related to different branches of science including a wide range of traditional subjects and emerging branches. This is intended to help young learner to select a career in a science-related profession in different streams such as physical sciences, engineering sciences, technology and medicine. Learning on the basis of categories sharpens the memory and lead learners to come up with the correct answer. It is categorized into biology (Mader, 2001; Malacinski & Pratt, 2006; Karp, 2006; Sheeler & Bianchi, 2006; Lodish et al., 2004; Audesirk & Beyers, 2008), chemistry (Greenwood & Earnshaw, 1984; Kroshiwitz, 1995; Brown et al., 2003; Spencer et al., 2003; Siberberg, 2006; Atkins & Jones, 1992; Maple, 1996; Timberlake, 2015; Hill & Homan, 1995; Chang & Overly, 2011), earth sciences (Lahee, 2002; Yeats et al., 1997; Ahrens, 2008; Pidwimy, 2006; Adams & Lambert, 2006; Smith & Pun, 2006), mathematics (Croft et al., 1996; Mei, 1997; Vaccari et al., 2006; Rudin, 1976; Potter et al., 2008; Jefftey, 2005; Kreyszig, 2012; Herstein, 2007; Thomas & Finney, 2010), medicine (Komaroff, 2003; Chawla, 1994; Delvin, 2006; Cox & Nelson, 2008), physics (Serway et al., 1997; Krane, 2012; Bransdey & Joachain, 2003; Fraser, 2009; Bernstein et al., 2000; Serway, 2010; Briser et al., 2009) and interdisciplinary science (Nelson et al., 2007; Vaccari et al., 2006; Mathews et al., 2000; Webster, 1988) for the purpose of questionnaire. This categorization is not rigid but changing and context-dependent to provide the spark to illuminate the branches of science and to highlight the roots. The specific purpose of this paper is to present a broad picture and tangential perspectives of the different areas of science in a simple question and key-word answer format for a general readership in a user-friendly way. It is the constant spirit of inquiry and a feeling of connectedness in such questionnaire that trig-

gers dynamic interactions. The basic general objective is self-improvement, vocabulary enrichment, development of inner sense of scientific terms, and awareness creation about different scientific disciplines. This is also useful to develop clear understanding about the usage of exact words and expressions, and satisfy the inherent curiosity of young learners. The specific objective is to provide the key terms describing the various branches of science in a structured and useful manner to serve as a preparatory exercise and to inspire general readers about the study of scientific principles, connecting concepts, and modern scientific problems.

Special emphasis is placed on the areas that are generally considered to be specialized areas of current research activity. In addition, to demonstrate the importance of interdisciplinary science, we have incorporated a number of questions on recent interdisciplinary branches. The intention is to provide learners with a basic familiarity with various branches of science to make individual choices and follow certain specific paths in their scientific journey. This is not comprehensive and includes explanation of common scientific terms that can eventually lead to sophisticated scientific study. The answers to the questions are listed at the end as answer keys to give learners immediate feedback in understanding the terms. We hope that this self-study paper is useful as an additional material for gaining knowledge about different subjects from metallurgy to materials science, civil to chemical engineering, robotics to rocket science, electrical engineering to electronics, and genetic engineering to environmental science. This article is for the layperson who would like to understand the meaning of the exact words and expressions used for branches of science. It will add a new dimension to the general reader's knowledge base often initiating a new line of thinking and may help them to find solutions to a cluster of problems using advanced technologies in an environment friendly approach to achieve quality benchmark included in the Atlas. This questionnaire is designed as a convenient and flexible way of checking current branches of science at a comfortable click. One can check the right answer by clicking the hyperlinks provided and several illustrations are incorporated to make the matter interesting by visual impact and artful attraction. The meanings of certain major terms associated with scientific study have been made clear with clipart pictures that captivate learners' attention and leave a deep impression. The list of different classes of medicines has been incorporated at the end (Appendix A) to help learners to become familiar with different medical terms and highlight the significance of the drug based on the keywords. Additional model questions in a mixed format is also incorporated as Appendix-B. The reader can refer to the teaching resources enlisted at the end to obtain further details regarding basic vocabulary, sophisticated ideas, fundamental principles, contemporary concepts, experimental observations, practical procedures and product

applications. This process broadens our vision to take our own independent decision regarding the path to pursue after considering all the points. The most important aspect of such questions is to keep the young aspirational students mentally active that may be especially beneficial to take better-informed decision regarding the selection of specific subject in the beginning of their career.

