

Welcome to the International Science Bee!

1. There are two main types of **cells**: prokaryotes and eukaryotes. **Prokaryotes** are unicellular (one cell) organisms that lack a nucleus or membrane-bound organelles. **Eukaryotes** are multicellular organisms that contain a nucleus and other membrane-bound organelles.
2. Cells are composed of **organelles**, which are structures that help assist the cell with its various functions. All cells contain a plasma membrane, cytoplasm, vacuoles and ribosomes.
3. The **nucleus** is where DNA is stored in eukaryotic cells.
4. The **mitochondria** is an organelle that generates chemical energy in the form of **ATP** (adenosine triphosphate) to power the cell's biochemical reactions.
5. The **Golgi body**, or **Golgi apparatus**, is a stack of flat membranous sacs derived from the endoplasmic reticulum that act as the "post office" of the cell. It receives proteins, lipids, and other molecules from the endoplasmic reticulum and separates, modifies, and packages these materials into vesicles that are transported to other parts of the cell.
6. **Chloroplasts** are organelles found primarily in plants and are the site of **photosynthesis**.
7. **Mitosis** is a process of nuclear division in which a cell is divided into two identical daughter cells. This process requires the doubling of a cell's DNA so that each resulting cell has a copy of the genetic information.
8. While mitosis produces two identical daughter cells, in order for sexual reproduction to occur, haploid cells (also called gametes) must be produced from diploid cells in a process called **Meiosis**.
9. **Cellular Respiration** is a set of reactions that occurs in cells that convert chemical energy from food and nutrients into energy in the form of **ATP**, the energy currency of the cell.
10. **Photosynthesis** is a process used by plants to convert carbon dioxide, water and light energy into **glucose** and oxygen and is often considered the opposite to cellular respiration. The two main stages of photosynthesis are the **Calvin Cycle** and Light Dependent Reactions.
11. In the **Calvin cycle**, carbon dioxide is fixed to ribulose biphosphate (**RuBP**) to eventually form glyceraldehyde 3-phosphate, a major building block of glucose and many other molecules. In the process, ATP and NADPH from the light reactions are used up.
12. **Bacteria** are single-cell organisms that can be found throughout Earth. Bacteria are notable through reproducing using binary fission, a form of asexual reproduction. Common strains of bacteria include **Escherichia coli** (E.Coli), **Salmonella**, and staphylococcus aureus.
13. **E. Coli** is a rod-shaped gut-residing bacteria from the Escherichia genus.
14. **Antibiotics** are often used against bacteria but the rising problem of antibiotic resistance has lead to the issue of "superbugs". **Penicillin** is the first commercial antibiotic, derived from a type of mold and accidentally discovered by **Alexander Fleming**.
15. **Viruses** are noncellular infectious particles composed of a protein capsid and genetic material, either DNA or RNA. Viruses have no metabolic processes and are therefore not considered living.
16. **HIV** is a virus that weakens the immune system and leads to AIDS. The retrovirus infects helper T cells of the immune system.

