



Estd. 1996 - and counting...

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“Exploring the Mysteries of Minerals in Waldorf Education”

Rudolf Steiner emphasised the significance of the age of twelve (pre-teens) in a child's development and the significance of the age-appropriate Waldorf curriculum. It's a time when children undergo noticeable changes. Just before and around the onset of puberty, they tend to lose some of their graceful movements and start becoming somewhat awkward in how they use their bodies, their behaviour, and even their facial expressions. Their growing limbs may outgrow their clothing, making them seem a bit clumsy. In essence, during this phase of life, a child's physical growth, particularly their skeletal development, takes centre stage.

In addition to these physical transformations, something remarkable happens within the child. They begin to develop a more independent perspective on their surroundings, and their judgments of parents and teachers become more discerning and critical. This shift marks a crucial juncture in a child's educational journey within the Waldorf curriculum.

This is the age when a child should be introduced to the basics of physics and delve into abstract arithmetic through algebra for the first time. It's also during this phase, when a child is significantly influenced by their own physical development, that they can gain a deeper understanding of the Earth's geological structure.

In a Waldorf School, the study of nature begins in the fourth grade with a focus on "**Man and Animal**," and continues in the fifth grade with a study of **botany**. Over these two years, the natural science curriculum consistently centres around the relationship between humans and their natural environment. The curriculum gradually brings students closer to an understanding of the **Earth**, culminating in the sixth grade with the exploration of **geology and mineralogy**. This progressive approach to science education ensures that students build a strong foundation before delving into the intricacies of the Earth's structure.

Rudolf Steiner emphasised a comprehensive approach to the study and understanding of nature, including a specific focus on **minerals**. Following his insightful guidance, our educational journey begins with **geography**, and in close connection with geographical studies, students learn to distinguish between different types of mountain formations, such as primitive granite ranges and limestone ranges.

For a school situated in Hyderabad, it makes perfect sense to initiate this exploration with a study of the geological formation of the Deccan Plateau. These solid granite layers serve as the bedrock upon which this city is built, where we see spectacular rocks around our city. It's even tempting to think that the vitality and energy of the city's inhabitants are somehow linked to these layers of rock, as they provide the essential stability for urban life to flourish. Typically, the Deccan Plateau is made up of basalt, an extrusive igneous rock. Also, in certain sections of the region we can find granite, which is an intrusive igneous rock. It is of great importance for children to not just learn but truly understand the origin of rocks such as igneous and granite, which dates back to the earliest stages of our Earth's development, rendering it the most enduring and robust of all stone formations. Granite, in its ancient past, existed as a vast, molten mass of fiery substance that gradually cooled over vast spans of time while other rocks formed layers atop it. Over the course of eons, these upper

layers were eroded by the forces of water and glaciers, eventually revealing granite as the core material beneath the towering peaks of mountains.

When teaching about these slow and majestic transformations, the teacher aims to instil a sense of reverence for what could be considered the "oldest altar of the world's creation." These words, attributed to the great poet Goethe, can evoke a profound sense of wonder in the children's minds.

To further enhance their understanding, children engage in drawing and painting exercises that depict the various stages of the Earth's development. These activities not only provide joy but also a sense of discovery. Additionally, poetry is often used as a tool to kindle within the children a deep appreciation for the Earth's marvels and its hidden, intrinsic beauty.

“From placid mountain brow, so solemn, old,
the mysteries of days long fled unfold.
There in time’s far-distant dawning morn
the word of worlds in trinity was born.
Its first faint echo, rising from this hour,
bespeaks primeval harmony of power
and strives in white of quartz and dark-hued gneiss
and golden mica like rosin bound in ice
to spread forth pure the altar-table here,
presented long ago to that first year.”

In contrast to the granite mountains formed by fiery eruptions, limestone ranges were shaped by the erosive forces of water. Children, without the need for complex theories, can intuitively grasp the concept of fire and water as the fundamental primordial forces responsible for shaping our Earth's surface. Children are led to appreciate the idea of these creative and divine forces at work.

At this point, it's ideal to include a sketch or diagram of a volcano. This visual aid allows children to draw and understand the layers of the Earth's surface, descending from sandstone, limestone, coal, devon, gneiss, to granite, and ultimately to the fiery magma, the Earth's original foundation.

