Introduction to the Sensorial Area

History of the Sensorial Area
In The Discovery of the Child (Ch. 7), Montessori summarizes the history of the material for the Sensorial Area – materials specially designed for the development of the senses. She writes that this material
... represents a selection, based upon careful psychological experiments; from material used by Itard and Seguin in their attempts to educate deficient and mentally defective children; from objects used as tests in experimental psychology; and from a series of material which I designed in the first period to my own experimental work. The way in which these different means were used by the children, the reactions they provoked in them, the frequency with which they used these objects, and above all the development they rendered possible, furnished us gradually with reliable criteria for the elimination, the modification or the acceptance of these means in our apparatus. Colour, size, shape, all their qualities in brief were experimentally established.

In this area of the Casa, we can clearly see Montessori’s collaborative approach in developing her alternative system of education: seeking extensively amongst both the popular and the obscure in the history of pedagogy; assessing, applying, testing, and evaluating what others had developed; adapting and perfecting those materials she borrowed and kept; and designing new materials to fill the gaps. We see a mind at work in service to the emergent development of the child: neither too proud to seek for answers among the established work of others; nor too awe-struck to question or modify those answers based upon the one “reliable” criteria – the response of children acting freely in the liberating environment of the Casa.

Also in this area we see very clearly Montessori’s pedagogical lineage – not so much within the mainstream of childhood education, as represented by Rousseau, Pestalozzi, and Froebel, for example; but with the history of the education of “deficient” children, and especially of the deaf, as pioneered by Jean Itard and Edouard Seguin. More detail about this aspect of the Montessori heritage can be found in The Wild Boy of Aveyron by Harlan Lane. Montessori’s own account of her pedagogical heritage, and her own place in this lineage, is found in its earliest form in her 1912 publication The Montessori Method Ch. II “History of Methods”; in Montessori’s own revision of that work, The Discovery of the Child; and in the descriptions of the individual sensorial materials found in both books. Some examples are as follows:

Materials for Visual Discrimination of Dimension
A quintessential sensorial material, the Pink Tower, began as a tower of blocks designed by Wilhelm Wundt. Wundt established the first psychological laboratory in Leipzig in 1879 and used this tower in intelligence tests.
Montessori adapted the tower for the visual discrimination of three dimensional change. The tower inspired Montessori’s own design of the Cylinder Blocks (at first three, followed later by a fourth block) to extend the visual discrimination of dimension; and the addition of a material for discrimination of two-dimensional change, the Broad (or Brown) Stair. The set of materials for discrimination of dimensions was completed by the Long (or Red) Rods as a material for the isolation of one-dimensional change. These rods, in turn, were adapted from the Number Rods, first designed by Seguin to present the quantities 1 - 10. As described in The Montessori Method, p.193, the rods for length originally were the same as the sectioned rods we now use for counting. Annette Haines notes Montessori’s reference to Seguin as the originator of the Number Rods in “The Three Period Lesson”, p. 5
Material for Visual Discrimination of Shape

Itard, and then Seguin, used geometric insets in their work – both for the discrimination of shape and for the discrimination of color. Montessori used, and then adapted this design in several ways – first with the children in the asylums, and then in the first Casa. She eventually standardized the color of the shapes to create the Geometry Cabinet for the isolated visual discrimination of shape. She also expanded the set of shapes, re-designed the cabinetry, and added the neuro-muscular component of tracing the shapes. She also added a series of cards with drawn versions of each shape, to further challenge the child’s visual discernment.

Other Materials

When working with “normal” children, Montessori designed the color tablets as cards with wound silk. Suitable exercises to isolate the experiences of the other senses followed and activities for touch, sound, taste, and smell emerged through the experiments of the early Casas. Montessori also elicited a new generation of collaborators from among the “New Teachers” she trained: e.g., Anna Maccheroni, Directress of the first Casa in Milan, designed the set of Bells for Auditory discrimination of Pitch; and Margot Waltuch tells the story of setting to work to design what became the Leaf Cabinet after she and Dr. Montessori observed children in the school at Laren playing in the fallen leaves on an Autumn day. Her ultimate collaborator – Mario Montessori – in turn helped design many of the materials we find in the advanced set of materials which mix the perception of visual impressions. The work with Sensorial materials was also inspired by Montessori’s predecessors: techniques of offering contrasts, of pairing, and of offering increasingly narrow contrasts in order to refine discrimination – are derived from the work of Itard as expanded and applied by Seguin. Most specifically, the technique for giving language is Seguin’s classic “Three Period Lesson”.

