

Addlo Montessori Schools

Primary Curriculum – Science

This is an integrated science curriculum. Depending on your choice you may decide to rotate the curriculum in parts for a three-year cycle. I have provided this format because it enables the child to learn in a logical sequence.

The Sciences are Divided into

1. Life Sciences: Botany and Zoology (Biology)
2. Physical Sciences: Physics and Chemistry
3. Earth Sciences: Ecology, Geography, Geology etc.

Lower Primary

Primary 1

Classification

Phase 1	Topic	Lessons	Objectives
1	Organizing into Categories	How the Classroom is organized. How books are organized in a Library. Various games and activities.	To learn the vocabulary: Organize, category, organization, categories To be able to recognize and describe how items are arranged in homes, shops, libraries, classrooms, and other situations in everyday life. To be able to use organization in thinking and memory exercises. To know that different purposes may need different systems of organization. To be able to organize things into logical categories according to different criteria. To continue to develop organizational skills in their everyday lives, thinking, and work.

2	Classification	Living and non-living things Things in nature, Living: plant's and animals Man made objects. Natural things.	To help the child group and discuss the differences between living and non-living things, as well as Natural and Man-made things. To enable the child organise things into categories To give the child a deeper understanding of characteristics and classification of animals
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Life Sciences

3	Living Things	Differences between plants and animals The Animal and the Plant kingdom. The different sources of energy for plants and animals.	To distinguish between Plants and Animals To understand that all living things belong to The Plant or the Animal Kingdom. To be able to state the basic features that distinguish a plant from an animal.
4	Identifying Living Things	Similarities and Differences	To be able to recognize and identify common plants and animals in the community and region, leaves, trees, birds, mammals etc.

Earth Sciences

5	Gravity 1	The Earth's gravity: Horizontal and Vertical	To learn the nomenclature gravity, horizontal and vertical. To understand that thing fall downward because of a state we call gravity. To enable the child, know that all people experience gravity in the same way. To be able to measure and express weight as the pull of gravity of an object. To be able to show how horizontal and vertical angles relate to gravity.
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			Recognise that all objects in space have their own gravity depending on their mass/size
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Physical Sciences

6	Solid, Liquids and Gases	The Identification of Solids, Liquids and Gases How Solids, Liquids and Gases change.	To learn the nomenclature, Liquid, Solid, Gas and States of matter, as well as identify liquids, solids and gases in everyday life. To be able to describe the key features of Solids, Liquids and Gases and recognize them as different states of matter. To enable the child see and describe how water can change into gas, solid and liquid depending on temperature. To see and be able to describe how many things, especially living things are complex combinations of solids, liquids and gases.
7	The Concept of Energy A.	Making Things Go	To understand that things need something additional to move. Things do not move by themselves. To understand that things need heat, electricity, light or movement to go. That they are known as forms of energy. Firewood, batteries or food are not energy but contain energy that is released. To see how light bulbs, motors and engines change one form of energy into another. To understand that energy always comes from another source. To understand that solid, liquid and gas is not energy, they do not change into it, neither is energy itself changed into liquid, solid or gas.
8	Air	Air is a Substance	To demonstrate that liquids and solids, occupy space and have weight.

			<p>To show that air occupies space, To demonstrate that air has weight. To give reasons why air is a real substance. To be able to show why gases (air) are matter and discuss the similar attributes shared with solids and liquids.</p>
9	Matter A	Matter is made up of particles	<p>Solids, Liquids and Gases can be divided further into particles The 3rd attribute of matter is its particulate nature. To see that the distinction between the states of matter comes from the way their particles attract and hold together. To enable the child explain freezing and thawing in terms of particles and their reaction to temperature.</p>
10	Basic Materials	Materials we use to make things: Wood, metal, plastic, glass, rubber and clay/stone.	<p>To learn the following vocabulary: Brittle, Ceramic, Elastic, Fiber, Fabric, Flexible, Metal, Mouldable, Opaque, Plastic, Rubber, Texture, Transparent, Translucent. To be able to identify material from which items or their parts are made. To discuss how to identify various materials. To describe the characteristics of various materials. To discuss why certain materials are used for given functions</p>

Life Sciences

11	Exploring Nature	Observe the cycles of life: Allow the children explore the school garden. What animals live there? Over the years let them study and observe, the birth, growth, death and decay and the cycle of life around us.	To enable the child to observe the cycle of life in the environment.
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12	Collecting Natural Items	Nature Center: Let the children collect items to keep or explore using scientific tools such as the magnifying glass, microscope, measuring tools in the classroom. The animals should be released back to where they were found after studying them. E.g. earthworms, ants, butterflies, spiders, birds etc. This work can be done alone or in small groups.	To enable the child work as a scientist, observing and gathering information about animals in the environment. To give them an opportunity to discuss with other student's work together as a team.
13	Describing the natural items	Allow the children to do presentations on their observations of items of interest that they have in the nature centre or garden.	To enable the child to communicate their scientific findings, this will lead on to their ability of classification.
14	Life Cycles	Life cycles of the hen, the frog, the mosquito, the butterfly, spider, goat. Learn the names of each evolving animal.	To help the child learn how animals grow and learn appropriate vocabulary: Life cycle, Male, Female, Fertilization, Reproduction, Larva, Pupa, Pupae, Metamorphosis, Dormant. To be able to see that living things do not live forever. To help the child see that living things grow from conception through to birth and grow to maturation, age and eventually die. To see that all living things depend on reproducing to exist. To learn that the life cycle occurs from the adults of one generation to the adults of the next generation. To be able to identify the life cycles of several living things, e.g. mammals, hen, frog, butterfly, mosquito, and spider.
15	Species	What is a species? What is a breed, a variety, a race or a subspecies? What does hereditary mean? Hereditary and the Environment.	To learn the proper use of the following words: Species, Genus, Family, Breed, Variety, Race, Subspecies, Variation, Taxonomy, Heredity To understand that the word Species refers to a particular kind of plant, animal, or other kind of organisms. To understand that species usually occur in a general group of similar species called Genus. To be able to describe the term hybrid.