List of questions:



1. Which branch of agriculture is concerned with crop production for food, fuel, fiber and the study of soil?
2. Which term is used for the branch of zoology dealing with the study of insects?
3. What does the term ‘ornithology’ in the scientific context mean?
4. Name the obsolete term used to describe the science subject that deals with the study of generation.
5. What is the term used to describe the multidisciplinary field involving the study of biodiversity crisis and methods to prevent extinction?
6. Name the branch of microbiology that deals with the study of bacteria.
7. Name one of the two main fields of biology that is concerned with the study of plants?
8. What is the branch of biology that deals with the study of animals from sponges to spiders called?
9. Name the branch of biology that deals with structure and function of cells?
10. Which branch of botany is concerned with the classification and identification of plants?
11. Name the branch of zoology that is concerned with the study of amphibians and reptiles?
12. Which branch of zoology involves the study of shells of mollusks?
13. Name the branch of biology that deals with the study of normal functions of living organisms and their parts such as movement, metabolism, nutrition and reproduction.

14. Which branch of zoology deals with the study of the mollusks?

15. What do you call the branch of science that involves the study of submicroscopic viruses and viral diseases?

16. Which discipline of molecular biology deals with the structure, function, evolution, and mapping of genomes?

17. What is the branch of biology that concerns with the microscopic structure of cells and tissues?

18. Which branch of biology focuses on the search for extraterrestrial life and effects of extraterrestrial environment on living things?

19. Which division of biology deals with the study of life in the oceans and other saltwater environment?

20. Which biological discipline is involved in the study of parasites, their hosts and the relationship between them?

21. Name the discipline that involves the study of microscopic organisms, such as bacteria, viruses, fungi and protozoa**.**

22. Which branch of zoology is devoted to the study of fish?

Chemistry

23. What is the name of the branch of science that deals with the extraction of metals from their ores?

24. Which term is applied to the study of the physical structure and construction of metals using the microscope?

25. Which branch of chemistry involves the study of metal-metal bonded compounds that are intermediate in size between molecules and bulk solids?

26. Which branch of chemistry is concerned with the chemical reactions inside living organisms?

27. Which discipline involves the study of the composition and reactions in the stars, and in interstellar space and the interactions between this matter and radiation?

28. Which branch of chemistry is associated with the chemical processes and interactions of all components of foods?

29. Which field of chemistry involves computer simulation of molecules and conduct test reactions for biological activity?

30. What is the study of chemistry that occurs in air, water, soil and its impact on natural systems called?

31. Name the sub-discipline of chemistry that deals with the changes in the nucleus of the atom.

32. Which subfield of chemistry includes the synthesis, structure and properties of macromolecules?

33. Name the branch of chemistry that deals with the synthesis, structure, properties and bonding in any compounds that aren't based in carbon-hydrogen bonds.

34. Which branch of chemistry applies calculations to explain or make predictions about chemical phenomena?

35. Which branch of chemistry deals with the magnetic properties of the chemical compounds?

36. Which branch of chemistry deals with the interrelations between electrical and chemical phenomena?

37. Which is a sub-discipline of chemistry concerned with interactions between light and matter?

38. What is the design of chemical products and processes that eliminate or minimize the use and release of hazardous substances called?

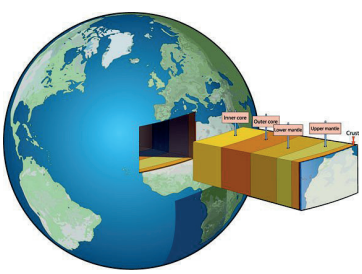
39. Which is the branch of chemistry that is focused on the study of the synthesis, characterization, structure, properties, and chemical processes that occur in the solid phase materials?

40. Which branch of chemistry focuses on the study of energy, and heat absorbed or released in a chemical reaction?

41. Which branch of chemistry is concerned with the production and the reactions of nanoparticles and their compounds?

42. What is the name given to the branch of chemistry that concerns with the study of chemical interactions at temperatures below 123 K?

Earth Sciences



43. Which branch of science involves the study of the Earth's history, structure and composition?

44. Name the branch of geology concerned with the study of rocks and minerals.

45. What is the term used to describe the study of earthquakes and related phenomena?

46. Which subject involves the study of rocks and rock structures?

47. What is the appropriate term descriptive of the study of formation and structures of rocks and minerals on other planets?

48. Which area involves the study of water, its occurrence and properties in the atmosphere?

49. What is geochemistry concerned with?

50. Which branch of geology concerns with the scientific study of the relationship among organisms and the environment in which they live?

51. What is the branch of physical geography dealing with the study of mountains called?

52. What is the meaning of the word 'meteorology'?

53. What does selenology deal with?

54. Name the field that concerns with the exploration and study of the ocean.

55. Which discipline of science deals with the forms of life that existed in prehistoric periods known from fossil remains?