17. **Vaccines** are often used to help prevent diseases caused by viruses by injecting weakened forms of the virus into the human body to build up an immune response.
18. **Tundra** encompasses the vast treeless plains of the arctic region. It is characterized by extremely cold temperatures and permafrost (permanently frozen subsoil).
19. **Deserts** are characterized by the lack of water and are usually found around specific latitudes that have descending masses of warm, dry air that create this dry climate.
20. **Tropical forests** (or **rainforests**) occur along the equator and are home to nearly half of the species on earth. This biome is characterized by the high amounts of rainfall, the wet and dry season, and the structurally complex trees.
21. **Taiga** biome can be found in the mountains of the Northern Hemisphere. No permafrost is present but these regions typically receive heavy snowfall during the winter. Coniferous forests characterize the biome.
22. **Genes** are the functional unit of heredity. In Mendel's experiments, "genes" that Mendel investigated were flower color and plant height.
23. **Gregor Mendel** was an Austrian monk who discovered the fundamental mechanism by which traits are inherited through his rigorous experimentation with **pea plants**.
24. **Deoxyribonucleic acid (DNA)**, is the genetic information for all organisms and helps code all functions and structure. DNA is made up of subunits called nucleotides, that each consist of a phosphate group, 5-carbon sugar (deoxyribose) and one of four nitrogenous bases (**adenine, thymine, guanine cytosine**). DNA has a **double helix structure** that consists of two strands running opposite to each other.
25. **Amino acids** are the building blocks of proteins, and consist of a central carbon that has an amine group, a carboxyl group, a hydrogen, and an R group attached to it.
26. **Ribonucleic acid (RNA)** is another important biological molecule. Unlike DNA, ribonucleic acid is made up of a 6-carbon ribose sugar and consists of different nitrogenous bases (**uracil, adenine, guanine, cytosine**).
27. **Genetic mutations** result from defects in the chromosomes or changes in the normally occurring DNA sequence, which can result in fatal genetic disorders such as **Down Syndrome** (extra chromosome-21) and **sickle cell anemia** (valine replaces glutamic acid).
28. **Evolution** is defined as the change in **heritable** (acquired) characteristics of species over multiple generations.
29. In 1859, **Charles Darwin** published "**On the Origin of Species**" where he outlined his **theory of evolution by natural selection**. Darwin is famous for his experiments aboard the **HMS Beagle**, where he observed 13 different varieties of **finches** while in the **Galapagos islands**.
30. **Natural selection** is the differential reproductive success of members of a species based on differences in phenotype (characteristics). The mechanism of natural selection can also be explained by the phrase "**survival of the fittest**", where the best characteristics are "automatically" selected and passed on to the next generation of species.
31. **Kingdom** is the highest taxonomic rank and includes the following classifications: Animalia, Plantae, Fungi, Protista, Archaea, and Bacteria.
32. **Fungi** is a kingdom of organisms which are primarily decomposers, like mushrooms.

33. **Phylum** is the next classification after Kingdom and some important phyla include **chordata** (organisms with a notochord), **Porifera** (sponges), **Cnidaria** (jellyfish, corals, anemones), **Nematoda** (roundworms), and **Arthropoda** (arachnids, crustaceans, insects).
34. **Non-vascular** plants, examples of which include mosses, hornworts, liverworts, and some forms of algae, are characterized by their lack of vascular tissue (a tissue that helps transport nutrients) and structures like the root, leaves, and stems.
35. **Vascular plants**, examples of which include trees, shrubs, and flowering plants, are characterized by the presence of vascular tissue.
36. **Gymnosperms**, which are a class of vascular plants, are plants that produce seeds that are not enclosed in a specialized chamber.
37. **Angiosperms**, which are a class of vascular plants, are plants that produce flowers and seeds that are enclosed in a specialized chamber (fruit). Like gymnosperms, they also follow an alternation of generations reproduction pattern.
38. **Leaves** are green part of a plant that will change colors and fall off of trees in colder seasons. They are the site of concentrated chloroplasts that perform photosynthesis.
39. **Roots** are structures that are specially adapted to maximize the uptake of water when water enters the xylem through roots via osmosis.
40. **Invertebrates** are organisms that lack a backbone and examples of invertebrates include insects, jellyfish, and worms.
41. **Mollusks** are characterized by a muscular foot, a soft body, and a mantle that produces a shell. Mollusks obtain calcium carbonate from the seawater in order to deposit their shell, which is used for protection.
42. **Arthropods** are characterized by a segmented body, a chitinous exoskeleton, and paired-jointed appendages. Arthropod appendages include antennae, mouthparts, and legs. Examples of arthropods include crustaceans, insects, arachnids, chilopods, and diplopods.
43. **Cnidarians** are characterized by their radial symmetry and presence of a specialized cell called a cnidocyte that is used for predation and defense. Examples of cnidarians include jellyfish, sea anemones, and coral.
44. The main objective of the **digestive system** is to digest food. There are many organs involved in digestion. The **esophagus** then carries food and liquid down to the stomach. **Stomach** is an organ that secretes gastric juice to break down food received from the esophagus. It uses hydrochloric acid to chemically breakdown food to obtain nutrients.
45. **Calories** is the unit used to count energy intake by food.
46. The **respiratory system**, which consists of organs like the **lungs**, nose, mouth, and **trachea** is responsible for keeping us breathing. This is done through taking in oxygen and removing carbon dioxide.
47. The **nervous system** is responsible for all of our conscious and unconscious thoughts, actions, and perceptions, and functions as the control center of our body. The central nervous system consists of two parts, the **brain** and the **spinal cord**. **Neurons** are cells that make up the spinal cord and brain.