			<p>To recognize the distinction between species and subdivisions of species.</p> <p>To understand that certain features of a living being can be shaped by both the environment and heredity.</p>
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Physical Sciences

16	Sound: Vibrations and Energy	Sound and Vibration and exploration of Musical Instruments	<p>To learn the following vocabulary: Vibrations, Tone, Pitch, Frequency and Amplitude</p> <p>To know how sound and vibrations are related.</p> <p>To be able to describe how we make sound with our voices.</p> <p>To be able to recognise the different sound made by different musical instruments.</p> <p>To demonstrate how pitch depends on frequency of vibrations.</p> <p>To model how sound is transmitted.</p> <p>To describe how the ear picks up vibrations and translates them into hearing.</p>
17	Concepts of Energy 2: Kinetic and Potential Energy	Understanding the interplay between stored and active energy.	<p>To learn the nomenclature: Kinetic, Potential, active and stored energy.</p> <p>To recognize that potential energy can be converted into kinetic energy and vice versa.</p> <p>To recognize that there is no creation of new energy between conversions of kinetic and potential energy.</p> <p>In everyday life experiences there are no versions of matter to energy nor energy to matter.</p> <p>To relate kinetic energy and potential energy to photosynthesis, food and animal activity.</p>

18	Concepts of Energy 3: Differences between Matter and Energy	The Attributes of Matter The Attributes of Energy (Children should be familiar with weighing things.)	To recognize the three states of all common forms of matter (solid, liquid and gas). To recognize and be able to state the attributes common to all forms of energy. To be able to discuss how the attributes of energy are different and distinct from those of matter. To use different examples to tell how energy may affect matter.
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Earth Sciences

19	Day and Night and the Earth's Rotation	Understanding the Earth's rotation Why we have day and night and how it occurs.	To use the globe to explain how the Earth rotates on its axis. To be able to model and explain how our experience of the passage of day and night is due to the Earth's rotation. To enable the child to describe sunrise and sunset in terms of the Earth's rotation. To show that sunrises and sunsets occur at opposite horizons and understand why.
20	Reading and drawing maps	An introduction to map reading and map drawing skills.	To be able to draw maps of the local area they are familiar with To be able to identify and associate the features shown on a map with the actual streets, roads, rivers, lakes, parks etc. they are familiar with. To be able to use a local map in following a route from one place to another.
21	North, South, East and West	Directions	To be able to identify on a globe the North and South Poles as well as the directions north, south, east and west.

			<p>To recognise that maps are pictures looking down on smaller portions of the globe.</p> <p>To know how to identify north, south, east and west at any location using the sun as an indicator.</p> <p>To be able to orient maps according to north, south east and west and follow the map to a given location.</p>
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Life Sciences

22	Food Chains and Adaptations	How animals and plants feed.	<p>Learn the nomenclature: Food chain, adaptation, herbivore, carnivore.</p> <p>To be able to give examples of food chains among species common in their region.</p> <p>Understand what being 'At the top of the food chain' means.</p> <p>To be able to describe what happens to the food available as you go up the food chain.</p> <p>To understand why all food chains must start with plants.</p> <p>To know and understand that the features and behaviours of specific animals are adapted to their environment for their survival.</p> <p>To be able to identify the features that adapt herbivores and carnivores to their particular ways of obtaining food.</p> <p>To be able to describe the adaptations of different sorts of plants.</p>
23	How Animals Move 1: The Skeleton and Muscle	The Human Skeleton Muscles move the skeleton	<p>To know the relationship between bones and joints.</p> <p>To demonstrate how pulling the forearm towards the shoulder is achieved by the biceps muscles pulling between the elbow and upper arm.</p> <p>To demonstrate how pushing the forearm away from the shoulder is done by the triceps muscles pulling between the elbow and upper arm.</p>

			<p>To recognize that back and forth movements in the body are performed by paired muscles pulling in opposite sides of the joint.</p> <p>To know that in general muscles can only contract and relax, they cannot push.</p> <p>To state that animal meat apart from organs is muscle.</p>
24	Basic Plant Structure	<p>Parts of a plant roots, stems and leaves</p> <p>Functions of roots, stems and leaves.</p> <p>The reproductive structures of plants.</p>	<p>To learn the following nomenclature: roots, stems, leaves, photosynthesis, reproductive structures, pollination, spores, spore capsules, modifications.</p> <p>To be able to identify roots, stems and leaves on any given plant.</p> <p>To know that all plants, except for a few, have a basic structure made of roots, stems and leaves.</p> <p>To be able to describe the basic functions of roots, stems and leaves.</p> <p>To recognize and be able to describe how flowers, or cones and spore capsules on non-flowering plants are reproductive structures.</p> <p>To be able to point out the male and female parts of a typical flower.</p> <p>To understand the basic story of pollination, fertilization and development of fruits and seeds that occur in flowering plants.</p> <p>To be able to recognize and give examples that illustrate the various forms or modifications of roots, stems and leaves.</p>