

# Family Connection

SEPTEMBER 2022

“Children display a universal love of mathematics,  
which is par excellence the science of precision, order, and intelligence.”

—Maria Montessori

## The Mathematical Mind of the Child

by Cynthia Brunold-Conesa



Montessori described the child as endowed with an absorbent mind. “From birth through approximately age 6, the young child experiences a period of intense mental activity that allows her to ‘absorb’ learning from her environment quickly and easily without conscious effort.” While all the human tendencies are relevant here, we examine three—order, concentration-repetition, exactness-precision—in order to understand how, through working with the sensorial materials, the child absorbs and assimilates information as it directly and indirectly relates to mathematics.

### ORDER

According to Montessori, humans have a tendency to recognize and appreciate order and organization in the various aspects of their existence, and this begins at birth. Children in the first plane explore a range of sensorial materials that essentially present the question, what things are alike and what things are different? The child investigates shapes and their corresponding insets; matches pictures and objects; explores dimensions in length, width, and height; grades objects by size and color; and identifies patterns—all basic principles of mathematics, absorbed by the child through their work with the materials. Because this work appeals to the child’s innate sense of order, the exercises are carried out with concentration and repetition.

Continued on next page

## CONCENTRATION AND REPETITION

This tendency, which guides us toward achieving a goal, is exemplified by the child's use of the Knobbed Cylinders (although other materials could also serve as examples here). The material allows the child to practice one-to-one correspondence as they fit each cylinder into its matching socket. Four different sets provide varying dimensions of height and width, and as the child works through these, they incorporate concepts of dimensionality that they will use later in volume work. With trial and error driving their first efforts, the child repeats and persists in this task until, eventually, visual discrimination takes over and the exercise takes less and less time. Concentration allows the child to repeat the exercise until it is brought to successful completion; this sequence has been inspired by the tendency toward exactness, or precision.

## EXACTNESS-PRECISION

The child's tendency toward exactness, or precision, is connected to their sense of accomplishment upon successfully completing a task. It "both inspires the activity and provides objective criteria for judging accomplishment" (Sackett 2013). The materials themselves provide feedback to the child through the control of error. If the child is not successful at replacing each of the pieces, the empty sockets and leftover cylinders will motivate them to try again, to do better, to be more precise. This trait usually manifests itself as logical, systematic thinking in the Elementary-age child. It should be noted that this tendency might not

be evident in a child who is not developmentally ready for a given exercise, or who is easily frustrated for any number of possible reasons. Also, levels of attention will impact to what degree a child exhibits a sense of order and concentration.

Up to now, it may appear as if the young child, while working with the sensorial materials, is not actually doing math; however, during their manipulations, the child recognizes quantities, sequences, and patterns, and the mathematical mind has thus been engaged.

When the groundwork for basic mathematical principles has been laid, the child is introduced to the early materials for counting—the number rods and spindle boxes—and on to the Golden Bead material once they count and understand quantities up to ten. With the Golden Beads, the child is given a visual representation of quantities from 1 to 9,999, practices symbol-quantity association, and eventually uses the material to perform the four operations.

They will continue in the Early Childhood and Elementary classrooms with a range of materials for solving problems requiring regrouping and exchanging. Rounding out the math curriculum is work in fractions and decimals, measurement, geometry, and algebra.

Excerpted from *The Mathematical Mind in the First Plane of Development: Montessori's Human Tendencies and Self-Constriction* which can be read in full at the Montessori Life blog.

Register for our family course!

## You and Your Child's Montessori Education: Early Childhood

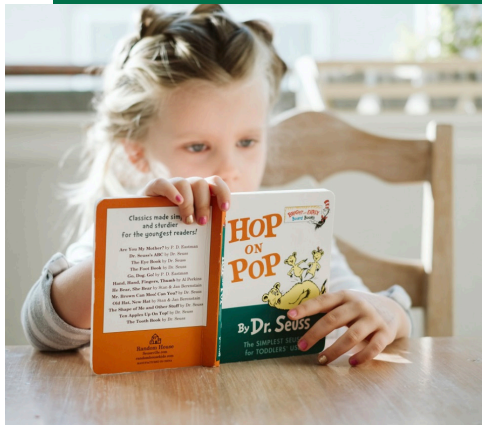
A course designed for families of students enrolled at an AMS member school.

LEARN MORE AT:  
[amshq.org/familycourse](https://amshq.org/familycourse)



AMERICAN MONTESSORI SOCIETY®  
education that transforms lives





## 5 Easy Ways to Cultivate a Language-Rich Environment in Your Home

by Heather White

- 1 Read with your child every day.**  
There are tremendous benefits for reading aloud to children—even those who are already fluent readers.
- 2 Tell true stories with a beginning, middle, and ending every day.**  
You can explain what happened on your commute to work or tell them about the deer you saw in the woods. Share lots of details.
- 3 Listen intently to your child's stories and ask questions when they are finished to help them share details.**
- 4 Include your child in family discussions.**  
Let them hear the back and forth nature of the conversation and, if they are old enough to engage verbally, ask them to share their thoughts and opinions on the topic.
- 5 Include your child in social situations.**  
Allow them to watch how you engage with others on the phone or in the neighborhood and invite them to join the conversation.

Excerpted from *10 Easy Ways to Cultivate a Language Rich Environment in Your Home* which can be read in full at the [Montessori Life blog](#).

## Elementary Students as Scientists

Adapted from original text by Zoe Rising and Letty Rising



Science is the study of the world around us, and a scientist's job is to ask questions about the world and then experiment to find the answers. There is not a more natural scientist than the Elementary child, whose reasoning mind is eager to ask questions, investigate, and discuss and compare findings with their peers. It will also shape their sense of place in the world, their understanding of interdependencies, and their ability to reason through difficult situations and make ethical decisions when solving problems.

*Continued on next page*



The Montessori classroom offers a prepared environment for students not only to watch scientific demonstrations but also to experiment independently and in collaboration with their peers.

Montessori classrooms offer numerous opportunities to practice the essential skills of executive functioning—planning, self-monitoring, self-control, time management, organization, and more—and there’s no better place to observe this in action than when a child is engaged in scientific experimentation.

**Students are:**

- › **Making plans** (What experiment should I do? What will I need in order to perform this experiment?)
- › **Practicing self-control** (developing precision when measuring substances and mixtures)
- › **Developing organizational skills** (retrieving materials needed for the experiment from various parts of the room, returning the materials, following the command cards step-by-step)

Critical thinking and problem-solving require children to analyze facts, conceptualize abstract concepts, determine cause and effect, and put skills together.

While the younger Elementary child will typically be exploring the nomenclature material as well as completing short reports and experiments connected to lessons, the older

Elementary child is ready for some deeper investigations. The short reports of the Elementary 1 years transform into lengthier reports on specific topics. While the younger Elementary child is accustomed to selecting a topic, researching information, and writing a short report, the writing of the older Elementary child involves citing sources, outlining and preparation work, and creating drafts, revisions, and a final draft. When one thinks of science, writing doesn’t immediately come to mind, but

learning how to write technical pieces is an important area of writing fluency that can be developed when delving into science topics.

The benefits of encouraging scientific thinking and experimenting from a young age range from helping children understand complex topics to supporting the development of higher thinking, executive functioning, and problem-solving skills. And hopefully, today’s scientific thinkers will become tomorrow’s leaders and problem solvers.

Excerpted from *How to Encourage Scientific Thinking and Exploration in the Second Plane* (From the Spring 2022 issue of Montessori Life magazine).



**Read more at [MontessoriLife.org](https://www.MontessoriLife.org)  
the official blog of the American Montessori Society**