48. The **cardiovascular system**, which is also known as the **circulatory system**, consists of the heart and is in charge of transporting oxygen and nutrients to the entire body. **Heart** is an organ that circulates blood throughout the body.
49. **Skin** is the largest organ in the human body. The dermis and epidermis are part of the skin.
50. **Livers** are organs that produces bile, detoxifies blood, and becomes inflamed in hepatitis.
51. **Kidneys** are bean-shaped organs that filter blood to produce urine.
52. **Parasites** are organisms that target hosts to gain benefits, examples of which include tapeworms and leeches.
53. **Malaria** is an infectious disease spread by female Anopheles mosquitoes.
54. An **atom** is made up of **protons**, **neutrons**, and **electrons** and is the smallest unit of matter that can form a chemical element.
55. **Protons**, which have a positive charge and a mass of 1 amu (atomic mass unit) are located at the **nucleus**, or center of the atom.
56. **Neutrons**, which have no charge and a mass of 1 amu are also located at the nucleus.
57. **Electrons**, which have a negative charge and negligible mass are found in clouds outside the nucleus.
58. The **atomic number** of an atom represents the number of protons in the atom. Elements in the periodic table are arranged by their atomic number.
59. A **molecule** is a group of two or more elements held together by chemical bonds.
60. A **covalent** bond is formed by the sharing of electrons between two atoms.
61. An **ionic bond** is formed by the attraction of oppositely charged ions in a process known as ionization. An ionic bond is formed when one atom completely transfers one or more electrons to another atom.
62. **Hydrogen bonds** are weak bonds that result from the attraction of the partially positive hydrogen on one molecule and the partially negative atom (only forms between nitrogen, oxygen or fluoride) on another molecule.
63. The **Periodic Table**, which was invented by Russian chemist **Dmitri Mendeleev**, is a display that aims to organize known elements into a table by factors like atomic mass and chemical reactivity. The current periodic table is organized in order of increasing atomic number, with horizontal rows called **periods** and vertical columns called **groups**. Elements in the same group (ex. Halogens, alkali earth metals) have the same chemical properties.
64. **Hydrogen (H)** is the lightest and most abundant element and consists of a single proton and electron. Hydrogen has atomic number 1.
65. **Helium (He)** is an element with atomic number 2 and is a colorless and inert gas. Helium is part of a group of elements called the noble gases and has a very low boiling and melting point.
66. **Oxygen (O)** is an element with atomic number 8 and is essential for functions like respiration and is a byproduct of photosynthesis. The compound water consists of two hydrogen atoms bonded to an oxygen atom. Allotropes of oxygen include **ozone (O₃)**.
67. **Nitrogen (N)** is an element with atomic number 7. Earth's atmosphere consists mostly of nitrogen.
68. **Mercury (Hg)** is an element with atomic number 80. Mercury is the only metal to be a liquid at room temperature and was formerly used in many devices such as thermometers and barometers.

