Grade 8 Science Reviewer I. Matter and Its Properties - Matter has mass and occupies space. It exists in solid, liquid, and gas forms. - Physical properties include color, density, melting/boiling point, solubility, and conductivity. - Chemical properties describe a substance's ability to react and form new substances. - Law of Conservation of Mass: Mass is neither created nor destroyed in chemical reactions. - Mixtures can be homogeneous (solutions) or heterogeneous (colloids, suspensions). II. Atoms, Elements, and Compounds - Atom: smallest unit of an element. Composed of protons, neutrons, and electrons. - Element: pure substance with only one kind of atom. - Compound: formed when two or more elements chemically combine in fixed ratios. - Chemical bonding: Ionic bonds (transfer of electrons), Covalent bonds (sharing of electrons). III. Forces and Motion - Force: a push or pull; measured in newtons (N). - Newton's Laws: 1. An object stays at rest or in motion unless acted upon by an external force. 2. Force = mass × acceleration (F = ma). 3. For every action, there is an equal and opposite reaction. - Friction opposes motion; gravity pulls objects toward Earth's center. - Momentum = mass × velocity; conserved in closed systems. IV. Energy: Forms and Transformations - Energy: ability to do work. - Kinetic energy: energy of motion. Potential energy: stored energy. - Law of Conservation of Energy: Energy cannot be created or destroyed, only transformed. - Energy forms: mechanical, chemical, electrical, heat, light, sound, nuclear. - Renewable sources: solar, wind, hydro; Non-renewable: coal, oil, natural gas. V. Earth and Space - Layers of Earth: crust, mantle, outer core, inner core. - Plate Tectonics: Earth's crust divided into plates moving due to convection currents. - Earthquakes occur along faults; volcanoes form near plate boundaries. - Weathering and erosion shape Earth's surface. - Moon phases, eclipses, and tides result from Moon-Earth-Sun interactions. VI. The Solar System - Sun: center of the solar system; source of light and energy. - Eight planets orbit the Sun: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune. - Asteroids (rocky), comets (icy), meteoroids (space rocks) also orbit the Sun. - Gravity keeps planets in orbit. VII. Light, Sound, and Waves - Wave: disturbance transferring energy through a medium. - Types: mechanical (sound, water) and electromagnetic (light, radio, X-rays). - Sound travels fastest in solids, slower in liquids, slowest in gases. - Light travels in straight lines; can reflect, refract, diffract, and disperse. - Visible light spectrum: ROYGBIV (red to violet). VIII. Living Things and Their Environment - Cells are the basic unit of life; can be unicellular or multicellular. - Photosynthesis: plants use sunlight, water, and CO■ to produce food (glucose). - Ecosystems: interaction of living (biotic) and non-living (abiotic) components. - Food chains show energy flow; producers → consumers → decomposers. - Biodiversity ensures ecosystem balance and sustainability. IX. Reproduction and Genetics - Asexual reproduction: one parent, identical offspring (budding, binary fission). - Sexual reproduction: two parents, offspring with genetic variation. - DNA carries genetic information. - Dominant vs. recessive traits determine characteristics. - Gregor Mendel is the father of genetics. X. Climate and Environmental Issues - Climate: long-term weather pattern; affected by latitude, altitude, and proximity to water. - Global warming: increase in Earth's average temperature due to greenhouse gases. - Pollution types: air, water, soil, and noise. - Waste management: reduce, reuse, recycle. - Protecting natural resources promotes environmental sustainability. Review Tips: - Understand key terms and laws. - Practice problem-solving with formulas (e.g., F=ma, momentum, energy). - Review diagrams of atoms, Earth layers, and the solar system. - Study cause-and-effect relationships in natural processes.