The Five Senses and the Qualities They Perceive

The Activities of the Sensorial Area are organized according to the information (Perceptions) gathered by the five sensory organs of the body:

- **Touch**
  - Skin, specifically the Hand
- **Visual (or Sight)**
  - Eyes
- **Auditory (or Hearing)**
  - Ears
- **Olfactory (or Smell)**
  - Nose
- **Gustatory (or Taste)**
  - Tongue

The specific qualities perceived by the various sense organs are as follows:

- **Touch** – “That sense by which anything material is perceived by means of physical contact”
  - **Tactile**
    - The texture of a material surface (etymology = to weave, hence “textile”), such as degrees of roughness or smoothness, as perceived particularly by the fingers
  - **Thermic**
    - Heat, or the temperature of a material
  - **Baric**
    - Weight, or “the amount or quantity of heaviness or mass” of a material
**Stereognostic**
The mental perception of depth or three-dimensionality by the senses, usually in reference to the ability to perceive the form of solid objects by touch. [From Greek: *stereo* (solid) and *gnosis* (knowledge)]

**Visual** – “Of or pertaining to seeing or sight; perceptible by the sense of sight, visible”
- **Dimension** – extension in one of three directions; specifically
  - **Length:** the longest extent of anything measured end to end
  - **Width:** measure of the second longest dimension side to side
  - **Height:** extent or distance upward

- **Color** – the quality of an object or substance with respect to light reflected by it

- **Shape** – figure, configuration, external outline; the external appearance of a clearly defined area as visually distinguished from aspects of color or dimension (also referred to as “Form”)

**Auditory** – “pertaining to hearing, to the sense of hearing, or to the organs of hearing”
- **Volume** – degree of sound intensity or audibility; loudness

- **Pitch** – the degree of height or depth of a tone or of a sound, depending upon the relative rapidity of the vibrations
  - by which it is produced

  [**Timbre** is another aspect of Auditory perception. It is the characteristic quality of a sound, independent of pitch and loudness, from which its source or manner of production can be inferred. Timbre depends on the relative strengths of the components of different frequencies, which are determined by resonance. It can be described as the characteristic “voice” which produces the sound: as in the Pitch “A” produced at the same volume by two different musical instruments; or less technically, the recognizable qualities which distinguish one human voice from another. There is not a specific material to isolate Timbre. It is explored through a Following Exercise to the Sound Boxes and experienced through various activities, such as those with Rhythm Instruments]

**Gustatory** – of or pertaining to taste or tasting
- Taste has no isolated qualities. Instead, this sense identifies a limited set of categories labeled as salt, sweet, bitter, and sour. A fifth category is often added – known as umami and identified particularly in the Japanese cuisine. Other than these sensations, all else we identify as ‘taste’ is in fact an interaction between taste and smell.

**Olfactory** – of or pertaining to the sense of smell
- There are no isolated qualities for the sense of smell. Although severely limited in comparison to other animals, humans can nevertheless distinguish over ten thousand distinct smells. We distinguish these with exceptional precision, and as we sense them a direct and powerful connection is made in the brain between each smell and memory. In contrast to other senses, however, there is only a minimal connection between olfactory experience and language. Precise, particular scents elude precise labels. We can name (if we know it) the source of the scent, or attempt to approximate a description through simile or metaphor; but exact labels, devised by communal agreement, do not exist, as they do for visual, touch, or auditory qualities; nor are there
limited, general categories such as those detected by taste when it is separated from its more potent olfactory component.

For each Sense there are materials in the Sensorial area which isolate the particular qualities perceived by the sense organ for the child’s exploration. Because these materials are designed to meet universal needs of developing children, the Sensorial Area will look the same in any Casa in any culture throughout the world.

The Sensorial Area can be thought of as a materialized map of human sensory perception: one could examine its materials displayed on the shelf and discern from their design and accompanying activities each sense and its pertinent aspects. The only exception to this is among the materials for the Visual Sense, which include several materials which combine aspects or qualities. These are sometimes known as “Mixed Impressions”; they are for the older child’s exploration of relationships between and among previously isolated visual qualities.

**Characteristics of the Sensorial Materials**

We have seen repeatedly how the child in the First Plane of Development constructs himself at the expense of his environment; in other words, through direct, interactive experience which allows for unconscious absorption, concrete manipulation, and sensorial exploration or (in contemporary terms) “experimental interactions with the environment”. When the child arrives in the Casa, he already brings with him all of the images unconsciously gathered through his senses by the Absorbent Mind since before birth – perceptions which he has begun to organize according to the powers of the Sensitive Periods. It is this organization which we want to assist through the Sensorial materials – this organization, and the crystallization of his experience through the formation of abstractions. The pathway to these abstractions in the mind, however, continues to be through the activity of the child’s own senses and through exploration assisted by the refined capacity to manipulate objects with the hands. The characteristics of the Sensorial Materials are determined by these developmental interests of the First Plane child – a sensorial learner, who learns by literally wrapping his hands around the objects of his experience.