69. **Sulfur (S)** is an element with atomic number 16. The most common form of elemental sulfur, which exists as a yellow solid, is the S₈ (octasulfur) molecule. Compounds containing sulfur include sulfur dioxide (SO₂), which is used for sterilizing fruit and hydrogen sulfide (H₂S), which is used to mark dangerous gases.
70. **Iron (Fe)** is a metal with atomic number 26 that is the primary component of steel.
71. **Carbon (C)** is an element with atomic number 6 and has the ability to make four covalent bonds. Due to this property, carbon has the ability to make different allotropes such as diamond, graphite, and fullerenes. Organic chemistry is the study of carbon-containing molecules. Carbon-14, an isotope of carbon, is commonly used to date ancient artifacts and fossils due to its predictable mechanisms of radioactive decay.
72. **Lithium (Li)** is an element with atomic number 3. Ions of Lithium are frequently used in rechargeable batteries found in phones and laptops.
73. **Gold (Au)** is an element with atomic number 79.
74. **Uranium (U)** is an element with **atomic number 92**. Uranium-238, the most common isotope of uranium, is used to date ancient volcanic rocks as it decays into lead-206. Uranium-235, another isotope of uranium, is used to fuel nuclear reactors. Aluminum is a metal with chemical symbol Al and atomic number 13.
75. **Aluminum (Al)** is the most abundant metal found in the lithosphere.
76. **Calcium (Ca)**, which is part of a group of elements called the alkaline earth metals, has atomic number 20. The calcium ion is released during muscle contraction and can be found in teeth and bones.
77. **Silicon (Si)**, which is part of the Group 14 elements, is an element with atomic number 14. Silicon has various industry applications, such as transistors, computer chips and solar cells.
78. **Phosphorus (P)**, which is part of the Group 15 elements, is an element with atomic number 15. White, red, and black phosphorus are all allotropes of phosphorus, which is commonly found existing as phosphate in rock.
79. **Water (H₂O)** is a compound composed of one oxygen and two hydrogen atoms.
80. **Carbon Dioxide (CO₂)** is a greenhouse gas which is released by the burning of fossil fuels.
81. **Coal** is a combustible, sedimentary black rock used as a fuel source. Anthracite and bituminous are considered higher quality of coal whose lower quality forms include lignite and peat.
82. **Alloys** are mixtures of a metal and another substance. Steel and Bronze are example of an alloy.
83. A **solid** is a substance with a fixed volume and shape. Examples of solids include ice, rock, wood, and metal.
84. A **liquid** is a substance that has fixed volume but not shape. Examples of liquids include water, milk, and blood.
85. A **gas** is a substance that has no fixed volume and no shape. Examples of gases include air, water vapor, and helium.
86. **Plasma** is the final state of matter and consists of a gas of ions. Plasma is the most abundant state of matter and examples include lightning and solar wind.
87. An **endothermic reaction** is a type of reaction where the products are higher in energy than the reactants. Heat is absorbed from the surroundings in an endothermic reaction, causing a positive change in enthalpy.

88. An **exothermic reaction** is a type of reaction where the reactants are higher in energy than the products. Heat is released from the surroundings in an exothermic reaction, causing a negative change in enthalpy.
89. **Evaporation** is the change from **liquid to gas**. Evaporation is an **endothermic process**, as heat is absorbed during the process. An example of evaporation is the steam rising from the top of a coffee cup when heated.
90. **Melting** is the change from **solid to liquid**. Melting is an **endothermic process**, as heat is absorbed during the process. An example of melting is an ice cube melting in liquid water.
91. **Freezing** is the opposite of melting and is the change from **liquid to solid**. Freezing is an **exothermic process**, as heat is used up during the process. An example of freezing is water turning into ice.
92. **Condensation** is the opposite of evaporation and is the change from **gas to liquid**. Condensation is an **exothermic process**, as heat is used up in the process. An example of condensation is fogging a mirror after a hot shower.
93. **Boiling** occurs when a liquid is heated to its **boiling point**, which is defined as the point at which the vapour pressure of the liquid is equal to the pressure exerted on the liquid by the surrounding atmosphere. This causes the liquid to become **vaporized** due to the continuous heating.
94. **Sublimation** is the change from solid to gas directly without passing through the liquid phase. An example of sublimation is **dry ice**, which is usually found as a gas.
95. **Pressure** is defined as the perpendicular force on an object per unit area. Pressure is measured in units of force (F) per unit area (A). The force exerted by the atmosphere at sea level is 14.7 pounds per square inch (psi), or 1 atmosphere (atm).
96. **Avogadro's law** states that at constant temperature and pressure, the volume of a gas is directly proportional to the number of moles of gas.
97. **Acids** are molecules or compounds that have a pH less than 7.
98. **Bases** are molecules or compounds that have a pH greater than 7.
99. The **pH scale**, which ranges from 1 (very acidic) to 14 (very basic) is used to measure the acidity of a solution.
100. **Catalysts** act by lowering the activation energy of the reaction but are not consumed during the reaction. **Enzymes** are a type of biological catalyst.
101. **Entropy** is the amount of disorder within a compound.
102. The **first law of thermodynamics** states that the change in internal energy is equal to the amount of heat added minus the amount of work done by the system.
103. The **second law of thermodynamics** states that the total entropy of a system and surroundings will never decrease.
104. **Silicates** are a family of minerals consisting of silicon and oxygen. **Feldspar**, **quartz**, and zeolites are some examples of common silicates.
105. **Non-silicates** are the other family of minerals and contain neither silicon or oxygen. Non-silicate minerals include **carbonates** (minerals containing CO₃²⁻), **sulfates** (minerals containing SO₄²⁻), **sulfides** (minerals containing sulfur), **oxides** (minerals containing oxygen), and **halides** (minerals that are salts of the halogen acids)

