



GYM WIZARDS®
STRONGER. FITTER. SMARTER KIDS



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A Paediatric Occupational Therapist's perspective of the functional benefits of the Gym Wizards Academy Programme

From sensory processing to essential motor skills, this report provides information regarding the neuroscience behind the benefits of the type of purposeful movement provided by the Gym Wizards Academy curriculum and how it promotes success for children, both inside and outside of the classroom.

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INTRODUCTION

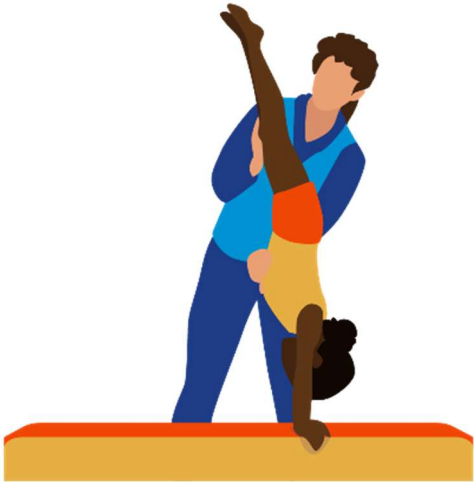
Gym Wizards Academy is a movement and exercise-based programme that is especially designed for children from ages 4 to 12. It is designed not only to improve their motor skills and to promote their overall fitness and physical well-being, but also to facilitate various essential skills and functions that children in this age group are learning. It promotes social and emotional skills development, and it boosts cognitive development and academic success. This is all achieved through purposeful movement-based activities which are structured in a carefully thought-out curriculum and facilitated by trained and knowledgeable instructors.

In the last two decades, children have been pushed to achieve academic success in the classroom at a younger age, with higher expectations of skill but reduced opportunities to use movement in the classroom. Classroom environments are movement restricted by default and this is resulting in more children requiring intervention at a younger age, due to not successfully meeting these high expectations which are devoid of movement. We are also seeing a sharp increase in the amount of time children are spending in static recreational activities, especially as we move closer and closer to an age governed by technology and the virtual world. Outdoor play is the gold standard for active movement and learning but this is becoming increasingly unsafe, and children are relying on indoor methods for active play. For these reasons, structured exercise programmes such as Gym Wizards Academy are becoming increasingly relevant in our current times.

As a Paediatric Occupational Therapist, I am passionate about helping children to reach their full potential. The majority of the work I do with children involves purposeful movement because I know how important it is for them and how it contributes to achieving success in all aspects of their lives. Movement is the basis of all learning.

In order to understand the benefits of Gym Wizards Academy fully, it is important to understand how movement impacts the brain and its development, because the brain is the organ responsible for all that we do.





THE BRAIN

The brain is like the central processing unit of a computer - it takes in information and uses that information to govern the processes of your computer. There is an input and an output. Without the central processing unit, your computer would not work.

Similarly, the brain receives information from our environment and from our bodies through our senses.

It then processes that information and makes sense of it. This information can then be used to govern a response, which is usually observed in a motor output. Here we have a sensory input which is processed in the brain and a motor output that is informed by the brain's understanding of that sensory input. This is called Sensory Processing. For example, you are taking your roasted potatoes out of the oven and accidentally grab the roasting tray with your bare hand. Your skin, the primary sensory organ for the tactile sense, sends a message through the spinal tract responsible for transmitting pain to the area of your brain responsible for perceiving tactile information on your hand. This is interpreted as pain, which your brain understands as something to be avoided, something detrimental to your survival, so it sends a message via motor pathways down your spine and through the nerves which innervate the muscles in your arm and hand which will allow you to let go of the tray before you burn excessively. Without your brain's understanding of the sensation of pain and attributing meaning to it, you would not let go in time to avoid burning badly. The brain has understood information from the environment and used that information for you to respond appropriately.

Sensory processing is the basis of our ability to adapt to our world. Did you know that there are actually 8 senses? The "traditional" five senses inform our brain about what is happening in our *external* environment.

These sensory systems are:

1. The **Visual** System - seeing
2. The **Auditory** System - hearing

3. The **Olfactory** System - smelling
4. The **Gustatory** System – tasting
5. The **Tactile** System - touching

However, we also need to perceive information from our own bodies so that we can use our bodies to interact with the world effectively. These sensory systems allow us to understand *how our bodies can move and adapt to our environment*.

These systems are:

1. The **Vestibular System** - balance and movement
2. The **Proprioceptive System** - body awareness in space
3. **Interoception** - governs perceiving the internal state of our body such as feelings of tiredness, hunger, temperature, sickness etc.

It is essential to understand that the senses all work together. The brain integrates information from most of the senses in any given situation. Therefore, isolating them is challenging and not necessarily a true representation of what happens in the brain when we go about our everyday lives. However, for the purposes of understanding the possible positive impact of a *movement* programme such as Gym Wizards Academy on development, I will be isolating the **vestibular and proprioceptive systems** in this report, because Gym Wizards Academy provides the brain with this type of sensory input, and it challenges the skills that come from a well-integrated vestibular and proprioceptive sensory system.

Another important concept that emphasizes the importance of movement for development is the neuroscience behind brain development. *How does the brain actually develop and how does movement contribute to this development?*

When we are born, the brain is the only part of the body that is not fully developed. This is not the same as being born with a fully developed body part that is just a smaller copy of that of an adult. It is only in our late 20's that the human brain is fully matured, and the majority of that development occurs in childhood. What grows and builds the brain then? What turns an immature infant brain into a mature adult one, and why are our brains not all the same? *Experience!* What we experience in childhood has a lifelong impact on the

way we interact with the world because it governs the connections or neural pathways created in the brain. With each new and repeated experience, pathways form across neural networks determining the very shape and strength of our brain. It is these neural pathways that we use to process sensory information and to respond to it. The type of information that the brain receives in the first step of sensory processing (the input - which we know can also be *movement*) is what wires the brain and what determines how the brain will respond throughout life. Genes do play a role in wiring the brain because they determine how brain connections form, but it is experience that activates these connections.

Children between the ages of 4 and 12 are experiencing rapid brain growth and the quality of their experiences, such as movement, wire their brains. The neural pathways created by movement are used for higher order, academic based learning. If a neural pathway is formed but not used, that pathway will be lost. In the same way, if a neural pathway is formed and used consistently, it becomes stronger and transmits messages more efficiently. This is the neural process behind the term “practice makes perfect”. From this it is clear that children need varied movement experiences because this impacts how their brains develop. In turn, this unique brain development determines how they respond to their world and to the various challenges they encounter in their roles as friends, students and children.



EMOTIONAL REGULATION, ATTENTION & ACADEMIC SUCCESS

Jean Piaget was a Swiss psychologist who developed a theory of cognitive development in children that is utilized in all fields of paediatrics. He theorized that all humans develop cognitive abilities in a developmental sequence, divided into stages depending on a child's chronological age. The first stage is called the Sensorimotor stage. Here, infants from birth to age three, learn about their world and interact with their environment through their senses and by learning how to move their bodies. Their learning is sensorimotor in nature and acts as a foundation for later stages of learning that are necessary for children to meet the demands of the classroom. This is testament to the fact that movement precedes the development of more advanced cognitive skills.

The human brain develops in a hierarchy, from the lower centres of the brain to the higher centres which form last. This hierarchy is important to understand because it directly links the benefits of movement to higher order learning.