The characteristics of these materials are as follows:

**Materialized Abstractions**

For the adult mind to understand this characteristic requires some mental back-tracking. To design the material requires first the designation of an abstraction – a quality of objective reality which the mind of the child will explore through concrete manipulation. Then this abstract quality must be realized (made real) in material form. The resulting object or set of objects materializes the quality – makes it literally tangible, in a recognizable physical representation. In *The Discovery of the Child*, Montessori elaborates on this characteristic of the Sensorial materials, stating:

> Abstract ideas are synthetic conceptions of the mind which, detached from actual objects, abstract from them qualities held in common which do not exist of themselves but exist in the actual things. For example, weight is an abstraction; it does not exist by itself, only heavy objects exist. (p. 186)
She continues:

The sense material may certainly be considered from this point of view as materialized abstraction. It presents colour, dimension, form, odour, sound, in a tangible and distinct manner and arranged in grades which permit of the classification and analysis of qualities. (p. 187)

Isolation of the Sense
Each material is designed so that, to the degree possible, the sense it serves is isolated from the other four. In the 1946 London course lecture, Mario Montessori likened this to a **darkened concert hall** in which the audience listens to the performance of music. This isolation is accomplished by stimulating the focus of one sense only, excluding to the extent possible stimulation of the other four. Materials hold few if any clues beyond the sense that is isolated – for example, touch impressions within a visual material is kept uniform, so as to ‘fade into the background’ and entice the visual perception to engage. Non-visual materials keep visual data uniform for the same reason. A material for the sense of touch can be explored with closed eyes or blindfolded; and visual clues and information are kept constant or eliminated in an auditory exercise. The child’s activity thus concentrates on the information specific to the targeted sense, to the exclusion of the other senses.

Isolation of the Quality
Mario Montessori likened this to a **spotlight focused on the performer**. In order to be accessible for the child’s exact exploration, the materialized quality must be isolated from all other qualities of the concrete object. In other words, to the degree possible, all other qualities must be kept constant or minimized, such that **only the designated quality is readily apparent**. This includes other qualities of the sense, which are also kept constant or eliminated as stimuli. For example, if an exercise is meant to focus on the visual quality of Shape (Form), then the visual qualities of Color and of Dimension are kept uniform. Distractions and confusions are thereby eliminated or kept to the barest minimum. In Montessori’s words:

This precision ... renders possible a work of internal and external analysis fitted to bring order into the mind of the child. (Discovery of the Child, p. 121)

Interactive Nature
Each material must be available to the child’s **concrete manipulation**, engaging the hands in service to the exploration by the sense. The information encapsulated in the material is, then, immediately available to the child through his experience of concrete manipulation. In this way, we harness the child’s Human Tendency of **Exploration**: As Montessori writes, the child

... is an ardent explorer in a world which is new to him, and like an explorer, what he needs is a road (that is, something limited and direct) which may lead him to his objective and save him from the wearying deviations which hinder his progress. (Discovery of the Child, p. 123)

The resulting interaction with the material is **developmentally purposeful** – i.e. it serves some aspect of the developmental purposes of the Area. The adult’s task continues to be only one of **initiation**. Through her **presentation**, the Directress gives the information minimally necessary to connect the child with the isolated, materialized abstraction. She shows the child something definitive to do with the material, and then withdraws. The general pattern of interaction modeled in the presentation is to bring the objects in the material from a state of disorder or randomness into a state of order. The nature of this initiation is such that it will **stimulate** the child’s own open-ended exploration, experimentation, variations, and discovery – again, according to the developmental purposes of the material.
Keys to the World
Because the child has been continuously absorbing information through his senses, we do not have to offer him new experience or information, nor do we have to offer the entire range of variables possible within a sensory category. Montessori states:

(The child’s) need is to bring order into the chaos which is created in his mind by the multitude of sensations which the world has given him.” (Discovery of the Child, p. 123)

For the purposes of classification and clarification, we have only to offer an essence, a key experience which unlocks the door to the world of that sensory quality. Through his interactive exploration of the quality as isolated in the material, he constructs the generalized abstraction which organizes his previous perceptions. This generalized abstraction will inform all of his subsequent experience of that quality – his experience of the variety and multiplicity of its manifestations in the real world; and of its infinite range of possibility in the realm of his imagination.

Limited Quantity
In the Prepared Environment, we typically think of limited quantity as the principle of having only one of each exercise available to the children. This limit also pertains to the Sensorial Area; but here limited quantity takes on a second meaning. It refers to the number of ways that a sensorial quality can be experienced by the child. There is one, and only one, material for each isolated quality. However, although there is only one materialization of that quality for the child to explore, through its design there are many levels of exploration possible with that one material. The Sensitive Period (For the Development & Refinement of Sensory Perceptions) prompts the child to find a motive of activity appropriate for each intended psychic construction. If there were many potential motives of activity, a variety of ways to experience a quality, the child’s interaction with the quality would more likely remain superficial and transient. It is the fact of limitation to one means only, which opens the possibility of deeper exploration, pulling him into the variety of ways to explore the quality – the many levels of interaction possible with the one material – rather than the same level of interaction with many materials.