56. What does the term 'cryology'or'glaciology' mean?

57. Which domain involves the scientific study of the physical features of the Earth's surface and the physical or chemical processes that occur on it?

58. What is the name given to the use of forming methods that are less resource intensive and work in harmony with nature?

59. What is the scientific study of weather conditions averaged over a period of time known as?

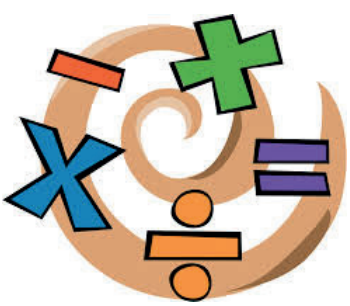
60. Which field is concerned with determination of the age of rocks, fossils and sediments using inherent features?

61. Which division of ecology covers the scientific study of the life and phenomena of inland water including fresh water and saline lakes, rivers, streams and wetlands and their functional relationship?

62. Name the branch of soil science that deals with the study of soils in their natural environment including the formation, morphology and classification.

63. Which area deals with the study of volcanoes, lava, magma, and related geochemical phenomena?

Mathematics



64. Which branch of mathematics studies the properties of lines, shapes, angles and their interrelationship?

65. What is the science of analyzing data known as?

66. Name the basis of mathematics that consists of addition, subtraction, multiplication and division.

67. Which interdisciplinary field involves the application of mathematics, statistical methods and computer science, to economic data?

68. Which field deals with the mathematical study of geometric properties of shapes or size of figures?

69. Which branch concerns with the study of algorithms that use numerical approximation for the problems of mathematical analysis?

70. Which discipline deals with the statistical study of human population involving data such as births, deaths, or income?

71. Which branch of mathematics studies relationships involving lengths and angles of triangles?

72. Which is the area concerned with the mathematical study of change and their application to solving equations?

73. What is the application of statistical analysis to biological data known as?

74. Name the two major branches of calculus.

75. Which area deals with the study of geometry using a coordinate system or the geometry of analytic varieties?

Medicine

76. Which branch of medicine falls in the domain of anesthetics administration and the study of patient condition?

77. Name the well-known branch of medicine that deals with drugs and their effects on the body.

78. Which branch of medicine deals with the diagnosis and treatment of emotional, behavioral problems and mental disorders?

79. Name the domain that involves the study of the origin, nature, and course of diseases via laboratory examination of samples of body tissue for diagnostic or forensic purposes.

80. Which branch of medicine is concerned with the study, diagnosis, treatment, and prevention of diseases related to the blood?

81. Which branch of medicine involves the study of the nervous system, its function and disorders, diagnosis and treatment options?

82. Which area of medical science is concerned with the reproductive system, pregnancy, childbirth and infertility?

83. Name the term used for the medical branch involving the treatment of diseases in children.

84. What does dermatology deal with?

85. Which subject is concerned with pregnancy, labor and child birth?

86. Which subarea of medicine deals with the disorders of the eye?

87. Which branch of pharmacology deals with the study of the harmful effects of chemicals on living organisms?

88. What does the term 'enterology' mean?

89. Which is the branch of science dealing with the study of teeth?

90. Which technical word is used to describe the study of the qualities of the mind from the shape of the skull?

91. Which domain of medicine is concerned with the diagnosis, therapy and palliative care of cancer patients?

92. Which subspecialty of internal medicine aims to prevent or treat the disorders that affect the kidney?

93. What is the medical term used to describe the scientific study of parasitic worms including their taxonomy and the effect on their hosts?

94. Name the branch of medicine that concerns with diseases and conditions requiring operative or manual procedures by incision or manipulation, especially with instruments.

95. Which branch of medicine deals with the diagnosis and treatment of disorders of the heart and blood vessels?

96. Which is the branch of pathology that studies the manifestations of the disease at the cellular level?

97. Which branch of medical science deals with the classification of diseases?

98. Which branch of medicine is concerned with the diagnosis, treatment and prevention of diseases in elderly people?

99. Which branch of medicine incorporates the study and management of diseases that affect the liver, gallbladder, biliary tree and pancreas?

100. Which division of dentistry deals with the prevention and correction of irregularities of the teeth?

101. Which branch of clinical medicine concerns with the diseases of the respiratory organs?

102. Which is a sub-specialty in internal medicine and pediatrics, concerned with the study, diagnosis and therapy of rheumatism, arthritis, and other disorders of the joints, muscles, and ligaments?

