



This document presents a summary of the Science curriculum for KG1 to Grade 8 as well as the benchmarks for each of those levels broken down by the four domains: Life Science, Earth Science, Physical Science and Scientific Investigation. We also have the Fundamental Science Principals at the end which apply at every grade level.

We believe that science should emphasis thinking, reasoning, and making connections between the scientific facts and theories and the functioning of the natural world. Mastering content is not the major objective, but rather using the content to explore the natural world and find those “connective threads” which tie everything together is! Humans, plants, animals, the weather, forces and motions, heat, the Earth ....they are all connected and work in unison in this world. These are the ideas we want to students to discover, understand, and embrace at Al-Bayan Bilingual School.

### Summary of the Science Curriculum

<b>KG1</b>	<ul style="list-style-type: none"> <li>• Earth Science in KG 1 looks at the natural materials that comprise our Earth and how these materials can be and are used in our daily lives. Students will explore the characteristics of these materials through their 5 senses, linking their knowledge of what they have learned about the properties and characteristics of objects and materials.</li> <li>• KG 1 Life Science examines the basic life needs and characteristics of all living things. Students examine the 4 main phases of the life cycle, view life cycles of man and mammals, and then compare and contrast the cycles. All organisms use their senses to learn about and function in the world around them, and KG1 students will explore how humans use their senses to gather information about their environment.</li> <li>• Physical Science in KG 1 explores the world of objects, materials from which they are made, and the observable properties of both. Students will enhance their critical thinking skills by sorting and categorizing materials and objects by sets of different criteria, and will extend their knowledge by gathering information about properties of materials and objects by using their 5 senses.</li> </ul>
<b>KG2</b>	<ul style="list-style-type: none"> <li>• In KG 2, students continue to explore the world of living and non-living things but through the lens of weather. They will focus on the role of the Sun in determining weather conditions, and they will examine how weather affects their daily lives and the lives of other living things.</li> <li>• In KG 2, students continue to explore the world of living and non-living things but at a more complex level. Students begin to examine how non-living elements in a habitat or an environment contribute to the existence of living things. Students will begin to</li> </ul>

	<p>communicate their findings based on facts and their own inferences. Lastly, KG 2 students will examine how the natural world is filled with elements and principles of art and design.</p> <ul style="list-style-type: none"> <li>In KG 2, students again look at properties and characteristics of objects and materials as they did in KG 1, but this time through the lens of “natural” and “man-made” and continue the skill of classification based on various criteria. Students will ponder the different uses of various natural and made-made materials and objects in terms of the 3-“Rs” --- reduce, reuse, and recycle – and how various materials and objects benefit or harm our environment.</li> </ul>
<b>Grade 1</b>	<ul style="list-style-type: none"> <li>Earth Science in Grade 1 explores the world of weather and the major factors which influence it: wind, water, and heat. These 3 “major players,” through the actions of the Sun and the water cycle, and the seasonal cycles, generally control life on Earth. Students will also examine cloud formation and the different types of precipitation clouds can release.</li> <li>In Life Science, the focus is on plants. Study starts centered on basic plant structures and functions, then opens up to plant changes and the life cycle determined by seasons, broadens to look at plants’ role as the foundation of all other life on Earth, and lastly on man’s multiple uses and dependence on plants throughout the ages.</li> <li>Physical Science in Grade 1 explores the world of forces and motion. Although the kinds of different forces are limited, the kinds of motions and movements of objects are wide, and students will examine these different kinds of motion and the forces causing them.</li> </ul>
<b>Grade 2</b>	<ul style="list-style-type: none"> <li>Earth Science in Grade 2 delves into the Solar System. Students will look broadly at our Solar System and the planets and other bodies present in outer space. Contrary to the still night sky above us, students will learn that outer space is dynamic and explosive and in perpetual motion, and the planets themselves have very distinctive and extremely different characteristics.</li> <li>Life Science in Grade 2 focuses on the animal world and links the Life Science knowledge with what is learned in Earth Science. Students will examine animal structures in the terms of “form and function” and how specific structures allow organisms to thrive and survive. Students will also examine the place of animals in the food chain, and then discuss and explain ways that animals have been, and are still being, used by humans for their own survival.</li> <li>Physical Science in Grade 2 will explore the 3 different states of matter and the role heat plays in the three different states. Students will experiment with different mediums to create mixtures and solutions and document their findings in a scientific manner.</li> </ul>
<b>Grade 3</b>	<ul style="list-style-type: none"> <li>Earth Science in Grade 3 looks at the role of rocks and soil in an ecosystem. Students will investigate the rock-to-soil cycle, the different soils associated with different land formations, and the types of ecosystems normally found in the different land formations according to the soil composition. Lastly, students will examine how living organisms contribute to the continuation of a soil cycle and this necessity in maintaining balanced ecosystems.</li> <li>Life Science in Grade 3 focuses on ecosystems and the interaction of living (biotic) and non-living (abiotic) things in them. Students will look at the different “groupings” found in ecosystems and examine the role each plays in maintaining a balanced ecosystem. Students will also examine factors, both natural and man-made, which may affect the balance in an ecosystem and then explore the responsibility humans have in respecting and caring for the various ecosystems.</li> <li>Physical Science in Grade 3 looks at energy in the form of light and sound. Students will explore the behaviors of these energy forms and also ways to use and manipulate them. As a link to their study of “ecosystems” in Life Science, students will examine ways that heightened sharpness of animal senses allows them to capitalize on using light or sound to thrive and survive.</li> </ul>