This limit channels the child’s purposeful activity into deeper levels of exploration and discovery. This can be a difficult concept for adults to understand, particularly in the over-stimulating atmosphere of an industrialized, consumer economy. Montessori addresses this common misconception with gusto:

We all believe wrongly that the child who has the most toys, who gets the most help, ought to be the best developed. Instead of that, the confused multitude of things raises new chaos in his mind, and oppresses him with discouragement. The limits to the aids which enable the child to reduce his mind to order, and to make it easy for him to understand the infinite number of things which surround him, are represented by the maximum necessity for economizing his energy and for enabling him to advance along the difficult way of development.

Discovery of the Child, p. 124

Materials Are Attractive, Clean, In Good Repair
This is characteristic of every material in the Prepared Environment; but bears repeating. Here the requirement is still for “voices” which call to the child’s attention – irresistible enticements to the Inner Guide searching out the motive of activity best able to assist a particular inner formation –
The child obeys any object which at that moment corresponds with his most acute need for action. In the same way in a field, the petals of all the flowers are calling to other living things with their perfumes and their colours, but the insect chooses the flower which is made for him. (Discovery of the Child, p. 122)

Mathematically Precise
Whenever possible, the Sensorial Materials are mathematically precise – providing an internal consistency for exact comparisons and clarifications, and making a direct bridge as appropriate to the precise investigations of relationship in Mathematics.

Control of Error
In the Sensorial Area, Control of Error occurs in two ways: it is structured into the materials; and it is structured into the child’s purposeful interaction with those materials. It operates to facilitate the child’s exploration and process of discovery – independent of external guidance or conventional adult-centered teaching. The feedback inherent in the experience of manipulating these interactive materials, and the structure of work with them, are sufficient to support the creation of order out of chaos, and to keep the child on that road towards the formation of accurate and exact classifications and abstractions. Control of Error is manifested as follows, depending upon the design of the material:

Mechanical Control of Error
The Physical Construction Guides the Child’s Manipulation
Examples: Cylinder Blocks; Geometry Cabinet – Insets & Apertures

Perceptual Disharmony
The child’s own increasingly refined sensory discrimination and discernment signals some discrepancy in the process of bringing the objects from chaos into order. This Control of Error relies on the emergent clarity of the child’s internalized images, and begins to operate as that clarity emerges in the child’s own awareness
Examples: Pairing identical variables; grading a series

Concerning Control of Error, Montessori has this to say:
The material control of error leads the child to apply to his doings his reasoning power, his critical faculty, an attention which grows more alert to distinguish small differences. In this way the mind of the child is prepared to control errors, even when these are not material and apparent to the senses. (Discovery of the Child, p. 122)
Patterns of Activity with Sensorial Materials

There is a consistent structure to the progression of interaction with the Sensorial materials. Each aspect of this progression is not always available in each material; for some qualities, different sets are necessary to allow for the full progression. But the progression of activity is generally followed in all materials which isolate a single sense and/or quality of a sense. The hand provides the foundation for interactive exploration of each sensorial quality – therefore, very specific movements of the hand will be presented for each material. These are not arbitrary movements, but rather movements which will offer very particular neuro-muscular support for creating a mental image of the isolated quality. Presentation of each material, then, will require exact and precise movements by the teacher.

To the degree possible, we will first introduce elements in the material which represent the most contrast or the extremes of the quality: rough and smooth; hot and cold; the primary colors; the loudest and softest volume of sound; the most contrasting geometric shapes, smells, tastes; etc.

Having identified the extremes in the set, the child can then explore the intermediary variables between the extremes – at first by finding identical variables (pairing); then, when possible according to the sense quality, by exploring and confirming the relationship among the variables (grading).

For more details on this progression of activity, see The Discovery of the Child p. 146 “Contrasts, Identities, Gradations”.

These levels of exploration will be deepened by two other types of activity common for the materials: Memory Games will be available to extend the length of time a child holds the perception in his mind without the concrete material directly in front of him; and Language will be introduced at each step – after the child has sufficient experience to attach specific language to the isolated perception.

Finally, an atmosphere of interactive exploration will support the child’s own Variations with the objects – supporting discoveries beyond the presentation and exploration of the relationships between and among various sets of materials.

These patterns of activity allow the child to explore beyond the superficial aspects of the materials and justify the characteristic principle of Limited Quantity of materials. They also correspond to the work of the Sensitive Period for Sensory Perception regarding the constructing of the child’s intellect and fulfillment of the Human Tendency for Abstraction and Imagination. The result is an Intelligence based in order and clarity; and the creation of precise, accurate and reliable Abstractions in the child’s mind which will set the foundation for Imagination as a Power of the Second Plane.