103. Which is the branch of medical science that studies the circulatory, lymphatic system, and vascular diseases?

104. Name the branch of medicine that concerns with the prevention of correction or

of deformities, disorders, or injuries of the skeleton and associated structures.

105. Which branch of medicine deals with the structure, functions, diseases, and pathology of the stomach and intestines?

106. Name the branch of biomedical science that deals with the immune system from fundamental mechanisms to applied aspects.

107. Which branch of medicine concerns with the study, diagnosis and integrated management of diseases of the teeth, oral cavity and their supporting structures?

108. Name the medical specialty of pediatrics that consists of the medical care of newborn infants, especially the ill or premature ones.

109. Which branch of psychology deals with how the brain and the nervous system influence a person's cognition and behaviors?

110. Which branch of medicine concerns with the prevention, diagnosis and treatment of disease, disorder and injury in animals?

Physics

111. Which branch of physics deals with the study of electricity and magnetism, force and motion, and light and waves?

112. Name the branch of physics that deals with the properties of matter at ultralow temperatures?

113. What is the name given to the interdisciplinary science involving the study of mechanical waves in gases, liquids, and solids including sound and vibration?

114. What is the study of nature of the planets, stars and galaxies called?

115. Which word describes the study of sounds, their production, transmission and reception?

116. What does the term 'radiology' mean?

117. What is the study or production of three dimensional images (holograms) known as?

118. What does 'particle physics' deal with?

119. Which domain of science deals with the emission and manipulation of electrons and the construction of devices?

120. Which branch of physics deals with the diagnosis and treatment of diseases using techniques of physics?

121. Which branch of physics concerns with electromagnetic radiation, nuclear reaction, chaos and relativity?

122. What is the name given to the area of physics dealing with the study of physical processes and changes that occur in living organisms?

123. Name the subject of natural science that deals with physical processes of the Earth including rock formation, volcanoes and its magnetism?

124. Which branch of physics is concerned with the effects of electric current with magnetic fields or with other electric currents?

125. Name the branch of physics that deals with the interactions of electromagnetic radiation with matter and the construction of instruments that use or detect it.

Interdisciplinary science

126. Which interdisciplinary branch of physiology and medicine deals with endocrine glands and hormones, including diseases and conditions associated with hormonal imbalance and damage to the glands?

127. Name the engineering discipline that applies engineering science and technology to agricultural production and processing.

128. Which is an established and famous area of scientific study that is essential to modern science and technology?

129. Which field deals with planning, designing, and constructing buildings and other physical structures?

130. Which multidisciplinary field is concerned with design, operation and application of robots?

131. What is the field involving scientific study, design and manufacturing of air flight-capable machines to travel in the air called?

132. Name the branches of fluid mechanics that studies fluids at rest or in motion.

133. What is the scientific study of fingerprints, palm prints and sole prints called?

134. Which multidisciplinary domain involves the application of engineering principles and design concepts to medicine?

135. Which interdisciplinary science deals with the recovery and identification of plant remains from geological contexts, and their use for the biological reconstruction of past environments?

136. Which multidisciplinary subject examines the interactions between electromagnetic radiation and matter as a function of wavelength?

137. Name the area of science that includes the study of all indoor aspects of wine production.

138. Which multidisciplinary science branch concerns with the application of science to the law by collecting and analyzing physical evidence that help investigate crimes?

139. Which subject deals with the study of the characteristics of woody plants?

140. Which branch of mechanical engineering and materials science concerns with the design, friction, wear, and lubrication of interacting surfaces in relative motion?

141. What is 'campanology'?

142. Which field encompasses the application of measurement science to manufacturing and other processes and their use in society?

143. Which branch is exclusively concerned with the application of statistics to the various biological processes?

144. Which interdisciplinary branch is concerned with the application of information technology in analyzing biological data?

145. Which field concerns itself with the study of the nose, sinuses and skull base?

146. Which multidisciplinary area is concerned with the assessment, diagnosis, treatment, and prevention of mental disorders?

147. Name the branch of medicine and physiology that focuses on the surgical and medical aspects of the human urinary system.

148. What does the word 'osphresiology' mean?

149. Which branch of science is concerned with the study of anatomy and physiology of animals as a basis for electronic devices or methods?

150. What is the term given to the branch of computer science concerned with the study and creation of systems that exhibit some form of human intelligence?

151. Which branch of engineering deals with the design and operation of industrial chemical plants, develop new materials and processes using the knowledge of chemistry, physics, biology, mathematics and economics?

152. Which is an interdisciplinary area of engineering that combines mechanical and electrical engineering and computer science?

153. What is the name given to the science of rearing of silk worms for the production of raw silk?

154. Which branch of science deals with the structure and properties of crystals?

155. Which is the interdisciplinary branch of science that deals with the study of genes, heredity, and variation in living organisms?