<b>Grade 4</b>	<ul style="list-style-type: none"> <li>• Earth Science in Grade 4 expands on the knowledge of ecosystems learned in Grade 3. Students will deepen and broaden their understanding of the relationship of living and non-living elements in creating and sustaining life by studying global biomes, climate, and weather and the effect weather and climates have on these biomes.</li> <li>• Life Science in Grade 4 looks at the 3 major systems in the human body -- the skeletal, respiratory, and muscular systems-- in terms of major organs in each system and their <i>basic</i> functions in maintaining overall good health. Students will engage in activities which will measure the fitness levels of their own 3 systems, and they will then analyze the results based on the factual information learned in class. Lastly they will propose ways to strengthen their areas of weakness through simple, daily actions or changes in behavior.</li> <li>• Physical Science in Grade 4 examines forces and motions in relation to simple machines. Students will examine and experiment with the some of the 6 different simple machines in terms of making “work” easier. Students will also study the interrelationship of forces and motions as well as factors which help or hinder motion.</li> </ul>
<b>Grade 5</b>	<ul style="list-style-type: none"> <li>• Grade 5 explores the Earth’s four spheres -- the geosphere, hydrosphere, atmosphere, and biosphere -- and their interplay in promoting and sustaining the biodiversity of life. No sphere is fully independent of the others, but they all have specific functions and characteristics not present in the other spheres. Through a balanced interplay of the four spheres, Earth continues to thrive and survive.</li> </ul>
<b>Grade 6</b>	<ul style="list-style-type: none"> <li>• In Earth Science 6<sup>th</sup> grade will explore the universe in the vein of violent energy released by celestial bodies. In addition to studying specifics about the planets, students will investigate the tremendous energies associated with supernovas, solar winds, meteor showers and other occurrences happening in outer space. Students will never look at the evening sky again as a place of peace and tranquility!</li> <li>• Health and wellness, although synonymous, are not identical. Health refers to freedom from diseases, but wellness refers to a balance of the 6 major components of health, which in turn affects the overall physical health. Grade 6 Life Science will look briefly into these 6 major health components and then focus on the body’s reaction to an imbalance in the components.</li> <li>• Students in Grade 6 will expand their knowledge of energy by learning about additional forms of energy, such as electrical energy. The students will explore how different forms of energy transfer and transform and how these properties have helped technology advance.</li> </ul>
<b>Grade 7</b>	<ul style="list-style-type: none"> <li>• Earth Science in Grade 7 builds on the knowledge students learned in Grade 5 about the 4 spheres (hydro-, geo-, atmos-, and biospheres) by taking a step further and examining the interactions which happen between the spheres and the ultimate impact these interactions have on Earth’s ecosystems. Students begin to tie scientific theories and facts together and examine how they apply in various natural or ecological situations and how they can use this knowledge to understand patterns and make predictions about phenomena in Nature.</li> <li>• Life Science in Grade 7 will look at life at the cellular level in both plants and animals, examining the function and structure of cells and genes. Students will continue their examination of structure and function in terms of “form follows function” in the genetically inherited physical characteristics of plants and animals and how all this ties together in evolution and natural selection and survival.</li> <li>• Physical Science in Grade 7 will explore the “invisible reality” of heat and its ramifications in our daily lives, in our greater world, and even in the universe.</li> </ul>

