

Core Curriculum Continuum: From Toddler to Upper Elementary

The following is a brief overview of our core curriculum continuum in the areas of language arts, mathematics, social studies, science, sensory training, and practical life. Since our students progress at their own pace, it is not possible to divide up our curriculum by grade levels. Don't be concerned if your child does not bring home much "product" from school. The Montessori classroom is intensively "process" oriented. Your child may discover things through experience before the teacher applies a name to the discovery. For example, he might tell you he was "playing with beads all day" and have no conscious awareness that the activity is something we adults call "addition".

Reading and Language Arts

Pre-Reading:

Our youngest students are constantly exposed to the older children in the class who are already reading. The total environment of our Pre-Primary classes tends to create and reinforce in our young children a spontaneous interest in learning how to read. We begin teaching reading as soon as that interest is first expressed.

1. Using a total immersion approach, we help our youngest children to develop a highly sophisticated vocabulary and command of the language.
2. Our children are taught through many early approaches to listen for and recognize the individual phonetic sounds in words.
3. We introduce our children to literature by reading aloud and discussing a wide range of stories and poetry.
4. We help our Pre-Primary children recognize the shape and phonetic sounds of the alphabet through the sandpaper letters: a tactile sandpaper alphabet.
5. Naming: Everything in this world has a name and that name is built with sounds. A large portion of Pre-Reading is naming.
6. Art is also a pre-reading activity. It is the telling of a story through pictures before the use of writing words develops.
7. Alphabets made up of easily manipulated plastic letters are used for the early stages of phonetic word creation and spelling:
 - a. For the analysis of words
 - b. To facilitate early reading and writing tasks during the period when young children are not yet comfortable with their own writing skills

Writing:

Control of the hand in preparation for writing is developed through many exercises, including specially designed tasks in the use of the pencil. Such exercises begin with very young children and extend over several years so that mastery is gradually, but thoroughly, attained.

Our children practice making letters from the time of their first initial "explosion into writing" at age 3 or 4:

- a. At first, by tracing sandpaper letters and tracing letters into a sand tray
- b. Later, by writing on blackboards that are unlined, wide-lined, and narrow-lined
- c. On paper: unlined, wide-lined, and narrow-lined
- d. Cursive: (Typically around age 7)
- e. Word processing on our elementary classroom computers

Composition:

1. Even before the children are comfortable in their handwriting skills, they spell words, compose sentences and stories, and work on punctuation and capitalization with the moveable alphabets (age 4-6).
2. Once handwriting is nearly mastered, composition skills are acquired by several means. These include preparing written answers to simple questions, written descriptions of science experiments, letter and report writing, and creating written stories that follow a sequence of pictures. These skills begin to develop as soon as the young child begins to read and write, and continue over the years with increasing complexity.
3. By about age 9, research skills and report preparation are a major component of the entire educational program at AMS. The students research areas of interest or assignment in depth, and prepare both formal and informal, written and oral reports.
4. Writing skill development continues in both the expository and creative domains. Typically, elementary students write every day, composing short stories, poems, plays, reports, and news articles.

Spelling:

Children begin to spell using the moveable alphabet to sound out and spell words as they are first learning to read. They often spell exactly as the word sounds to them. This is called "invented spelling" and allows children to come back at a later time and read what they have written. Studies have shown that there is seldom any difficulty experienced by children when changing to conventional spelling. The sequence of spelling, as with all language skills, begins much earlier than is traditional in this country, during a time when children are spontaneously interested in language. It continues throughout their education.

1. Learning to sound out and spell simple phonetic words.
2. Learning to recognize and spell words involving phonograms: "sh", "ai", etc.
3. Developing a first "personal" dictionary of words that they can now spell.
4. Learning to recognize and spell the "puzzle words" of English: the many words that are non-phonetic and are not spelled as they sound.
5. Studying words: involving compound words, contractions, singular-plural, masculine-feminine words, prefixes, suffixes, synonyms, antonyms, homonyms. Spelling lists are given every week in the lower and upper elementary classes.