156. Which engineering discipline pertains to the design, construction, analysis and maintenance of natural and man-made structures including roads, bridges, dams, ports, railways, airports and buildings?

157. Which sub-discipline of civil engineering includes the planning, design, analysis and construction of structures that support or resist loads?

158. What is the scientific study of animal behavior from a biological perspective called?

159. What is the study dealing with the phenomena of sleep including treatment of sleep disorders and irregularities?

160. Which discipline deals with the design and applications of manufacturing techniques and management science?

161. Which branch of engineering is concerned with the application of fission and fusion reactions and radioactive materials?

162. Which engineering discipline deals with the design, construction, maintenance and operation of marine structures from sailboats to submarines?

Concluding remarks

We can learn a lot by getting out of our comfort zone to enter a broad perspective zone. The most crucial step towards improving the quality of science education is the nurturing and channeling the intellectual potential of youngsters towards science education, research and development. Awareness about diverse disciplines is one of the most dynamic design ingredients in a perspective journey involving serpentine roads. It can be integrated into the study scheme, gain insights, and finally arrive at better solutions or to establish the gold standard in theory and practice. The learner-centric approach using question-answer format has a remarkable effect in capturing the attention and engaging a new generation of readers in the learning process. This broad brush stroke depicting individual bristles will open the doors to a wealth of information in various subjects and help check whether the youth have any interest and inclination to study the subject and select the appropriate path from multiple options available. This questionnaire on important branches of science as a learning supplement will provide initial inspiration and motivation to readers to put in some solid effort and make good future plans to study inter-, trans- and multi-disciplinary science subjects. The series of questions along with keyword answers has an important role to provide the vital link to connect to the world of various scientific disciplines. This will stimulate the ability to reason clearly and create an interest in science subjects to become a pioneer of the future. This alternate method involving self-directed learning will provide conditions where students can actively involve themselves in the learning process. This will help build confidence to achieve their objectives in work-life and extend the study to other branches of science in the digital age. This will open new windows in the form of novel ideas at different layers and eventually lead people to become successful in the professional world.

Additional information obtained from resources listed can help in solving complex practical problems related to every branch of science and to deal with fabricated exercises in different disciplines. This can be adapted to conduct a quiz in an innovative and

interesting way using audiovisual mode of presentation or television quiz contest. The questions can be prepared on PPT slides, which can be projected subject-wise in the class using an LCD projector. After completing the quiz questions one can recall keywords to revise the different meanings by clicking on the answer keywords. It can be extended to design a questionnaire based on applications of diverse disciplines in every aspect of the industry from plastics to pharmaceuticals, domestic applications from combustion to comforts and laboratory applications ranging from inspiring instruments to innovative materials. This could include medical terms used to describe different diseases, disorders, conditions and phobias and publish in the form of books such as science quiz book, quiz time-science or global science quiz bank. There is scope for multiple options including publishing in open source journals, downloading articles and creation of digital audio-visual material that helps build a bridge to reach out to a larger audience. The introduction of self-assessment questions (SAQ), critical thinking questions (CTQ), drill exercises and difficult problems helps the learner to understand important basic concepts, principles, relationships and applications of knowledge to new situations and enable them to contribute to future developments in each subject.

A lot of study is required on the academic question: why is the younger generation not interested in the science stream? A key step is to inspire the youth towards science and enhance their level of activity and create an enabling environment for them contribute towards innovative products, processes, systems or services. A process of intellectual assimilation and absorption of scientific knowledge leads to our understanding and self-transformation and eventually act as vehicle in the scientific roadmap to developed world. The tertiary education systems with multiple educational programs, courses or open electives and conducting research in all branches of science can provide game-changing ideas and concepts. This leads us to have a unique turning point in discoveries, inventions, innovations, process, product, systems and application development from grassroots to galaxies, from smart glasses to smart home technologies. The planet is under constant pressure from the needs of the growing human population such as agricultural development, natural resource exploration and industrialization. The future generation will face the problems in the areas of economy, energy, education, employment, entrepreneurship, healthcare, infrastructure and industries, water and waste management, transport and connectivity, and disaster management. They need to develop smart solutions for a wide range of problems from the design of effective medicine to cure a disease to the development of the most destructive missile. It is important to address both the physical and digital sides of the issue to have maximum efficiency and definite progress in scientific evolution. The path for individual success will include answering the following basic questions in the initial stages of selecting a suitable subject:

1. Do you have real interest or inclination to in learning science?
2. Is your timing right for selecting a suitable branch?
3. Do you have intrinsic motivation to pursue particular subject?
4. Do you have a definite attitude and right kind of temperament that helps you a better future?
5. Do you have the intellectual dynamism, emotional enthusiasm and physical courage to work and contribute in a particular scientific field?
6. Do you plan to find out a suitable solution to a scientific problem or to understand the physical laws of the phenomenal world?
7. Do you take calculated and well-informed risks?
8. Do you have interest in innovative industrial solutions for a better life?
9. Do you have interest to work in research, development, marketing or service sectors?
10. Is it possible for you to follow a single scientific path or apply ideas to the real world?
11. Do you recognize the interconnection of subjects and consider interdisciplinary approach?
12. Are you passionate about science, engineering, technology or medicine?

List of answers:

1. Agronomy
2. Entomology
3. Study of birds
4. Genesiology
5. Conservation biology
6. Bacteriology
7. Botany
8. Zoology
9. Cytology
10. Taxonomy
11. Herpetology
12. Conchology
13. Physiology
14. Malacology
15. Virology
16. Genomics
17. Histology
18. Exobiology
19. Marine biology
20. Parasitology
21. Microbiology
22. Ichthyology
23. Metallurgy
24. Metallography
25. Cluster Chemistry
26. Biochemistry
27. Astro-chemistry
28. Food chemistry
29. Combinatorial chemistry
30. Environmental chemistry
31. Nuclear chemistry
32. Polymer chemistry
33. Inorganic chemistry
34. Theoretical chemistry
35. Magnetochemistry
36. Electrochemistry
37. Photochemistry

38. Green chemistry
39. Solid state chemistry
40. Thermochemistry
41. Nanochemistry
42. Cryochemistry
43. Geology
44. Petrology
45. Seismology
46. Lithology
47. Astrogeology
48. Hydrology
49. Earth & other planets' chemical composition & processes
50. Ecology
51. Orology
52. Study of the atmosphere
53. Nature, origin, & movement of moon
54. Oceanography
55. Paleontology
56. Study of snow and ice
57. Geomorphology
58. Agroecology
59. Climatology
60. Geochronology
61. Limnology
62. Pedology
63. Vulcanology
64. Geometry
65. Statistics
66. Arithmetic
67. Econometrics
68. Topology
69. Numerical analysis
70. Demography
71. Trigonometry
72. Calculus
73. Biometry
74. Integral and differential calculus
75. Analytical geometry
76. Anesthesiology
77. Pharmacology
78. Psychiatry
79. Pathology
80. Hematology
81. Neurology
82. Gynecology
83. Pediatrics
84. Study of skin, hair & nails
85. Obstetrics
86. Ophthalmology
87. Toxicology
88. Study of the intestine
89. Odontology
90. Phrenology
91. Oncology
92. Nephrology
93. Helminthology
94. Surgery
95. Cardiology
96. Cytopathology
97. Nosology
98. Geriatrics
99. Hepatology
100. Orthodontics
101. Pulmonology/Pneumology/Respirology
102. Rheumatology
103. Angiology
104. Orthopedics
105. Gastroenterology
106. Immunology
107. Restorative dentistry
108. Neonatology
109. Neuropsychology
110. Veterinary medicine
111. Classical physics
112. Cryogenics

113. Acoustics
114. Astrophysics
115. Phonetics
116. Study of X-rays & radioactivity
117. Holography
118. Study of particles
119. Electronics
120. Medical physics
121. Modern physics
122. Biophysics
123. Geophysics
124. Electrodynamics
125. Optics
126. Endocrinology
127. Agricultural engineering
128. Computer science
129. Architecture
130. Robotics
131. Aeronautics
132. Fluid statics & fluid dynamics
133. Dermatoglyphics
134. Biomedical engineering
135. Palaeobotany
136. Spectroscopy
137. Enology
138. Forensic science
139. Dendrology
140. Tribology
141. Technology of bells
142. Metrology
143. Biometry/biostatistics
144. Bioinformatics
145. Rhionology
146. Clinical psychology
147. Urology
148. Study of odors & the sense of smell
149. Bionics
150. Artificial intelligence
151. Chemical engineering
152. Mechatronics
153. Sericulture
154. Crystallography
155. Genetics
156. Civil engineering
157. Structural engineering
158. Ethology
159. Hipnology
160. Production engineering
161. Nuclear engineering
162. Naval engineering

