

# River Run

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## COMMUNITY MONTESSORI

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*“The secret of good teaching is to regard the child's intelligence as a fertile field in which seeds may be sown, to grow under the heat of flaming imagination. Our aim is not only to make the child understand, and still less to force him to memorize, but so to touch his imagination as to enthuse him to his innermost core. We do not want complacent pupils, but eager ones. We seek to sow life in children, rather than theories, to help them in their intellectual, emotional, and physical growth, and for that we must offer them grand and lofty ideas to explore.” - Maria Montessori*



## PROGRAM OF STUDY

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*Parts of this document were reprinted and adapted for RiverRun with permission from The Montessori Foundation. This is a living document and as such will continue to be updated to reflect the needs of the RiverRun community. It is an attempt to capture all that the Montessori approach encompasses to provide families with the most information to make the best decision about where and how their children will best thrive.*

RiverRun's program of study encompasses the full substance of the traditional curriculum and goes beyond to teach students how to think clearly, do their own research, express themselves well in writing and speech, and to put their knowledge to practical application. In short, it is our goal to instill in our students the foundation of any good education - to learn *how* to learn. Our students will go beyond the basic academic skills to become self-confident, independent thinkers who have a desire to learn because they have a genuine interest in the world and in life.

In stark contrast to traditional education, we have organized our program of study as an inclined spiral plane of integrated studies, rather than compartmentalizing into separate subjects, with given topics considered only once at a given grade level. At RiverRun, lessons are introduced simply and concretely in the early years and are re-introduced several times during the following years at increasing degrees of abstraction and complexity. Young children learn by observation and manipulating their environment; in that sense, the Montessori materials are actually *another teacher* in the room. These materials instill a sensorial impression of abstract concepts that become the foundation of a lifetime of learning.

While moving toward increasing degrees of abstraction and complexity, the entire program of studies ties the separate disciplines of the curriculum together into studies of the physical universe, the world of nature, and the human experience. This integrated approach is one of RiverRun's great strengths, and it sets us apart from traditional education. Our students pursue literature, the arts, history, social issues, government, economics, architecture, medicine, science, and the study of technology in a complementary way, and not out of context.

As a result of our interdisciplinary approach, RiverRun provides a rigorous, yet innovative, academic program. And while we offer a warm, supportive academic atmosphere, we set a high level of expectation for the quality of thought, work, and mastery of content and skills - which is quite contrary to the misconception that Montessori students can do whatever they want academically. In fact, the opposite is true. RiverRun students "have to live within a cultural context, which for us involves the mastery of skills and knowledge that we consider basic" (Seldin and Epstein 2006).

In fact, as children progress through the elementary years, they will be challenged to pursue a considerable amount of library and field research. And, in preparation for high school and college, the Montessori environment at RiverRun consciously teaches students how to develop effective work habits. Again, these elements are not typically found in traditional educational environments.

In sum, RiverRun is committed to offering a typical Montessori curriculum that meets the needs of the whole-child at developmentally appropriate milestones and in an individualized fashion led by the child himself. Furthermore, it is our intent to foster respect and independence that translates from the RiverRun community to the community-at-large - and beyond.

## CORE CURRICULUM OVERVIEW

The following is a brief overview of RiverRun's core curriculum in the areas of sensory training, practical life skills, language arts, mathematics, social studies, and science for our students age three through the upper elementary level. This only represents an overview of the course of study and is not meant to be complete. Since our students progress at their own pace, it is not possible to divide up the curriculum by grade levels, and it is imperative that we underscore that “the Montessori system is open enough to allow the evolution of interests and learning to happen organically. The Montessori teacher does not plant questions [or skills] in the children, but stimulates their imaginations such that children develop their own questions [in pursuit of those skills]. Learning based on such interests is superior to learning that has its roots in the interests of others” (Lillard 2005).