Age and Readiness

The materials and activities of the Sensorial Area are designed for the child we meet in the Casa – the child in the second half of the first plane (ages 3-6). This is the child whom Montessori describes as “the conscious worker” (The Absorbent Mind Chapter 16: ‘From Unconscious Creator to Conscious Worker’). The ‘older’ child is initiated into the Sensorial materials according to an order which reflects his maturing capacities: the materials, in other words, are developmentally organized; they are Materials for Development. An ideal age can be given to first present these materials: note in particular, that many Sensorial materials can be offered to quite young Casa children and Touch materials in particular are best
when offered as soon as possible after the child enters. However, presentation of Sensorial materials in general requires some specific capacities which support purposeful interaction with the materials according to their developmental purposes. So we look not only at literal age but also prepare and observe for specific readiness to engage in these activities. This point is underscored in the following comment found in the AMI Trainers Album:

The Sensorial material requires concentration, interest and observation on the part of the child. This is the reason why it should be presented when the child has acquired and developed at least a certain amount of concentration and the ability to work independently, which will have been gained through the Practical Life exercises. For this reason, the age for presenting the material cannot be strictly defined. It is advisable to ensure that the child has worked sufficiently with Practical Life activities before presenting the Sensorial Material.

Observable signs of Readiness:
- Coordination of Movement of the Whole Body
- Refinement of the Hand
- Concentration
- Ability to Sustain a Three Part Work Cycle
- Ability to Follow a Logical Sequence

Many movements which support Sensorial Exploration will have been first isolated and practiced by the child through various Preliminary Activities such as: moving through the room, carrying objects, and the careful handling of materials. Sensorial Exploration itself will be accomplished through the activity of the hand: it is the hand which serves the child’s mind in this self-guided interaction with the sensorial qualities. The necessary refinements of the hand are particularly developed through Exercises in Care of the Environment and Care of the Person.

A child who still exhibits a strong, developmental interest in manipulating objects for the sake of the movement only – and not as a vehicle for further developmental learning – should continue to meet that need through exercises of Practical Life. The exercises of the Sensorial Area are not exercises in movement per se (although movement of all kinds will be further refined and perfected under their stimulus). In their developmental purpose, they are exercises in which coordinated movement channels exploration, in which movement is the agent of a mind in pursuit of a new set of psychic constructions.

Ideally, we offer Sensorial Presentations to a child who is already exhibiting characteristics of normality, achieved in Practical Life through the psychological phenomenon of Normalization. These characteristics will include engaged concentration, consistent 3 part work cycles, and the ability to follow a logical sequence – which now will be applied in an open-ended activity that does not structure these experiences externally in the manner of a Practical Life activity.

In general, all of the materials for Sensory Education will be presented to a child by the age of 4½ – by the time, in other words, that the Sensitive Period is fading. The child has constructed the separate inner formations related to his Sensory Perceptions. He is now ready to use them: to integrate these separate creations, and to explore their relationship to each other. In the Casa, this integration will be associated particularly with Language; while exploration of relationship among the abstract sensorial qualities will be at the heart of the activities of Mathematics.
A child who enters the Casa at age 4 or 5 will have missed the ideal time for sensorial work. However, the sensorial materials can still be shared with this child if we alter our typical pattern for presentation. The key to connecting the older child to these materialized abstractions will be to start from the end and work backwards (so to speak) – this will parallel the older child’s more utilitarian approach to Practical Life. Memory Games provide an excellent starting point for the new older child, providing experience which can then be fixed or crystallized through 3 Period Lessons for the target language. When we see interest in true collaborative work, we can team the older child with a comparable child for partnered exploration of the materials. As soon as literacy is present, that too can be harnessed to direct the child towards meaningful sensorial exploration. Awareness of the Indirect Preparations for Language and Mathematics that are built into Sensorial activity can guide us as well.

Examples of adapting Sensorial Activities for an New Older Child:
- Geometry Cabinet with Full Set of Cards – Two locations for matching
- Tracing a shape from the Geometry Cabinet ‘10 times’, then drawing the same shape with its Metal Inset (first aperture; then inset; then fill in)
- Take turns picking up a knobbed cylinder then holding a pencil – repeat repeat repeat (make a game of this)
- Classified Language for Geometric Solids (like Classified Cards in Spoken Language)
- 3rd period review for Color Box 2 – leading to Scattered Location Pairing
- Spoken or Written Commands for Known Sensorial Vocabulary – focus on a word function, such as Adjective or Preposition
- Group Assessment Games (see Theory Album: ‘Normalizing the Conditions’)
- Mixed Impressions explorations after isolated language
- Spoken or Written Commands related to Mixed Impression activities
- Experienced Child Partner to explore and share variations with the new child

Language
Positive Language after Pairing
Comparative and Superlative Language after Grading

- Specific Vocabulary Fixes the Abstraction in the Mind
- … Makes the Abstraction Accessible: recall through language only
- … Offers Opportunities for Clear Communication

When a new challenge or level of interest with a material is sought, Language is presented in the context of the Three Period Lesson. The sensory image has been clarified in the relevant area of the brain through interactive experience with a material; then it is further fixed in the mind through this connection with a piece of precise language. Once this precise language is, This precise language can now be used in and of itself to call forth the image of the quality, an important step away from the concrete object. Possession of this language, held in common with his community, opens the possibility for meaningful, precise, and successful communication.