APPENDIX -A
Types of medicines/medication or class of medicines

Anesthetics, Analgesic, Antacids, Anthelmintic, Antidepressant, Antibiotics, Anticoagulants, Anticonvulsants, Antidepressants, Depressants, Antidote, Antiepileptic, Antifungals, Antihistamines, Anti-inflammatories, Antipsychotic, Antipyretics, Antiseptics, Antitussive, Appetite suppressant, Beta-blocker, Bronchodilator, Decongestant, Diuretic, Antidiuretics, Antipruritic, Emetics, Antiemetics, Purgatives, Diaphoretics, Carminatives, Expectorants, Antispasmodic, Sedatives, Disinfectants, Stimulants, Hypnotics, Tonics, Anti-inflammatory, Anti bilious, Anti- rheumatics, Astringents, Laxatives, Aphrodisiacs, Emollients, Rejuvenatives, Lithotriptics, Antihypertensive,

Digestives, Anthelmintics, Dilators, Vasodilators, Vasoconstrictors, Demulcent, Cosmetics, Antiflautulents, Suppressants, Hematinic, Tranquilizers, Vermicide, Vermifuge, Antitoxin, Fungicide, Immunosuppressive, Muscle relaxant, Antiphlogistic, Antiscorbutic, Hypertension drug, Anxiolytics, Antioxidants, Antiprotozoals, Antipsychotic drugs, Antithyroid drugs, Antivirals, Anticholinergic drugs, Antianxiety drugs, Antibacterial, Antipsychotics.

APPENDIX –B
Additional model questions in a mixed format

Some learners may prefer to skip certain questions of the main quiz the first time they encounter them or in different contexts of learning experience. The supplementary questions given below may be incorporated at various points as unfamiliar question substitutes for a more balanced consideration of each classified subject questions. The appendix expands the scope of the battery of questions on names of scientific branches to facilitate extended learning experience that enhance their confidence level and eventually enable them to choose appropriate branch of science for further studies.

1. Which interdisciplinary science field concerns with the discovery, development, production and use of subsurface earth resources and large-scale intervention in the Earth's natural systems to counteract climate change?
2. Which science area deals with the patterns, causes, and effects of health and disease conditions in different groups of people?
3. Which branch of biology deals with the form and structure of animals and plants and their specific structural features?
4. Which branch of biology is concerned with the scientific study of fungi and fungus-caused diseases?
5. Name the branch of anatomy that involves the study of structure and function of bones
6. Name the new discipline that involves the study of energy and materials flows through industrial systems that helps in a systematic tracking and controlling interactions between the industrial economy and the environment.
7. Which branch of biology deals with the anatomy and physiology of the nervous system in animals and humans?
8. Name the term used to describe the scientific study of biological, cognitive and psychological aspects of aging and the particular problems of old people.
9. Which scientific discipline is concerned with the study of roundworms?
10. Which branch of study involves the application of engineering principles to the designing and developing of methods for extracting crude oil and natural gas from the earth?

11. Which is the branch of botany concerned with the study of the structure of seeds and fruits?

12. Name the science dealing with the study of sleep and hypnotic phenomena including clinical study and treatment of sleep disorders and irregularities.

13. Which branch of ornithology is concerned with the study of birds' eggs, nests and breeding behaviour?

14. Name the branch of medicine that deals with the anatomy, function, physiology of the ear as well as its diseases, diagnosis and treatment.

15. Which branch of medicine deals with the nose and its anatomy, physiology and pathology?

16. What is the scientific study or exploration of caves known as?

Answers:

1. Geoengineering
2. Epidemiology
3. Morphology
4. Mycology
5. Osteology
6. Industrial ecology
7. Neurobiology
8. Gerontology
9. Nematology
10. Petroleum engineering
11. Carpology
12. Hypnology/Somnology
13. Oology
14. Otology
15. Rhinology
16. Speleology

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REFERENCES

Adams, S. & Lambert, D. (2006). *Earth science: an illustrated guide to science*. New York: Chelsea House.

Ahrens, C.D. (2008). *Essentials of meteorology: an invitation to the atmosphere*. Boston: Brooks Cole.

Atkins, P. & Jones, L. (1992). *Chemistry, molecules, matter and change*. New York: E.H. Freeman and Company.

Audesirk, T. & Byers, G. (2008). *Biology: life on Earth*. London: Pearson.

Beiser, A., Mahajan, S. & Choudhury, S.R. (2009). *Concepts of modern physics*. New York: McGraw Hill.

Bernstein, J., Fischbane, P.M. & Gasirowich, S.G. (2000). *Modern physics*. Singapore: Pearson Education.