This hierarchy, from the bottom up, is:

1. **The Brainstem** - often called the reptilian brain, controls basic survival functions such as breathing, sleeping, heart rate, digestion and maintaining consciousness.
2. **The Cerebellum** - is responsible for much of the proprioceptive system, vestibular system, coordination, *attention* and rhythm. This brain structure is essential in developing and monitoring skilled movement. Signals transmitted to and from the brain when our bodies move and learn pass through the cerebellum. This is considered part of the lower brain and is believed to contain between 50% and 80% of our neurons or brain cells.
3. **Cerebral Cortex** - also known as the Cerebrum or “thinking brain”, is the largest brain structure and is divided into four lobes that are each accountable for different parts of learning. These are broken up into higher and lower functions of the brain:
 - Lower level
 - **Occipital Lobe:** Visual system, visual information, sight (letters, shapes, sizes, numbers)
 - **Temporal Lobe:** Speech, auditory processing, hearing, *behavior, emotions*, short-term and long-term memory (processing what the teacher says, fear, fight or flight, recalling facts and details)
 - **Parietal Lobe:** Senses, sensory integration, sensory input (taste, temperature, smell, touch)
 - Higher level
 - **Frontal Lobe (prefrontal cortex):** Highest levels of learning and activity used for problem solving, executive functioning, reasoning, motor skills, organizing, abstract thinking, analyzing, expressive language (telling stories, organizing thoughts on paper, starts and completes tasks, retains information, choices between right and wrong, social skills).

The lower and more primitive centres of the brain need to be well developed in order for

the higher centres to work well. As parents and teachers, we often miss these lower brain functions, which should be automatic (such as learning to control our emotions, to sit still and to pay attention) as the reason why children struggle with learning.

When we experience sensations derived from movement (to be discussed later), neurotransmitters send impulses from our muscles, through the spinal cord and up to the brain. These impulses follow neural pathways that first enter the cerebellum before being transmitted to the cerebral cortex. *The cortex functions well when supported by automatic movements established by the lower brain.* To understand this better, we need to look at the cerebellum. Together with other important areas of the lower brain such as the basal ganglia, movements are refined and automated by achieving a balance between excitatory and inhibitory movement. This makes movement automatic. This balance allows the cortex to focus on and enhance executive functioning, instead of being distracted by a poorly functioning cerebellum and basal ganglia. When these lower areas are not functioning adequately, movement that should be automatic, is not, which distracts the thinking brain and inhibits learning.

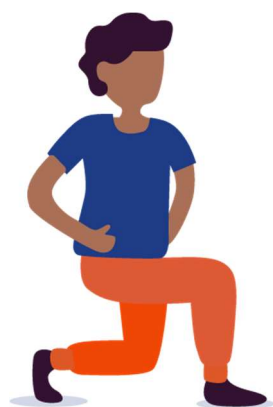
An essential lower-level skill that is important for executive functioning and higher order learning is the ability to regulate one's emotions. Emotional regulation is an essential part of growing up. This is the ability to understand and reason the emotions we feel and requires neural pathways to be created between specific areas of the brain that connect emotion and reasoning. Poor emotional regulation can lead to social issues, meltdowns, problems at home and school, negative behavior, anxiety, and later in life, even addictions and difficulty with relationships. As adults, many of us have learnt that movement can be regulating, even emotionally transformational. This is what results in a great day at work after a morning in the gym or an excellent brainstorming session following a long run.

Another important lower-level skill that is the foundation for learning is the ability to attend. This relates to focusing on what is important and filtering out what is not important. When a child moves, the sensory information from all those movements sends impulses to the cerebellum to the *Reticular Activating System (RAS)*, which is located in the brain stem.

The RAS “wakes up” the cerebral cortex and tells the brain to be responsive and pay attention in the classroom by quickly focusing on what their teacher is saying. Connections

between the cerebral cortex and the vestibular and proprioceptive systems (senses for movement) is extremely important to a child's learning experience. When a child doesn't move, they do not activate their muscles and balance system, which means they are not taking in much information from their environment. As your child participates in more movement activities, they train their brain to respond accurately to their environment, thereby improving their attention and concentration in the classroom.

We have established that the brain needs movement to learn. Let's take a closer look at the movement provided by the Gym Wizards Academy programme, by starting with the sensory systems it stimulates.



THE VESTIBULAR SYSTEM

The Vestibular system is responsible for processing information related to the position of one's head in relation to gravity, motion and spatial orientation. It is the system involved in motor functions that allow us to maintain our balance, stabilise our head, eyes and body during movement and to maintain our posture.

The organ responsible for sending this information to the brain can be found in the inner ear in a system of compartments called the Vestibular Labyrinth. The Vestibular Labyrinth contains the Semicircular Canals which is a small system of three circular tubes which lie on the three planes in which the head can rotate or move. These canals are filled with a liquid called Endolymph. At the end of each canal is a swelling called the Ampulla which houses hair cells, the sensory receptors of the Vestibular System. At the top of each hair cell is a collection of hairs called Stereocilia which move in the direction of the Endolymph when the head moves. When the head is rotated it causes the movement of Endolymph through the specific semicircular canal that corresponds with the plane of movement. It flows into the Ampulla and moves the Stereocilia. This releases neurotransmitters which send information about the plane of movement to the brain to be processed. This processing informs our body's reaction to movement of the head. The Vestibular System also uses Otolith Organs to transmit linear acceleration and gravitational forces to the brain. There are two Otolith Organs in the Vestibular Labyrinth; the Saccule which detects movement in the vertical plane and the Utricle which detects movement in the horizontal

plane.

The Semicircular Canals and Otolith Organs act as a miniature accelerometer and gyroscope, continually reporting information about the motions and position of the head and body via the vestibulocochlear nerve to the cerebellum and to nuclei in the brainstem called the vestibular nuclei. The vestibular nuclei then pass the information on to a variety of targets, ranging from the muscles of the eye to the cerebral cortex.

The Gym Wizards Academy movement library has a wide variety of exercises that incorporate each of the movements of the head that stimulate the Semicircular canals and the Otolith organs. Let's take a closer look.

During their *static* basic body positions such as the Superman, Bridge and Tuck sit, children's heads are held in positions that their vestibular systems need to interpret in order to inform the perfect technique of the body position required. This is especially evident in their Front, Side and Back Supports where the muscles of the neck need to respond to vestibular input from the ears to hold the head in line in three different positions against gravity. In their *moving* basic body positions movement library, children need to assume and maintain body positions when their heads are moving. For example, during the Rock & Roll movement of Endolymph in the Semicircular canal responsible for movement on the sagittal plane is triggered, and this assists children to make postural adjustments that allow them to keep their bodies in a flexed position as they roll backward and forward. It also assists them to improve eye movements on a sagittal plane which occur in the classroom when looking up to the board in front of them and back down to their books.

Their Locomotions section contains movement that is rich in vestibular input, as the name locomotion implies. Here children need to control their bodies with their heads in positions that are varying such as the One-Legged Baboon Walk where the head is almost upside down with eyes looking at the ground and Bottom Shuffles where the head is upright but also tilting backwards slightly with each shuffle forwards. What is unique about their locomotions is that children gradually progress in terms of acceleration, moving at greater speeds as they improve in complexity of the given movement. This occurs as children progress from the Cheetah Run to the more advanced Cheetah Run 2. This gradual

increase in acceleration has the potential to decrease possible sensitivities to vestibular input and to improve vestibular processing gradually, over time.