Language is first offered as Positive (Static or Generic) – Examples
- Cylinder Block 2: “Large”; “Small”
- Sound Boxes: “Loud”; “Soft”
After the child achieves competence at the grading level, Language expands to the language of relationships:

**Comparative** language names the relationship between any two variables in the series – Examples
- Pink Tower: “Larger”; “Smaller”
- Sound Boxes: “Louder”; “Softer”

**Superlative** language names the extremes of three or more variables in the series – Example
- Pink Tower: “Largest”; “Smallest”
- Sound Boxes: “Loudest”; “Softest”

Since Language is employed to fix isolated qualities as materialized by the objects in an exercise, no specific language is offered for materials of Mixed Impressions. The exact language offered for each material is listed in the Presentation Text of the Sensorial Album.

**Memory Games (Distance Games)**
Memory Games are *structured experiences of holding specific sensory information solely in the mind and away from the objects which materialize that information*. They are a valuable step in the progression towards a precise, accurate and reliable abstraction in the mind. Memory Games are offered to the child when the teacher recognizes that the initial activity with the material no longer interests the child, or otherwise, that the child is ready for a new level of challenge in the exploration of the quality. The child performs the familiar activity appropriate to the material (such as pairing or grading), and other sensory stimuli continue to be eliminated or controlled in the process; this is particularly true of visual stimuli or clues when playing the games with a non-visual material. The child may or may not have had the relevant language for the material prior to playing a Memory Game with it.

**Memory Games**
- Extend Concentration
- Build Short-Term and Long-Term Memory
- Support Recognition Of The Quality in the World at Large
- Validate and Confirm Knowledge
- Introduce Aspects of Social Life as a Game is Played

Memory Games require that the child **interacts with the material while moving about in the environment**. She no longer explores within the protected zone of concentration which surrounds her own work space, but must carry her concentration with her if she is to be successful amidst the varied stimuli and many distractions suddenly available. The progression of the Memory Games (described below) **lengthens the time in which this mental information must be accurately held and increases the challenge of competing stimuli**. By drawing the child out into the Prepared Environment, these games also begin to **draw the child’s attention away from the isolated, key materialization of the quality and back to its varied, multiple, and dynamic manifestations in the external world**. Throughout, the child is made increasingly aware of the need for Exactness and Precision to successfully detect, apply, and (perhaps) communicate about these finer degrees of difference. The knowledge she has already gained through her exploration of the quality with the material is **continually verified and validated** by success in playing Memory Games. And since the
games involve movement away from an isolated, individual work space, an interesting motive for positive and harmonious social interactions is injected into the child’s activity.

The Teacher presents the format for each game, but it is not always necessary to demonstrate each game to each child for each material. Once the child understands the technique of a game, she can be invited to apply it to a new material as her interest and readiness dictate. The teacher should, however, be ready to assist and clarify as needed, so as to support the purpose of the game. For example, a child new to pairing or grading from scattered locations can easily mistake the process to be one of hiding the objects around the room. As needed, the teacher can reinforce a point of interest such as putting each object where the child can easily see it. Similarly, when playing the game with non-visual materials, such as those typically done with a blind fold, the teacher will want to stay alert to ways to play safely while still eliminating the visual sense. In an environment which supports open-ended, purposeful exploration, children will naturally apply and extend memory games throughout the area.

Memory Game: Two Locations
The materials are brought from chaos to order at a distance. For paired materials, each set of variables is arrayed at two different places as far apart as possible, and brought to order at one of the locations. A memory marker can be employed to indicate which variable the child is seeking to match. Materials in a graduated series are left in chaos in a work space in one location and brought to order in another as far as possible from the first location.

Example: Thermic Bottles
After Success Pairing the Thermic Bottles
Arrange one set of prepared bottles on a table. Arrange the other set on a table at a great distance from the first. Feel one bottle from the first table, place the memory marker next to it, go to the other table and explore each bottle in succession, until a match is found. Return to the first table with the match, verify the match by feeling both bottles, and place the pair aligned in the center of the table. Repeat until all are matched. Transfer the work when the child catches on. Encourage repetition.

Example: Pink Tower
After Success Grading the Pink Tower
Place two rugs at a great distance from each other. Array all of the cubes at random on one rug. Choose the cube that comes first (the “largest”), carry as in the presentation to the other rug, and place it. Return to the first rug, choose the cube that comes next, carry it to the other rug, and superimpose in on the first. Continue as needed. Transfer the work when the child catches on. Encourage repetition.

Memory Game: Scattered Locations
The materials are brought from chaos to order from numerous locations throughout the environment. For this game, there need to be standards of Grace & Courtesy familiar to the entire group concerning how to carry specific materials about in the room or on a tray, the appropriate ways to place different types of materials, appropriate places to put them, how to retrieve the materials and how to deal with any social interactions which might ensue. For matching paired variables, the memory marker is again used.