<b>Grade 8</b>	<ul style="list-style-type: none"><li>• Earth Science in Grade 8 examines the two most basic processes that change the surface of the Earth, weathering and erosion, along with natural phenomena which also can play a major role in altering Earth's surface. Using knowledge of forces and motion, students will explore how these principles are evident in the forces of nature, and how scientists can use these principles in making predictions and analyzing data on surface transformations.</li><li>• Life Science in Grade 8 will continue the examination of the body systems which was started in Grade 4. Students will study the cardiovascular, respiratory, digestive, and nervous system structures and their functions, and then study some common disorders of these systems. Students will discuss the impact of lifestyle choices and trends which may contribute to some of these disorders and also general ways they, themselves, and their society, may cut the risk of developing them.</li><li>• In Grade 8 Physical Science, students start exploring the chemical world of matter. Students will learn about mixtures and solutions, elements and compounds, and the physical and chemical changes which take place when different substances are acted upon. Students will use this knowledge to examine different chemical changes which happen in the natural world and in their everyday lives.</li></ul>
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**Al-Bayan Bilingual School Science Curriculum Benchmarks**

Grade	Life Science	Earth Science	Physical Science	Scientific Investigation
<b>KG 1</b>	<p>1.1 Living things have basic needs (food, air, water, shelter)</p> <p>1.2 Living things develop in a predictable cycle</p> <p>1.3 Organisms can be described and sorted by their physical characteristics</p> <p>1.4 Humans have 5 senses which they use to gather information about the world around them</p>	<p>2.1 Earth’s natural materials have properties and characteristics that affect how we use those materials (<i>ex: shelters; tools; clothing; structures</i>)</p> <p>2.2 Earth’s natural materials can be compared and classified based on their properties</p>	<p>3.1 <b>Objects</b> have properties &amp; characteristics (color, shape, texture, size, weight) which are used to describe and sort them through observation and measurement</p> <p>3.2 Different <b>objects</b> are made up of different types of <b>materials</b> and have many different observable <b>properties</b> (<i>ex: color, strength, flexibility, hardness, texture, absorbency</i>) that are best suited for an intended purpose</p> <p>3.3 Things can be done to materials to change some of the properties, but not all materials respond in the same way</p>	<p>4.1 The Scientific Method guides us to develop questions, design and conduct experiments using appropriate technologies, analyze and evaluate results, make predictions, and communicate findings</p> <p>4.2 Always follow established safety procedures during science investigations</p>
<b>KG 2</b>	<p>1.1 Living things develop in predictable cycles (<i>various organisms’ life cycles</i>)</p> <p>1.2 Organisms can be described and sorted by their physical characteristics</p> <p>1.3 Different kinds of environments provide different habitats for living things</p> <p>1.4 Organisms use their 5 senses to gather information about</p>	<p>2.1 The Sun provides heat and light to the Earth</p> <p>2.2 Local weather changes daily and over seasons, and there are patterns in those changes</p> <p>2.3 Weather forecasts help us prepare for and respond to different types of weather</p> <p>2.4 All living things react to weather</p>	<p>3.1 Materials can be compared and classified by their properties</p> <p>3.2 Man-made materials can impact the environment (for better or for worse)</p> <p>3.3 We can reduce pollution by the 3 “R”s: reuse, reduce and recycle.</p>	

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	the world around them and to warn them of danger			
<b>Grade 1</b>	1.1 A plant is a living thing that has physical characteristics to help it survive in its environment 1.2 Changes in the appearance or behavior of plants can be adaptations to seasonal changes as well as different phases of the life cycle 1.3 Plants have been utilized in a multitude of ways throughout history to help humans survive and progress 1.4 All other organisms depend on plant life	2.1 Weather changes are measured by differences in temperature, air pressure, wind, water in the atmosphere, and types of precipitation, and the Sun is the controlling factor of them all 2.2 Weather and the changing seasons impact the environment and organisms	3.1 Some things naturally move the way they do, and some movements can be controlled by visible and invisible forces 3.2 There are factors which influence whether things fall or stand 3.3 Objects can move, and be moved, in a variety of ways that can be described by speed and direction 3.4 The position of an object can be described by locating it relative to another object or background	4.1 The Scientific Method guides us to develop questions, design and conduct experiments using appropriate technologies, analyze and evaluate results, make predictions, and communicate findings. 4.2 Always follow established safety procedures during science investigations. 4.3 We can use tools to observe, analyze, and record scientific data.
<b>Grade 2</b>	1.1 All living organisms have different structures or behaviors that serve different functions to help them survive, grow, and meet their needs 1.2 All living things have a life cycle 1.3 All living things depend on their surroundings and other living things to meet their needs 1.4 Animals have been utilized in a multitude of ways throughout history to help humans survive and progress	2.1 The planets and other astronomic bodies orbit the Sun in predictable patterns that lead to observable paths of objects in the sky and affect our life on earth. 2.2 The universe is in a constant state of dynamic movement	3.1 All matter is made up of particles that are too small to be seen but take up space, have mass, and exist in different states such as solids, liquids, and gases 3.2 Energy is something that is needed to make things happen, and heat is the principal source of energy 3.3 Matter can change from one state to another by adding or removing heat	4.1 The Scientific Method guides us to develop questions, design and conduct experiments using appropriate technologies, analyze and evaluate results, make predictions, and communicate findings 4.2 Always follow established safety procedures during science investigations 4.3 We can use tools to observe, analyze, and record scientific data.