## MONTESSORI ELEMENTS

### Sensory Training

These are exercises in perception, observation, fine discrimination, and classification that play a major role in helping our children to develop their sense of logic and concentration. At first, sensory materials can be simple activities for our youngest students, but later they are integrated into all of the core subjects at the developmentally appropriate time. In sum, these materials instill a sensorial impression of abstract concepts that become the foundation of a lifetime of learning.

#### **Early Sensory Training:**

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

Discrimination among musical tones

Discrimination of texture by touch

Discrimination of weight by touch

Discrimination of temperature by touch

Discrimination of scents

#### **Which leads to such exercises as:**

Precise observation of the natural world

Culinary discrimination

Artistic appreciation

Architectural appreciation

Musical appreciation

## Practical Life Skills

One of the first goals of RiverRun is also to develop in the 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 developing skills that allow the child to effectively control and deal with the social and physical environment in which he lives. There is a growing pride in being able to "do it for myself." Practical life begins as soon as the child enters the school and continues throughout the curriculum to more and more advanced tasks appropriate to the oldest students.

### **These practical life tasks may include:**

Learning home address and phone number

Carrying liquids without spilling

Pouring liquids without spilling



Carrying objects without dropping

Using knives and scissors 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

Table setting-serving yourself-table manners

Folding cloth: napkins, towels, etc.

Simple use of needle and thread

Using common household tools: tweezers, tongs, eye-droppers, locks, scissors, knives

Increasingly precise eye-hand coordination

Cooking, baking, and food preparation

Dish washing

Weaving, bead stringing, etc.

Sewing

Crocheting

Getting around on their own: Metro, buses, cabs, hiking

Self-defense

Making consumer purchase decisions, comparison shopping, budgeting

Mastering test taking strategies

Caring for younger children

Interior decorating

Furniture refinishing

Wilderness skills

Gardening

Recycling

## MONTESSORI INTERDISCIPLINARY UNITS OF STUDY

### The Great Lessons

Five key areas of interconnected studies are presented in the elementary years. They are presented in story form and often dramatically to motivate students to want to find out more on their own. The Great Lessons include:

- The Story of How the World Came to Be
- The Development of Life on Earth
- The Story of Humankind
- The Development of Language and Writing
- The Development of Mathematics

### International Studies

- Integration of art, music, dance, drama, cooking, geography, literature, and science.
- Second language: develop conversational skills, expand vocabulary, understand basic written information and have a better appreciation for the culture of the countries where the language is spoken.

### Practical Economics (Consumer Sciences)

- Students will learn how to compare prices against value
- Compute cost
- Maintain a checkbook
- Operate small school stores
- Understand the stock market

### Going Out into the Community

Elementary Montessori students usually suggest and help organize their own field trips for the class or a small group who share a common interest. Students are responsible for:

- Proposing an idea
- Developing a preliminary plan
- Assisting in making arrangements and carrying them out

### Social Skills, Character, Ethics and Community Service

Simple lessons of “Grace and Courtesy” which began in the primary years (ages three to six) begin a serious exploration of moral philosophy in the elementary years.

Typical Studies Include:

- Conflict resolution
- Working as committees to complete complex tasks
- Encouraging and acknowledging one another
- Discussing and exploring moral philosophy:
  - Why is it important for the fortunate to lend a hand to the poor?
  - If kindness is so important, what can I do when I feel angry?

## Reading and Language Arts

The process of teaching reading in a Montessori setting versus a traditional one involves various practical life and sensorial exercises introduced long before what is typical.

### **Pre-Reading**

Due to our multi-age classroom design, our youngest students are constantly exposed to the older children in the class who are already reading. The total environment of the classes tends to create and reinforce in our younger children a spontaneous interest in learning how to read. We begin to teach reading as soon as that interest is first expressed, unlike a traditional setting where students are all taught to read on the same day, in the same year, and in the same way.

Using a total immersion, multi-sensory approach, we help the youngest children to develop a highly sophisticated vocabulary and command of the language.

The children are taught through many early approaches to listen for and recognize the individual phonetic sounds in words.

We introduce the children to literature by reading aloud and discussing a wide range of classic stories and poetry.