106. **Crystals** are a solid material in which atoms are arranged in a definite and structured pattern. Examples of crystals include **diamond** (crystal carbon), **quartz**, and snowflakes.
107. The **Mohs Hardness Scale** is a quantitative scale used to identify different minerals by comparing the resistance of a mineral to being scratched by ten reference minerals on a scale of 1-10.
108. **Igneous rocks** are one of the three types of rocks and are formed by the cooling and solidification of magma.
109. **Felsic** rocks are igneous rocks that are rich in elements that form quartz and feldspar. The most common felsic rock is **granite**. **Obsidian** is another felsic rock, and is formed when **lava** from a volcano cools rapidly with little crystal growth. **Pumice** is a third type of felsic rock and is a light colored rock that contains volcanic glass.
110. **Mafic** rocks are igneous rocks that are rich in elements like magnesium and iron. The most common mafic rock is **basalt**.
111. **Sedimentary rocks** are formed through the accumulation or deposition of organic particles on Earth's surface.
112. **Metamorphic rocks** are rocks that have undergone a transformation from their original igneous or sedimentary state. **Slate** is a type of metamorphic rock that is formed from shale under low pressure and temperature conditions.
113. **Radiometric Dating** is a method for determining the age of materials such as rock or carbon through looking at the decay of radioactive isotopes.
114. **Carbon-dating** is a way to determine the age of an object by looking at the radioactive decay of carbon-14. The **half-life** is the amount of time (usually years) it takes for half an isotope to decay into another different isotope.
115. The **Precambrian Era** was the period of time from when Earth formed until the Cambrian period. During this period of time, the solar system began to form, continental landmass began to emerge, and we see the emergence of the first bacteria and multicellular organisms.
116. The **Paleozoic Era** is one of the three geologic eras of the Phanerozoic Eon and is divided into six geologic periods. During this period of time, there was an explosion in marine organisms. The Paleozoic Era ended with the **Permian extinction**, the largest extinction event in the history of the earth.
117. The **Mesozoic Era** is the second of the three geologic eras of the Phanerozoic Eon and is divided into three geologic periods (Triassic, Jurassic Cretaceous). This period of time was characterized by the presence of dinosaurs and the break-up of supercontinent **Pangea**.
118. The **Triassic Period** was the first of three periods in the Mesozoic Era. The **Carnian Pluvial Event** occurred during this period of time which resulted in a drastic change in global climate. This period saw the breakup of Pangea into **Laurasia** and **Gondwana**.
119. The **Cretaceous-Tertiary (K-T) Mass Extinction**, was an event that resulted in the extinction of the dinosaurs and 80 percent of all species of animals. There is speculation regarding the cause of the K-T Mass extinction but prominent explanations include the Alvarez hypothesis (asteroid theory).
120. The **Holocene Epoch** is the current geological epoch. This period is characterized by the growth and evolution of the human species.
121. **Plate Tectonics** — **Continental drift** was a theory proposed by **Alfred Wegener** that explained how the continents on Earth shifted places. The theory explains that continents have “drifted”

across Earth's surface, and have moved over geologic time in relation to each other. Evidence that supports this theory includes fossil records and rock formations.