Our subject matter is categorised into four main parts: rocks, minerals, metals, and gems. Rocks encompass various minerals, and these minerals, in turn, consist of numerous chemical substances, often including metals. Under specific conditions, minerals and metals can reach a higher level of development through crystallization. Crystals and gems represent the rarest and most refined forms of the solid element. Consequently, we guide the children from the study of rocks and minerals toward understanding metals and crystals, emphasising that within these minerals, the Earth's architectural design becomes more intricate and refined compared to the raw forms found in rocks and minerals.

In our quest to progress from the general to the specific and from the original to the derivative, we introduce quartz as the primeval manifestation of all mineral substances.

Metals represent purified ores, and the logical starting point for our exploration is gold, as it serves as the archetype of all metals. When teaching about gold, it is essential to connect it to the significant role it has played in legends, fairy tales, and myths originating from what we refer to as the Golden Age of humanity. By delving into the unique qualities of gold, such as its malleability, flexibility,

insolubility, and its perpetual lustre, we provide a comprehensive understanding of this precious metal. For instance, gold can be hammered into an astonishingly thin sheet, as fine as 1/250,000 of an inch. Even a minuscule piece of gold can be stretched into a wire that is 500 feet long, showcasing its high malleability. Remarkably, gold never loses its colour and brilliance; it remains untarnished over time.

In our teaching, we always seek connections that bridge the human being with the natural world. When discussing these five exceptional qualities of gold that make it the "king" among metals, we draw parallels to the five most important qualities required for anyone aspiring to become a special "king" – someone who can effectively guide themselves. These qualities relate to the guidance of thoughts, strengthening of willpower, emotional composure, sound judgment, and impartiality toward life.

During the Middle Ages, there were individuals who pursued gold in this symbolic manner – they were the true students of higher learning. They did not aim to "create gold" in the literal sense but to develop these five "golden" abilities in their quest for higher knowledge. This underlying significance of gold permeates all fairy tales and legends. While these specific connections are not explicitly shared with the children, they live as inner convictions and sources of inspiration within the teacher's mind.

Following our exploration of gold, the study of silver, copper, and iron becomes more accessible. Historically, gold was the first metal to be discovered, followed by silver and copper. Iron, on the other hand, did not come into significant use until around the first millennium B.C., marking it as the true Roman metal. Lead, a later discovery (around 500 B.C.), is also briefly discussed. To conclude our study of metals, we may touch upon one of the more recent discoveries, such as radium, in connection with the fascinating and mysterious X-rays.

Finally, we delve into crystals and gems. Here, we encounter the most magnificent artistic creations within the realm of minerals. Crystals and gems share the same elemental components as rocks and minerals, but they elevate the art of earthly construction to its highest level of perfection. Crystals exhibit incredible geometric forms, frozen into stone according to an eternal law of the universe. The ancient Greeks proclaimed that "God is a geometrician," and crystals and gems indeed appear as products of this divine geometry. When we gaze upon precious stones, it's as though the splendour of the stars has descended to Earth itself.

Many of us are familiar with the snowflake, the simplest form of crystal. The shape of an ice crystal is a hexagonal prism, and our word "crystal" is derived from the Greek word "kristallos," which means ice. We begin with the crystals of the quartz family, including rock crystal, amethyst, and rose quartz. From there, we explore garnets, the corundum family (which encompasses sapphires, rubies, emeralds, and topaz), and finally, we arrive at the diamond – the true archetype of all crystals and gems.

The diamond stands as the mightiest among minerals. What sets the diamond apart is its unique composition, consisting of just one chemical substance. When pure carbon, or graphite, undergoes crystallization in the form of an octahedron, a profound transformation occurs – from the darkest and most opaque substance to the purest and most transparent one: the diamond. The diamond can serve as a symbol of the ability to discern between good and evil.

As we conclude our study of mineralogy, it is fitting to cultivate moral and idealistic reflections on this remarkable phenomenon. In diamonds, we can perceive the pristine brilliance of sunlight, as if in them, the entire Earth has begun to pivot toward a future where darkness will be vanquished by the power of light.