Grade	Life Science	Earth Science	Physical Science	Scientific Investigation
	1.5 The transfer of energy is essential for all living organisms			
<b>Grade 3</b>	1.1 Biodiversity in an ecosystem enhances the quality of life for all organisms within it 1.2 Organisms interact with each other and their environment in various ways that create a flow of energy and cycling of matter in an ecosystem 1.3 Small changes in one part of a system might cause large changes in another part	2.1 Rocks, soils, and sediments are broken into smaller pieces through mechanical weather and moved around through erosion by water, ice, wind, and vegetation 2.2 The components of various soils enable the soil to provide shelter/homes and/or nutrients for different organisms 2.3 Changes to the Earth’s surfaces can happen slowly or quickly, resulting in dramatic consequences to the abiotic elements of an ecosystem	3.1 Energy comes in many forms such as light and sound and can be transferred from place to place in these forms.  3.2 Vibrations move at different speeds in different materials, have different wave lengths, and set up wave-like disturbances that spread away from the source	4.1 The Scientific Method guides us to develop questions, design and conduct experiments using appropriate technologies, analyze and evaluate results, make predictions, and communicate findings 4.2 Always follow established safety procedures during science investigations 4.3 We can use tools to observe, analyze, and record scientific data.
<b>Grade 4</b>	1.1 Body systems are groups of cells that work together to form tissues and organs that are specialized for particular body functions 1.2 All living organisms have distinct structures and body systems that serve specific functions in growth, survival, and reproduction 1.3 Our lifestyle and daily decisions have a positive or negative effect on our bodies.	2.1 Weather changes are measured by differences in temperature, air pressure, wind, water in the atmosphere, and types of precipitation 2.2 Climate is the result of energy transfer among the atmosphere, hydrosphere, geosphere, and biosphere 2.3 A biome is a large, distinctive complex of plant communities, created and maintained by climate	3.1 Different forces can affect the shape, balance, or position of structures and objects 3.2 The force of friction alters the movement of an object and varies by surface 3.3 Objects can move, and be moved, in a variety of ways that can be described by speed and direction 3.4 Simple machines make work easier by trading distance for effort	4.1 The Scientific Method guides us to develop questions, design and conduct experiments using appropriate technologies, analyze and evaluate results, make predictions, and communicate findings 4.2 Always follow established safety procedures during science investigations 4.3 We can use tools to observe, analyze, and record scientific data.

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	1.4 Human activities and technology impact the environment	2.4 Changes in climate can result in changes to the plant communities and drastic reactions to and from other living things.		
<b>Grade 5</b>	<p>1.1 Land forms are created through a combination of constructive and destructive forces and processes, some happening in milliseconds, some happening over millennia.</p> <p>1.2 The interactions between and among the abiotic and biotic elements in the biosphere support sustainability</p> <p>1.3 The Earth system is characterized by numerous overlapping cycles in which matter is recycled over and over again</p> <p>1.4 People are part of the Earth system and they impact and are impacted by its materials and processes.</p> <p>1.5 The interaction between the biosphere and other Earth spheres creates biodiversity which is essential for the existence of life on Earth</p>			<p>4.1 The Scientific Method guides us to develop questions, design and conduct experiments using appropriate technologies, analyze and evaluate results, make predictions, and communicate findings</p> <p>4.2 Always follow established safety procedures during science investigations</p> <p>4.3 We can use tools to observe, analyze, and record scientific data.</p>
<b>Grade 6</b>	<p>1.1 All components of the ‘health wheel’ work together in maintaining overall wellness</p> <p>1.2 Lifelong personal well-being is achieved through responsible actions based on healthy attitudes and behaviors.</p> <p>1.3 Heredity, environment, access to health care and information, family and friends, and lifestyle factors affect an individual’s health</p> <p>1.4 Nutrients and energy needs</p>	<p>2.1 Patterns in the natural and human designed world can be observed</p> <p>2.2 Cause and effect relationships may be used to predict phenomena in natural or designed systems</p> <p>2.3 The universe is a dynamic, rhythmic place characterized by tremendous bursts of violent energy</p>	<p>3.1 Energy comes in many forms such as thermal, solar, sound, mechanical, and electrical and can be transferred from place to place in these forms</p> <p>3.2 Energy can travel in different waves, such as electromagnetic and sound, which have common characteristics as well as unique properties</p> <p>3.3 Energy can transfer or transform but the total amount of energy is</p>	<p>4.1 Scientific investigations usually involve collecting relevant data, using logical reasoning, applying imagination in devising hypotheses and explanations, and using appropriate recording forms to make sense of the collected data</p> <p>4.2 One reason for following directions carefully and keeping accurate records of observations and results is to provide information on what</p>