122. The **Mid-ocean ridge** is a type of mountain system in the seafloor formed through tectonic plates.
123. **Seafloor Spreading** is a process that occurs at mid-ocean ridges. In this process, tectonic plates split apart from each other to form a new oceanic crust.
124. The **lithosphere** is the outermost rocky layer of the Earth, and is made up of the crust and portions of the upper mantle. The lithosphere is composed of felsic rock and is very cool.
125. The **Mantle** is a layer of the earth above the outer core and below the crust. "Plumes" in this region may drive its convection which causes seafloor spreading.
126. **Tectonic plates** are pieces of the lithosphere and consist of oceanic and continental crust. Events like earthquakes, volcanoes, and mountain formation occur at boundaries where tectonic plates meet (faults).
127. A **Divergent boundary** is a structure that exists when two tectonic plates are moving away from each other. The Mid-Atlantic Ridge is an example of a divergent plate boundary.
128. **Convergent boundaries** are structures that exist when two tectonic plates come towards each other. The impact of the collision between the plates causes the edges of the plates to either buckle up into a mountain range or bend down into a seafloor trench. **The Pacific Ring of Fire** is an example of a convergent plate boundary.
129. A **transform boundary** is formed when two plates slide past each other. An example of a transform boundary is the San Andreas fault zone.
130. **Continental crust** is the outermost layer of the lithosphere and helps make up our continents and all of Earth's land surfaces.
131. **Oceanic crust** is also the outermost layer of the lithosphere and helps make up the surface of our oceans. Oceanic crust is thinner than continental crust.
132. **Subduction zones** are locations found at convergent plate boundaries where the lithosphere sinks into the mantle and is recycled. At this point, the heavier plate dives beneath the second lighter plate and sinks into earth's mantle.
133. An **earthquake** is a natural disaster that results in the sudden shaking of the earth due to the collision of tectonic plates or volcanic eruptions. The **epicenter** is the point where an earthquake originates, and is located directly above the **focus** or hypocenter, which is a region inside Earth's crust.
134. When an earthquake occurs, two types of **seismic waves** are produced. **P waves** travel the fastest and are longitudinal waves which can travel through solids and liquids. **S waves** are slower and are transverse waves which can travel through solids only.
135. The **shadow zone** is a region of Earth's surface that does not receive any P waves. **Seismographs** are unable to detect earthquakes in this region.
136. The **Mercalli Intensity Scale** is a scale used to measure the intensity of earthquakes and ranges from 1 to 12.
137. The **Richter Scale** is a scale used to measure an Earth's magnitude and ranges from 1 to 9.
138. **Clouds** are masses of water vapor from which rain is released. Types of clouds include cirrus, stratus, and cumulonimbus.
139. **Jet Streams** are rapidly moving bands of air located in the upper atmosphere.

140. **Ocean Currents** are these large directed flows of water found in the ocean. The **Gulf Stream** is an ocean current that flows from North America to Europe.
141. **Tornadoes** are rapidly spinning winds which typically form during severe thunderstorms.
142. **Glaciers** are large, moving bodies of ice. They can create fjords by cutting through bedrock.
143. **Milky Way** galaxy is the galaxy which contains the Solar System.
144. The **Sun** is the star at the center of our Solar System around which the Earth revolves.
145. **Mercury** is the smallest and closest planet to the Sun.
146. **Venus** is the second closest planet to the Sun. Due to sulfuric acid in its atmosphere, Venus has the highest surface temperature in the solar system. With the naked-eye, it is the brightest planet in the sky.
147. **Mars** is the fourth planet from the Sun and is often referred to as the Red Planet. Mars has two moons: **Phobos** and **Deimos**.
148. **Jupiter** is the largest planet in the Solar System and is known for its Great Red Spot.
149. **Saturn** is the sixth planet from the sun known for its extensive ring system
150. **Pluto** is a dwarf planet, which was formerly classified as the ninth planet from the sun. It is sometimes considered to be a double planet with its largest moon, Charon.
151. **Solar Eclipses** are astronomical events in which the Sun is at least partially blocked by the Moon.
152. **Asteroids** are astronomical bodies which make up a namesake "belt" in the solar system.
153. **Black Holes** are astronomical bodies which have a gravitational singularity so strong that light cannot escape past their event horizon.
154. **Comets** are orbiting icy bodies, which include ones named Halle-Bopp and Halley's.
155. **Asteroids** are astronomical bodies that make up a namesake "belt" in the solar system.
156. **Speed of Light** (c) is about 300 million meters per second and represents the maximum speed at which objects can travel.
157. **Supernova** is an event in which a star explodes.
158. The **Big Bang** theory is the theory that the universe exploded out from one infinitely dense singularity.
159. The **Apollo Program** is a series of missions with astronauts like Neil Armstrong and Buzz Aldrin going to the moon.
160. **Levers** are **simple machines** exemplified by a seesaw. Levers derive more mechanical advantage from having longer arms, which reduce the amount of force needed to be applied over a longer distance.
161. **Pendulum** is a device consisting of a weight suspended from a pivot which swings back and forth.
162. **Pulleys** are simple machines whose name comes from the action performed on the rope to lift up an object. It consists of a wheel on a fixed axle with a groove to support a sliding rope.
163. **Gravity** is the weakest of the fundamental forces, which causes objects to fall to the ground.
164. **Electronegativity** is the measurement of an atom's ability to attract electrons. It is measured on the Pauling scale.
165. **Mass** is a quantity, whose SI unit is the kilogram
166. **Voltage** is a quantity, symbolized V , which is 120 for U.S. wall outlets and measures the electric potential difference. It is equal to current times resistance according to Ohm's law.