We help our youngest students to recognize the shape and phonetic sounds of the alphabet through the sandpaper letters: a tactile alphabet.

### **Reading**

The youngest Montessori students are introduced to a few letters at a time through sandpaper letters. They trace each letter as it would be written, they feel its shape and how it is written, and they hear the teacher pronounce its phonetic *sound*—not the letter name. Students are taught to read through touch, sight, and sound. Next, students use the moveable alphabet. The children compose words by selecting a small object or picture and then laying out the word one letter at a time. It is important to note that a typical Montessori reading program has always included what are just now becoming standards and recommendations in public education. Dr. Montessori always understood that “reading” is actually a process that involves the attainment of many skills: from the recognition that printed words represent spoken words, to breaking those words down to letter-sound combinations or phonics, and finally reading with accuracy and fluency. All of this is referred to today by literacy specialists as “decoding.” For simplicity, we will use the term “reading” and note that the Montessori method breaks down the process into what would normally be termed decoding skills.

### Sample Lesson with Sensorial Materials

A typical lesson would include having students trace the sandpaper letters, say the letter sound, and advance to writing the letter in cornmeal, rice, or shaving cream to reinforce the sense of touch and movement as it leads to cognition.

A recent study on the use of sensorial materials and their effect on reading indicated that the Montessori approach to reading is a more comprehensive approach than those found in traditional settings particularly when it comes to students with exceptionalities or language learning differences because “it is strengthened by the utilization of the senses in learning. For individuals with language learning differences, this provides optimal educational practice” (Richardson 2004).



Sandpaper letters and tray of cornmeal for tracing

## Reading and Language Arts (continued)

### Reading (continued)

In sum, our approach to reading is a comprehensive approach that far surpasses that of the public schools because it addresses the needs of each of our learners in a developmentally appropriate way. Moreover, it has been field-tested and successful for over one hundred years. There is no doubt that a Montessori trained teacher is a highly skilled reading teacher.

- Development of the concept that written words are actual thoughts set down on paper. This process takes children much longer than most people realize. The sandpaper letters and moveable alphabets are two ways in which students in a Montessori classroom learn to read. The actual touching of the letters and looking at them at the same time fixes the image through cooperation of the senses. Later, they separate: looking becomes reading; touching becomes writing (Montessori 1912). This also touches on the Montessori principle that movement and cognition are intertwined (Lillard 2005).
- Phonics: Phonics are the sound-symbol relationship between spoken and written language. They are introduced systematically through the sandpaper letters, matching letters to picture cards and objects for beginning and ending sounds. Letters are taught by their phonetic sound.
  - Sounding out simple three or four-letter phonetic words.
- Phonemic Awareness: A phoneme is the smallest representation of sound, and phonemic awareness is the ability to orally hear, identify, and manipulate individual sounds or segments of sound in words. Recent research has identified phonemic awareness as an essential and necessary ability if a child is to become a good reader, confirming what Montessori identified over one hundred years ago. It is taught through the two moveable alphabet sets in different colors.



Lowercase moveable alphabet

For example, students will layout consonant blends in one color and complete small words with letters from the second color.

- Phonograms are the combination of vowels that form new sounds on their own and they are also taught through the two different colored moveable alphabet sets. For example, -ee, -ai, -ough, -oa, etc.. Because English is not a completely phonetic language, students are directly taught the phonograms and puzzle words.
  - Puzzle words are taught through memorization and games: i.e. the, was, you, they, their.
- Vocabulary in context that is interdisciplinary: Early exercises to practice reading and to gain the concept of a noun: labeling objects with written name tags, mastering increasingly complex words, and naming things that interest them--such as dinosaurs, the parts of a flower, geometric shapes, the materials in the classroom, etc.
- Grammar: Beginning with learning to recognize verbs. These are normally exercises in which the child reads a card with a verbal "command" printed out (such as run, sit, walk, etc.) and demonstrates his 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." This activity also allows the teacher to observe whether or not the student comprehends what she is reading.