Example: Thermic Bottles
After Success Pairing Thermic Bottles; Comfortable with Two Locations Game
Arrange one set of bottles on a table; place the bottles of the other set in various parts of the room on shelves or tables. Give a point of interest – let’s place the bottles where we can see them. Feel one bottle at the table, place a memory marker next to it. Move about the room, feeling each bottle in succession until a match is found. Return to the table, verify the match by feeling both bottles. Repeat. Transfer. Encourage repetition.

**Example: Pink Tower**  After Success Grading Pink Tower; Comfortable with Two Locations Game Place the cubes in various parts of the room on shelves or tables. Move about the room visually searching for the first (“largest”) cube, and carry it to the rug. Visually search for the cube that comes next, carry it to the rug, and superimpose on the first cube. Repeat. Transfer. Encourage repetition.

**Memory Game: Materials to the Environment**
This game relates directly to the preparation of the environment, because success depends upon finding exact matches to the various qualities materialized in the exercises. For some materials this is not realistic, but the Teacher should strive to make this game possible for as many materials as possible. A memory marker can be used to indicate the quality being matched.

**Example: Color Tablets #2**  After success Pairing Color Tablets; Comfortable with Scattered Locations Game

Arrange one set of Color Tablets in a vertical line at the left edge of a work rug. Place a memory marker next to any color tablet at random. Move about the room and visually search for an object which matches that tablet in color. Return with the object and exchange it for the memory marker, acknowledging the match. Repeat. Transfer. Encourage repetition.

Occasionally it will not be practical to bring the matched object from the environment to the material; in that case the material piece may be brought to the environmental piece. This is particularly the case with a material such as the Red Rods. This game to the environment has many social aspects: the length of a red rod might be matched by the length of a child’s arm, or a color matched by an object already in use by another child. The teacher can be alert to offer Grace and Courtesy appropriate for such interactions. Children might also attempt this game with an exercise that does not completely lend itself to matching from the environment; although the teacher would not present this game with that material, the child may be left to explore the possibilities to the extent she can, as long as she stays within the practical and social limits of the game.

**Memory Game: The Group Game**
This game is usually presented with materials which have a graded series, and generally requires the same number of children as there are variables in the series. Each child selects one variable, experiences it as appropriate to the exploration of that material and then places it on the work surface. (Visual materials can also be removed from sight.) When each variable has been selected, the series is brought to order one by one. This arrangement helps to refine the discrimination of the relative difference among the variables, since the child must hold the memory of her particular variable in relation not to its identical quality, but as compared with the quality of each of the other variables. This game also heightens the social aspect of Memory Games since it evokes the cooperation, self-control and patience of each participant; and also in that it can be played by a group of children without the teacher’s guidance. On their own, children are of course free to adapt this game for paired variables.
**Example: Pink Tower**  
After success Grading Pink Tower  
Place the cubes at random on a rug. Have ten children sit around the rug. Invite each child one at a time to pick up a cube, experience it manually and visually, and put it down in front of her. Build the tower by having the children superimpose their cubes one by one, in order, on the rug. Be sure that the sequence begins with the first ("largest") cube. An alternative is to have each child explore her cube then place it behind her out of sight and out of her hands until retrieving it to place into the tower. When the tower has been built, return all cubes to chaos and repeat, encouraging each child to take a different cube than before.

**Memory Game: Language**  
This game is usually played with one child at a time, but can be adapted for a small group. The teacher names a quality and the child retrieves it. Positive, Comparative and Superlative language can all be incorporated, depending upon the child’s own knowledge. This game is sometimes known as ‘The Bring Me’ Game. We can think of it as an extension of the Second Period of the Three Period Lesson; it is played in the style of Command Games in Spoken Language. It is very free-form and open ended.

**Example: Pink Tower**  
Incorporating Positive, Comparative and Superlative language  
After success Grading Pink Tower; comfortable with the language for the Pink Tower  
Place the cubes at random on a rug. Sit at a distance from the rug, but be sure you can still see the rug. Give a command to the child, such as “bring me a large cube”. When the child brings a cube confirm what she brought, as in “you brought a large cube”. Keep the large cube and ask for a cube which is “larger” than this cube. When the child returns confirm what she brought, as in “this cube is larger”, comparing the two cubes. Have the child return one of the cubes to the rug. Ask the child to bring a cube smaller than the one you kept. You can also keep two or more cubes and when the child retrieves another cube ask “which is the largest / smallest” of the cubes. Continue as time and interest allow.

**Variations**  
As discriminations are refined, open-ended exploration of materials evolves into the child’s own variations. Variations can be defined as:

- A modification in the use of the material which is different from the presentation but still serves the same purpose for which the material was designed.

When we speak of variations, we refer to something which the child does spontaneously out her own activity with the material. These spontaneous inventions are an important aspect of the child’s interactions with the materials; they result from the discoveries she is making based in the purposes of the activity. Variations are never shown to the child – this would rob the child of the joy and certainties of her own discoveries.