Reading:

1. The development of the concept that written words are actual thoughts set down on paper. (This takes children much longer than most people realize.)
2. Sounding out simple three or four letter phonetic words, (around age 5).
3. Early exercises to practice reading and to understand the concept of a noun: labeling objects with written name tags, mastering increasingly complex words naming things that interest them, such as dinosaurs, the parts of a flower, geometric shapes, the materials in the classroom, etc.
4. Learning to recognize verbs: normally exercises in which the child reads a card with a verbal "command" printed out (such as run, sit, walk, etc.) and demonstrates his/her understanding by acting it out. As the child's reading vocabulary increases, verbal commands involve full sentences and multiple steps: "Place the mat on the table and bring back a red pencil."
5. Reading specially selected or prepared small books on topics of interest to the child, such as science, geography, nature, or history.

6. Interpretive reading for comprehension at ever increasing levels of difficulty, beginning in the early elementary grades.
7. Use of reference books on a daily basis for both research and pleasure.

Grammar:

The study of grammar begins almost immediately after the child begins to read, during the sensitive period when he/she is spontaneously interested in language. It continues over several years until mastered. The idea is to introduce grammar to the young child as he/she is first learning to put thoughts on paper, rather than waiting until the late elementary and junior high school years.

1. We introduce our children to the parts of speech one at a time through many games and exercises that isolate the one element under study. Montessori has assigned an international geometric symbol to each element of grammar. (For example, verbs are represented by a large red circle.) The children analyze sentences by placing the symbols for the appropriate part of speech over each word.
2. Once students have mastered the concrete symbols for the parts of speech, they perform more advanced exercises for several years with grammar boxes set up to allow them to analyze sentences by their parts of speech.
3. Sentence analysis: simple and compound sentences, clauses, verb voices, and logical analysis of sentences are studied using many different concrete materials and exercises. (This begins with the fairly young child, normally about age 5 – 6, and continues over several years into the lower elementary.)
4. Students continue the study of language from the mid-elementary years onward, reviewing and exploring new concepts and skills:
5. tenses, moods, irregular verbs, person and number, and the study of style.

Mathematics

Numeration and Operations:

1. The first introduction to numeration (typically at age 3): numbers zero to ten, numbers shown as length (red and blue rods), sandpaper numerals, association of number rods and numerals, spindle boxes, cards and counters (learning numbers 0-10 as quantities), counting, sight recognition, concept of odd and even.
2. Introduction to the decimal system (typically age 3 or 4): presentation of the decimal system (units, tens, hundreds, thousands) through specially prepared materials that represent the decimal hierarchy in concrete three dimensional form: units = single beads, tens = a bar of 10 units, hundreds = 10 ten bars fastened together into a square, thousands = a cube of ten units times ten. The children learn to first recognize the quantities, then to form numbers with the bead or cube materials through 9,999 and to read them back, to read and write numerals up to 9,999, and to exchange equivalent quantities of units for tens, tens for hundreds, etc.
3. Linear Counting: learning the number facts to ten (what numbers make ten, basic addition up to ten); learning the teens ($11 = \text{one ten} + \text{one unit}$), counting by tens ($34 = \text{three tens} + \text{four units}$) to one hundred.
4. Development of the concept of the four basic mathematical operations: addition, multiplication, subtraction, and division through work with the Golden Bead Material. The child builds numbers with the Golden Bead Material and performs mathematical operations in three dimensions. (This process normally begins by age 4 and extends over the next two or three years.) Long term work with this material is critical to the full understanding of abstract mathematics. This process tends to develop in the child a much deeper understanding of mathematics.
5. Development of the concept of "dynamic" addition and subtraction through the manipulation of the math materials, (i.e. carrying and borrowing).
6. Memorization of the basic math facts: adding and subtracting numbers under 10 without the aid of the manipulatives (typically begins at age 5).
7. Development of further abstract understanding of addition, multiplication, subtraction, and division with large numbers through the Stamp Game: a manipulative system that represents the decimal system as color-keyed "stamps," and the Small and Large Bead Frames, which are color-coded abacuses.
8. Skip counting with the chains of the squares of the numbers from zero to ten: i.e., counting to 25 by 5's, to 36 by 6's, etc. (usually by age 6). Developing first understanding of the concept of a "square" of a number.