When a child is required to jump, either on the spot or while moving in any direction, their vestibular system is involved because their heads move up and down and in a combination of ways when children jump between, to, from and over objects. The Gym Wizards Academy movement library is filled with activities where children have to jump, an excellent example of which is their Rope Skipping activities. Here children have to jump Forwards and Backwards and Side to Side over the rope when it is on the floor, both on the spot and while moving along the length of the rope. During their 18 different types of basic jumps, with the rope in their hands, children need to jump in a variety of directions with increasing speed and varying directionality.

Even more complex and rotational vestibular input is received through their Hurdling, Rebounding, Cartwheeling and Parkour movement libraries. An excellent example of vestibular input here is their Backwards Roll where children need to move into backwards space while they learn to roll over their shoulders. Their heads move as they transition from standing to sitting down to backwards rolling to upright again, all in one movement. Just as gradual increase in acceleration during their locomotions section has the potential to decrease sensitivity in the vestibular system, *moving into backwards space* does too, especially when taught in the safe, playful and encouraging context of a group class. Moving into backwards space is used regularly in Gym Wizards Academy: in Parkour during the Kick-Back for example, or during the Backwards Safety Fall. The Gym Wizards Academy Handstand series is done with the body (and head) completely upside down!



Almost all exercises provided to children within the Gym Wizards Academy curriculum will stimulate the vestibular system - but why is this so important? The Vestibular sense is crucial for a child's development because it enables a child to feel secure and confident in their body, so they can move, learn and play.

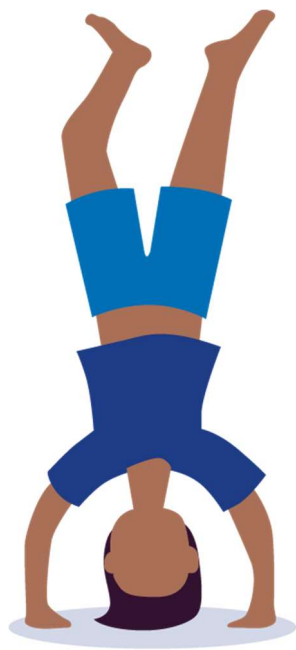
More specifically the vestibular system:

- Contributes to good **balance**. When balance is challenged, such as when a child stands on one leg during the Stork Stand, Arabesque or Lunges and Levers in the Gym Wizards Academy curriculum, they will naturally wobble on their balancing leg. The Vestibular System detects slight head movements as this happens which the brain interprets in order to recruit the muscles necessary to maintain their balance in these positions. This occurs through reflexive reactions (*without thinking* - we have previously discussed why these *automatic* movements are important for the brain to attend to what is important) such as protective extensions of our limbs if we fall, or reaching an arm or leg out (during Lunges and Levers, the back leg must swing upwards in order to maintain balance) and various other postural adjustments throughout their bodies. More on balance later.
- Improves **visual tracking**. One way the vestibular system helps our bodies to respond reflexively to external forces is through a mechanism called the Vestibulo-Ocular Reflex. Here, connections between the vestibular system and the muscles of the eyes allows our gaze to remain fixed on a particular point even when we move our heads. During a Hurdle into Hoop in the Gym Wizards Academy curriculum, a child's eyes need to remain fixed on the hula hoop in which they must land while their heads move up, down and forwards as they jump. During a Half Turn or Full Turn, children learn to fixate their eyes to *spot* so that they are better able to complete the turn without becoming disoriented, all while their heads are rotating rapidly. Visual tracking helps a child with reading readiness, an essential skill for children entering the formal schooling environment. Without this *eye-head coordination*, children might find it difficult to:
 - smoothly look up at a whiteboard, then back down at their work.
 - read effortlessly, as they find it hard to scan a line of text.
 - enjoy sports that involve keeping track of a moving ball.
 - In this way, the vestibular system also contributes to fine motor skills such as cutting and writing because these tasks require smooth eye movements.
- Improves **hand and eye coordination** which assists a child to be successful in ball games and sports and to colour, cut and write within the lines. Any tasks where the eyes govern movements of the hands involves hand and eye coordination, such as The Snake Rope, Pull and Catch and Tick Tock elements in the Rope Skipping Gym Wizards Academy movement library.

- Develops and maintains normal **muscle tone**. Muscle tone is different to muscle strength - it is the state of our muscles at rest and their readiness to activate when needed. At rest, muscle tone will be low, but when we want to move, it will rise in response to the command from the brain. Without a properly functioning vestibular system, movement of the head will not initiate this response and a child may find it hard to maintain their posture while sitting at their desk. They might prefer to lean on their elbow for support or to lie on the table. They are also often observed to lie on the floor during mat time. Children might counteract this by seeking out vestibular input such as rocking in their chairs or fidgeting. Vestibular rich exercises in the Gym Wizards Academy curriculum can contribute to increasing muscle tone.
- Supports **language** development by integrating with our visual and auditory senses. This occurs as children partake in a Gym Wizards Academy lesson because they need to integrate vestibular input from movement while also listening to instructions and copying visually demonstrated movements from their instructors. The Vestibular system is an integral part of motor development which includes the movements of the tongue, lips, and jaw as needed for *speech production*.
- Assists a child to be independent in self-care and school-based tasks which require **bilateral coordination and sequencing**. This is the use of both sides of the body together. The Gym Wizards Academy curriculum has a plethora of movements which promote bilateral coordination and vestibular input such as the Cartwheeling movement series where both sides of the body need to move in a sequence while the head turns upside down and upright again. More on bilateral coordination later.
- Encourages **self-regulation** by keeping us in the right state of arousal for learning. Irregular and rotational movements can help us to focus when we feel tired or are daydreaming because they are considered excitatory for the nervous system. These types of movements are seen throughout the Gym Wizards Academy curriculum such as Rebounding into Rolling or Half Turns in Both Directions. Rhythmic up and down movements such as Tuck Jumps and Pencil Jumps can be calming when we feel excited, disorganised or when we are struggling to calm down because they are considered inhibitory for the nervous system.



In summary, the best way to stimulate the Vestibular system and to improve a child's processing of vestibular input is to provide them with regular movement or exercise that involves movement of the head and body in a *variety* of ways. Gym Wizards Academy does exactly that because the curriculum is vast, allowing for stimulation of the entire Vestibular Apparatus.



THE PROPRIOCEPTIVE SYSTEM

The Proprioceptive system is responsible for processing information related to muscle contraction and position. By utilizing stretch receptors in the muscles and tendons throughout our body, the proprioceptive system allows us to sense where we are in space and what position our body is in without having to rely on our vision. This awareness is *subconscious* because we are not always thinking about where our bodies are in space, when we are walking for example. Kinesthesia is the *conscious* awareness of joint movement and is often referred to as conscious proprioception - it involves more conscious awareness of movement such as perfecting the

Cartwheel or Parkour Palm Spin.

The most studied proprioceptor is called a muscle spindle, which is located in the muscle body and parallel to voluntary muscle fibres. Depending on the length of the muscle and the velocity of the stretch produced in the muscle as it moves, the muscle spindle will stretch or contract with the muscle. Inside the muscle spindle is a protein which also stretches along with the fibre. The brain needs input from many of these spindles in order to register changes in angle and position that the muscle has accomplished. The Golgi Tendon Organ is another proprioceptor and is located at the junction of muscles and tendons. The skin also plays a role in proprioception as it stretches or wrinkles over moving joints and muscles.

Proprioceptive input is constantly transmitted to the brain but is emphasized when the body is moving *actively*. By default, all exercises within the Gym Wizards Academy curriculum provide proprioceptive input to the brain because they involve active contraction and stretching of muscles. An excellent way to ensure that the proprioceptive

sensory system is being stimulated thoroughly is to provide children with active movement that requires them to know where their body is in space without seeing it. This is best done against gravity or with the added input of resistance or prolonged muscle contraction. This is seen in the Parkour movement of the Cat Grab. Here children need to jump onto an inclined surface with their hands perfectly placed on top of the surface and their feet in a tuck position, which they cannot see. They then have to maintain this position, against gravity, by anchoring themselves there which uses a lot of muscle power, specifically *isometric muscle contraction*. Isometric muscle contraction is especially rich in its capability to recruit proprioceptors.

In their Stretching and Flexibility movement library, *all* muscles (including those not conventionally stretched such as the toes, ankles, shoulders and wrists) are provided with gradual stretch which also activates muscle spindles to send proprioceptive input to the brain.

Any movement which requires *jumping* results in the inevitable landing on descent. As the body lands from a jump, joints are compressed and muscles contract powerfully to protect them, thereby increasing the number of proprioceptors recruited. As mentioned previously, jumping is a fundamental aspect of the Gym Wizards Academy programme and occurs constantly in their Locomotions, Hurdling, Rebounding and Parkour movement libraries.

Furthermore, many of the unique jumps in the curriculum require landing on an elevated surface or jumping at a height which necessitates *explosive* jumping. For example, in their Rebounding drills of Stretch Jumps on Top and over Blocks and Straddle Jumps, children land on a mat and on top of blocks as they move over a row of blocks. In the intermediate version of Precision Jumps in Parkour, children need to jump to and from a height explosively. Explosive jumping is essential during all Parkour movements and is also shown during Clear Work where children need to learn how to jump in order to hurdle over an obstacle at the height of their waist. Using trampolines and other surfaces which rebound the body, such as an air track and tumble track, increase the proprioceptive input sent to the brain too.

Animal walks, such as the Bear, Crab, Frog and especially the Seal require the child to weight bear on their limbs, thereby giving extra proprioceptive input to the brain. This also occurs during the Handstand, which entails prolonged weight bearing on the arms, as well

as during their Cartwheeling drills where children learn to transfer weight from their feet to their hands and back to their feet again.

Furthermore, instructors will often give children instructions that require them to feel their body position when they cannot see it such as “*keep your back pushed into the floor*” while lying on their backs or “*tuck your bottom under*” and “*pull your ribs down*” in standing. During Angry Cat Happy Cat, children need to feel the difference between a rounded and arched back without looking.

The Proprioceptive Sense is essential for a child’s development because it enables a child to understand how their body can move to interact with their world.

More specifically, the proprioceptive system:

- Promotes good **body awareness**. In their Parkour series of movements, children need to be acutely aware of where their body is positioned in relation to a variety of surfaces such as raised and lowered landing surfaces, obstacles at varying heights, walls and inclines. Poor body awareness here would result in children being unable to maneuver themselves around these obstacles successfully and safely. More on body awareness next.
- Assists children to maintain appropriate **posture** at their desks, by enhancing their unconscious awareness of the position of their trunk muscles. In the Straddle Sit basic body position, children need to sit on the floor and focus on maintaining good posture with cues such as keeping their backs straight and their shoulders down.
- Contributes to our **gross motor** development by ensuring that we know where our body is in space when we cannot see it - such as the position of our feet and legs when climbing up and down stairs or the position of our arms and legs when doing Jumping Jacks. This impacts on our ability to play sport and coordinate movement.
- Impacts on our ability to interact with objects and thus our **fine motor** control. The density of muscle spindles increases in the muscles involved in fine movements, such as those of the hands and mouth. This is because the movement required in



these muscles is more refined and specific than movements of larger muscles such as the calf or thigh muscles. For this reason, proprioceptive awareness plays a key role in fine motor control by sensing the amount of force needed to interact with objects, because proprioception *allows one to feel how heavy an object is* based on the tension placed on the muscles of your arm as you hold and manipulate it. This helps a child to know how much effort is needed to grasp a pencil and to make a mark on the page that is not too soft or too hard. This also helps a child to feel the correct position of the fingers to achieve a mature pencil grasp. By incorporating Wrist Stretches, the muscles which run over the wrist (and which control bending and stretching of the fingers) receive proprioceptive input.

- Enhances our ability to **balance and prevents injury**. For example, when you walk on an unstable surface your foot and leg position will send proprioceptive input to your brain which in turn allow you to use your arms to balance and *prevent falling or twisting of your ankle*. If you step on a rock incorrectly and feel your ankle twisting, your brain will use information from the stretch produced in your muscles surrounding the ankle to inform your reaction, allowing you to alter your foot position or to use your eyes to quickly find a new and safer rock to stand on. The Toes and Ankle Stretches, along with the Calf Stretches give proprioceptive input around the ankle.
- Assists a child to be independent in self-care and school-based tasks which require **bilateral coordination**. This is the use of the right and left sides of the body together, in symmetrical and asymmetrical ways. A child needs to be able to *feel* that both sides of the body are moving together because it is not always possible to use vision in bilateral tasks. This is evident in the Gym Wizards Academy Rebounding Combination Jumps where children have to use their vision to focus on jumping over blocks with two feet, so they need to use proprioception to ensure that their feet perform Stretch, Tuck, Straddle, Pike, Half Turn and Full Turn jumps over the blocks. The same occurs during Rope Skipping where children can't always watch their feet to ensure they jump over the moving rope.
- Along with an intact tactile system, it allows a child to **motor plan** by laying down

muscle memory related to prior movement. For example, a child knows exactly how much force must be used to throw and catch a ball based on previous experience from proprioceptive input.

- Assists a child to determine the **rhythm and timing** needed for coordinated movement. More on rhythm and timing later.

The Vestibular and Proprioceptive systems are complementary to one another. These two senses, along with information coming in from other senses such as vision, hearing and touch, work together to ensure that we know how our bodies can move and adapt to the environment appropriately. They inform *coordinated* movement.

In the following sections, we will look at some of the skills and motor functions that come from a well-integrated sensory system. Without proper sensory processing, dysfunction would be seen in these areas. Let's take a closer look at these skills and how the Gym Wizards Academy programme can develop them. Information will also be provided on how these skills relate a child's ability to meet the demands placed on them in their everyday lives, both inside and outside the classroom.



BODY AWARENESS

Body awareness is the knowledge or sense of where all the body parts are in space and how these body parts can work independently or interact with each other and with the environment. It is an innate, or unconscious awareness that develops from a foundation of good proprioceptive processing.

Body awareness develops as a baby discovers their body parts through the sense of touch, by mouthing their hands and grabbing their feet. As they progress through developmental milestones, they learn to feel how their bodies can move and essentially how they can work. Through active exploration, practice and perseverance, babies also learn how to interact with objects, such as holding or playing with a rattle.

The Gym Wizards Academy Programme has many opportunities to develop and promote body awareness and for a child to practice how their body can move. For example, while Rebounding into Rolling, children need to complete three consecutive jumps before

smoothly transitioning into a forward roll. In order to do this successfully, they need to understand the exact body positions and movements needed. While rolling, their chins need to be tucked, their knees must not touch their faces and their backs must be rounded. When standing up afterwards they must not use their hands, so they need to feel their weight transitioning forward to a greater degree and they need to use more power through the muscles of their legs. Sometimes, instructors will include an elevated mat to roll on which changes the positions and movements of the body while rolling. Without good body awareness, children would not be able to do this. The same is true for Hurdling drills where children need to learn how to maneuver their bodies in different ways such as combining a step, hurdle, rebound and landing all together.

Games such as Mirror, Back-to-Back, Simon Says and GOLD all challenge children to *identify* body parts and to move them in different ways. Although these games are not new, they are rarely played in current times. *Body part identification* is a key element to body awareness. Being able to *imitate movement* is an excellent way to practice body awareness, because children need to have a good understanding of their body parts and how they can move in order to do this. Games such as The Wheels on the Bus and Follow the Leader give children opportunities to imitate body movement, while using their imagination. Again, these classic games are often overlooked because the value of them is underestimated.

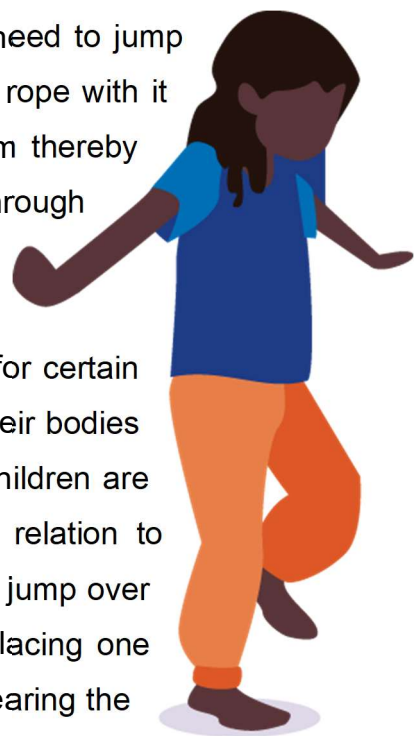
The tiered nature of the Gym Wizards Academy curriculum, meaning that children are first required to practice and perfect basic body positions before moving onto more complex, moving work, lends itself to the *gradual development of body awareness*. For example, children first need to understand how to position and hold their bodies in a Bridge, using the perfect technique and positioning (feet under knees, hips up directly in line with knees and shoulders, head forward and neutral), before moving on to a Bridge with Kicking Over into a Lunge. All basic body positions require good body awareness, from the Star to the Dish to the Lunge.

Body awareness is a precursor to the development of **spatial awareness**, because children relate bodily experience to spatial awareness. Spatial awareness is the ability to understand and interact with the environment around you, in a way that reflects an understanding of your body in that space. Children develop an understanding of their

relationship to their environment, and begin to make judgments of what their space is, compared to others' spaces. Whether it be avoiding obstacles when walking, reaching out to grab a pencil, or determining left from right, these are all examples of tasks that require spatial awareness. *Spatial awareness, as it relates to body movement, is a precursor to the development of mathematical based spatial concepts in the classroom, because the same neural pathways are used.*

The Gym Wizards Academy curriculum allows children to practice their spatial awareness, by introducing obstacles which children need to maneuver their bodies around. Instructors will often set up obstacle courses with equipment such as blocks, trampolines, vaults and tumbling tracks where children need to hurdle, rebound and roll under, over and around. This clever use of unique equipment and coordinated movements is the perfect way to enhance spatial processing through body movement.

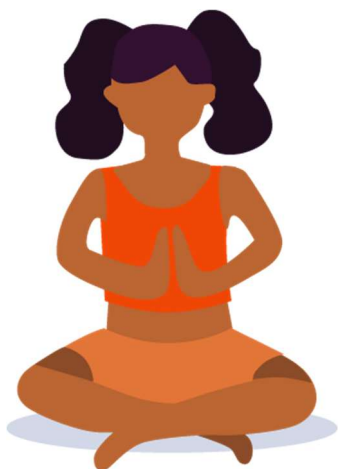
Rope Skipping is also a good example of this, as children need to jump over the rope in various ways, moving their bodies over the rope with it between their feet, behind, in front, around and next to them thereby enhancing their understanding of these prepositional terms through bodily spatial relations. Blocks, hula hoops, balls, poly dots and other equipment are regularly used - not only does this assist children in developing the correct technique required for certain exercises, but it gives them an opportunity to practice how their bodies need to move in order to avoid or hit a target. In Parkour, children are required to move their bodies in a variety of positions in relation to obstacles - in the Safety/Speed vault, they are taught how to jump over increasingly high surfaces safely and at speed while only placing one hand on the surface and swinging their bodies to the side, clearing the surface completely side on. This takes excellent spatial awareness and understanding how the body needs to move and be shaped, in order to clear the height of the given surface.



From this, it is evident that the opportunities to develop body awareness within the Gym Wizards Academy programme are vast. From basic body positions to more complex

movements that involve obstacles and unique equipment, children are given the opportunity to enhance their body awareness. By participating in movements that promote body awareness, children are less likely to have the following problems commonly associated with poor body awareness:

- **Poor posture** in a classroom chair or while on the mat.
- Problems with word spacing, writing on lines and mathematics which are related to **visual perceptual skills** that are directly related to body awareness. These are commonly known as *Position in Space and Spatial Relations*.
- Difficulty with **handwriting**, including pencil grip and writing pressure.
- Difficulty **walking in line with classmates**.
- An **avoidance of playground equipment** due to a lack of confidence which can result in weak core muscles and a variety of other functional deficits, as a result of poor play participation.
- Difficulty with group **sports**.
- Difficulty applying **directional or prepositional concepts** like over, under, left, right, up or down which translates into issues with following spoken directions. The Gym Wizards Academy curriculum requires children to apply and practice *left and right* concepts throughout their Cartwheeling movement library and in Rope Skipping where children Run Over the Rope Sideways in different directions. They are also required to use specific feet to place over the rope in an alternating way and they need to Swing the Rope Right and Left before jumping over it. Children are given the opportunity to practice right and left concepts in games such as Hello-Hi, with the hands and feet, and in Ships and Sailors. The Opposite Game really challenges this because children need to move in the opposite direction to what is being called!
- **Clumsiness**, especially in unfamiliar environments, such as bumping into objects. This often results in an anxious child who avoids movement and play opportunities that would serve to remedy their clumsiness.



CORE STRENGTH

An important principle to motor development is that of proximal to distal control. This means that children will develop increased control and coordination of their muscle from a proximal (muscles at the centre of the body first) to distal (muscles at the ends of our body last) manner. This is because the muscles at the centre of the body, or the core, need to be stronger and more maturely developed for the muscles at the ends of our body to work well.

“The core” muscles are those situated in the stomach and back, as well as those surrounding and supporting the shoulder and hip girdles.

These muscles act to stabilize, align and move the trunk of the body. They act as a foundation for movement of the limbs. Without a strong core, children may experience difficulty with:

- **Transitional movements**, such as getting up and down off of the ground after morning ring or group work on the mat.
- **Playing** - Strong core muscles are needed to climb and navigate jungle gym equipment.
- **Gross motor control** - In order to perform activities such as walking, running, jumping or hopping, a child needs core muscles that are strong. Children who are successful in sport have strong core muscles.
- **Fine motor control** - The core muscles act as a stabilizing base which allows the arms and hands to participate in fine motor tasks in a controlled and efficient way. Children with weak core muscles often find tasks such as colouring in, cutting and writing to be tiresome and the quality of their work can be poor as a result of weak core muscles. This also applies to being able to use the hands for activities of daily living such as shoelace tying, teeth brushing and dressing. Similarly, a child needs a strong shoulder girdle for dexterous use of the hands.
- **Posture** - Many everyday tasks are completed at a desk or while seated on the floor in a classroom environment. Strong core muscles allow children to remain

upright while seated for fine motor tasks.

- **Balance** - In the same way that core muscles allow for the use of arms for fine motor tasks, they also allow for appropriate use of the arms to maintain balance. Balance also involves postural adjustments of the trunk such as rotation, flexion and extension patterns.
- **Attention and concentration** - When the brain is utilizing excessive energy and focus to keep a child upright, it has less energy to dedicate to other functions such as attending to instructions or completing tasks which require increased cognitive input.
- **Overall endurance**

A programme such as Gym Wizards Academy is a great way to improve a child's core strength because the exercises in the curriculum engage the muscles in the trunk. The movement library contains a *whole section dedicated to core strength*. These strengthening exercises are presented to children in fun games, often with partners, so that children are motivated to participate even when their bodies are pushed and feeling uncomfortable. For example, in The Chinese Fan children are partnered up in the Front Support Position and need to move in the shape of a fan opening and closing, involving their imagination in the process. Furthermore, all of the more complex movements such as Rolling and Parkour are built on a foundation of a strong core because this allows the limbs to move with greater ease and with more precision.

Let's take a closer look at specific exercises within the Fitnastic curriculum that targets the muscles of the core individually and as a whole:

1. **Stomach** - Crunches, Russian Twists, Jack Knives and Heel Raises.
2. **Back** - Arch Superman, Supine, Angry Cat & Happy Cat, Donkey Kick and Side Plank.
3. **Shoulders** - Shoulder Taps, Push Ups, Dips, Dolphin Push Ups and all activities which involve weight bearing on the upper limbs such as the Handstand and Cartwheeling series.
4. **Hips** - Rear support, Step Ups, Bulgarian Split Squat, Lateral Lunges and Squat Jumps.
5. **All together** - Mountain Climbers, Bridge Kicks, Inchworms, Hand Walk Ups and

Burpees.



BALANCE

A properly functioning balance system allows children to see clearly while moving and to determine direction and speed of movement. It also identifies orientation with respect to gravity and directs the body to make *automatic* postural adjustments, to maintain posture and stability in various conditions. Balance is achieved by a complex set of sensorimotor control systems that include sensory input from vision, proprioception and the vestibular system. In general, it is the Cerebellum that monitors sensory impulses received for balance.

Balance is both dynamic and static. Dynamic balance is the body's ability to counteract external forces while moving - here a child needs to stay in control of their body while it is moving, such as riding a bike, running or completing an obstacle course. Static balance is the body's ability to counteract external forces when the body is still - here a child needs to remain still while in a fixed position, such as holding a handstand or balancing on one foot. Static and dynamic balance is controlled by vestibular input from the Otolith Organs and Semicircular canals respectively.

Balance is obtained when our center of gravity relies on the base of our body for support. A child's centre of gravity depends on various factors such as their height or the position of their body in relation to the ground. Their base of support is dependent on the size of their body and how much of their body is touching the ground. Balance also depends on the quality of the surface on which a child is required to balance. These three factors can make balancing easier or more challenging and they are constantly changing as your child grows and encounters different environments. For example:

- **Centre of gravity** - the higher the centre of gravity, the harder it is to balance. It is harder to balance while standing up, when compared to sitting or lying down.
- **Base of support** - the smaller the base of support, the harder it is to balance. It is harder to balance on one foot, than it is on two. And it is easier to balance when your feet are apart as opposed to together.

- **Surface** - a smooth, flat surface is easier to balance on than a bumpy surface. Similarly, balancing on a moving surface is challenging when compared to balancing on a surface that is static.

Balance is not fully developed until age 12 so it is important for children to be provided with opportunities to challenge this skill. The Gym Wizards Academy programme works on both static and dynamic balance. Their basic body positions require children to maintain static postures with narrowed bases of support such as the Stork Stand, Tuck Sit and V-Sit. Simple dynamic balance is introduced when children progress beyond these static postures, requiring them to move while maintaining their balance in exercises such as a Bunny Hop and the Donkey Kick.

Children at an advanced level need to maintain their balance during complex movement sequences of tumbling, such as a series of Cartwheels in a row. These children also challenge their static and dynamic balance during hurdling and rebounding drills where their bases of support are continuously changing, where their centre of gravity is altered and where the surface upon which they land continuously changes. For example, children complete a combination of jumping with legs open and closed, on one foot and on two, from a height to rebound off of a trampoline to rolling onto a soft surface. Here they need to maintain their balance throughout the drill. This is especially evident in Parkour, where children combine static and dynamic balance while moving between surfaces and obstacles at varying heights and inclines. This requires children to jump to a surface and remain there using static balance, such as the Cat Grab, or needing to move over and across varying surfaces quickly using dynamic balance, such as the *Vertical Wall Run*. Furthermore, all Gym Wizards Academy classes take place on an uneven surface, such as gym mat or air track, which requires children to use more effort to balance while participating in a lesson.

Achieving good balance is valuable to a child's *overall* well-being. Why is it so important?

- A well-integrated balance system **prevents your child from injury** by reducing the risk of falling. Children who struggle to balance fall over often and are clumsy
- Balance helps children to **stay in their chair for active learning** in the classroom. Children with poor balance tend to seek out movement to stimulate their vestibular

and proprioceptive systems in order to get a better understanding of their bodies. They might walk around the classroom or fidget in their chair. This can have a negative impact on their ability to focus, to listen to the teacher and to learn.

- Balance is required for a child to complete **fine motor** tasks because it provides a stable base of support from which the hands can work.
- Balance helps a child to feel **confident** in their bodies. This means that children will use their bodies confidently while playing sport and while using playground equipment. They are also more likely to meet **gross motor** milestones.
- Balance assists children to **cross their midline** which is an important motor skill for all aspects of classroom and home learning. More on midline crossing later.
- Balance is required for **activities of daily living** such as dressing (e.g. putting on pants while standing up - balancing on one leg).



BILATERAL INTEGRATION & SEQUENCING

Bilateral integration is the ability to coordinate movement on both sides of the body in an organized and controlled way. This includes hands, eyes, arms, legs, feet and the brain. The cerebrum of the brain is separated into two hemispheres which are connected by a structure called the Corpus Callosum. This structure is filled with millions of neurons that help the right and left sides of the brain communicate with one another and share information received during sensory processing. On a motor level, the left side of the brain controls movement on the right side of the body and the right side of the brain controls movement on the left side of the body. As human beings we often need to use both sides of our bodies at the same time in order to function and this requires interhemispheric communication.

Bilateral integration requires a well-integrated proprioceptive and vestibular sensory system and allows a child to:

- **Establish laterality**, or dominance of one side of the body. This includes using a preferred hand, foot and eye when completing unilateral motor tasks. Gym Wizards Academy instructors are trained to monitor a child's dominance when teaching

children how to Cartwheel at age 4 or 5 because they need to select a dominant foot to place onto a block first, followed by a dominant hand on the same side. By this time dominance should be established.

- **Discriminate between their right and left** sides. This is essential for learning to write and form letters as it involves directionality. Children also learn to differentiate between right and left when learning the Cartwheel.
- Complete **activities of daily living** independently such as shoelace tying and fastening zips and buttons
- **Stabilize their page** with their non-dominant hand while their dominant hand uses their pencil.
- **Cut out** effectively on straight and curved lines because their non-dominant hand needs to stabilise and move the page while their dominant hand manipulates their scissors.
- Coordinate movement to reach basic **gross motor** milestones such as walking, climbing stairs, jumping jacks, skipping and jumping with two feet.
- Use a ball in a skilled manner because **ball skills** such as throwing and catching rely on the use of both hands. This can affect a child's ability to participate in social games and sports, such as Soccer and Rugby.
- **Cross their midline.** Once a child has established good bilateral integration, their brains are ready to allow their body to cross their midline in functional tasks. More on midline crossing next.
- Move their bodies in a **coordinated and rhythmic** way that enables them to participate in activities to music. Gym Wizards Academy provides a wide range of activities and prescribed movement sequences to music.
- Assist children with **emotional stability, emotional control and emotional regulation** so that they are better able to learn in the classroom. The right hemisphere of the brain involves emotion. The left hemisphere involves reasoning. As children age, they tend to move from predominant use of the right side of the brain to using the left side. By enhancing the neural pathways of the corpus callosum, children make this transition more easily and are better able to reason their emotions. Delays in bridging the gap between the right and left hemispheres can result in an emotionally unstable child.
- The right and left sides of the brain also have different functions which involve

academic success. The right side of the brain is involved in creative tasks such as art, singing, music and imaginative play. The left side of the brain is used for intellect and higher order learning such as reading, writing, math and problem solving. Many classroom-based tasks use both sides of the brain, such as reading and writing, because they involve both academic and creative processes. For example - writing a story involves imagination and creativity, as well as understanding language and recognising letters. So, improving communication between the hemispheres by including movement activities that involve bilateral integration filters into other areas of learning that allow a child to **meet the academic demands of the classroom.**

Bilateral integration develops in a sequential manner, as follows:

1. **Symmetrical bilateral integration** - Both sides of the body work together in the same motor pattern, such as using a rolling pin to roll out play dough, jumping from two feet together or clapping the hands. In the Gym Wizards Academy curriculum children are given the opportunity to practice symmetrical bilateral integration regularly. For example, in the more difficult version of the Inchworm, children need to move their arms forward together and then their legs forward together. The same occurs in the Cheetah Run. Parachute games also help children to move their arms symmetrically in order to achieve a shared goal as a team, such as throwing a ball into the air and catching it with the Parachute
2. **Reciprocal bilateral integration** - One side of the body does the exact opposite of the other, such as climbing stairs, riding a bicycle or skipping. During a Split Leap or alternating Stride Jumps in the Gym Wizards Academy curriculum, one leg extends forward at the same time that the opposite leg extends backwards. This reciprocal movement also occurs in the arms and legs when children do Forward Straddle Jumps along a skipping rope.
3. **Asymmetrical bilateral integration** - Each side of the body completes a different movement but both sides of the body are involved in the same activity, such as



cutting, using a stencil, eating with a knife and fork or threading beads onto a string. Here, the non-dominant hand acts as the stabilizer and the dominant hand is more active in the task. This can be seen in the Rope Skipping release elements.

The Gym Wizards Academy curriculum continuously provides children with the opportunity to challenge their bilateral integration in a variety of ways and through their whole bodies. An excellent example is their Rope Skipping movement library where the legs have to jump in symmetrical and asymmetrical patterns. The arms also need to maneuver the rope evenly between right and left hands to ensure its correct open position and movement around the body without touching it. Furthermore, the arms and legs need to work in a coordinated bilateral pattern, both symmetrically (arms to swing rope and legs to jump into the air at the same time) and asymmetrically (legs - when doing alternating Lunges for example) to ensure that the feet clear over the rope. This simple task, presented in varying degrees of difficulty and with a multitude of combinations, is a real challenge for integrating the right and left sides of the brain. The Gym Wizards Academy Program teaches rope jumping in a way that slowly builds bilateral integration skills, ensuring success as children progress in levels of difficulty.

During locomotions along the air track or long mat, such as the Baboon walk, Seal Walk or Bear Walk, children need to coordinate movement between the right and left sides of the body in a symmetrical or alternating way in order to achieve locomotion in a straight line. The arms and legs need to work together to ensure proper and equal force and propulsion on both sides of the body, otherwise children would not move in a straight line or develop the ability to increase their fluidity and speed. The same is true for the legs in Rebounding drills such as the Pike Jumps and Stretch Jumps.

In their Hurdling movement library, children are taught the valuable technique of swinging their arms as they jump in order to assist them to achieve adequate elevation. This technique is used throughout the curriculum and is an excellent example of utilising bilateral integration between the arms and between the arms and legs. For example, in a Standing Long Jump the arms need to move slightly behind the body as the knees bend to initiate the jump, then they need to swing forwards together as the legs jump, reaching above the head at the height of the jump and coming back down into the Safety Landing Position in front of the body on landing. Once children are easily and almost automatically

able to swing their arms in this way to jump, it is incorporated into more complex movement sequences of hurdling and jumping such as Rebounding Over Blocks or Arm Circles to a Height. This occurs on the trampoline and with the arms going forwards and backwards.

Adequate bilateral integration in a precursor to **sequencing** movements. Even the simplest movements, such as jumping off the ground with two feet, are comprised of a sequence of simpler movements e.g., bend both knees at the same angle, stretch both knees with the same amount of force, press both balls of the feet into the ground with equal force to plantarflex the ankles evenly and the reverse to land. Although these smaller components of bigger movements should be automatic, for children with bilateral integration difficulties they are not.

As children progress through the curriculum at Gym Wizards Academy, their skills are built upon. First, they learn to perfect basic body positions, ensuring the correct form is achieved before combining these movements to form more complex patterns and prescribed sequences. Eventually they are performing multiple combinations of hurdles, rebounds, jumps, rolls and landings.

Sequencing movements is a precursor to the skill of sequencing in general. The ability to sequence events and objects is essential for a young child's learning and the ability to put thoughts and actions into sequence is important for the development of many competencies such as language development, following instructions, understanding patterns of letters and sounds, predicting a mathematical pattern or understanding the consequences of actions.



MIDLINE CROSSING

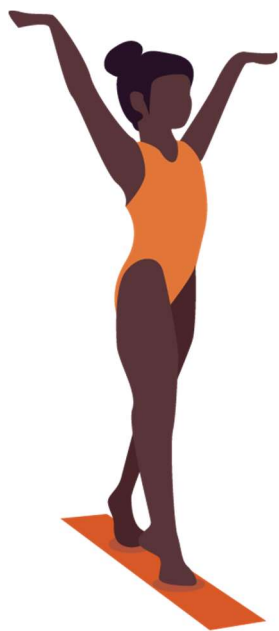
A skill which is closely correlated to bilateral integration and use of both cerebral hemispheres is midline crossing. It is also closely correlated to lateralization. Crossing the midline refers to the ability to *spontaneously* cross over the midline of the body, which is an imaginary vertical line down the centre of the body along the coronal plane, during functional motor-based tasks. This involves the hand, foot or eye of one side of the body moving into the space of the hand, foot or eye of the other side. This requires interhemispheric communication that is automatic.

The Gym Wizards Academy programme gives children many opportunities to improve midline crossing. While rope skipping, children cross their midline with their arms while practicing swinging the rope side to side with both hands, while switching it under the legs and while doing a Cross Wrap, Arm Wrap and Bunny Hop. The same occurs during Cartwheel drills and during Russian Twists and Shoulder Taps in the strengthening library.

Midline crossing allows children to:

- **Visually track** in a smooth way across their horizontal line of sight without hesitating when they cross the coronal plane. Doing so allows a child to read across a page from left to right quickly and automatically. It also affects other motor skills that rely on visual tracking and scanning such as sports like tennis.
- **Write** from the left to the right side of the page with their page at their midline. It also encourages children to start writing against the margin (for right handers) and write to the end of their line (for left handers.)
- Establish **lateralization**, such as hand dominance. Children who struggle to cross their midline tend to swap hands when a task requires them to cross their midline such as writing across a page, using a stencil or cutting out. This can delay lateralization.
- Participate in **sport** age appropriately. Some examples include performing an accurate golf swing, catching a displaced ball that is thrown to the side during Rugby or dribbling and kicking a ball during soccer.

- Stimulate communication between the two cerebral hemispheres thereby improving resultant skills such as **auditory processing, emotional regulation and academic success.**
- **Chew** their food properly by moving it to the molars with lateral movement of the tongue across the midline.



MUSIC AND LEARNING

In any given Gym Wizards Academy lesson, the instructor will select parts of the lesson to be done to music. This could be the warm up, during conditioning elements, to serve as a transitional guide between activities, to be used during activities or as a cool down. The music used involves following rhythm and pace and requires children to move to the beat. Music is an excellent tool to utilise in any work with children because it introduces an element of fun and improves motivation - this encourages children to push through when they feel tired or to try harder when a task is challenging for them. When music is incorporated into any learning experience, attention, focus and retention are improved. Let's take a closer look at the benefits of music and combining this with purposeful movement such as that in the Gym Wizards Academy program.

Music incorporates both emotional and organizational components of the brain, integrating right and left hemispheres, making it a whole brain experience - the benefits of which have been discussed in previous sections. The emotional aspect of music impacts our intrinsic motivation, imagination and creativity, conceptual thinking and stress response. The organizational aspect of music, such as following the sequence of a song and recognising arrangements and choruses (which Gym Wizards Academy encourages by doing repetitive movements during the chorus of a chosen song, assisting children to recognise the chorus by associating it with movement), develops the sequential parts of brain processing. This also develops the same parts of the brain responsible for habitual and refined movements. A predictable and repetitive rhythm primes the brain for all areas of language development, memory, organizational skills and self-regulation.

When we move to music, our brain releases endorphins throughout our brain and body.

This stimulates the limbic system, which is responsible for emotional regulation, thereby increasing feelings of positivity and joy and reducing stress. The limbic system is also involved in learning and memory. Moving to music that we enjoy sets our limbic system into a relaxed emotional state – the ideal receptive state for learning and memory.

Gym Wizards Academy uses various games with balls, skipping ropes, bean bags and hoops where children need to move their bodies and an object to the beat. This helps them to learn prescribed movement sequences. This integration of the vestibular, proprioceptive, auditory and visual systems is stimulating for so many parts of the brain that are related to learning and movement such as the basal ganglia and the cerebellum. When children synchronize their bodies to a beat it helps them to develop **rhythm and timing**. Rhythm and timing are essential for learning and social development because it helps children to develop a concept or sense of time. This sense of time is at work while children listen to directions, when they process and respond to those directions, while they converse with friends, read or solve math problems. All of these things are about timing attention responses, attention spans and working memory. The Gym Wizards Academy curriculum also contributes to the development of the concept of time by timing children as they complete movements. For example, an instructor will count how many Runs Over a Skipping Rope a child attempts in 10 seconds.



OTHER BENEFITS OF GYM WIZARDS ACADEMY

Apart from providing valuable sensory input and developing core motor skills for learning, Gym Wizards Academy has the following added benefits for children:

- Promoting the development of **social skills** through age-appropriate discussions and homework for practice in real life settings. Social skills promoted include cooperation and sharing, use of appropriate language in social settings, working hard as a team, conflict resolution, participating, building resilience and being helpful. By working in a group format with other children, social skills are also easily practiced and reinforced during their weekly Gym Wizards Academy class.
- Improved **physical fitness and cardiovascular endurance**. Children who are fit

are capable of participating in all aspects of life with greater ease and motivation.

- **Decreasing obesity**, which is on the rise in children of all age groups. Regular participation in Gym Wizards Academy, combined with regular other exercise and eating a balanced diet is important here.
- Improving their ability to **push through when a task is challenging**. Exercise places the body in a state of discomfort. The Gym Wizards Academy curriculum encourages children to endure this discomfort by presenting lessons in a fun and distracting way. In doing so, children become comfortable with being uncomfortable. This trains the brain to be confident in facing challenges in all areas of life, such as facing a challenging task in the classroom. It improves their self-confidence and thus their ability to be effective in other areas, such as in the classroom.
- **Improving diet and sleep**. Studies show that children who are physically active are more likely to eat a wider variety of foods and less likely to have difficulties with falling and staying asleep.
- **Improving overall confidence and self-esteem**. The design of the Fitnastic curriculum is such that children progress through varying levels of difficulty. As each new movement or exercise is mastered, children will naturally feel a sense of self mastery which makes them feel better about themselves. This boosts self-esteem which results in a feeling of being able to effect change in the world. This results in better learning.
- **Reinforce basic concepts** of colour, shape and number by introducing and applying these in group games. Instructors will often count aloud and incorporate basic addition and multiplication concepts into the lesson, depending on the child's age and grade.



CONCLUSION

Movement is essential for learning because it stimulates the proprioceptive and vestibular systems. These sensory systems are the foundation for motor skills which directly relate to academic success and mastery in all spheres of childhood life. The types of purposeful movements presented to children in the Gym Wizards Academy curriculum also provide children with valuable opportunities to practice these motor skills in a warm and welcoming environment. Furthermore, The Gym Wizards Academy programme assists children to develop skills such as attention and emotional regulation which are also essential automatic brain functions for higher learning.

In one class, children are afforded the opportunity to improve sensory processing, body awareness, core strength, balance, bilateral integration and sequencing and midline crossing. Many of the exercises provided in the curriculum target almost all of these areas and each class incorporates a large variety of exercises. For example, let's take a look at a simple Bunny Hop over a skipping rope. Here, with a skipping rope laid down along the floor, your child needs to weight bear with both hands on either side of the rope while they hop with both feet together to either side of the rope.

The benefits of this movement and *possible* related functional outcomes (if performed correctly, regularly and over time) are:

1. **Creation of essential neural pathways between lower and higher centres of the brain** - ensuring that children can use their frontal lobe for better judgement and critical thinking.
2. **Proprioceptive input received through weight bearing on upper limbs and jumping with lower limbs** - calming activity for better focus.
3. **Vestibular input received from altering position of the head while jumping** - promotes improved balance.

4. **Body awareness and spatial awareness is challenged** because the child needs to feel that both feet are working together even though they can't see them, and they need to understand the position of the rope in relation to their hands and feet - essential for learning the difference between a 'b' and a 'd'.
5. **Strengthening of the shoulder and core muscles** - improves fine motor skills such as endurance for colouring in or writing a long essay.
6. **Improved balance by receiving vestibular input.** The child also needs to maintain their balance on both hands as their feet lift off the floor - important for concentrating on the teacher's instructions because the brain is not expending energy focusing on balance reactions which should be automatic
7. **Bilateral integration is achieved by jumping with both feet simultaneously** - this builds connections between the right and left side of the brain which improves literacy.
8. **The midline is crossed with each arm as the feet move from side to side** - improves smooth reading by ensuring the eyes cross the midline when moving across a line of script.

While Gym Wizards Academy does not act to replace traditional therapies such as Physiotherapy, Speech Therapy or Occupational Therapy for children who need it, it could be an excellent supplementary extra-curricular activity for these children, should their treating therapist determine it to be. It is also beneficial for children who are functioning well in their everyday lives but who are looking for an extra boost to their learning and development.



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