Bransdev, B.H. & Joachain, C.J. (2003). *Physics of atoms and molecules*. London: Pearson Education.
Brown, T.L., LeMay, H.E., Burstein, B.E. & Burdge, J.R. (2003). *Chemistry - the central science*. Upper Saddle River: Prentice Hall.
Chang, R. & Overby, J. (2011). *General Chemistry: the essential concepts*. New Delhi: McGraw Hill.
Chawla, N.P.S. (1994). *Family medical encyclopedia*. New Delhi: Penguin.
Cox, M.M. & Nelson, D.L. (2008). *Lehninger principles of biochemistry*. New York: W.H. Freeman & Co.
Croft, A., Davison, R. & Hargreaves, M. (1996). *Engineering mathematics: a foundation for electronic, electrical, communications and systems engineers*. Boston: Addison-Wesley.
Devlin, T.M. (2006). *Textbook of biochemistry with clinical correlations*. New York: Wiley.
Fraser, G. (2009). *The new physics of the twenty first century*. Cambridge: Cambridge University Press.
Greenwood, N.N. & Earnshaw, A. (1984). *Chemistry of the elements*. Oxford: Pergamon Press.
Herstein, I.N. (2007). *Topics in algebra*. New Delhi: Wiley Eastern Ltd.
Hill, G.C. & Homan, J.S. (1995). *Chemistry in context*. London: Nelson International Editions.
Jeffrey, A. (2005). *Mathematics for engineers and scientists*. Boca Raton: CRC Press.
Karp, G. (2006). *Cell and molecular biology: concepts and experiments*. New York: John Wiley & Sons.
Komaroff, A.L. (2003). *Family health guide*. London: Cassel.
Krane, K.S. (2012). *Modern physics*. New York: John Wiley & Sons.
Kreyszig, E. (2012). *Advanced engineering mathematics*. (2012). Singapore: John Wiley and Sons.
Kroschiwitz, J.I. (1885). *Kirch-Othmer encyclopedia of chemical technology*. New York: John Wiley & Sons.
Lahee, F.H. (2002). *Field geology*. New Delhi: CBS Publishing.
Lodish, H., Berk, A., Mtsuadaira, P., Kaiser, C.A., Krieger, M., Scott, M.P., Zipursky, S. & Darnell, J. (2004). *Molecular cell biology*. New York: W.H. Freeman & Co.
Mader, S.S. (2001). *Biology*. New York: McGraw Hill.
Malacinski, G.M. & Pratt, G.W. (2006). *Essentials of molecular biology*. New York: John Wiley & Sons.
Maple, J. (1996). *Advanced chemistry: an enquiry based approach*. London: John Murray.
Mathews, C.K., Van Holde, K.E. & Ahern, K.G. (2000). *Biochemistry*. Boston: Pearson Education.

Mei, C.S. (1997). *Mathematical analysis in engineering: how to use the basic tools*. Cambridge: Cambridge University Press.
Nelson, D.L., Cox, M.G., Berg, J.M., Tymoczko, T.L. & Stryer, L. (2007). *Biochemistry.* New York: W.H. Freeman & Co.
Pidwirny, M. (2006). *Fundamentals of physical geography*. Vancouver: University of British Columbia Press.
Potter, M.C., Goldberg, J.L. & Aboufadel, E.F. (2008). *Advanced engineering mathematics*. New York: Oxford University Press.
Rudin, W. (1976). *Principles of mathematical analysis*. Singapore: McGraw Hill.
Serway, R.A. (2010). *Physics for scientists and engineers with modern physics*. Boston: Brooks Cole.
Serway, R.A., Moses, G.J. & Moyer, C.A. (1997). *Modern physics*. Philadelphia: Saunders College Publishing.
Sheeler, P. & Bianchi, D.E. (2006). *Cell and molecular biology*. New York: John Wiley & Sons.
Silberberg, M.S. (2006). *Chemistry, the molecular nature of matter and change*. New York: McGraw Hill.
Smith, G.A. & Pun, A. (2006). *How does the Earth work: physical geology and the process of science?* Upper Saddle River: Prentice Hall.
Spencer, J.N., Bodner, G.M. & Rickard, L.H. (2003). *Chemistry: structure and dynamics*. New York: John Wiley & Sons.
Thomas, G.B. & Finney, R.L. (2010). *Calculus and analytic geometry*. London: Pearson Education.
Timberlake, K.C. (2015). *Chemistry: an introduction to general, organic and biological chemistry.* London: Pearson Education.
Vaccari, D.A., Strom, P.F. & Alleman, J.E. (2006). *Environmental biology for engineers and scientists*. New York: Wiley-Interscience.
Webster, J.G. (1988). *Encyclopedia of medical devices and instrumentation*. New York: John Wiley & Sons.
Yeats, R.S., Sieh, K. & Allen, C.R. (1997). *The geology of earthquakes*. New York: Oxford University Press.

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