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	vary in relation to gender, activity levels, and stages of the life cycle		conserved (i.e., that energy is neither created nor destroyed) 3.4 Devices that transform energy are found in various technological equipment	might have caused differences in investigations. 4.3 Because science is a human activity, what is valued in society influences what is valued in science.
<b>Grade 7</b>	1.1 Cells are the smallest units of life that can function independently and perform all necessary functions of life 1.2 Parts of the cell contribute to key cellular functions of obtaining nutrients and water from its environment, disposing of waste, and producing energy 1.3 Organisms reproduce and transmit genetic information to offspring, which influences an individual's traits in the next generation 1.4 All living things have characteristics which are inherited genetically and characteristics that result from direct interaction with their environment	2.1 Within a natural system, the transfer of energy drives the motion and/or cycling of matter 2.2 Small changes in one part of a system might cause large changes in another part	3.1 Energy is associated with the movement of particles and is essential to many processes within the Earth's systems 3.2 Changes in particle motion, temperature, and state of a pure substance occurs when thermal energy is added or removed 3.3 When energy is transferred, the type of matter, the mass, and the change in the average kinetic energy of the particles is measured by the temperature of the sample	4.1 Scientific investigations usually involve collecting relevant data, using logical reasoning, applying imagination in devising hypotheses and explanations, and using appropriate recording forms to make sense of the collected data 4.2 One reason for following directions carefully and keeping accurate records of observations and results is to provide information on what might have caused differences in investigations. 4.3 Because science is a human activity, what is valued in society influences what is valued in science
<b>Grade 8</b>	1.1 Organisms have internal and external structures and systems that support their survival, growth, behavior, and reproduction 1.2 Body systems are groups of	2.1 The Earth's surface has changed over scales that range from microscopic to global in size and operate at times ranging from fractions of a second to billions of	3.1 Physical change can occur in a substance without altering its identity, while a chemical change implies a change in identity 3.2 Mass is conserved during any	4.1 Scientific investigations usually involve collecting relevant data, using logical reasoning, applying imagination in devising hypotheses and

Grade	Life Science	Earth Science	Physical Science	Scientific Investigation
	<p>cells that work together to form tissues and organs that are specialized for particular body functions</p> <p>1.3 Environmental and genetic factors influence the growth of organisms</p> <p>1.4 The lifestyle we choose can have a positive or negative effect on our bodies</p> <p>1.5 Lifestyle trends impact public health</p>	<p>years.</p> <p>2.2 Major geologic events are associated with plate boundaries and attributed to plate motions</p> <p>2.3 Complex interrelationships exist b/w Earth’s structure and natural processes that over time are both constructive and destructive</p> <p>2.4 Energy from the Earth’s interior drives convection with cycles Earth’s crust leading to melting, crystallization, weathering, and deformation of large rock formations, including generation of ocean sea floor ridges, submergence of ocean sea floor at trenches, mountain building and active volcanic chains</p>	<p>change, be it physical or chemical change</p> <p>3.3 Changes in thermal energy always accompany changes in states of matter, even if the temperature does not change</p> <p>3.4 The periodic table is a table organized to reflect the properties of elements and the structure of atoms</p>	<p>explanations, and using appropriate recording forms to make sense of the collected data</p> <p>4.2 One reason for following directions carefully and keeping accurate records of observations and results is to provide information on what might have caused differences in investigations.</p> <p>4.3 Because science is a human activity, what is valued in society influences what is valued in science</p>

**“Fundamental Science Principles” to be applied in all units in all domains**

- 5.1 All human activity draws on natural resources and has both short and long-term consequences, positive as well as negative, for the health of people and the natural environment
- 5.2 A critical interdependence exists among science, technology, and society
- 5.3 The natural world operates chiefly through systems, cycles, patterns, and interactions which are observable and predictable
- 5.4 Cause and effect relationships may be used to predict phenomena in natural and designed systems