167. **Inertia** is the resistance to change in an object's motion, often explained as "An object in motion will stay in motion."
168. **Momentum** is the product of mass and velocity, quantification of an object's tendency to stay in motion.
169. **Friction** is a force that resists motion. It comes in static, rolling, and sliding forms.
170. **X-rays** is a form of radiation that can penetrate through soft tissue to image bone.
171. **Kinetic Energy** is the energy of moving objects. The quantity for an object's kinetic energy is equal to momentum squared over two times the mass.
172. **Photons** are quantum particles that carry the electromagnetic force and mediates visible light.
173. **Electrical Resistance** is a quantity that describes how much a device opposes electric flow. It is measured in ohms.
174. **Electronic Circuits** are devices consisting of components that allow electricity to flow.
175. The **Ideal Gas** law is a law which relates the product of pressure and volume of an ideal substance to its temperature.
176. **Density** is equal to mass divided by volume, which can be used to determine if an object floats in water.
177. **Matrix** is a mathematical object which is array of numbers in rows and columns.
178. **Circle** is a 2D shape consisting of all points equidistant from a fixed center. The area of a circle is calculated by the formula Pi times the radius squared.
179. **Standard Deviation** is a quantity symbolized "sigma" which represents how spread out a set of data is from the mean.
180. **Irrational numbers** are numbers that cannot be represented as the quotient of two integers, such as Pi.
181. **Perfect Numbers** are numbers which are the sum of their own prime factors.
182. **Pi** is the ratio of the circumference of a circle to its diameter which is approximately 3.14.
183. **Factorial** is a function symbolized by an exclamation point next to a number. It gives the number of ways to arrange n distinct objects in a row.
184. **Calculus** is a branch of mathematics dealing with integration and derivative. It was independent discovered by Gottfried Leibniz and Isaac Newton.
185. **René Descartes** is an early modern French philosopher and mathematician, who stated "I think therefore I am."
186. **Stephen Hawking** is a British physicist who was confined to a wheelchair due to ALS.
187. **Galileo Galilei** is an Italian scientist who was condemned by the Inquisition for supporting heliocentrism.
188. **Edwin Hubble** is a scientist who names a 1990 space telescope.
189. **Thomas Edison** is an American inventor, who developed the most popular incandescent light bulb.
190. **Alan Turing** is an English mathematician, who names a test which can determine if a computer possesses strong artificial intelligence.
191. **Euclid** is a Greek mathematician who wrote the Elements and is considered the "father of geometry."

192. **Erwin Schrödinger** is an Austrian physicist who demonstrated superposition using his namesake cat.
193. **Marie Curie** is a Polish scientist who coined the term "radioactivity" and also discovered radium with her husband, Pierre.
194. **Leonhard Euler** is a Swiss mathematician from the 18th century who names the transcendental number e . He discovered the number which serves as the base of the natural logarithm.
195. **Johannes Kepler** is an astronomer who devised three laws of planetary motion.
196. **Archimedes** is a Greek mathematician of Syracuse who discovered the principle of buoyancy.
197. **Louis Pasteur** is a scientist who names a process used to keep milk sanitary. He was the creator of the rabies and anthrax vaccine invented a process where mild heat is used to remove pathogens.
198. **Albert Einstein** is a scientist who proposed the famous rest-mass equation E equals m, c squared.
199. **Bluetooth**, developed by Ericsson, is a technology for wirelessly networking consumer electronics, named for a 10th century Danish king.
200. **Paper** is a material made from ground up fiber and cellulose in wood. It was invented by Cai Lun.