The psychological atmosphere of the Casa should encourage this type of spontaneous exploration beyond the activities of the initial presentation: there should never be a conscious or unconscious message that children can only do what was shown in the presentation. The child should experience the presentation for what it is: an initiation offering just enough knowledge and experience of the material to “get started”: the
real work (and real fun!) happens through the child’s own manipulation and exploration, with the constant incentive to the child’s curiosity – what will happen if I do this? ... if I try that? if I place it this way? and so on. Also in such an atmosphere, the child has constantly absorbed the images of other children experimenting appropriately with the sensorial materials. The transfer of the work during the initial presentation becomes an exciting moment eagerly anticipated by the child’s interest: “now it is my turn!” After mastering these initial movements or explorations, the child naturally pursues that interest beyond the minimum which the teacher has shown. Without this encouragement in the environment, the child’s work remains limited, sterile, and quickly uninteresting.

On the other hand, activity which does not further the developmental purposes of the material must be discouraged, and the child re-directed back to developmentally significant interaction. This is a frequently misunderstood aspect of the Montessori environment, and here in the Sensorial area this misunderstanding has its most frequent manifestations. The teacher has to have a deep connection to the developmental purposes of each material in order to assess when the child’s activity is a true variation and when it constitutes misuse or abuse of the material. The importance of Observation as a pedagogical tool of the teacher is paramount here, as well as the capacity for respectful intervention which does not arouse a child’s defenses.

Some Indirect Ways to stimulate Variations include:
- timing the initial presentation of a material to the developmental interest of the child, when there is the appropriate level of challenge, and therefore stimulus to repetition and exploration
- timing presentation of memory games to stimulate renewed interest and assist the formation of the abstraction
- timing language lessons to stimulate renewed interest and fix the abstraction

Stimulating the child’s own active participation in the interactive relationship with the materials is part of the teacher’s art. There is a delicate but significant balance to be achieved between the liberty for exploration and the license for misuse. Creating this balance is an expectation of our work.

The Developmental Purposes of the Sensorial Area
The Sensorial Materials are designed to assist developmental work in the First Plane of Education. This developmental work of the child is ongoing – directed according to the motivations of the Conscious Absorbent Mind and the Sensitive Period for the Development and Refinement of Sensory Perceptions. The Sensorial materials offer particular assistance to these aspects of the child’s self-construction through age 4½. They also offer opportunities for development as motivated by the Human Tendencies for Exploration, Order, Abstraction, and Exactness throughout the period 3-6, thereby preparing the Constructive Powers of the Second Plane.

The Specific Purposes of the Sensorial Area are:

To Classify and Categorize Sensory Perceptions
This assistance to classify and categorize sensory perceptions must be distinguished from sensory perception per se (the acquisition of sensory information). The particular opportunities offered are in the classification of those sensory perceptions which the child has already acquired through her own experience – in utero and since birth. Our purpose is not to give primary sensory experience. It is to offer the conscious
Absorbent Mind opportunities to re-visit and organize sensory perceptions; and to become aware of the categories of abstract qualities which are associated with those perceptions. These constructed mental classifications are then available to the child to organize and clarify his continuing experience of the world.

**The Refinement of Sensory Perceptions**

Through the exploration invited by the design of the materials and through the structure of sensorial work, the child is offered an opportunity to further refine the sensory perceptions he is gathering in his day-to-day experience. Prior to c. age 4.5, this directly assists the work of the Sensitive Period for the Development and Refinement of Sensory Perceptions, including opportunities for: heightened perception and awareness; refined discrimination of qualities; and improved capacities to make finer distinctions of difference among sensory data. Such refinements, in turn, directly enhance the quality of classifications and categorization of sensory perceptions forming in the child’s mind.

**To Assist the Process of Developing Abstractions**

The child’s mind continually forms and holds Abstractions for the qualities encountered through sensory experience. These Abstractions become the standard by which subsequent experience is assessed, organized, and integrated. The quality of these internal formations – these abstractions – reflects the quality of experience and the quality of organization possible during the First Plane of Development. Depending upon this quality of experience, these abstractions might be vague, imprecise, incomplete, relative, or highly subjective. The child’s heightened powers of discrimination, developed and refined by a process of work such as is offered through the Sensorial materials, makes it possible to form precise, reliable, and objectively accurate abstractions – including the possibility of constructing Abstractions which match perfectly the separate qualities of perceived reality (such as “perfect pitch”).

**Development of Accurate and Discriminating Recall of Perceptions**

These opportunities focus on the development of Memory as a component of making organized perceptions available to the child’s conscious mind; and particularly, development of Memory as a basic step in the formation of Abstractions.

**Development of Life-Long Tendencies toward Exactness (Order and Precision)**

The design of the Sensorial materials and the structure of the child’s interaction with them make it possible for the Human Tendencies for Order and for Exactness to be continually realized. These “exercised” tendencies towards Order and Exactness, in turn, are pivotal in the on going development of the Mathematical Mind.

These developmental purposes of Sensory Education are actualized through

1. the characteristics shared by the sensorial materials
2. the design of the sensorial materials
3. the structure of the activity they stimulate
Bibliography


For Definitions: