

**Curricular Report
Bella Mente Montessori Academy
A California Public Charter School**

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The Primary Elementary Curriculum (Kindergarten)

Primary Elementary

The Montessori Primary Curriculum spans three years of development. For the purposes of the charter, the last year of the Montessori Primary Curriculum is the Kindergarten year for most children. The founding team, however, feels strongly that the Primary Program is the foundation program for the Montessori approach, so it is important to describe the entire program in some detail.

The Montessori Primary Curriculum is composed of six interwoven curricular areas, each of which is described below. In addition to imparting core academic skills in math and language, the Montessori Primary Curriculum is designed to foster independence, coordination, problem solving, scientific thinking, socio-emotional development, and creative arts skills. However, the fundamental goal in the first plane of development is for children to develop themselves as individual beings and to master the process of learning, thereby creating a solid foundation for personal and academic success.

Areas of Curriculum

- *Practical Life*
- *Sensorial*
- *Mathematics*
- *Language*
- *Cultural Studies and Science*
- *The Arts (Visual Arts, Music, Drama, Movement)*
- *Character and Peace Education*

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Practical Life Overview

Practical Life activities encourage the development of independence and foster each child's adaptation to the social context of his or her environment. At the primary level, practical life activities include care of self, care of the environment, exercises of grace and courtesy, and control of physical movement.

Goals

Although the activities are largely skill oriented (e.g. learning how to wash a table), their purpose is not that children master these tasks for their own sake. Rather, the primary goal is to aid each child's inner construction of discipline, organization, independence, and self-esteem through concentration on precise and full cycles of activity.

Objectives

Development of sense of order, independence in navigating classroom, fine and gross motor control, ability to concentrate

Instructional Strategies & Materials

Care of the Self

- Dressing Frames: buttons, zippers, snaps, hooks and eyes, buckles, bow tying, safety pins, lacing
- Personal Care: nose blowing, getting a drink, hand washing, dressing and undressing, taking off a coat, hanging up a coat, putting on a coat, putting on an apron, using the bathroom
- Grooming: hand washing, clothes washing, shoe polishing, hair combing, hair brushing, braiding, nail buffing, nail clipping

Care of the Environment

- Setting up for an activity: Rolling/unrolling/carrying a rug, carrying a tray, carrying a bucket, using a book, sitting at a table, carrying a chair, carrying a table, opening/closing a door
- Cleaning: Wiping up spills, crumbing a table, sweeping, table scrubbing, dish washing, cloth folding
- Polishing: mirror, wood, and metal polishing
- Plant Care: Plant watering, leaf polishing, flower arranging
- Pet Care: pet feeding, environment cleaning

Food Preparation

- Cutting: fruit, vegetable and bread cutting
- Juicing: fruit juicing

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- Spreading: butter, jelly, cream cheese spreading
- Measuring: measuring spoons, measuring cups
- Grating

Movement

- Pouring, squeezing, twisting, pinching, pincer grasp, sorting

Social Interaction Skills

- Introducing yourself, greeting, saying goodbye, how to ask for help, how to get a teacher's attention, how to say "Excuse me," how to observe someone who is busy, how to walk indoors, how to talk indoors

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Sensorial Overview

The Sensorial Curriculum consists of concrete manipulatives that enable young children to discriminate, order, and classify sensory impressions in relation to length, size, color, pitch, smell, weight, texture, etc. The addition of language gives children a beginning “scientific vocabulary” to describe and compare qualities of objects. The materials are divided into eight subcategories, detailed below.

Goals

The Sensorial Curriculum has two primary goals, one direct and one indirect, both of fundamental importance. The direct goal is to educate and refine each child’s sense perceptions and to provide vocabulary to describe those perceptions. The indirect goal is to assist children in the development of their intelligence, which is dependent upon the organizing and categorizing of their sense perceptions into an inner mental order.

Objectives (aligned with state standards)

Development of visual discrimination of dimension, ability to concentrate, ability to place objects in seriated order, problem solving skills, hand-eye coordination, stereognostic sense, discrimination of shape and form, understanding of geometric shapes, fine motor skills, visual discrimination of color and shade, auditory discrimination, tactile discrimination, baric sense, thermic sense, and olfactory sense.

Instructional Strategies & Materials:

- Visual Sense, Cylinders: Knobbed Cylinders, Knobless Cylinders
- Visual Sense, Block Materials: Red Rods, Broad Stairs, Pink Tower
- Visual Sense, Geometric Shape: Geometric Solids, Geometric Cabinet and Cards,
- Constructive Triangles
- Visual Sense, Algebraic Materials: Square of Pythagoras, Binomial Cube, Trinomial Cube,
- Power of Two Cube
- Visual Sense, Colors and Patterns: Color Tablets, Patterned Fabric Squares
- Auditory Sense: Sound Cylinders, Bells
- Tactile Sense: Rough and Smooth Boards, Tactile Tablets, Tactile Fabric Squares
- Complex Senses – Baric, Thermic, and Olfactory: Baric Tablets, Thermic Tablets, Smelling Bottles, Tasting Bottles

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Mathematics Overview

Through the manipulation of concrete materials, the child internalizes concepts of number, symbol, sequence, memorization of basic facts, and basic operations. The materials simultaneously reveal arithmetic, geometric, and algebraic correlations. The materials are divided into nine categories, detailed below.

Goals

As with the other curricular areas, the Mathematics Curriculum has two primary goals, one direct and one indirect. The direct goal is for each child to learn concepts of numeration, counting, number formation, basic math operations, decimal system, place value, fractions and the memorization of math facts in addition, subtraction, multiplication and division. The indirect goal is to assist children in the development of their intelligence by refining and expanding their ability to concentrate, follow a process, work independently, problem solve, and complete the full cycle of a task.

Objectives (aligned with state standards)

Introduce and associate quantities and numbers 0-9,999, develop ability to place objects in seriated order, introduce concept of number as a symbol for a collection of separate objects, develop ability to count independently to 9,999, develop ability to follow verbal directions, introduce the decimal system, introduce process of exchanging in decimal operations, introduce and develop ability to perform addition, subtraction, multiplication, and division operations, memorize basic math facts, provide a concrete introduction to the concepts of squaring and cubing, introduce skip counting, provide concrete introduction to fractions, introduce fraction vocabulary.

Instructional Strategies & Materials

- Counting Materials: Number Rods, Sandpaper Numerals, Spindle Boxes, Counters and Numerals, Colored Bead Stair, Memory Game
- Golden Beads: Introduction to the Golden Beads, Nine Tray, Ten Tray, Quantity Layout, Numeral Layout, Full Decimal Layout, Composition of Quantity and Symbol
- Teens and Tens: Teen Boards, Ten Boards, Hundred Board
- Simple Counting: Positive Snake Game, Negative Snake Game, Multiplication Board, Division Board
- Simple Operations: Addition Strip Board, Subtraction Strip Board, Memorization Charts, Multiplication Bead Bar Layout

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- Operations with the Golden Beads: Static and Dynamic Addition, Subtraction, Multiplication and Division, and Long Division
- Bead Cabinet: Squaring and Cubing Sensorial Activities, Linear Counting, Skip Counting
- Decimal Operations: Stamp Game, Small Bead Frame, Dot Board Game
- Fractions: Fraction Skittles, Fraction Circle Insets

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Language Overview

Language is interwoven throughout all aspects of the classroom curriculum. Specific language activities include oral language, written expression, and reading. The primary Language Curriculum builds upon oral language to discover the relationship between sound and symbol. This discovery enables the child to make his or her own thoughts visible (writing) and to decipher the thoughts of others (reading). Further activities spark conscious awareness of the order and function of words (grammar).

Goals

As with the other curricular areas, the Language Curriculum has two primary goals, one direct and one indirect. The direct goal is for each child to learn concepts of oral communication, written expression, and reading. The indirect goal is to assist children in the development of their intelligence by refining and expanding their ability to concentrate, follow a process, work independently, problem solve, and complete the full cycle of a task.

Objectives (aligned to state standards)

Development of phonetic awareness, letter/sound recognition, spoken vocabulary, handwriting ability, letter and sentence formation skills, grammar skills, and reading skills including phonetic words, puzzle words, phonograms, reading analysis, and early reader books.

Instructional Strategies & Materials

- Expansion of Language: enrichment of vocabulary through spoken language (naming of objects in classroom environment, classified cards, etc.), language training (storytelling, poetry, etc.)
- Writing: Sound games, Sandpaper Letters, Moveable Alphabet, Metal Insets, handwriting materials
- Reading: Phonetic Object Game, Phonetic Reading Activities, Phonograms, Word Study, Puzzle Words, Reading Classification, First Books
- Function of Words: Grammar Symbols Box, Noun Games, Articles, Adjective Labels, Logical Adjective Game, Detective Adjective Game, Conjunctions, Prepositions, Verbs, Adverbs, Logical Adverb Game, Commands

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Cultural Studies and Science Overview

An ecological perspective highlights the interrelationships of the earth, its flora and fauna, and human life. The Cultural Studies and Science Curriculum materials allow children to order simple classifications of non-organic and organic forms and to identify basic parts of plants and animals. Each child discovers the richly varied way in which people meet the same basic needs in relation to differences in topography, climate, and natural resources. Simple experiments with magnets, electricity, etc. allow children to explore the physical sciences with concrete manipulatives.

Goals

The goals of the Cultural Studies and Science Curriculum are to provide children with a basic scientific vocabulary for understanding and communicating about the world around them and to engender an understanding of the earth as a unified system.

Objectives (aligned with state standards)

Introduce the scientific method, support the development of a global perspective, introduce basic scientific vocabulary, develop an understanding of basic needs of living things, and develop an understanding of parts/whole relationships.

Instructional Strategies & Materials:

- Geography: Land and Water Forms, Colored Globe, Political Maps and Labels, Geography Pictures, Flags of the World, Days and Months, Directions, Hemispheres
- Biology: Botany (care of classroom plants, plant stories, botany cabinet, leaf materials, nomenclature materials), Zoology (classroom animals, animal stories, nomenclature, books), Classification Exercises (living/non-living, plant/animal, etc.)

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The Arts (Visual Arts, Music, Drama, Movement) Overview

The arts are integrated into the daily life of the classroom. Fundamental techniques (pitch, rhythm, use of specific artistic media, movement patterns) are presented in isolation to assist each child in developing a personal repertoire of skills. The children then use these skills to express their own ideas and feelings, to more deeply explore other content areas in the curriculum and to join with others in communal celebration and expression. Children are also introduced to a wide variety of styles of artistic expression, developing an appreciation for the contributions of artists both known and unknown.

Goals

The goal of the Arts Curriculum is to introduce children to the concepts of artistic expression and to develop basic techniques as a vehicle for their own expression.

Objectives (aligned with California Visual and Performing Arts standards)

Develop basic art expression techniques, develop a basic arts vocabulary, refine fine/gross motor control, develop an appreciation for aesthetic beauty, refine auditory discrimination, and develop rhythm.

Instructional Strategies & Materials:

- Visual Art: There are no prescribed art materials. However, art materials are kept on their own section of shelving in the classroom. The materials are available as a choice just as are the rest of the materials in the classroom environment.
- Music: bells, rhythm instruments, teacher-led songs and activities
- Drama: teacher-led games and activities
- Movement: teacher-led games and activities

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Character and Peace Education Overview

Character and Peace Education, while arguably the core of the Montessori Primary Curriculum, is also the least visible. There are little or no physical materials devoted to the development of good character and peace education. However, the threads of this curriculum area are present and interwoven throughout the classroom. It begins in Practical Life, where each child learns to care for him or herself as well as their shared environment. The exercises of Grace and Courtesy explicitly teach social interaction skills, creating the means for a harmonious classroom culture. The Sensorial, Mathematics and Language curriculum enhance children's abilities to understand the world and to communicate effectively with the people in their community. The Cultural Studies, Science, and Arts materials complete the curriculum by providing a global perspective and an understanding of the world as a unified whole.

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The Elementary Montessori Curriculum (Children Ages 6-9, Ages 9-12)

Elementary Program

The academic program at BMMA integrates Montessori methodology, state standards and assessment, arts integration, design thinking and research-based instructional best practices. The result is a highly differentiated learning environment that facilitates accelerated student learning and achievement across the curriculum. Our elementary program, like most Montessori elementary programs, is divided into two groups, lower elementary which includes ages 6 to 9 and upper elementary, which includes ages 9 to 12. The curriculum is composed of interwoven subject areas, which are described below. The core academic subjects of mathematics, language, and cultural studies are initially introduced through the Five Great Lessons. BMMA's curriculum is designed to address the psychological characteristics of children in the second plane of development, which include a stronger capability of effort and concentration, an immense desire for knowledge, a stronger need for intellectual curiosity, development of the powers of imagination and heightened social exploration.

Accountability in this differentiated model is assured through use of Work Plans and Record Sheets. Teachers meet with each child weekly to develop a Work Plan (Individualized Learning Plan), for the following week, which includes a checklist of activities the child should complete. These activities are selected based on the child's interest, ability, and age, within the context of the state standards for that grade level. The Work Plans ensure that each child knows which activities s/he is expected to complete. Depending on the child's age, the activity may be teacher checked or self-checked and the recording format varies from a teacher-provided sheet to one that the children create themselves (e.g., journaling). Once this process is complete, each child records his completed work on the Record Sheet. In this way, children develop specific skills in collaboration with their teachers and a classroom environment that is prepared for them. The goal of BMMA's elementary program is for children to develop themselves as individual beings and to master the process of learning, thereby creating a solid foundation for personal and academic success.

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Areas of Curriculum

- *Language Arts*
- *Mathematics & Geometry*
- *History/Social Science*
- *Cultural Studies and Science*
- *Arts (Visual Arts, Music, Drama, Movement)*
- *Character and Peace Education*
- *World Language*
- *Health and Physical Education*
- *Practical Life*
- *Design Thinking*
- *Technology*

Grade level state standards in English Language Arts, Mathematics, History/Social Studies, Science, Physical Education/Health, World Languages and the Arts are taught to mastery. Of the remaining four curriculum areas, two come from the Montessori methodology: (1) Character and Peace Education and (2) Practical Life. Finally, Design Thinking (from Stanford) and Technology round out our work to develop creative thinkers, prepared for a future in the 21st Century.

Curricula for grades 7- 8 will be based on the Common Core standards.

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Language Arts Overview

Language in BMMA's elementary classrooms is connected to all curricular areas and serves as a tool for exploration, communication, and self-expression. Children of this age are interested in exploring beyond the immediate environment and in knowing why things are the way they are. The Montessori language arts curriculum caters to these characteristics by enabling children to investigate the origin and structure of words and the growth of language in relation to the development of culture. At BMMA, the language arts curriculum is introduced with the Fourth Great Lesson, "The History of Language."

Goals (aligned with state standards)

- Read: By the end of lower elementary, all children will be fluent readers who comprehend grade level text. By the end of upper elementary children are accomplished readers who use reading strategies and skills appropriately according to the genre of the text.
- Write: By the end of lower elementary, all children will be able to analyze sentences, including parts of speech and grammatical forms and functions. As a result, students starting at age six will be able to express their ideas in writing. By the end of upper elementary all children are able to organize their ideas into coherent written communication and composition, including persuasive essays, narratives, and other types of creative writing.
- Communicate: By the end of lower elementary all children will be able to articulate themselves in speaking and writing using complete and coherent sentences. By the end of upper elementary all children will be able to articulate a point of view in speaking and writing in a variety of settings using grade appropriate academic language and Standard English.

Instructional Strategies & Materials

Children are provided manipulative materials in the prepared environment that advance their understanding of the concepts above. Detail is provided here to illustrate some of BMMA's instructional strategies.

The history of language is the concept at the center of the Fourth Great Lesson story. This story introduces the history of language over time.

- Fourth Great Lesson story: Children are invited together to hear an oral retelling of this story. The story is meant to pique their interest and provide the jumping off point for further study. It

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provides the framework for continued learning, including various stories of how languages developed throughout the world and how that led to the development of different cultures.

- Language Timeline: A graphic representation of the history of language provided to children when the Fourth Great Lesson story is introduced and for some time afterwards as a reference and example of how to organize historical thinking.
- Four part cards: These are sets of four cards that provide content explanations for children to study. For example, the first card on hieroglyphics would include the title, Hieroglyphics, an illustration of hieroglyphics and a definition, or explanation of the term or concept. The other three cards of the set break up the title, illustration and definition. The cards are mixed up with other card sets and children demonstrate their understanding by matching them correctly and checking to ensure their accuracy. This is a demonstration of the Montessori control of error (self-checking assessment). Once the children complete their checks, they invite the teacher to review their work. To close, and depending on their age, children record their findings in writing.
- Other important tools may include materials like cave drawings, clay tablets and carving tools that further develop the children's understanding of the history of language.
- Grammar: In Montessori elementary, grammar is systematically and explicitly taught. Multi-sensory instruction includes linking each part of speech with a key experience (a mini lesson), objects (realia), etymology (history of word), and a symbol. Children apply their understanding through use of a compartmentalized wooden grammar box with cards to sort parts of speech. For example, after the key experience and exploration of objects, a child may work with the grammar box to sort and match articles and nouns. Below is an example of how nouns are introduced and explored in BMMA's prepared environment:
 - Key Experience with objects: Children are invited to join a lesson. The teacher dramatically writes the name of an object, hands the label to a child and asks the child to bring the object to the rug. For example, she may hand the child a label, "book," and the child retrieves a book. She continues with each child, with children placing their objects on the rug next to the label that names it. The teacher states that all of these objects have a name; everything has a name. She continues that names are nouns; a noun is a naming word. This builds on the child's prior knowledge of objects in the classroom and connects it to a new concept, nouns as parts of speech.
 - Etymology: Next the teacher gives the etymology of the word "noun." Children learn that a noun is a naming word deriving from the Latin word nomen, which means a naming word. This exploration of the word "noun" connects with their work in the Fourth Great Lesson that words are the building block of language and each has a history.

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- Grammar Symbols: The symbol for the noun is a large, black pyramid because pyramids are old, stable foundational structures, as are nouns.
- Grammar Boxes: Children apply their knowledge of the parts of speech to sort and match.
- Sentence Analysis Charts: Children diagram the structure of sentences by cutting apart the written sentence itself and by using symbols to represent the parts of speech and the relationship between parts of a sentence. This type of work demonstrates concrete understanding of the concepts that are foundational for coherent writing and speech.
- Word Study: Similar to how grammar is taught, word study includes a key experience lesson with objects, an introduction to etymology and application. Word study includes, but is not limited to, the study of compounds, antonyms, synonyms, affixes (prefixes and suffixes), word families, homophones, homonyms and homographs. As above, children are invited to a lesson with the teacher, participate by manipulating objects, learning about etymology, recording (independent practice). The teacher assists with control of error, and collaboration with the teacher allows for checking for understanding and assessment.
- Mechanics: This includes capitalization and punctuation and is explored as described above. For example, the lesson on a question mark includes the use of an object to illustrate the concept. In this case, a question is like fishing. You throw out a fishing hook hoping to catch a fish. You ask a question hoping to generate an answer. In this demonstration, the teacher uses a real fishing hook and line. Conceptual understanding of the purpose of a question mark is reinforced through use of this analogy.
- Reading: Grade level reading standards are assessed and taught to mastery using the Rigby Reader Program. The state frameworks inform a balanced approach, which includes phonemic awareness, systematic and explicit phonics instruction, the use of leveled reading groups and independent reading to develop fluency, vocabulary, and comprehension. Children learn grade and content specific reading strategies and skills. In addition, children are taught to read for specific purposes: for pleasure or to get information. Specific reading genres are introduced and may include: picture books, fairy tales, legends/myths, folktales, chapter books, reference books, non-fiction, biography, autobiography, etc. Children also learn to read tests as a genre. They receive instruction in learn how to read and understand the format of tests, including how to follow the directions given, how find and interpret key words, and how to respond to different question types.
- Spelling: Spelling rules are explicitly taught through the use of the Words Their Way Program. A spelling diagnostic is administered in the beginning of the school year and children receive

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small group instruction, according to the results of that assessment. Spelling instruction is provided weekly in these small groups and is focused through exploration of that week's spelling rule. Children use the Montessori Movable Alphabet to manipulate the letters to exemplify the rule. They have a list of the words for the week and Command Cards that support their continued learning and reinforce the rule they're studying.

- **Moveable Alphabet:** A visual, tactile, and auditory tool for exploring graphemes and phonemes, while learning rules for spelling. For example, children studying what traditional schools might call "Silent E" would be shown a decorative box, which has a decorative E hiding inside. After building up how magical the E is, the E is revealed, and placed at the end of a three letter short vowel word, such as /c/ + /a/ + /p/. The teacher explains that the E is magical because it changes the short vowel /a/ to Long A. The word cap becomes cape!

- **Command Cards:** Children have access to a basket full of Command Cards, from which to choose. The Cards provide the children with activities to do to strengthen their spelling skills. The Cards require children to apply their spelling skills and knowledge of spelling rules in multiple ways. For example, a Command Card might ask a child to use two different colored pencils – one color for consonants and one color for the vowels or it might hone in on that week's rule by having children transform words like cap into words like cape using the Magical E.

- **Writing:** Communication using the written form is a central part of the curriculum in traditional and Montessori schools. At BMMA, writing is integrated across subject areas in Montessori with grade level standards introduced and reinforced throughout the lower and upper elementary programs. Grade level writing standards are assessed and taught to mastery. The state frameworks inform a balanced approach to writing instruction, which includes journal writing, creative writing instruction, research, and genre-based writing instruction. This instruction exemplifies all aspects of the traditional school's writing instruction, including: modeled writing, shared writing, guided writing, independent writing, and assessment. Children learn grade level and content specific writing strategies and skills through small group and one-on-one instruction.

- **Journal Writing:** Journaling is common to both lower and upper elementary. Children write to record information and their original thoughts. This is free form writing and each child decides the extent to which the writing is shared or private.

- **Creative Writing Instruction:** Children are provided explicit instruction about how to organize their sentences into paragraphs and how to stay on topic through the 4-Square approach. The 4-Square structure is introduced at the beginning of lower elementary and is developed through upper elementary. Children begin by using the structure to develop their ideas with cut-and-paste pictures and then progress to writing sentences and paragraphs. For example, in lower

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elementary, if a child is using the 4-Square structure to record his favorite foods, he would start with the topic, Favorite Foods. In the four surrounding boxes, he would paste pictures of his four favorite foods. A child in upper elementary would use the same 4-Square structure to organize and develop a multi-paragraph essay. For example, a child may be exploring How Access to Healthy Foods Would Decrease the Obesity Epidemic. The upper left part of the 4-Square would organize the introductory paragraph(s), while the upper right and lower left would organize ideas for the supporting paragraphs. The bottom right would organize ideas for the concluding paragraph(s). Consistent use of the 4-Square structure throughout lower and upper elementary enables children to focus on the writing itself, rather than a new structure each year. The 4-Square is introduced and reinforced in small age (grade) level groups. For example, in a multi-age class of approximately 36 children, 12 six to seven year olds (first graders) would meet with the teacher together on using the 4-Square to explore grade level state standards. Similarly, 12 seven to eight year olds (second graders) would meet and 12 eight to nine year olds (third graders) would meet. This approach meets children's developmental needs, while also meeting state standards. Other creative writing, including monologues, plays, and poetry is also explored.

- **Research & Technology:** Children are provided instruction about how to conduct research. Most often, this research is guided by the child's interests, but is linked to age appropriate learning objectives and state standards. For example, the lower elementary child writing about seasons might draw his own pictures, look in magazines to find pictures to cut out, or look on the computer to find pictures to print and cut. Additional information will be of interest to the lower elementary child able to write his ideas, and therefore more research would be done through the use of classroom computers and other reference materials. The upper elementary child conducts research almost exclusively through classroom computers. For example, she might do a Web Quest or use other research tools to learn more about obesity rates in the United States, or other related topics. Large sheets of paper are made available for the children to mount their work and children self-publish books about their research to include in the classroom library. Further, children in upper elementary engage in a special kind of field trip called "Going Out," which requires them to research and plan the group trip. "Going Out" for the children researching obesity might involve interviewing medical practitioners and visiting community gardens before completing their writing.

- **Genre-based Writing Instruction:** Children are provided instruction on a variety of writing genres. These may include, but are not limited to: descriptive, narrative, expository, and persuasive writing. Children are introduced to the writing genres in their first year of elementary and go on to develop their ability to craft a narrative with sophisticated dialogue, a response to literature, or an expository essay. Descriptive and narrative writing are taught and reinforced through journaling and through use of the 4-Square. By the age of nine and ten years old, upper elementary children have more advanced writing skills and the ability to craft an articulate

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persuasive essay. For example, children develop their abilities to craft expository and persuasive essays by conducting research on topics they're pursuing (see above).

- **Work Plans:** Teachers meet with each child weekly to develop a Work Plan for the following week. In lower elementary, teachers provide an individualized Work Plan, which includes a checklist of activities the child should complete. These activities are selected based on the child's interest, ability, and age, within the context of the state standards for that grade level. The Work Plans ensures children know which activities they are expected to complete. Depending on the child's age, the activity may be teacher checked or self-checked. Once this process is complete, each child records his completed work on the Record Sheet. In upper elementary, children journal to record their completed work.

- **Handwriting:** Children write using D'Nealian manuscript and then cursive. They learn about the development of written language through the Fourth Great Lesson, The History of Language, which includes consideration of writing as an art form. Children in upper elementary further their skills by learning calligraphy.

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Mathematics & Geometry Overview

Mathematics in the elementary classroom continues to focus on the use of manipulative materials that lead the 3 to 6 year old child toward abstraction, but differs according to the developmental characteristics of the 6 to 12 year old child. Elementary aged children are socially oriented and enjoy using their ability to reason and to complete large, challenging projects. To cater to these characteristics, the Montessori mathematics curriculum encourages children to collaborate on activities and to derive for themselves the formula, algorithm, or rule necessary for abstractly completing a mathematical procedure. Many exercises allow for the possibility of extensive work while the flexible structure of classroom time enables children to complete large projects and investigations.

The mathematics curriculum is introduced with the Fifth Great Lesson, The Story of Numbers. It is divided into 13 primary areas of work: numeration, multiplication, division, fractions, decimals, squaring and cubing, square root and cube root, powers of numbers, negative numbers, non-decimal bases, word problems, ratio and proportion, and algebra. The study of geometry forms a separate curricular area in the Montessori methodology. However, geometry concepts are introduced and examined in the same manner as general mathematical ideas and the two curricula are explored concurrently throughout the school year. The study of geometry at BMMA focuses on leading children from a sensorial foundation in two and three-dimensional forms to the discovery of geometrical relationships and abstractions based on their explorations. Concrete materials (manipulatives) help develop each child's conceptual understanding of geometry and stimulate mental development by providing experience with logical reasoning, problem solving, deduction, and synthesizing. Geometry at the elementary level can be divided into six areas of work: the study of line, the study of angles, polygons, equivalence, area of plane figures, and solid geometry. Just as children's elementary mathematics work is initiated by a story outlining the history of mathematics, the geometry curriculum at the elementary level also begins with an historical account of the development of geometry. Once a story describing the history of geometry has been presented, work in all other areas of the curriculum can be undertaken.

Goals

- **Conceptualize (Mathematics):** By the end of lower elementary, all children understand computations, procedural skills, and problem solving via sequential exposure to manipulatives that develop abstract understanding. By the end of upper elementary children are skilled at performing mathematical computations, procedural skills, and problem solving abstractly. They maintain strong conceptual understanding through the continued use of manipulatives.

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- **Conceptualize (Geometry):** By the end of lower elementary, all children further develop abstract understanding of geometric relationships through use of manipulatives. By the end of upper elementary, all children understand geometry abstractly, and are able to use manipulatives to model the concepts.
- **Compute (Mathematics):** By the end of lower elementary, all children have developed basic computational and procedural skills to automaticity in: numeration, multiplication, division, fractions, decimals, squaring and cubing. By the end of upper elementary all children can further compute and perform procedural skills in: powers of numbers, negative numbers, nondecimal bases, ratio and proportion, and algebra.
- **Compute (Geometry):** By the end of lower elementary, all children can perform basic geometric computations (e.g., area, perimeter, equivalence). By the end of upper elementary, all children can perform more complex geometric computations (e.g., volume, formulations). **Solve Problems (Mathematics & Geometry):** By the end of lower elementary all children can apply their computational and procedural skills to solve word problems. By the end of upper elementary all children will be able to apply skills, understandings, and experiences to resolve challenging mathematical situations.

Instructional Strategies & Materials

Children are provided manipulative materials in the prepared environment that advance their understanding of the above concepts. Again, detail is provided to illustrate the instructional strategies BMMA will use.

Story of Numbers: The concept at the center of the Fifth Great Lesson story. This story introduces the history of numbers over time.

- **Fifth Great Lesson story:** Children are invited together to hear an oral re-telling of this story. The story is meant to pique their interest and provide the jumping off point for further study. It provides the framework for continued learning, including various stories of how numerals developed throughout the world and how that led to the development of different major systems of counting to fulfill basic human needs. The relevance of mathematics in human society is emphasized in the story and a connection between the study of mathematics and other curricular areas is established. Later presentations on the history of measurement and the history of geometry provide further details in relation to the whole study of numbers and continue the child's exploration of historical mathematics.

Math Timeline: A graphic representation of the history of counting systems provided to children when the Fifth Great Lesson story is introduced and for some time afterwards as a reference and example of how to organize historical thinking.

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Four part cards: These are sets of four cards that provide content explanations for children to study. These cards are explained above, in the Language Arts section.

Geometry Materials

As described above, geometry at the elementary level is divided into six areas of work: the study of line, the study of angles, polygons, equivalence, area of plane figures, and solid geometry. The first is described in detail below to illustrate the type of instructional strategies and use of materials used at BMMA. Just as the elementary mathematics work is initiated by a story outlining the history of mathematics, the geometry curriculum at the elementary level also begins with an historical account of the development of geometry. Once a story describing the history of geometry has been presented, work in all other areas of the curriculum can be undertaken. The sequence of geometry presentations will differ according to the interests of each child and not all areas need to be introduced with each student so long as the appropriate state adopted grade level standards are taught.

The Study of Line

In the study of line children are introduced to the concept and language of lines through the use of concrete materials and various naming activities. No more than three concepts are introduced at a time and terminology is always given in conjunction with a concrete visual impression. For example, to present the idea of a line segment, a piece of string is marked, then cut, in two places to demonstrate that a line segment has two end points.

The four areas covered in this section include:

1. Concept of Lines: straight line, ray, line segment
2. Line Position: vertical, horizontal, oblique
3. Positions of Two Straight Lines: parallel, divergent, convergent
4. Intersecting Lines: perpendicular, oblique

The Study of Angles

The child's study of angles includes eight exercises introducing and exploring the characteristics of angles and a set of activities that sensorially prepare the student for the theorems of angles. The geometric sticks, which consist of colored sticks of different lengths that can be connected through holes at the ends of each stick, are used to demonstrate different kinds of angles and are connected to illustrate the application of angles to the naming of different kinds of triangles, e.g. obtuse, scalene triangle; acute, isosceles triangle. The measurement of angles is introduced through a metal frame, calibrated in 360 degrees, into which fraction pieces can be placed and

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measured accordingly. Angles can be added and subtracted using the Montessori instrument for measuring angles, and eventually the student can be shown how to use a protractor to measure and draw angles of a particular size. The terminology for interior and exterior space of line is presented using the geometric sticks and a cutting and matching exercise during the sensorial preparation for theorem of angles activities.

Polygons

The concept and nomenclature of both polygons and circles is explored in the polygon area of the geometry curriculum. In the first activity the terminology of various polygons is presented to the child as each shape is constructed using the geometric stick material. Various exercises are undertaken to acquaint the student with the different forms, including the special names given to quadrilaterals, and a second set of lessons that examines the nomenclature of polygons (side, perimeter, angle, area, vertex, base, altitude, etc.) is presented. A similar presentation is given to introduce the nomenclature of a circle and two additional activities can be initiated to investigate the relationship between a line and a circle, and the relationship between two circles. These activities provide experience in the construction and analysis of plane geometric figures and establish a foundation for the student's later work in area and solid geometry.

Equivalence

In the elementary Montessori classroom the student explores equivalence through three groups of activities. In the first series, equal, similar, and equivalent figures are examined using two sets of divided squares--one containing rectangles and squares of different sizes, the other, triangles. Once the child is able to identify equal and similar figures, equivalence is demonstrated by placing first a rectangular half over a whole square, then a triangular half over the same square and noting that the halves are equivalent because they have the same size despite their different shapes. In the next sequence of activities, the child further explores equivalent figures using the constructive triangle material first introduced in the early childhood class. After experience in this area, equivalence with the Pythagorean theorem is introduced using a set of three metal plates containing insets that demonstrate different applications of the theorem. Work in this area is extended through a number of activities illustrating the theorem with the constructive triangles. The student's experience with equivalence directly prepares her for the study of area and the abstract geometry she will encounter at the middle school and secondary level.

Area of Plane Figures

The area of plane figures, including the circle, is explored through a sequence of activities that move from purely sensorial exercises to those where the formula for determining the area of different geometric forms is derived. In the first set of activities, the child is prepared for finding

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the area of plane figures through a study of the relationship of lines (base and height) in equivalent figures.

Thirteen metal plates containing interchangeable insets are used to demonstrate the equivalence between geometric forms and to help the student discover the rules governing these equivalencies. In the next set of exercises the concept of area of plane figures is introduced through the yellow area material which consists of a collection of movable figures that can be assembled into a parallelogram and three kinds of triangles and then converted into rectangles to demonstrate in concrete form different formulas for calculating area. Further experience with deriving the formulas for area are obtained by analyzing the metal plate material used to show equivalence.

The circle is introduced in the next set of activities. To help the student discover pi, the circumferences of various sized circles from the polygon drawer of the geometry cabinet are recorded each on a separate line. The number of diameters that fit into each circle's line is then counted and the child is helped to see that for every circle, the diameter fits three times and a little more. A second exercise is then given to demonstrate how to find the area of a circle using two circles divided into equal parts that are fit together to resemble a rectangle. By associating the height and base of the rectangle with the radius and circumference of the circle the student is provided with a concrete bases for determining the formula necessary for calculating the area of a circle.

Solid Geometry

The child's exploration of solid figures continues at the 6 to 12 year old level through a study of volume and total area. The formula for calculating the volume of solid figures is arrived at through a series of exercises beginning with ample experience analyzing forms constructed with small cubes.

The procedure for computing the volume of a solid prism is investigated in a subsequent lesson and an activity focusing on the equivalence between prisms with different bases is presented to help the student calculate the volume for a variety of prisms. A set of hollow solids that can be filled with sand are then used to help the child discover the formula for finding the volume of a pyramid. The study of volume culminates in an activity where the child is led to determine the volume formula for the cylinder and cone of the geometric solids. The area of solids is examined by drawing the outline of figures from the geometric solids on large sheets of paper. Once the surface area has been laid out in two dimensional form, the child can apply what she knows about calculating the area of plane figures to determining the formula for finding the total area of solids. Both series of exercises in the solid geometry area of work enable children to discover the

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necessary formulas themselves and to apply these formulas to three-dimensional forms found in the environment.

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History/Social Science Overview

At BMMA, History/Social Science will be called social studies. Classroom activities and materials will be drawn from Montessori materials used in geography, history, and anthropology. Because the evolution of human societies is examined as part of the whole unfolding of life on earth, there is much intersection between the science and social studies curricular areas. For children in the lower elementary program, history and geography are presented from a global perspective, beginning with stories from various cultures about the beginning of the world.

Children explore political geography through the use of maps and picture folders. They learn more about how time is measured (daily calendar, the clock, etc.), as preparation for reading timelines of history. Next, children study early human beings, and using the Chart of the Basic Needs and Tendencies, see how all peoples, even from earliest times, have had the same basic needs, and have met these needs through interaction with the physical environment. This connection is made throughout the child's studies – that history is shaped, in part, by geography. The child begins the systematic study of his/her own country, then other countries, through a map series that isolates various physical and cultural features: capitals, borders, rivers, cities, etc.

In the second and third years of lower elementary, the study of early human beings becomes the focus of cultural history, using the prepared timelines and the Chart of the Basic Needs and Tendencies. The Migration Charts are introduced, especially those of early peoples. In Geography, the Classified Nomenclature provides a guide to further exploration of the physical world, parts of the earth, parts of the atmosphere, climate zones, and more specific land and water forms. Whenever possible, the children are taken to natural sites where they can actually observe a marsh, a cliff, etc. When this is not possible, models made of clay and sand are constructed so that the child has the kinesthetic experience of these various configurations. Political geography continues through the use of picture folders, stories, literature, songs, and celebrations from various cultures.

In the first year of upper elementary, the child integrates history and geography, seeing how the particular geographical and biographical features affect the development of a civilization. S/he continues the study of human migrations through the impressionistic charts. The classified history questions offer a more detailed framework for research of a given culture. The child now begins to construct timelines of his/her own, integrating the various skills necessary to execute such a project: collaboration, setting the scale, selection of material, calligraphy, and artwork. When completed by a child or small group, timelines are then presented to the other children in the class. The other dimension that begins at this age is economic geography. Here the child discovers the interdependencies within our economic system. S/he sees we are all interdependent, each giving something to the whole and each taking something. Various systems of exchange are studied, from barter to the use of credit cards.

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In the second year of upper elementary, the child continues the study of civilizations, with concentration on the Middle Ages and Renaissance. Instead of working with prepared timelines, the child (usually working with several other children), constructs his/her own timelines, using the Chart of the Basic Needs and Tendencies and the History Questions as guides. In these studies, s/he comes across other forms of human migration, which are crystallized on the Migration Charts. Economic geography expands to include studies of population density and imports and exports.

In the third year of upper elementary, the emphasis in history and geography is on recent and current events – exploring African history, the age of Exploration, and the development of the United States of America. In particular, the child researches and constructs timelines on the history of California and Vista . S/he makes a study of different political systems and investigates the structure and function of national, state, and local governments. Finally, the child studies the steps in world unification, both economically and ideologically, through an investigation of world trade agreements and peace efforts.

Goals

- Children will develop knowledge and cultural understanding. This includes incorporating lessons from history and the other humanities, geography, and the social sciences.
- Children will develop an understanding of democracy and civic values. This includes an understanding of our national identity, constitutional heritage, civic values, and rights and responsibilities.
- Children will develop skills, which include basic study skills, critical thinking skills, and participation skills that are essential for effective citizenship.

Instructional Strategies & Materials

To achieve the goals above, children do activities using Montessori materials specific to history and geography. These are listed below. In addition, teachers develop thematic standards-based units for History/Social Science concepts that are not taught to mastery by the end of the corresponding year. Further, children are provided with opportunities to learn about social studies through primary sources, guest speakers, inquiry-based research projects, and “going out” on field to learn and share.

Activities and materials in the elementary history program include:

- Natural history
 - The Black Strip

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- o Clock of the Eras
- o Timeline of Life
- Timeline of Life
- The Linear Measurement of Time
 - o The Clock
 - o Days of the Week
 - o Months of the Year
 - o Class Diary
 - o History of Children's Names
 - o Personal Timelines
 - o The B.C. and A.D. Timeline
- Pre-History
 - o The Hand Chart
 - o The First Timeline of Human Beings
 - o Fundamental Needs Charts
 - o Second Timeline of Human Beings
 - o History Question Charts
- Written History
 - o The Growth of Culture
 - o Study of Other Civilizations
 - o Study of Child's Own Civilization

Activities and materials in the elementary geography program include:

- Preliminary Exercises
- The Beginning
 - o Great Lesson
- Economic Geography
 - o Production and Consumption
 - o Imports and Exports
 - o Interdependencies
- Nomenclature
 - o Mountains
 - o Rivers
 - o Coastlines
 - o Inland Land Formations
- Experiments

Note that BMMA classifies the study of The Nature of the Elements, Sun and Earth, The Work of Air, and Work of Water as science. State standards by grade level are incorporated into the categories of activities listed above.

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Science Overview

No longer content with sensorial experiences, the elementary child's interests extend beyond the immediate environment to the world and include questions of where, when, how, and why. As a result, children study the Earth as a part of its universe and explore the origin of the Earth and the interdependence of plants and animals.

Biology is viewed through a lens of the Earth's creation and explores the needs of plants and animals, ecology, and classification. Lessons are presented in small groups and incorporate factual information as well as myths and fairy tales. Illustrative charts, demonstrations, and experiments are also used during presentations to make an impression on children and to help them visualize how the world functions. Each child then has the possibility to explore topics of interest on his or her own or may repeat the experiments individually using written instructions referred to as command cards. The command cards help children organize their thoughts clearly and sequentially, and provide them with a format for making up and writing their own experiments. Accurate scientific terminology is used within the presentations in both curriculum areas and, where possible, is linked to its etymology to help children make sense of the language. Nomenclature booklets in the elementary classroom serve as a reference and as a source from which terms that facilitate understanding of scientific concepts can be memorized.

Goals

- Children will learn facts, skills, concepts, principals, and theories specified in grade level content standards.
- Children will learn investigation and experimentation skills essential for inquiry at BMMA, through high school, and beyond.
- Children will raise questions, follow their curiosity through scientific inquiry, and develop analytical skills in the process.

Instructional Strategies & Materials

At BMMA, the elementary science curriculum can be divided into five broad units of study: The Creation of the Earth, Nature of the Elements, The Sun and Earth, The Work of Air, and The Work of Water. Each unit serves as a follow-up to the story of the earth's creation and will be presented as details set in the framework of the whole rather than as facts to be learned and memorized. The units are closely related and may be presented according to the interests of the children once the story of the earth's formation has been given.

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Story of the Earth

The story of the Earth is presented to the entire class early in the school year and serves as the new elementary child's introduction to both the study of science and history. The entire story is given at one sitting and can be based on a printed story given to Montessori teachers during their training or developed by the teacher himself. Fairy tales symbolizing facts are used within the story to catch the student's interest, and emphasis is placed on the idea that laws affecting all particles have achieved order within our universe.

A number of large, impressionistic charts are displayed during the story to help the child visualize phenomena, such as the relative size of the earth to the sun, and seven different experiments representing basic laws of nature are demonstrated during the presentation. For example, to illustrate that matter settles according to its weight, water, oil, and mercury are poured into a test tube and observed as they form three distinct layers. Books about the solar system and the universe should be made available in the classroom following the presentation, and portions of the story can be retold in more detail if children express an interest in hearing it again.

Various follow-up activities, such as swinging a bucket of water over our heads to demonstrate why we don't fall off the earth, can be presented before specific details about the earth are explored more formally. The unit's remaining lessons examine the composition of the Earth. The Earth's spheres, the concept of gravity, the layers of the Earth, and various pressures influencing the surface of our planet are sequentially explored through the use of charts, demonstrations, and materials allowing children to investigate attributes of our Earth on their own.

Nature of the Elements

In this unit, basic principles of nature are explored through factual lessons that use personification and imagery to engage the student's interest and assist her understanding. For example, in one presentation particles are said to be "very stubborn in solids" and "more obliging in liquids" in an attempt to describe the phenomena in terms that the student can relate to. Teacher demonstrations, such as melting wax to illustrate particles becoming loose when heated, are used to illustrate basic laws of nature, and children are encouraged to repeat the experiments themselves using corresponding command cards. The lessons serve as a means for organizing the information and only as much as well will make an impression on the child should be presented at one time.

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The main topics and subtopics examined in this unit include:

- a. Properties of the Three States of Matter
- b. Further States of Matter
 1. Solids: Rigid, Elastic, and Plastic
 2. Liquids: Fluid and Viscous
 3. Solids Can Have Elasticity
- c. Different Ways of Combining
 1. Solutions
 2. Non-combining Particles
 3. Mixing Particles
 4. Precipitated Reactions
 5. Chemical Reactions
 6. Saturation
- d. Attraction of the Earth and Gravity
 1. Magnetic Pull
 2. Heaviest Particles Settle Towards the Center
 3. Gravity
 4. Heavy Objects Sink

The Sun and Earth

The Sun and Earth unit explores how the sun influences the earth. The unit consists of four lessons and includes presentations on four different work charts that are manipulated in some manner by the student to reinforce particular concepts introduced during the lessons.

The first lesson, referred to as "The Rotation of the Earth and its Consequences", uses a globe, a lamp, and a number of charts to illustrate how the earth is affected by its own rotation and by its rotation around the sun. The lesson explores why we have night and day, and examines how the earth is heated and cooled in a 24-hour period. Follow-up activities include an introduction to AM and PM and to longitude and latitude.

A second lesson in the unit explores the influence of the sun's perpendicular and oblique rays on the earth. Toothpicks are placed in both a flattened piece of clay and a spherical ball of clay to demonstrate how the curve of our planet's surface causes the sun's rays to fall obliquely on specific areas of the earth. A flashlight is then shone on a piece of paper both perpendicularly and obliquely to show how the perpendicular rays are more intense. The lesson continues by discussing why it is warmer at the equator than at the poles using a variety of charts to illustrate the different explanations.

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The next lesson presented in this unit, entitled "The Seasons", explores how the earth's tilt influences the length of our days and the different seasons we have within our year. A story intended to excite the student's curiosity is used to introduce the idea that our days change in length during the year. A clay sphere on a pointer stick is then rotated around a lamp in a tilted position to demonstrate how the sun's perpendicular rays hit the earth at different points during the earth's rotation around the sun causing some areas to get more sun at certain times of the year than other areas. A connection between the length of day and the season is made during the lesson and the student is introduced to the terms solstice and equinox. Follow-up exercises further explore the effects of the planet's tilt through the use of factual charts. Four work charts (a work chart of zones, a time zone chart, a protractor zone chart, and a work chart for the seasons) are introduced at this point to reinforce ideas presented in the seasons lesson.

The last lesson presented in the Sun and Earth unit examines our atmosphere and how rain occurs. Impressionistic charts are used to show how our atmosphere absorbs radiated heat and simple experiments, such as placing a cold lid over a pot of boiling water so that the moisture turns back into liquid, help the child to understand why it rains. Extensions to this lesson are open-ended and could include a study of cloud formations, precipitation, the geography of deserts, etc.

The Work of Air

The Work of Air unit focuses on the planet's winds and how these have influenced our earth's climate. The unit begins with a demonstration of three experiments showing that air occupies space, rises when heated, and moves to replace heat that has risen. Six lessons are presented in the unit using a combination of charts, demonstrations, and experiments, and three of the charts introduced are also used as work charts through the addition of a moveable sun and some arrows.

Topics and subtopics explored in this unit include:

- a. Winds
 1. Simple Cycle of Winds
 2. Introduction to Pressure Zones
 3. Slanted Movement of Winds
 4. Steady and Variable Winds
- b. The Effects of Heat on Land and Water
 1. Absorption of Heat by Land and Water
 2. Sea and Land Breezes
- c. Seasonal Changes
 1. Perpendicular Rays of the Sun
 2. Effects on Wind Directions
 3. Effects on Rain

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- d. Local Winds
- e. Oceanic Currents
 - 1. The Wind's Effect on Currents
 - 2. Vertical Motion of Currents
- f. Erosion by Wind (or Wind as Sculptor)

Work of Water

Lessons examining how water in its various forms has helped to shape the surface of our planet are presented within the Work of Water unit. Clay models representing land formations are used in many of the lessons to demonstrate how rivers, rain, and waves have altered the earth's exterior, while both factual and impressionistic charts are used throughout the unit to illustrate the concepts being introduced. Children should be taken to places in nature showing the phenomena introduced when possible, and can follow-up the lessons by building their own models.

The unit's topics and subtopics include:

- a. The Work of Rivers
 - 1. Carving a River
 - 2. River Deposits
 - 3. Introduction to Highlands and Lowlands
 - 4. Rivers of North America
 - 5. Rivers of the World
 - 6. Introduction to Cities on Rivers
 - 7. 'V' Valleys and Canyons
- b. Work of Rain
- c. Work of Waves
- d. Work of Ice
 - 1. Breaking Rock Apart
 - 2. Glaciers
 - 3. Results of Glaciers
- e. The Cycle of Water
- f. Spread of Vegetation
- g. People in Different Zones
- h. Composition of the Earth

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Biology

The subject of biology in the Montessori classroom is closely related to the child's history work and focuses on the immense variety of ways plants and animals have fulfilled their needs. Biology is viewed as an essential factor in the story of the earth's creation, and the curriculum's main concern is to foster an appreciation for the diversity of life and to instill an awareness of the importance of preserving the balance of our planet.

At BMMA, the biology curriculum is divided into four areas (botany, zoology, classification and ecology) and caters to the elementary child's ability to reason and her desire to know the how and why of things. Lessons incorporating allegory and personification are used to arouse the child's curiosity, and charts and experiments are used within the talks to engage the child and to help clarify the information presented. Observations of plants and animals both in the classroom and nature are an important part of the biology work, and relevant books should be made available to children within the classroom. Either botany or zoology can be given first, or both may be explored simultaneously. Classification activities may be started once the child has attained a store of information about the variety of features in plants and animals.

Botany

The botany portion of the Montessori biology curriculum begins by introducing the primary needs of plants through three experiments. During the first experiment seedlings are placed under different conditions to emphasize that plants need water, light, and heat in order to grow. The second experiment demonstrates that plants have a tendency to grow toward the sunlight, while the third exercise shows that plants need a variety of minerals for optimal health. A chart illustrating the needs of plants can be presented to summarize the experiments and to interest the child in how plants function.

Each part of the plant, which includes the leaves, roots, stem, flower, fruit, and seeds, are then individually explored through a series of lessons incorporating experiments, demonstrations, and charts. The first lesson presented for each part examines the function or contribution that part makes to the plant and frequently uses a story format. Subsequent lessons investigate the plant part in more detail and how different varieties of the part have assisted plants in adapting to their environments.

The main lessons included in this unit are as follows:

- a. The Leaf and Its Functions
 1. Function of Leaves
 2. Plants Give Out Oxygen
 3. Parts of Leaves

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4. Varieties of Leaves
5. Varieties According to Function
- b. The Root and Its Functions
 1. Experiments Showing Roots' Attraction to Water
 2. Roots Absorb Water
 3. Other Functions of the Root
 4. Two Main Types of Roots
 5. Other Sensitivities of the Root
 6. Varieties of Roots
- c. The Stem and Its Functions
 1. General Function of Stems
 2. Two Main Kinds of Stems
 3. Names of Tubes
 4. How Water is Moved Up the Stem
 5. Varieties of Stems
- d. The Flower
 1. Introductory Story to the Flower
 2. Parts of the Flower
 3. Varieties of Flowers
 4. Specialization to Assure Pollination
- e. Fruit
 1. Main Function of Fruits
 2. Kinds of Fruits
 3. Parts of Succulent Fruits
 4. Other Varieties of Fruits
- f. Seeds
 1. Kinds of Seeds
 2. Function and Parts of Seeds
 3. Seed Dispersal
 4. Botany Experiments
 5. Nomenclature Materials
 6. Classification Chart
 7. Classification Material – Kingdom Vegetalia
 8. Botany books for additional research

Accurate scientific terms are given throughout the presentations and botany card material, consisting of picture, name, and definition cards for botany concepts, can be introduced to help familiarize children with the terms and their definitions. Command cards providing directions for repeating the experiments demonstrated in the presentations can also be made available to children.

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Zoology

The zoology component of the Montessori biology curriculum focuses on the needs of animals and how these needs explain the animal's features and behaviors. Animals kept in the environment help children to become aware of the special needs animals have and provide opportunities for detailed and systematic observations. Two sets of materials, the story material and the body function material, are used in the classroom to help guide the child's explorations and to introduce different ways for classifying animals.

- Story Material

The story material consists of a set of envelopes each dealing with a different animal and containing a picture of the animal, a card of text, picture cards showing how the animal meets her needs and text cards relating to these. Various exercises using the materials are presented to small groups of children to help them become aware that all animals have the same needs but that they satisfy these needs in different ways. Question and answer cards pertaining to how the animal meets her needs, e.g. how do they move? (walk, crawl, swim, etc.), are then introduced as a simple means for classifying the animals and to start the children thinking about the immense variety of animals that exist.

- Body Function Material

The body function material, consisting of booklets, picture cards, and definition cards, are used to synthesize the knowledge the student already has about animals and to introduce the five classes of vertebrate. Various matching exercises provide the child with opportunities for exploring both the external and internal functions, which define a group or class of vertebrate and prepare the child for working with the animal classification material.

Classification

The Montessori plant and animal classification material enables children to develop their analytical abilities by providing them with opportunities to decide whether to place a specimen in one particular group or another. The material, which is composed of picture cards, text cards, and circular cards indicating the level of the subdivision it represents, is organized into envelopes by group with each envelope varying in size in such a way that subdivisions can fit inside of it.

Children are introduced to the subdivisions of classification by either working down from each of the kingdoms or by working up to the kingdom beginning with a particular subdivision. Various activities allow children to become familiar with the characteristics for different subgroups and prepare the child for creating a tree of classification which progresses from

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kingdom to families using the classification circle cards and cardboard branches corresponding to the number of groups being laid out. Children are also shown how to use books to trace a plant or animal's genealogy.

Ecology

The study of ecology in the Montessori elementary classroom focuses on viewing the world as an ecosystem and on the delicate balance existing between organisms and the environment. The idea of interrelatedness is emphasized and is introduced by exploring the physical and biological factors existing in our world and how these factors relate to one another within various ecosystems on our planet. Ecology serves as a natural conclusion to the child's work in many areas of the Montessori curriculum and can be explored in a variety of ways depending on the student's interests.

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World Language Overview

BMMA is committed to providing language learning opportunities as early as possible in the K-8 timeline. BMMA will provide world language instruction formally from kindergarten. The first world language offered will be Spanish. Moving forward as the school grows, BMMA will explore other world languages to offer both for native Spanish speakers seeking mastery of a third world language and for children interested in learning a world language other than Spanish.

Goals

- Children are able to communicate orally in a world language with a beginning level of fluency and are able to use that language to communicate in settings outside of the classroom.
- Children gain knowledge and understanding of another world culture and understand the role language plays in cultural identity.
- Children develop an understanding of the nature of language and are able to compare and contrast the language they are learning with their native language

Instructional Strategies and Materials

BMMA will provide world language instruction very similarly to the way the School will teach English Language Development to English Language Learners. Children will receive a balance of content-based language instruction and explicit language instruction. The content will enable children to make meaningful connections, build vocabulary and context, and learn about language as it relates to culture. The explicit language instruction will provide the rules of the language and in concert with the content build confidence in the language and provide context to the grammar and rules. In alignment with the Montessori approach, children will gain access to much of the content, vocabulary, cultural exploration, and connections through a prepared environment.

The Montessori setting naturally provides many of the graphic supports and visuals fundamental to content-based language instruction. The teachers will embed procedural, verbal, and instructional scaffolds into the prepared environment to enable them to access the language naturally, and they will create explicit opportunities for children to engage in conversation and discussion as part of the daily routine. This is also where the School will reach out to our families and our community to bring native speakers to the classroom whenever possible to authentically engage our children in the world language.

At the lower elementary level, BMMA will incorporate movement, song, dance, and storytelling, Practical Life and Peace and Character Education and will focus less on written language fluency

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and more on oral language fluency. Children will also be engaged in thematic cultural units that build their understanding and appreciation of the relationship between language and culture.

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The Arts (Visual Arts, Music, Drama, Movement) Overview

“The truth is that when a free spirit exists, it has to materialize itself in some form of work, and for this the hands are needed. Everywhere we find traces of men's handiwork, and through these we can catch a glimpse of his spirit and the thoughts of his time. The skill of man's hand is bound up with the development of his mind, and in the light of history we see it connected with the development of civilization.” ~Dr. Maria Montessori

With the belief that all children have innate creative capacities to be nurtured and shared, BMMA's elementary arts curriculum focuses on building artistic skills in visual arts, music, movement and theater while making larger connections to our history, our culture, our environment, and our unique and shared perspectives of the world. BMMA classrooms have artistic materials at the ready for children to produce creative ‘work’ emphasizing each child’s interests and understanding of The Great Lessons. Additionally, children receive instructional time in the afternoon to synthesize their ideas via visual arts, music and design thinking challenges.

Goals

- Children will build skills in visual arts, music, movement and theater so that they are able to articulate their ideas via a diverse range of visual, musical, kinesthetic or theatrical forms (i.e., drawings, paintings, sculptures, musical scores, dance scores, plays, operas, etc.).
- Children will develop meta-cognitive and reflective skills based on Studio Habits of Mind in order to synthesize their own learning strategies and strengths in both arts and other subjects.
- Children will appreciate different points of view and forms of creative expression across the artistic disciplines in order to empathize with other races, cultures and nationalities as well as take creative action in their own cultural contexts.

Instructional Strategies & Materials

The California Visual and Performing Arts Framework—artistic perception, creative expression, historical and cultural context, aesthetic valuing and connections/relationships/applications—guides BMMA teachers in their curriculum design and overall integration of the arts into The Great Lessons and Design Thinking curriculum.

- Analytic lenses from Harvard’s Project Zero help BMMA teachers and children think critically about their creative work. For example, the Studio Thinking Framework’s eight Studio Habits of

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Mind—develop craft, observe, engage and persist, stretch and explore, express, envision, reflect and understand art world—offer children and teachers a common language to articulate artistic choices and thinking processes. These habits of mind dovetail with the Design Thinking Processes.

- Project Zero’s Artful Thinking and Making Thinking Visible protocols also engage children to reflect upon their artistic work and make their learning visible to parents, peers, teachers and community members. Performances of understanding include: dance performances, plays, art galleries or exhibitions of learning.

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Physical Education/Health Overview

The development of healthy minds and bodies at BMMA is prioritized in three ways: instruction about healthy habits and choices, structured play, and unstructured play. These three foci are integrated in the Montessori curriculum, which includes the study of physical education/health within other areas such as care of self, coordination of movement, and biology and via instruction of the California state standards, which specify the teaching of discrete Physical Education/Health standards.

Goals

- Children will appreciate health through study of healthy habits and choices. They consistently apply these skills within and outside the school environment.
- Children will develop skills for unstructured play, including how to have fun playing alone and with others.
- Children will develop skills for structured play, including how to win and lose with grace.

Instructional Strategies & Materials

At the heart of teaching children about health and physical activity is the need to ensure that children feel included and safe as they learn about health and engage in physical activity. All children will have explicit time scheduled weekly for physical education classes where they will receive training and lessons in numerous physical fitness activities (could include martial arts, yoga, soccer, basketball, football, golf, tennis, swimming, dance, biking, hiking, running, gymnastics, sailing, rowing, climbing) and opportunities to practice their learning in a safe and encouraging setting.

They will also be provided with lessons as part of the core curriculum that teach specific concepts and skills and provided opportunities for practice to apply their learning. For example, inside the classroom, children learn about healthy eating habits through daily preparation and service of healthy snacks. This work has a permanent physical place in the prepared environment. Outside, children learn about healthy habits through shared meals, structured, and unstructured play. For example, gardening, hand washing, eating together, washing dishes, composting, playing “chase me,” resolving a conflict, or participating in a gymnastics or yoga class happens regularly.

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In particular:

- Instruction about healthy habits and choices provides children with the information they need to appreciate health. BMMA provides children with opportunities to develop healthy habits by making healthy choices.
- Unstructured play is time when children get to choose how, where, and with whom they want to play. Here, they develop responsibility for what they're doing and for each other, while developing independence and leadership skills.
- Structured play includes developmentally appropriate activities bounded by "the rules of the game." They include competitive activities and skill development about how to keep activities going so the larger group can keep playing when something comes up that stops play. This may include forms of self-handicapping such as switching players or adapting the rules.
- Exposure to a wide range of physical activities during Physical Education classes, from movement to yoga to traditional team sports, BMMA children will receive lessons and training in multiple sports and fitness activities to ensure each child connects with a physical activity that s/he enjoys.

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Character and Peace Education Overview

Central to Montessori curriculum is the development of children who are able to function successfully in society. At BMMA, character and peace education is core to the curriculum. Every member of the community is responsible for modeling respect. This includes respect for self, respect for others (including animals), and respect for the environment (at school, at home, and beyond). Many aspects of the school contribute to the development of these mores.

Goals

- Children will be mindful of their responsibilities as members of the class. This includes respecting themselves and others.
- Children will be able to solve real world problems within the context of their classroom, community, and world.
- Children will be empowered to feel they can and should contribute to their classroom, community, and world.
- Children will work with any child in the class on any project at any time.
- Children will develop empathy with others.
- Children will share their work, inside and outside the classroom.

Instructional Strategies & Materials

A variety of instructional strategies and materials contribute to making BMMA an environment that fosters character and peace education. Some of these include peer teaching, modeling, and the Peace Table/Corner.

- Peer teaching: In the Montessori classroom, multi-age groupings make it possible for authentic peer teaching to occur. In traditional classrooms, a teacher may have her third grade children meet with their kindergarten “Reading Buddies” once a week for 15 minutes. In our classrooms, children of different ages have strong relationships because they’re in the same classroom every day. They learn each other’s strengths and weaknesses, the younger children emulate the older children, and their engagement with one another is purposeful. The children are not required to help another child. They are part of a culture that values helping others. They are self-directed and choose to help each other joyfully, based on real interest and real needs.

- Modeling: Everything about the culture of Montessori classrooms and schools is intentional. In some traditional school environments, a teacher or adult may be considered the “Learned One” or bringer of knowledge. In contrast, at BMMA, adults and children co-create knowledge by participating in learning together. As described above, Individual Work Plans are prepared

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together. Modeling appropriate behaviors, attitudes, and habits is done by all members of the community, children and adults.

- **Peace Table/Corner:** Each classroom and outdoor space has a place designated for children to meet to resolve conflicts. In many classrooms, this is a low table called the “Peace Table.” Some classrooms place the table in a quiet corner and call it the “Peace Corner.” The table or area is meant to be inviting, cozy, and tranquil. Any colors used are soothing; if lights are used, they’re dim; floor pillow or beanbags may be used; water fountains may be used. Books on peace may be displayed. This builds on the early childhood experience of the “Peace Rose.” Prior to going to the Peace Table/Corner, a child needing help resolving a conflict completes a form like the one seen below requesting mediation. The form helps the child prepare for the meeting.

See below Sample Request for Peace Conference:

I _____ am calling _____ for a Peace Conference. I want to meet to discuss _____
I would like a (circle one) *teacher* or *peacemaker* to join us.

Once the children are at the Peace Table/Corner, they begin resolving the conflict through use of a Language Frame (see below).

Sample I-Message Language Frames:

Child 1 to Child 2: “My name is _____, and I feel _____ when _____ because _____.”

(Optional, depending on type of conflict. E.g., physical conflicts are likely to use this, but inclusion/exclusion conflicts are unlikely to) “I want you to _____.”

Child 2 to Child 1: “So the problem is you feel _____ when _____ and you want _____.”

At this point, Child 2 may share additional unresolved feelings, as needed.

- **Job Chart:** Each classroom has a Job Chart that lists jobs for each child to choose or rotate weekly. The jobs help the children develop specific skills to care for themselves, others, and the environment. See chart below for examples.

- Other possible opportunities for character and peace education are explained below.

Birthdays Children learn that they travel around the sun once for every year of their life. They participate in a “Sun Ceremony” that has them act out the process of their growing older. A rug/low table is prepared with a yellow sun model with the months around it and a candle acts as the sun. Children hold a small globe and walk around the sun, returning to stand at their birth month, while parent(s) shares important milestones and pictures from each year, as the child continues to walk around the sun.

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Historical Halloween Children choose an important figure from past or current history who has contributed to making the world more peaceful. They research the person, dress as the person, and share what they've learned with their class and schoolmates on Halloween.

International Day Children research their heritage, including where their ancestors came from, where their name comes from, etc. They share about their culture, including geography, food, customs, etc. with their class and schoolmates on International Peace Day.

School Government Children vote for President, Vice President, Treasurer, and Secretary of the school, as well as class representatives from each classroom. Those running have a platform, give a speech, and share what their plans are to improve the school. Once elected, they hold bi-monthly meetings to fulfill their elected duties.

The Green Team Children vote for two representatives from each classroom to be part of The Green Team. Their goal is make the school more environmentally friendly.

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Practical Life Overview

The primary goal of the practical life activities is to aid the children's development of self-esteem, concentration, organizational skills and independence. The elementary practical life curriculum is a continuation of the practical life skills presented in the primary classroom. Skills pertaining to care of self, care of environment and living things, along with grace and courtesy are still important. The children are responsible for the care of their classroom. The various responsibilities could include determining classroom guidelines, preparing new materials, printing paper and ordering new dictionaries. However the focus now includes strengthening the ability to cooperate so that the children may become fully capable and responsible adults who develop empathy and sensitivity towards others and who are contributing members of their community.

It is because of this greater sensitivity to others that community service projects are an important part of the elementary practical life curriculum. These projects include the entire school and beyond.

"Going out" trips into the wider community are often suggested and planned by the children with a parent or teacher. Such work might include a desire to assist a nation after a natural disaster has occurred. The children's planning process could include exploring the various channels for providing aid, such as viewing websites for organizations already involved. Children can research the work of the various organizations and think strategically about how they can help. Activities might include notifying the public of humanitarian needs, collecting the supplies and donations, and transporting the goods to the nearest office of the aid organization.

Goals

The primary goal is to strengthen the children's ability to cooperate and to develop a sense of responsibility. The children will develop empathy and sensitivity towards others within their immediate environment and beyond.

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Design Thinking Overview

Design Thinking is specifically taught and integrated into the curriculum to nurture a creative disposition in children and provide a skill set that enables them to leverage their content knowledge to identify problems and develop innovative solutions. Through Design Challenges, children are given meaningful opportunities to practice the design process and develop their capacities as designers.

These skills support the self-directed nature of the Montessori curriculum and help develop children who are primed both for success in high school and to make meaningful contributions to our 21st century society.

Goals

- Children recognize that the objects and systems in their world were designed and built by people
- Children recognize that they can create new solutions to change and improve their world
- Children have a problem solving process they can use to address challenges

As part of this process children learn:

- The phases of the design thinking process
- To play different roles on a design team
- To interview and observe others
- To define problems for which they will develop solutions
- The rules and roles of brainstorming
- To use tools and materials for prototyping
- To test their prototypes
- To present their ideas to others

Instructional Strategies & Materials

Design Thinking Education is an emergent discipline that is being successfully implemented by many school. BMMA will develop and implement instructional strategies that leverage the experience of our partners and that appropriately scaffold the design process for children in each of the developmental planes.

Since one of the tenets of design thinking is that materials inspire design, our classrooms will have a vast array of building materials (recyclables, fabric, wood, glue, etc.) and building tools to encourage broad thinking.

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- Both lower and upper elementary children work on Design Challenges to learn the design thinking process
- Both lower and upper elementary children work on Design Challenges tied to the Great Lessons and other curricular content
- Children will work on skill building within the prepared environment
- Children will work with basic shop tools as well as digital technologies to build their prototypes and share their work

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Technology Program Overview

The Elementary Technology Program begins by developing children's ability to use technology to bolster their creativity and innovative capacity progressing all the way up to understanding how to use technology effectively to communicate, collaborate and conduct research. Children will find natural intersections between technology and the schools' Montessori, Arts and Design Thinking curricula and will leverage modern technology to address the real world problems and opportunities that the founding team believes are central to providing children with context for their learning in the 21st century.

Goals

- Children will demonstrate basic computer fluency, including the ability to use the keyboard and mouse to interact with relevant software and online content
- Children will be able to use technology to write and illustrate short essays, stories and poems
- Children will be able to create basic multimedia artifacts, including simple movies, digital paintings and drawings, slides and other presentation materials
- Children will be able to identify technological opportunities to enhance and demonstrate their learning in any curricular subject
- Children will demonstrate basic Internet research skills, including introductory search methodology, data collection and organization and source citation
- Children will engage in basic online collaboration with other children and/or professionals at a distance

Instructional Strategies & Materials

BMMA will provide children with a range of technology, including computers, Internet connectivity, tablets, mobile devices, input devices and software (including adaptive, media creation, word processing, presentation, spreadsheet and collaboration products).

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The Secondary Montessori Curriculum (Serving Children 12-14)

Secondary Program

Like the elementary program, the secondary curriculum is composed of interwoven subject areas, and in alignment with the third plane of development, the curriculum becomes increasingly multidisciplinary and integrated in its approach and presentation.

Areas of Curriculum

- *Language Arts*
- *Mathematics & Geometry*
- *History/Social Science*
- *Cultural Studies and Science*
- *Arts (Visual Arts, Music, Drama, Movement)*
- *Character and Peace Education*
- *World Language*
- *Health and Physical Education*
- *Practical Life*
- *Design Thinking*
- *Technology*

Grade level state standards in English Language Arts, Mathematics, History/Social Studies, Science, Physical Education/Health, and the Arts are taught to mastery. It is at the secondary level where Design Challenges and arts integration are increasingly blended into the core curricula and where state standards are presented through multidisciplinary challenges that are meaningful and relevant to our youth.

Maria Montessori did not specialize in secondary education, but today there are hundreds of Montessori secondary programs nationwide that took her approach to primary and elementary education and mapped it to secondary education. While Montessori did not do extensive research at the secondary level and there are not specific Montessori curriculum materials at this plane of

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development, she did have several observations about adolescents and their particular plane of development that are in alignment with the understandings of the secondary educators on the BMMA founding team and current research on adolescents.

These observations include:

- Adolescence is a period of great vulnerability
- Adolescence is a period of self-construction; adolescents are trying to make meaning of themselves in the context of larger society
- Adolescents are intellectually prepared to ask and answer hard questions, dive deeper into complex topics, and become motivated by real world issues; simultaneously, they are self-conscious, discouraged easily, and insecure about their ability to do the above
- Adolescents have a great need for creative expression as a means for self-expression and for self-discovery in their pursuit of independence
- Adolescence is a critical time for determining self-worth,

"The whole life of the adolescent should be organized in such a way that it will enable him or her, when the time comes, to make a triumphal entry into social life, not entering it debilitated, isolated, or humiliated, but with head high, sure of himself or herself."

~Maria Montessori

The BMMA approach to its secondary program follows from the values statements made above and from the best practices of Montessori secondary schools across the country. One example is a nationally recognized public Montessori secondary school located in Cincinnati, Ohio, Clark Montessori. The first public Montessori secondary school in the country, Clark Montessori serves a socioeconomically and racially diverse student population and sends 100% of its seniors to college. Clark Montessori organizes its core content around eight central themes. The themes are selected to be relevant to adolescents and their development, to align with state standards in Social Studies and Science, and to unify the content in a meaningful way, and BMMA will use similar themes in alignment with the Common Core standards.

The themes used by BMMA are as follows:

1. Explorations & New Beginnings
2. Identity
3. Independence & Interdependence
4. Leadership through Stewardship
5. Balance
6. Change
7. Movement
8. Acquiring a Sense of Belonging

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The BMMA themes will be taught quarterly over eight quarters spanning seventh and eighth grade. Each quarter will culminate in an interdisciplinary Design Challenge that focuses on the theme. Children will receive instruction in all content areas and receive targeted instruction in the state standards throughout the quarter. They will be expected to apply their understanding and learning in complex and relevant challenges that require they employ Design Thinking in the development of solutions. It will be this application of knowledge and skills in real-world Design Challenges that motivates children to obtain the knowledge and skills to begin with. In addition, children in this plane of development will be expected to increasingly manage their learning and to collaborate with classmates around understanding the expectations and the standards, managing their time and their deliverables, and ensuring timelines and performance expectations are met. Teachers will play an increasingly facilitative role in secondary classrooms, focusing on building an individual's skills in accordance with individualized work plans and record sheets.

Similar to the elementary model, teachers will meet weekly with each child to develop a Learning Plan that will include a weeklong schedule of activities and deliverables expected for the week. Depending on the child's needs, the deliverables will be teacher-checked or self-checked and the recording format may vary in alignment with the child's needs. Some students may initially require more of a checklist format use in the elementary program; however, the goal would be to move students towards the secondary work plan format and to move them to towards greater independence. The secondary classroom will be completely differentiated with a goal of building every child's capacity to independently monitor his or her own learning, to advocate for his or her own learning, and to leverage the child's peers in his or her learning.

The prepared environment at the secondary level will be designed specific to the needs of adolescents. Secondary children will be organized in "houses" small clusters of children that "travel" together throughout the day. Each cluster will have their own common space set up for quiet study, small group work, research, and larger group meetings and lessons. Secondary children will each have their own personal space in the common room, a mini workstation. In addition, the common room will include comfortable couches, small tables to enable group work, and bookshelves and walls with leveled books and instructional resources. At this age, children will have a greater role in both creating and managing the prepared environment.

In addition to the common spaces for each cluster, there will be classrooms designed specifically to support the secondary curriculum and the secondary instructional strategies. There will be a science lab, a math lab, an art/design studio, conference rooms for seminars, and a computer learning lab.

Part of the day will be spent in seminar where children are receiving whole-group direct instruction from teachers on specific skills. Part of the day will be spent working independently or in small groups on design challenges in a workshop format. During this time, children will be

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pulled by teachers as needed for small group instruction, differentiated support, and individual conferencing according to a structured schedule. When children are not working specifically with a teacher either in a conference, lesson, or other structured activity, they are expected to be working in the common room in alignment with their individual work plans.

Once a year, secondary students will engage in a weeklong culminating intersession where they engage in a field study to address a specific design challenge. These field studies will allow the students the opportunity to work deeply on one challenge and have a hands-on experience in a specific field of study. Ideally, these studies would take place off-site and possibly be part of a multiday overnight trip, allowing community-building, personal and physical challenges, and a learning experience in another region or culture.

The larger goal of the secondary program is to ensure that children are prepared to be successful in any high school and in meeting their postsecondary goals. Teachers at the secondary level will ensure that children are able to utilize textbooks as resources in their learning, conduct effective research and fieldwork, write persuasively and powerfully, and organize and collect information from multiple sources and in multiple formats (lectures, text-based, primary, secondary, internet, interviews, numerical data, etc). BMMA anticipates its graduates will pursue high schools with diverse offerings and structures, and whether a child chooses a performance-based school for the arts or a more traditional college-preparatory program, BMMA Montessori children will have the skills, attitudes, self-confidence, and motivation to excel at the secondary school of their choosing.

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Language Arts Overview

BMMA will use the Common Core Standards adopted by the State of California for English Language Arts to organize our English Language Arts program. BMMA intends to adopt much of the Common Core Curriculum Maps for 7th and 8th grade. Teachers will determine how to align the recommended units with BMMA's adopted themes.

Goals

Reading

Through wide and deep reading of literature and nonfiction of steadily increasing sophistication, children gain:

- A reservoir of literary and cultural knowledge, references, and images;
- The ability to evaluate intricate arguments; and
- The capacity to surmount the challenges posed by complex texts.

Writing

For children, writing is a key means of asserting and defending claims, showing what they know about a subject, and conveying what they have experienced, imagined, thought, and felt. To be college- and career- ready writers, children must:

- Take task, purpose, and audience into careful consideration, choosing words, information, structures, and formats deliberately;
- Know how to combine elements of different kinds of writing to produce complex and nuanced writing;
- Be able to use technology strategically when creating, refining, and collaborating on writing;
- Become adept at gathering information, evaluating sources, and citing material accurately;
- Report findings from their research and analysis of sources in a clear and cogent manner;
- Have the flexibility, concentration, and fluency to produce high-quality first-draft text under a tight deadline; and
- Have the capacity to revisit and make improvements to a piece of writing over multiple drafts when circumstances encourage or require it.

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Speaking

To become college and career ready, children must have ample opportunities to take part in a variety of rich, structured conversations—as part of a whole class, in small groups, and with a partner—built around important content in various domains.

They must be able to:

- Contribute appropriately to these conversations;
- Make comparisons and contrasts;
- Analyze and synthesize a multitude of ideas in accordance with the standards of evidence appropriate to a particular discipline;
- Be able to listen attentively to others so that they are able to build on others' meritorious ideas while expressing their own clearly and persuasively.

Language

To be college and career ready in language, children must:

- Have firm control over the conventions of standard English;
- Be able to choose words, syntax, and punctuation to express themselves and achieve particular functions and rhetorical effects;
- Have extensive vocabularies, built through reading and study, enabling them to comprehend complex texts and engage in purposeful writing about and conversations around content;
- Become skilled in determining or clarifying the meaning of words and phrases they encounter, choosing flexibly from an array of strategies to aid them;
- Learn to see an individual word as part of a network of other words—words, for example, that have similar denotations but different connotations. (Common Core Standards: English Language Arts)

Instructional Strategies & Materials

Children at the secondary level will access primary and secondary sources to seek information and present their written and spoken understanding and analysis in multiple ways as appropriate for the audience. Children will have increased access to the resources available outside the classroom and will be taught how to differentiate and evaluate information and the sources from which the information comes. They will access multiple forms of information with an inquiry orientation, questioning the motives, intentions, and biases of the presenters and the context from which the information is being presented.

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Children will be expected to read and respond to classical literature, analyze and understand poetry, and be versed in the strategies for accessing and understanding nonfiction text. In alignment with the third plane of development, the secondary language arts curriculum will be integrated with the other disciplines. Lessons on accessing expository text will utilize science and history texts the children are already using. Lessons on poetry will align with cultural studies.

Children will increasingly leverage the world outside the classroom to get information and better understand multiple perspectives, increasingly doing fieldwork and interacting with community resources in Vista. Technology will play an increasing role in both the acquisition of information and the presentation of learning. As they advance at the secondary level they will use technological tools with greater frequency and will be explicitly taught how to assess the value of different sources as they conduct research. They will also be expected to integrate video, design, digital art, and other media tools in their presentations of learning. BMMA will explore the use of various software tools like My Access learning to ensure increased rigor, constant feedback, and accountability in our writing programs.

The general format for the school day will be a workshop format where children are expected to work on both group and individual assignments, peer conferencing with other children, or working in small groups on group assignments or projects while the teachers are teaching small groups mini-lessons or working with individuals on targeted lessons. There will be whole-group mini-lessons given throughout the week to ensure children receive explicit skills instruction in reading, writing, note-taking and presentation strategies in alignment with the Common Core standards. In addition, children will be pulled together during language arts time to respond to text using reciprocal teaching strategies, literature circles, and Socratic Seminars. Children will be explicitly taught to use note taking, processing, analysis, and planning tools to build their ability to organize their thinking and collect information in a useful format. As needed, children will receive targeted accelerated instruction in reading and writing strategies utilizing proven reading and writing interventions curriculum.

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Mathematics Overview

BMMA will use the Common Core Standards adopted by the State of California for mathematics to organize our Mathematics program. Because Montessori is at its foundation differentiated, teachers will develop individual learning plans in alignment with their zones of proximal development in mathematics. This could mean that a child in the 7th grade is learning Geometry if s/he has already demonstrated mastery of Algebra I. Our MINIMUM expectation is that ALL children graduate with mastery of Algebra I fully prepared to access Algebra II or Geometry at the high school level. This ensures all BMMA graduates are on track for A-G completion. However, this does not mean that the teacher is only providing instruction in pre-Algebra and Algebra at the secondary level. Based on diagnostic assessments, children will be grouped to receive strategic instruction in their Zone of Proximal Development. This could mean that some children are receiving instruction in Algebra II, Geometry or even Trigonometry if they are ready and have demonstrated mastery in prerequisite content and concepts.

Goals

All BMMA students will graduate with proficiency in Algebra I. They will demonstrate the following habits of Algebraic thinking:

- Doing – Undoing: Effective algebraic thinking sometimes involves reversibility
- Building Rules to Represent Functions: Input is related to output by well-defined rules
- Abstracting from Computation: Abstracting system regularities from computation (Fostering Algebraic Thinking, Driscoll, 1999, Educational Development Center, Heinemann)

Students will possess utility with algebraic language and constructs when presented with non-routine problems and approaches. They will demonstrate conceptual understanding, procedural fluency, strategic competence, adaptive reasoning, and productive disposition in:

- Problem Solving and Variable
- Equality and Algebraic Representation
- Linear and Non-Linear Functions
- Polynomial Functions
- Slope and Graphical Representation
- Polynomials (Multiplication and Factoring)
- Rate of Change and Technology

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Instructional Strategies & Materials

Similar to language arts, children will predominantly work in a workshop model where they are working independently or in small groups. Teachers in this model will be working with small groups of children or individuals on targeted lessons conscious that many children struggle to grasp mathematical concepts in the same form and that differentiation and scaffolding may be required for specific learners to master standards. Teachers will be tracking and monitoring student understanding and mastery of standards daily to monitor which lessons are strategic for which children, which children require more guided practice in small groups, or which children need re-teaching one-to-one or in small groups. Children will work on mastery of specific skills and standards in alignment with their individualized work plans developed on a weekly basis.

The materials used in the lessons and in the prepared environment will be strategically selected to support conceptual understanding. Children will be encouraged to make connections and push their understanding by accessing additional resources both in and outside of the classroom. For example, when children are exploring slope, they will be able to access multiple manipulative materials in the classroom that demonstrate slope and push their thinking about slope, but they will also be able to access engineers and road designs to understand why in going over a mountain engineers choose to use switchbacks instead of a very steep road.

Technology will increasingly be used to demonstrate concepts in the classroom and to enable children to work at their own level and pace. New “adaptive” teaching programs enable children to do independent practice of skills learned in their zone of proximal development. BMMA will explore programs like Carnegie Learning’s Cognitive Tutor as a supplementary program to differentiate and intervene. Using this type of program will support our ability to provide targeted instruction to both the motivated child ready to accelerate in mathematics as well as the struggling student requiring additional practice and support.

To organize and sequence the learning appropriately and to provide appropriate resources and content-specific professional learning opportunities, BMMA will explore programs like Connected Math that align closely to the BMMA philosophies around effective mathematics instruction.

Specifically, BMMA is committed to implementing a secondary math program where:

- The "big" or key mathematical ideas around which the curriculum is built are identified.
- The underlying concepts, skills, or procedures supporting the development of a key idea are identified and included in an appropriate development sequence.
- An effective curriculum has coherence-it builds and connects from investigation to investigation, unit-to-unit, and grade-to-grade.

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- Classroom instruction focuses on inquiry and investigation of mathematical ideas embedded in rich problem situations.
- Mathematical tasks for students in class and in homework are the primary vehicle for student engagement with the mathematical concepts to be learned. The key mathematical goals are elaborated, exemplified, and connected through the problems in an investigation.
- Ideas are explored through these tasks in the depth necessary to allow students to make sense of them. Superficial treatment of an idea produces shallow and short-lived understanding and does not support making connections among ideas.
- The curriculum helps students grow in their ability to reason effectively with information represented in graphic, numeric, symbolic, and verbal forms and to move flexibly among these representations.
- The curriculum reflects the information- processing capabilities of calculators and computers and the fundamental changes such tools are making in the way people learn mathematics and apply their knowledge of problem-solving tasks. (From the Connected Math Program)

Once children have demonstrated understanding of a given lesson and are able to apply their learning at the higher ends of Bloom's taxonomy (synthesize, apply, analyze, and create), teachers will create open-ended multidisciplinary Design Challenges for children to apply their learning to solve relevant and real problems, deepen their understanding and to integrate their learning from the other disciplines. Design Challenges will be facilitated in workshops where some children collaboratively engage with the challenges while the teacher is conducting targeted lessons with other small groups or individuals.

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History/Social Science Overview

History at the secondary level will be taught in alignment with the California State Standards. Because our classrooms will be multi-age with 7th and 8th graders combined, teachers at the secondary level will build upon the Great Lessons at the elementary level and teach World and United States history in the context of the overall advance of human civilization. Instead of separating World and United States history, the World and United States history standards will be integrated so children can build better awareness of how the United States and the rest of the world advanced, related, and interacted over time.

Goals

- Children will have knowledge of the pivotal historical events that took place in World and United States history from medieval times through World War I.
- Children will be able to explain how major events are related to one another in time, construct various time lines of key events, people, and periods of the historical era they are studying, use a variety of maps and documents to identify physical and cultural features of neighborhoods, cities, states, and countries and to explain the historical migration of people, expansion and disintegration of empires, and the growth of economic systems.
- Children will be able to frame questions that can be answered by historical study and research; distinguish fact from opinion in historical narratives and stories; distinguish relevant from irrelevant information and essential from incidental information; and assess the credibility of primary and secondary sources and draw sound conclusions from them.
- Children will be able to detect the different historical points of view on historical events and determine the context in which the historical statements were made; understand and distinguish cause, effect, sequence, and correlation in historical events; explain the sources of historical continuity and how the combination of ideas and events explains the emergence of new patterns; recognize the role of chance, oversight, and error in history; and recognize that interpretations of history are subject to change as new information is uncovered.

Instructional Strategies & Materials

The Social Studies units will align with the following themes to ensure there is cohesion across the curriculum.

- Explorations & New Beginnings
- Identity
- Independence & Interdependence

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- Leadership through Stewardship
- Balance
- Change
- Movement
- Acquiring a Sense of Belonging

Children are provided with opportunities to learn about history/social studies through primary sources (international pen pals, interviews of elders, autobiographies), secondary sources, inquiry-based research projects, and fieldwork. Because so much of history is based on interpretation, all units of history will be taught using diverse sources. The prepared environment becomes the perfect means by which to deliver a rich history lesson conducted through self-guided exploration, as a classroom can be arranged to present multiple perspectives, different media, and various sources on the same historical event. The teacher can then support children as they begin to understand the events that occurred through multiple voices and lenses and inevitably begin to ask questions about the accuracy of the sources, the biases imbedded, the means by which to seek “truth”, and the importance of understanding ALL the perspectives and voices.

Again, history will primarily be taught in a workshop model where children are working on multidisciplinary inquiries and Design Challenges in small groups while the teacher is doing direct targeted instruction in research skills, geography skills, analysis skills, and text-based language arts skills. Because so much of history is accessing, processing, and integrating information often found through text and because presentation of understanding and analysis will almost always have a verbal component, history will generally be integrated with language arts. The historical content will be taught as stand-alone lessons and units, but whenever possible, they will be integrated with science, math, art, music and peace education so children understand that all disciplines have a rich history that has informed our society and values today.

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Science Overview

The secondary curriculum will build upon the elementary focus on Earth, the origin of the Earth and the interdependence of plants and animals by going deeper into life sciences and then moving into physical science. Children will have the opportunity to build connections that link science to technology and societal impacts. As science, technology, and societal issues are strongly connected to community health, population, natural resources, environmental quality, natural and human-induced hazards, and other global challenges, children will begin building the foundation for understanding these issues.

Goals

- Children have basic understanding of life science (cell biology, genetics, evolution, the human body, and the principles of chemistry underlying biological functions) and physical science (motion, forces, structure of matter, and density and buoyancy).
- Children are able to select and use appropriate tools and technology to perform tests, collect data, and display data.
- Children are able to design and conduct a scientific investigation based on a question they produce and follow the scientific method– develop a hypothesis; design an experiment; distinguish between variable and controlled parameters in a test; construct appropriate graphs from data and develop quantitative statements about the relationships between variables; evaluate the accuracy and reproducibility of data; present a conclusion with comprehensive evidence.

Instructional Strategies & Materials

Science units will also align with the following themes to ensure there is cohesion across the curriculum.

- Explorations & New Beginnings
- Identity
- Independence & Interdependence
- Leadership through Stewardship
- Balance
- Change
- Movement
- Acquiring a Sense of Belonging

Children will be provided with opportunities to learn about science content through primary sources, secondary sources, inquiry-based research projects, hands-on materials, and fieldwork.

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The prepared environment again becomes the perfect means by which to deliver a rich science lesson conducted through self-guided exploration, as the classroom can be arranged to enable children to explore a scientific idea before they study it. The teacher can then support children as they begin to understand the motion or force or cell biology through exploration that generates questions and curiosity.

Like history, science will primarily be taught in a workshop model where children are working on multidisciplinary inquiries and Design Challenges in small groups while the teacher is doing direct targeted instruction in research skills, analysis skills, science content, integrated math skills, and text based language arts skills. The science content will be taught as stand-alone lessons and units but whenever possible, it will be integrated with language arts, history, math, art, music and peace education so children understand that science concepts and content flows across all disciplines and is foundational for understanding the interdependency of all things in our lives.

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World Language Overview

BMMA will provide world language instruction formally from kindergarten. At the secondary level, many children will have an opportunity to learn a third language.

Goals

- Children are able to communicate in writing and orally in a second world language (after their native language) with a high level of fluency and are able to use that language to communicate in settings outside of the classroom; children have a high level of fluency in reading texts and participating in text-based discussions in a world language
- Children are able to communicate orally in a third world language.

Instructional Strategies and Materials

BMMA will provide world language instruction very similarly to the way the School will teach English Language Development to English Language Learners. Children will receive a balance of content-based language instruction and explicit language instruction. The content will enable children to make meaningful connections, build vocabulary and context, and learn about language as it relates to culture. The explicit language instruction will provide the rules of the language and in concert with the content build confidence in the language and provide context to the grammar and rules. In alignment with the Montessori approach, children will gain access to much of the content, vocabulary, cultural exploration, and connections through a prepared environment. The explicit instruction will happen in small groups to allow children to learn at their own pace and to ensure language instruction is taking place in the child's Zone of Proximal Development. At the secondary level, design challenges will require children to go off campus and engage native speakers in interviews and discussions.

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The Arts (Visual Arts, Music, Drama, Movement) Overview

Building on the elementary arts program, BMMA young adolescents move into a more group-oriented focus where group projects require 21st century learning skills of leadership, collaboration and communication. They work increasingly more independently in the art studio, expressing individual points-of-view via art materials, while more fully participating in group-inspired artistic projects like community murals, public art installations, plays, dance performances, gallery exhibitions or film/videos.

Goals

- Children will master skills in visual arts, music, movement and theater so that they are able to articulate their ideas via a diverse range of visual, musical, kinesthetic or theatrical forms (i.e., drawings, paintings, sculptures, musical scores, dance scores, plays, operas, etc.).
- Children will further develop meta-cognitive and reflective skills based on Studio Habits of Mind in order to synthesize their own learning strategies and strengths in both arts and other subjects, propelling them to a successful high school experience.
- Children will appreciate different points of view and forms of creative expression across the artistic disciplines in order to empathize with other races, cultures and nationalities as well as take creative action in their own cultural contexts
- Children will participate in group-oriented projects that positively affect the community at-large and instill 21st-century learning skills of leadership, collaboration and communication.

Children will develop a portfolio of artworks for high school applications, including drawings, paintings, photographs of sculptures or installations, murals, music recordings, collaborative performances, murals, etc. and be able to articulate their thinking behind the chosen works.

Instructional Strategies & Materials

Similar to elementary school, the CA Visual and Performing Arts Framework guides BMMA's secondary school teachers in their curriculum design. In addition to fine art, teachers focus on media literacy—how to deconstruct advertising, propaganda, fiction, reality TV, etc. and tell persuasive stories so that children learn to function critically in a media-saturated society. Film, video and digital photography are introduced at the secondary level.

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- Project Zero's Studio Thinking Framework's eight Studio Habits of Mind are part of every secondary child's individualized learning plan and process portfolio reflection log, showing growth over time.
- Project Zero's Artful Thinking and Making Thinking Visible protocols are led by secondary children, who model creative confidence and make their learning visible to parents, peers, teachers and community members.
- Participating in mini-residencies with Bay Area Arts and media organizations, secondary children are given opportunities to further their disciplinary knowledge, propelling them to create a solid, well-rounded high school portfolio.
- Field trips to various artistic exhibitions of modern and contemporary art, museums, theater, street theater, music concerts, dance performances, plus film festivals are part of the secondary experience, fostering inspiration and increased understanding of the art world and all of its proponents.

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Physical Education/Health Overview

Very similar to the elementary physical education program, the secondary school physical education program is focused on the development of healthy minds and bodies. Because adolescents have so many changes taking place in their bodies, there will be ongoing space and time to discuss and better understand those changes. A significant component of the physical education program will be developing increasing understanding of the role of exercise and nutrition on physical and mental wellness and building healthy habits in our tweens. BMMA also explicitly design physical challenges that authentically teach important life skills like persistence, practice, teamwork, sportsmanship, self-awareness and reflection, and self-discipline.

Goals

- Children will to gain deeper awareness of the interconnectedness of mind and body, and as they develop into adolescents, they will develop positive body images.
- Children will able to identify at least two physical activities that they enjoy
- Children will demonstrate age-appropriate ability around and see the value in persistence, practice, teamwork, sportsmanship, self-awareness and reflection, and self-discipline.

Instructional Strategies & Materials

At the secondary level, physical education will be divided into three general areas – the relationship between nutrition, fitness and health; general body awareness; and physical and recreational activities that integrate environmental education and responsibility. The first two areas will be addressed through integration with the science curriculum as well as through team time.

Nutrition education and body awareness will regularly be integrated into science education, and Design Challenges will be presented that push children to make those connections. Nutrition education will also tie to the gardening program and the responsibility of children in the management of the school lunch program. Since school lunches are often critiqued by teens, BMMA will involve secondary classroom leaders in the decision-making around the school lunch program and seek a partnership with a lunch provider who is excited about the implementation of this learning component. BMMA will seek or develop curricula that support adolescents in developing positive body images and self-awareness around the changes in their bodies that will be implemented during intersession and during team time. Children will be separated by gender as needed so they can share openly about the physical and emotional changes taking place during this turbulent time.

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The third area of physical education will be facilitated through guided independent study. The elementary program exposes children to the many recreational and physical activities available in the Bay Area. At the secondary level, children will be able to select specific activities they want to learn more deeply. Children will develop individualized physical education plans that document how they are meeting the physical education standards. Physical education activities will also be recorded in student work plans. Children will be required to provide a log and a written report on their physical education activities to ensure they are completing the requirements. Almost all physical education activities will be done outside of the school day. On site, BMMA will assess students regularly in specific fitness activities in alignment with the Presidents' Physical Fitness Test. Any child who is struggling to meet the physical education requirements independently will be provided a more structured physical education program where his or her activities are dictated and monitored.

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Character and Peace Education Overview

Very similar to the elementary curriculum, character and peace education is also core to the secondary program. Ultimately, character and peace education is integrated thoughtfully into all disciplines in the secondary program through the eight themes. The skills required by the Montessori work plans and the many opportunities to collaborate as part of a team authentically build children's self-esteem, independence, responsibility, compassion, openness to new experience and learning, patience and self-discipline, acceptance of others, and effective and satisfying social relationships.

Goals

- Children will be mindful of their own learning and their own behavior. They will demonstrate self-awareness and self-discipline in their work and be able to identify and problem solve challenges as they arise.
- Children will be able to solve real world problems within the context of their classroom, community, and world; they will be able to articulate the value of the work they are doing.
- Children will feel self-confident in their ability to make a difference and be self-aware of the role they can play to positively impact their group, their class, their community, and their world.
- Children will demonstrate self-awareness and self-discipline in working collaboratively. They will take responsibility for leading and facilitating the group's progress and learning and will understand interdependency and the power and value of the collective.
- Children will be able to resolve conflicts by listening to others' perspectives, sharing their perspective respectfully, and facilitating collective understanding; all children will be able to understand and value the perspectives and experiences of others in different contexts, from different cultures, and with different opinions
- Children will be able to share their perspectives and opinion respectfully and present their understanding and their thinking in a clear and persuasive manner

Instructional Strategies & Materials

The secondary program focuses on supporting adolescents to build a strong sense of identity and a greater awareness of themselves in the context of their world. "In the transition from childhood to adolescence, individuals begin to develop more abstract characterizations of themselves, and self-concepts become more differentiated and better organized. Adolescents begin to view themselves in terms of personal beliefs and standards, and less in terms of social comparisons

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(Harter 1998).” True mastery of the goals stated above requires a foundation of self-confidence, self-discipline and self-awareness.

As stated above, character and peace education at the secondary level will be intentionally integrated across all the disciplines. To support children in developing this foundation, the Schools will utilize instructional strategies that promote discussion (Socratic Seminar, literature circles), that encourage debate, that push peer teaching (reciprocal teaching, collaborative inquiries), and encourage mindfulness (journal and letter writing, reflections, art, music, meditation). Design Challenges and lessons will be developed to encourage children to explore their own histories, cultures, values, and dreams so they can make meaningful connections to the history or science they are learning.

All units and lessons will be developed to encourage connections, build curiosity, and push critical thinking and aligned along eight critical themes. BMMA will ensure that every child at the secondary level has an adult ally to whom the child feels connected and safe, and children will be supported to find their own solutions to conflicts with peers, families, or with staff. The teachers for the secondary program will serve as mentors and facilitate the process as their children learn how to observe, listen, read critically, gather information, and learn from hands-on experience.

When children run into obstacles and identify challenges in completing their work, managing their time, managing themselves, or working with others, teachers will support students by coaching them, being a thought partner, asking meaningful questions, mediating issues in a group, providing feedback, and providing tools and strategies. That the challenges arise out of authentic tasks will enable children to learn these lessons in context, making the learning that much more meaningful.

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Practical Life Overview

Practical Life activities encourage the development of independence and foster each child's adaptation to the social context of their environment. At the secondary level, practical life activities return to care of self, care of the environment, and exercises of grace and courtesy though at a level relevant to adolescent development. At this age, care of self is about understanding what is happening with their bodies, being able to act with increasing independence in managing their lives, and developing a more personalized understanding of how to care for themselves. Care of environment extends past immediate environment to the larger community and global environment.

At this age, we push children to better understand how their day-to-day actions have impact on the globe and on other people. Grace and courtesy at this age is about self-awareness, empathy, and self-confidence.

Goals

- Children understand how their actions and behavior impact others both in their immediate environment as well as a larger global context
- Children are able to manage their time, others' expectations of them, and their work – prioritize, sequence, and request help as needed
- Children are able to go into foreign contexts, have the confidence to engage and interact, and develop positive relationships across cultures, languages, generations, and contexts.

Instructional Strategies & Materials

In the individualized Montessori setting, practical life goals and activities will be personalized to each child's level of functioning. Children will be facilitated in self-reflection to identify strengths and areas of growth. They will outline specific goals for themselves and then receive targeted instruction and monitoring in the achievement of those goals. For example, if a child identifies organization as a challenge, the teacher and that child would work together to develop a plan to develop better organizational skills, with scaffolding and specific lessons around how to be better organized in alignment with this plan. The idea that everything that we do has impact on someone else would be a constant and ongoing theme across all the disciplines and an explicit guiding question in all of the Design Challenges presented.

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Design Thinking Overview

Design thinking at the secondary level will be a natural extension of the program at the elementary level. Children already steeped in the design process, equipped with prototyping skills and viewing themselves as designers will take on projects of longer duration and with more profound real world impact than they experienced at the elementary level.

Goals

- Children understand that the design process can be applied to a wide range of problems and they regularly leverage this process
- Children perform ‘need finding’ to uncover opportunities to change and improve their world
- Children engage in solving problems that meaningfully impact themselves and their community and gain presentation and implementation skills to defend their ideas in a public forum and see their visions become reality
- Children view themselves as designers and develop additional techniques as they develop key design thinking mindsets
 - Mindful of process
 - Ready to collaborate
 - Empathy for others
 - Bias to action
 - Prototype everything

Instructional Strategies & Materials

At the secondary level, design skills will be reinforced and bolstered via special Stop, Drop and Design days with most of the projects fully integrated as an extension of the regular curriculum. Children will have tools and materials available to create high fidelity prototypes of their designs, leveraging principles of construction and engineering to truly test their ideas in the world.

- Design Challenges will be created so children can work on real world problems of relevance to their lives and community
- Graduating children will work on a capstone design project

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Technology Overview

The secondary technology program builds upon the foundation established in the elementary program. At the secondary level, children extend their skills to create more sophisticated, creative and innovative artifacts through the use of technology, advance their ability to gather and evaluate online content related to their learning, develop an understanding of what it means to be a digital citizen and understand technology operations and concepts related to how the hardware and software they use functions.

Goals

- Children will demonstrate proficiency with presentation, word processing and spreadsheet applications
- Children will demonstrate proficiency in at least one media creation application, such as Photoshop, Illustrator, or Final Cut Pro and will be able to integrate the appropriate use of original media into demonstrations of mastery for any curricular subject
- Children will demonstrate proficiency in using a variety of digital media to locate, organize, analyze and evaluate information from a variety of sources
- Children will understand how to engage safely and respectfully in online research, collaboration and networking
- Children will demonstrate at least a basic understanding of key computer components, internet infrastructure and application development principles
- Children will demonstrate at least an introductory level of mastery in one coding language, such as Ruby on Rails, JavaScript, ActionScript, Python, Perl or PHP.

Instructional Strategies & Materials

BMMA will provide children with a range of technology, including computers, Internet connectivity, tablets, mobile devices, input devices and software (including adaptive, media creation, word processing, presentation, spreadsheet and collaboration products).

There will be direct instruction on how to use the hardware, the software applications, and navigating the web, but application of technology will be integrated throughout the core curriculum and through arts integration and Design Challenges.