9. Skip counting with the chains of the cubes of the numbers zero to ten: i.e., counting to 1,000 by ones, tens, or hundreds. Developing the first understanding of the concept of a "cube" of a number.
10. Moving on to what we call "brain math", paper and pencil addition and subtraction problems.
11. Development of the concept of short multiplication and division through concrete work with the bead and cube materials. (The child is typically 6 or younger, and cannot yet do such problems on paper without the manipulative materials. The objective is to develop the concept first.)
12. Development of a more abstract understanding of "short" multiplication through more advanced manipulative materials (Multiplication Board and Multiplication with Bead Bars); movement to paper and pencil problems, and memorization of the basic multiplication tables.
13. Development of more abstract understanding of "short" division through more advanced manipulative materials (Division Board); movement to paper and pencil problems, and memorization of basic division facts.
14. Development of yet more abstract understanding of "long" multiplication through highly advanced and manipulative materials (Multiplication Checkerboard and Test Tube Division materials).
15. Problems involving parentheses: i.e., $(3 \times 4) - (2 + 9) = ?$.
16. Missing sign problems: i.e., in a given situation, should you divide, add...?
17. Introduction to problems involving tens of thousands, hundreds of thousands, and millions.
18. Study of fractions: normally begins when children using the short division materials find that they have a "remainder" of one and ask whether or not the single unit can be divided further.
19. Study of decimal fractions: all four mathematical operations.
20. Practical application problems, which are used to some extent from the beginning, become far more important around age 7-8 and afterward. Solving word problems, and determining arithmetic procedures in real situations becomes a major focus.
21. Money: units, history, equivalent sums, units and exchange.
22. Interest: concrete to abstract; real life problems involving credit cards and loans; principal, rate, time.
23. Computing the squares and cubes of numbers: cubes and squares of bi- and trinomials.
24. Calculating square and cube roots: from concrete to abstract.

25. The history of Mathematics and its applications in science, engineering, technology and everyday life.
26. Reinforcing the application of all mathematical skills to practical problems around the school and in everyday life.
27. Basic data gathering, graph reading and preparation, and statistical analysis.

Geometry:

1. Sensorial exploration of plane and solid figures at the Pre-Primary level of the school: the children learn to recognize the names and basic shapes of plane and solid geometry through manipulation of special wooden geometric insets. They then learn to order them by size or degree.
 - a. Stage I: The basic geometric shapes (age 3).
 - b. Stage II: More advanced plane geometric shapes-triangles, polygons, various rectangles and irregular forms (age 3-5).
 - c. Stage III: Introduction to solid geometric forms and their relationship to plane geometric shapes (age 3-5).
2. Study of the basic properties and definitions of the geometric shapes. This is as much a reading exercise as mathematics since the definitions are part of the early language materials.
3. Advanced study of the nomenclature, characteristics, measurement and drawing of the geometric shapes and concepts such as point, line, angle, surface, solid, properties of triangles, circles, etc.
4. Congruence, similarity, equality, and equivalence.
5. The history of applications of geometry.
6. The theorem of Pythagorus.
6. The calculation of area and volume.

Geography

Physical Geography:

1. Puzzle Maps (age 3-7): children work with specially made maps in the forms of intricate, color-coded, wooden jigsaw puzzles representing the continents, the countries of each continent, and the states of the U.S. They are presented to the children at an early age, and are at first enjoyed simply as challenging puzzles. Soon, however, the children begin to learn the names of given countries, and by age 6 are normally very familiar with the continents of the globe, the nations of North America, South America, and Europe, along with most of the states of the U.S. As soon as the children can read they begin to lay the puzzle pieces out and place the appropriate name labels to each as a reading and geography exercise.
2. The primary globes (age 3-5): these are specially prepared globes for the very young child that isolate single concepts of globe study identifying land and water, and recognizing the continents matching those on the puzzle maps.
3. Land & Water Formations: these materials are designed to help the very young child understand basic land and water formations such as island, isthmus, peninsula, strait, lake, cape, bay, archipelago, etc. At first, they are represented by 3-dimensional models of each, complete with water. Then the children learn to recognize the shapes on maps, and learn about famous examples of each.
4. Transference to maps: introduction to various forms of maps, along with early study of the flora, fauna, landscapes, and people of the continents.
5. The Earth and its parts: history, interior and exterior, oceans, atmosphere.
6. The study of coasts and land reliefs: hills, mountain ranges, volcanoes, valleys, plains, etc.; their formation, animal life, and effect on humanity.
7. The study of the hydrosphere: ocean, rivers, lakes, and the water cycle.

Cultural Geography:

1. Countries are studied in many ways at AMS, beginning around age 3. A number of festivals are held every year to focus on specific cultures and to celebrate life together: an example is Chinese New Year, when classes study China, prepare Chinese food, and learn Chinese dances. Anything that the children find interesting is used to help them become familiar with the countries of the world: flags, food, climate, costumes, cities, airlines, stamps, coins, shelter, music, history, etc.
2. The detailed study of one nation. All aspects of the nation are considered:

geography, rivers, cities, climate, people, food, religions, etc. Focus moves over the years from one nation to another, led by the children's interest.

3. Advanced study of the forms of government and national regions of the world.

Economic Geography:

1. Natural resources of the Earth.
2. Production: How Humankind uses natural resources.
3. Imports and Exports: The interdependence of nations.

History and The Needs of Humankind

1. The basic human needs are food, shelter, clothing, defense, transportation, culture, law, religion or spiritual enlightenment, love, and adornment.
2. The concept of time and historical time is developed through many activities and repeated at deeper complexity from age 5:
 - a. Family trees
 - b. Personal life time-lines
 - c. Time-lines showing the activities of a day, week, month, year
 - d. Historical time-line of the Earth's history
 - e. Time-line from 8,000 BC to 2,000 AD to study ancient to modern history.
3. The story of the development of the planet and its lifeforms over the eons is first studied at about age 6, along with an overview of human history. This is repeated throughout the curriculum in increasing depth of study.
4. Each year the child continues to study and analyze the needs, culture, technology, and social history of various periods in history. The trends of human achievement are charted, such as the development of transportation, architecture, great inventions, and great leaders.

Science

1. Differentiation between living and non-living things.
2. Differentiation between animals and plants; basic characteristics.
3. First puzzles representing the biological parts of flowers, root systems, leaves, and trees, along with the anatomical features of common animals. These are first used by very young children as puzzles, then as a means to learn the vocabulary, then are related to photos and/or the "real things," then traced onto paper, and finally with labels as a reading exercise.
4. Matching Cards:

Botany: identifying, naming, and labeling the parts of plants, trees, leaves, roots, and flowers.

Zoology: identifying, naming, and labeling the external parts of human beings, insects, fish, birds, and other animals.
5. Introduction of the families of the animal kingdom, and identification and classification of animals as mammals, birds, reptiles, amphibians, fish or insects. Introduction to the basic characteristics, lifestyles, habitats, and means of caring for young of each family in the animal kingdom.
6. Introduction to ecology: habit, food chain, adaptation to environment and climate, predator/prey relationships, camouflage, and other body adaptations of common animals.
7. Advanced Biology Cards: Names and functions of different forms of leaves, flowers, seeds, trees, plants, and animals. This usually begins with considering fieldwork, collecting specimens or observing.
8. Study of the development of life on the Earth over the eons.
9. Study of the internal parts of vertebrates: limbs, body coverings, lungs, heart, skeleton, and reproduction.
10. Advanced study of plants in class, greenhouse, and garden: experimenting with soil, nutrients, light, etc.
11. More advanced study of the animal kingdom; classification.
12. The plant kingdom: the major families of the plant life on the Earth.
13. Life cycles; water, oxygen/carbon-dioxide, nitrogen.
14. Introduction to chemistry: begins at age 6 and continues through upper elementary.
 - a. The three states of matter
 - b. Basic atomic theory
 - c. Elements and compounds
 - d. Basic molecular theory: Building atomic models