## Reading and Language Arts (continued)

### Reading (continued)

- Reading specially selected or prepared small books on topics that really interest the child, such as in science, geography, nature or history. Another principle of Montessori education, recently confirmed through research, is that people learn better when they are interested in what they are learning.
- Drama and interpretive reading for comprehension at ever increasing levels of difficulty, beginning in the early elementary grades and continuing until high school graduation.
- Shared Inquiry: Students use graphic organizers, work cooperatively, lead discussions, examine story structure, summarize and continuously monitor comprehension through this process. An introduction is made to the world's classical children's literature at increasing depth and sophistication. Interesting children's literature and reference materials on science, history, geography, and the arts are used.
- Use of the library and reference books on a daily basis for both research and pleasure.

### Handwriting

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 the youngest children and extend over several years so that mastery is gradually, but thoroughly, attained.

- Moveable Alphabets made up of easily manipulated wooden letters are used for the early stages of phonetic word creation, the analysis of words, and spelling. They facilitate early reading and writing tasks during the period when young children are still not comfortable with their own writing skills. 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.
- Children practice making letters from the time of their first initial "explosion into writing":
  - At first, by tracing letters into shaving cream
  - Next, by writing and "water painting" on vertical surfaces
  - Then, cursive writing develops
  - Calligraphy is offered whenever the child is interested

## Reading and Language Arts (continued)

### Composition

Before handwriting has even been mastered, the children compose sentences, stories, and poetry through oral dictation to adults and with the use of the moveable alphabet and drawings. Once handwriting is fairly accomplished, the children begin to develop their composition skills. They continue to develop over the years at increasing levels of sophistication.

- Preparing written answers to simple questions
- Composing stories to follow a picture series
- Beginning to write stories or poems on given simple themes
- Preparing written descriptions of science experiments
- Preparing written reports
- Research skills and the preparation of reports become major components of the educational program at RiverRun - students research areas of interest or topics that have been assigned in depth, and prepare formal and informal, written and oral reports
- Creative and expository composition skills continue to develop as the children advance from level to level - students are typically asked to write on a daily basis, 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 'take dictation' - spelling words called for by the teacher - as a daily exercise. 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.

- Learning to sound out and spell simple phonetic words
- Learning to recognize and spell words involving phonograms, such as ei, ai, or ough
- Developing a first "personal" dictionary of words that they can now spell
- Learning to recognize and spell the "puzzle words" of English: words that are non-phonetic and are not spelled as they sound
- Studying words: involving compound words, contractions, singular-plural, masculine-feminine words, prefixes, suffixes, synonyms, antonyms, homonyms

## Reading and Language Arts (continued)

### Grammar

The study of grammar begins even before the child begins to read, during the sensitive period when he is spontaneously interested in language. It continues over several years until mastered. The idea is to introduce grammar to the child as she is first learning how to put thoughts down on paper, when the process is natural and interesting, rather than waiting until the student is older and finds the work tedious.

- We introduce our children to the function of the parts of speech one at a time through many games and exercises that isolate the one element under study.
  - Montessori has assigned a geometric symbol to represent 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.
  - 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.
- Sentence analysis: simple and compound sentences, clauses, verb voices, and logical analysis of all sorts of sentences are studied using many different concrete materials and exercises.
- Students continue their study of language from the mid-elementary years onward, reviewing as well as engaging new concepts and skills: tenses, moods, irregular verbs, person and number, the study of style, the study of grammatical arrangements in other languages.



Grammar symbols

## Mathematics

The mathematics curriculum begins with the formation of concepts of quantity and operations through the uses of concrete material aids and progresses to “the study of the fundamentals of algebra, geometry, logic, and statistics, along with the principles of arithmetic” (Seldin & Epstein 2006). As with our entire curriculum, the acquisition of math skills is rooted in the practical application of mathematics around the school and in everyday life and adheres to the Montessori principle supported by current learning theory that learning situated in meaningful contexts is often deeper and richer (Lillard 2005). Students advance at their own pace and will typically cover all of the topics below if they complete the full lower and upper elementary program.

### Concept of numbers

- Units, tens, hundreds, thousands are represented by specially prepared concrete learning materials that show the decimal hierarchy in three dimensional form: units = single beads, tens = a bar of 10 units, hundreds = 10 ten bars fastened together into a square, thousands = a cube ten units long ten units wide and ten units high. 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.



Concrete math materials:  
Bead chains and cubes

### Computation

- 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.
- Development of the concept of the four basic mathematical operations: addition, subtraction, division, and multiplication through work with the Montessori Golden Bead Material. The child builds numbers with the bead material and performs mathematical operations concretely. Work with this material over a long period is critical to the full understanding of abstract mathematics for all but a few exceptional children. This process tends to develop in the child a much deeper understanding of mathematics.
- Development of the concept of “dynamic” addition and subtraction through the manipulation of the concrete math materials (i.e. addition and subtraction where exchanging and regrouping of numbers is necessary).
- Memorization of the basic math facts: adding and subtracting numbers under 10 without the aid of the concrete materials.
- Development of further abstract understanding of addition, subtraction, multiplication, 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 (color-coded abacuses).
- 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. Developing first understanding of the concept of the “square” of a number.
- Skip counting with the chains of the cubes of the numbers zero to ten: i.e., counting to 1,000 by ones or tens. Developing the first understanding of the concept of a “cube” of a number.

## Mathematics (continued)

### Computation (continued)

- Introduction to problems involving tens of thousands, hundreds of thousands, and millions.
- Development of the concept of long multiplication and of division through concrete work with the bead and cube materials.
- Beginning the “passage to abstraction,” the student begins to solve problems with paper and pencil while working with the concrete materials. Eventually, the materials are no longer needed.
- 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.
- Development of still more abstract understanding of “long” multiplication through highly advanced and manipulative materials (the Multiplication Checkerboard).
- Development of still more abstract understanding of “long” division through highly advanced manipulative materials (Test Tube Division apparatus).
- Order of operations: solving problems involving parentheses, such as  $(3 \times 4) - (2 + 9) = ?$ .
- Missing sign problems: in a given situation, should you add, divide, multiply or subtract.
- Study of fractions: begins with very concrete materials (e.g. the fraction circles) and involves learning names, symbols, equivalencies, and common denominators along with simple addition, subtraction, multiplication, and division of fractions up to “tenths”.
- Study of decimal fractions: all four mathematical operations.
- Practical application problems, which are used to some extent from the first year, become far more important around age seven or eight and afterward. Solving word problems, and determining arithmetic procedures in real situations becomes a major focus.
- Computing the squares and cubes of numbers: cubes and squares of binomials and trinomials.
- Calculating square and cube roots: from concrete to abstract.



The Binomial Cube is a concrete representation of the algebraic formula  $(a+b)^3$ . It is a sensorial activity of visual discrimination of color and form.

## Mathematics (continued)

### Measurement

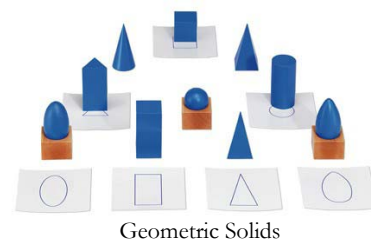
- Money: units, history, equivalent sums, foreign currencies (units and exchange). (Begins as part of social studies and applied math.)
- Interest: concrete to abstract; real life problems involving credit cards and loans; principal, rate, time.

### Statistics and Data Analysis

- Basic data gathering, graph reading and preparation, and statistical analysis.
- The history of mathematics and its application in science, engineering, technology, and economics.

### Geometry

- Sensorial exploration of plane and solid figures: 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.
  - Stage I: Basic geometric shapes.
  - Stage II: More advanced plane geometric shapes—triangles, polygons, various rectangles and irregular forms.
  - Stage III: Introduction to solid geometric forms and their relationship to plane geometric shapes.
- Study of the basic properties and definitions of the geometric shapes. This is essentially as much a reading exercise as mathematics since the definitions are part of the early language materials.
- More advanced study of the nomenclature, characteristics, measurement and drawing of the geometric shapes and concepts such as points, line, angle, surface, solid, properties of triangles, circles, etc. (Continues through each age in repeated cycles)
- Congruence, similarity, equality, and equivalence.
- The history of applications of geometry.
- The theorem of Pythagoras.
- The calculation of area and volume.



Geometric Solids



Study of Triangles

## History, Geography, and World Culture

A key objective of Montessori education is to develop a global perspective and an understanding of humanity's common heritage. To that end, our youngest students study maps and learn the countries of the world. Physical geography begins in the first grade with the study of the formation of the Earth, the emergence of the oceans and atmosphere, and the evolution of life. Students study the customs, housing, diet, government, industry, arts, history, and dress of the countries of the world. Emergence of the first civilizations and the universal needs of mankind are addressed. Upper elementary students focus upon early man, ancient civilizations, and American history.

### Physical Geography

- The Primary Globes: specially prepared globes for the very young child that isolate single concepts of globe study (e.g. how land and water are shown and the shapes of the continents).
- The Puzzle Maps: 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 United States. 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 become 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 United States. 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.
- Land & Water Formations: materials 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 three-dimensional models of each, complete with water. Then the children learn to recognize the shapes on maps, and learn about famous examples of each.
- Transference to maps: introduction to written names and various forms of maps, along with early study of the flora, fauna, landscapes, and people of the continents.
- Maps and compass: introduction to longitude and latitude, coordinate position on the globe, the Earth's poles, the magnetic poles, history and use of the compass, topographic maps, global positioning satellite devices, electronic charts.
- An introduction to humankind's search to understand how the Earth was formed, from creation stories to the evidence of contemporary scientific research: origins, geologic forces, formations of the oceans and atmosphere, continental drift and tectonic plates, volcanoes, earth quakes, the ice ages and the formation of mountain ranges.
- The study of coasts and land reliefs: hills, mountain ranges, volcanoes, valleys, plains, etc.; their formation, animal life, and effect on people.
- The study of the hydrosphere: ocean, rivers, lakes, the water cycle.



Puzzle Map of Asia

## History, Geography, and World Culture (continued)

### **World Culture**

- Countries are studied in many ways at all levels beginning at a very young age. Sometimes, festivals are held to focus on specific cultures and to celebrate life together: an example being Chinese New Year, when the school might study China, prepare Chinese food, learn Chinese dances, and participate in a special dragon dance parade. Anything that the children find interesting is used to help them become familiar with the countries of the world: flags, boundaries, food, climate, traditional dress, houses, major cities, children's toys and games, stamps, coins, traditional foods, art, music, and history. This interweaves through the entire curriculum.
- Study of the regions, culture, and natural resources of the United States, including geography, climate, flora and fauna, major rivers and lakes, capitals, important cities, mountains, people, regional foods, traditions, etc. This begins in the first year and continues at increasing depth at each level.
- The detailed study of one nation at a time. Focus moves over the years from one continent to another, as the children's interest leads them. Many aspects of the nation are considered: geography, climate, flora and fauna, major rivers and lakes, cities, mountains, people, food, religions, etc.

### **Economic Geography**

- Natural Resources of the Earth.
- Production: How natural resources are used by humankind.
- Imports and Exports: The interdependence of nations.

### **History & the Needs All People Share**

- The concept of time and historical time is developed through many activities and repeated at deeper complexity:
  - Telling time on the clock.
  - Time-lines of the child's life.
  - Time-lines showing the activities of a day, week, month, year.
  - Family trees.
  - Time-line of the Earth's history.
  - Time-line from 8,000 B.C. to 2,000 A.D. to study ancient to modern history.

## History, Geography, and World Culture (continued)

### History & the Needs All People Share (continued)

- Even the youngest students study the story of the evolution of the planet and its life forms over the eons, along with an overview of human history. This story is repeated throughout the curriculum in increasing depth of study.
- Each year the student 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.
- The basic needs of man are food, shelter, clothing, defense, transportation, culture, law, religion or spiritual enlightenment, love, and adornment.
- Students study the earliest humans, ending with an introduction to the first farmers. They consider early societies in terms of how they organized themselves to meet the common needs of all peoples.
- Students study the creation of the universe, formation of the earth, evolution of life, and early human civilizations. These topics are first introduced at the lowest elementary level and then go into greater depth. Students prepare increasingly sophisticated projects and research reports.
- Older students study ancient civilizations, including the Mesopotamian cultures, Greece, Rome, ancient China, Byzantium, ending with an introduction to the Middle Ages.
- Older students study American studies (inclusive of New York in particular), including an introduction to the history of the United States, American folk culture, technology, children's literature, government, and geography. The class also considers Pre-Colombian Central and South American cultures, the Native American peoples of North America, the age of exploration, and the immigrant cultural groups who came to America from Europe, Africa, Asia, and Latin America.

## Science

The Montessori Science curriculum is focused on the study of life, the laws and structure of the universe, and how humanity has struggled throughout history to put our understanding to practical use.

### Earth and Space Sciences

- Geology and mineralogy.
- Meteorology.
- Astronomy and cosmology.

### Life Sciences:

#### **Most Basic Biology, Botany, and Zoology**

- Differentiation between living and non-living things.
- Differentiation between animals and plants; basic characteristics.
- Observation of animals in nature.
- First puzzles representing the biological parts of flowers, root systems, and trees, along with the anatomical features of common animals. These are first used by the youngest students as puzzles, then as a means to learn the vocabulary, then are related to photos and/or the "real thing," then traced onto paper, and finally with labels as a reading experience.



Biology puzzles: leaf, tree, and flower.

#### **Biology and Botony**

- Botany: identifying, naming, and labeling the parts of plants, trees, leaves, roots, and flowers.
  - Advanced elementary biology study: the names and functions of different forms of leaves, flowers, seeds, trees, plants, and animals. This usually begins with fieldwork involving the collection and/or observation of specimens.
  - The plant kingdom: Study of the major families of plant life on the Earth and classification by class and phyla.
  - Advanced study of plants in class, greenhouse and garden: experimenting with soil, nutrients, light, etc.
  - Life cycles; water, oxygen, carbon-dioxide, and nitrogen.

## Science (continued)

### **Life Sciences: (continued)**

#### **Zoology**

- Identifying, naming, and labeling the external parts of human beings, insects, fish, birds, and other animals.
- Introduction of the families of the animal kingdom, and identification and classification of animals into the broad families. Introduction to the basic characteristics, life-styles, habitats, and means of caring for young of each family in the animal kingdom.
- Introduction to ecology: habitat, food chain, adaptation to environment and climate, predator-prey relationships, camouflage, and other body adaptations of common animals.
- Study of evolution and the development of life on the Earth over the eons.
- Study of the internal parts of vertebrates: limbs, body coverings, lungs, heart, skeleton, reproduction organs.
- More advanced study of the animal kingdom: classification by class and phyla.
- Animal behavior: detailed observation.
- Anatomy: systems of the animal and human body.
- Health and nutrition.



3-D Model of the Human Body

**Ecology:** Study of the interrelationships of life forms.

#### **Physical Sciences:**

##### **Chemistry**

- The three states of matter.
- Basic atomic theory.
- How elements are created through stellar fusion.
- Elements and compounds.
- Mendelov's table of the elements.
- Basic molecular theory: Building atomic models.
- Physical and chemical changes.

## Science (continued)

### Physical Sciences: (continued)

#### Chemistry (continued)

- Research into the elements and continued study of the periodic table.
- Introduction to chemistry lab experiments:
  - Development of skills in careful observation, recording and describing, and use of increasingly sophisticated techniques of measurement.
  - Development of skills using common scientific apparatus: microscopes, telescopes, hand lens, collecting field specimens, dissecting, preparing displays.



#### Physics

- Light, electricity, magnetic fields, gravity, mass.

#### Nature of Science

- Development of field science skills: tracking, listening, observing.
- Development of scientific inquiry skills: forming hypothesis, designing experiments, recording results.
- Study of the great inventions; machines and technology and their effect on society throughout history.
- Study of the great scientists.
- Preparing and analyzing all sorts of graphs and data displays; basic statistics.

## **The Arts**

The Arts are integrated into the rest of the curriculum as modes of exploring and expanding lessons that have been introduced in science, history, geography, language arts, and mathematics in keeping with the interdisciplinary approach of the Montessori curriculum.

Art and music history and appreciation are woven throughout the history and geography curriculum.

## **Health, Wellness, and Physical Education**

The Montessori environment is one that encourages movement throughout the day in the classroom, in other areas of the school, and in the community itself. However, in a typical Montessori program, physical education is also a choice that children can make. With access to a gymnasium and an outdoor area, given several options, children choose at least two physical activities to participate in each week. It is our belief that the need for physical activity is also to be met by family-initiated after-school community based programs.

Here it is important to note that while Physical Education programs are mandated in traditional educational settings, the childhood obesity rate is still a national health problem. To address this problem, we challenge our students to develop a personal program of lifelong exercise, recreation, and health management that includes the following:

- Understand and appreciate how our bodies work
- Care and feeding of a healthy, human body: diet and nutrition
- First aid, response to injury and illness
- Stress management
- Peacefulness and mindfulness in daily life

## ASSESSMENT

Assessment takes many forms in schools, whether they be traditional or Montessori. This is an overview of our position on assessment to include a discussion of grades and standardized testing.

### Grades

While it is common practice for students to take quizzes on material, letter grades are not assigned. Assessment at RiverRun differs from the traditional sense of testing for a particular skill. Stressed in the Montessori environment is the mastery of skills and concepts and authentic assessment. Montessori methods were founded upon the philosophy that tying extrinsic rewards to an activity negatively impacts motivation to engage in that activity when the extrinsic reward is withdrawn. Several studies regarding the use of extrinsic rewards and the negative impact upon motivation, cognitive functioning, creativity, and pro-social behaviors have since proven that Dr. Montessori was correct. With all of this in mind, RiverRun does not use grades and instead strives to instill a sense of intrinsic motivation.

### Types of Assessment

Our goal is to assess our students based upon authentic assessment measures on real learning tasks through careful teacher observation, student portfolios, and self-reflection. The preferred method of assessment is performance based. Just as your employer will measure how you do on the actual job, Montessori students are measured by how they actually apply their knowledge in a real context.

A compelling research study done in 1987 by Grolnick & Ryan underscores this Montessori principle. In sum, they found that “students who expect to be tested initially learn *facts* better, by rote, but as soon as the test is over, they forget much of what they learned. Results from tests taken under such conditions are therefore probably not indicative of *long-term knowledge gains*” (as stated in Lillard 2005).

There are a variety of assessment techniques used at RiverRun that include, but are not limited to the following:

- Teacher evaluations by oral quizzes or having a student teach the skill to another student
- Teacher observation and record keeping
- Self-evaluation by students occurring monthly
- Portfolios, created and maintained by students, in which they self-assess their own work. They choose pieces of work based on criteria that they themselves have set.
- Family conferences twice yearly
- Teacher narratives sent home twice yearly

Finally, a note on standardized tests:

Standardized tests are created based upon the assumption that knowledge can be broken into separate pieces and that people learned by passively “absorbing” these pieces. “Yet today, cognitive and developmental psychologists understand that knowledge is not separable bits and that people (including children) learn by connecting what they already know with what they are trying to learn. If they cannot actively make meaning out of what they are doing, they do not learn or remember. But most standardized tests do not incorporate these modern theories and are still based on recall of isolated facts and narrow skills” (FairTesting.org). As a private school, we are not required to administer the yearly New York State standardized tests that begin at grade three and continue throughout a child’s educational career, and we choose not to.

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