- e. Physical change and chemical change
 - f. Research into each element and the study of the periodic table
15. Animal behavior: detailed observation (age 9 and up)
 16. Anatomy: systems of the animal and human bodies (age 9 and up)
 17. Health and nutrition (age nine and up).
 18. Ecology: advanced study of the interrelationships of life forms (ages 9 and up)
 19. Development of skills in careful observation, recording and describing, and use of increasingly sophisticated techniques of measurement.
 20. Development of skills using common scientific apparatus: microscopes, telescopes, hand lens, collecting field specimens, dissecting, and preparing displays.
 21. Development of field science skills: tracking, listening, observing.
 22. Development of the scientific inquiry skills: forming hypotheses, designing experiments, and recording results.
 23. Study of the great inventions; machines and technology and their effects on society throughout history.
 24. Study of the great scientists.
 25. Introduction to the physical sciences:
 - a. Geology and mineralogy
 - b. Meteorology
 - c. Astronomy and cosmology
 - d. Elements, physics: light, electricity, magnetic fields, gravity, mass
 26. Preparing and analyzing various of graphs and data displays; basic statistics.

Practical Life — Everyday Living

One of the first goals of the school is to develop in the very young child a strong and realistic sense of independence and self-reliance. Along with love and a stable environment, this is the child's greatest need. This area of the curriculum focuses on development skills that allow the child to effectively control and deal with the social and physical environment in which he or she lives. There is a growing sense of pride in being able to "do it for myself." Practical life begins as soon as the young child enters the school and continues throughout the curriculum to increasingly advanced tasks appropriate to the oldest students.

Early Tasks (Age 15 months—4 years)

- Dressing
- Pouring liquids without spilling
- Carrying objects without dropping
- Carrying liquids in pitchers, pails, and glasses without spilling
- Walking without knocking into furniture or people
- Using scissors and knives with good control
- Using simple carpentry tools
- Putting materials away on the shelves where they belong when finished
- Working carefully and neatly
- Dusting, polishing, and washing just about anything: floors, tables, silver
- Sweeping and vacuuming floors and rugs
- Flower arranging
- Caring for plants and animals (gardening, simple pets)
- Table setting—serving yourself—table manners
- Folding cloth: napkins, towels, etc.
- Simple use of needle and thread
- Using common household tools: tweezers, tongs, eyedroppers, locks, eggbeaters, stirrers, scissors and knives
- Increasingly careful and precise eye-hand coordination
- Simple cooking and food preparation
- Learning home address and phone number
- Dishwashing
- Weaving, bead-stringing, etc.

This process continues logically so that the older children learn such practical tasks as:

- Sewing
- Working with tools
- Making simple repairs
- Getting around on your own; buses, cabs, hiking
- Making consumer purchase decisions, comparison shopping, budgeting
- Earning spending money
- Mastering test-taking strategies
- Caring for young children
- Wilderness survival
- Running a small business enterprise
- Gardening, etc.

Sensory Training

These are exercises in perception, observation, fine discrimination, and classification that play a major role in helping children to develop their sense of logic and concentration. They begin at the earliest ages and are a major area of concentration typically through age 4.

- Discrimination of length, width, and height
- Discrimination of volume
- Discrimination in multiple dimensions
- Discrimination among color tones
- Discrimination among geometric shapes for shape and relative size
- Discrimination among solid geometric shapes by sight and touch
- Solving of complex abstract puzzles in three dimensions
- Discrimination of intensity and nature of sounds