Learnercise Brain Research

(Research Summarized by Jean Blaydes-Madigan)

"Movement with intention" anchors learning and prepares the brain for learning.

There are added benefits of using intentional movement, especially if music or rhythmical patterns are added to enhance learning and understanding.

Brain science strongly supports the link of movement to learning. Students use gestures, action, movement patterns, songs, and dance to understand academic concepts and anchor learning. This concept is called **embodied cognition**.

When more modalities are used to learn a concept, the brain has stored the information in several areas. As a result, the brain has more memory pathways to retrieve the information stored.

Specific benefits of intentional movement related to academic performance

The brain and body's movement and learning systems are interdependent and interactive. For example, motor development provides the framework that the brain uses to sequence the patterns needed for academic concepts. The body's vestibular system controls balance and spatial awareness and facilitates the student's ability to place words and letters on a page.

For more information please visit
www.geomotiongroup.com/resources/research

Curriculum created and developed by GeoMotion Group, Inc. Founder and President: Dr. Debby Mitchell.

Music created by Music with Mar.

Song composition, arrangement and instrumentation by Mark J. Dye. Vocals performed by Maryann "Mar." Harman.

Office: 407-275-0510 Fax: 407-275-3031

GeoMotion

www.geomotiongroup.com

LEARNERCISE Math

Movement Based Academics

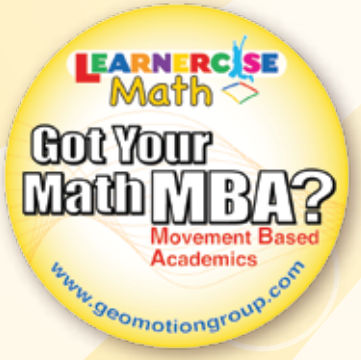
Improves Test Scores 30%

Basic Fact Fluency - Math Integration

www.geomotiongroup.com

GeoMotion
Move to Achieve

Learnercise Math Movement Based Academics



GeoMotion Group curriculum helps parents and educators who want to increase academic achievement utilizing music and physical activity. The Learnercise program focuses on children's learning by utilizing multi-sensory integration strategies that has children jumping, singing meaningful lyrics to music, and learning academic concepts.

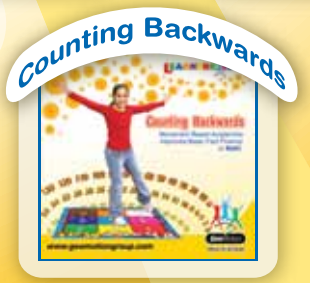
Learnercise Math is a **M**ovement **B**ased **A**cademic Program used as a fun way to supplement existing math curriculum designed to encourage students to master their basic math facts. The program is based on the latest brain research. A specific study found that integration of **physical activity improved student multiplication scores by 30%.**

NCTM emphasizes that developing fact retrieval is crucial to the successful mastery of number concepts and algebraic reasoning. If fluent retrieval of math facts does not develop, it can impede participation in math class discussions, successful mathematics problem solving, and even the development of everyday life skills.

Developing students that are well versed in the **STEM** fields (Science, Technology, Engineering, and Mathematics) is a priority in education.

The **Basic Fact Fluency Math Integration** series includes the surrounding music CDs with Activity Worksheets. This curriculum is designed to work with the Learnercise Phone or Clock mats. Children participate by listening to the music and moving to the correct solution of a problem.

Children **MOVE TO ACHIEVE!!**



www.geomotiongroup.com **Office: 407-275-0510 Fax: 407-275-3031**

GeoMotion
Move to Achieve

Move it ... Learn it... Integrated Learning through Movement

Paola Fontana BS. Phys ED
p.fontana@geomotiongroup.com- Cell: (407) 340-6554

Motivating children to move!

- FUN! the more fun kids have…the more they will move.
- Play-based movement; the exercise is hidden in the activity.
- Make the child feel successful.

Learnercise is a curriculum based program that consists of an exercise mat divided into nine blocks that are numbered. This matrix on the Learnercise mat reinforces numbers 0-9, math, colors, N S E W and the alphabet which allows for numerous curricula to be applied. These include academic integration for cross- disciplinary collaboration,children's choreography, games, cardio workouts, strength training, flexibility improvements, circuit training,dance, and more. Leanercise certainly aims to contribute to the battle against obesity – but it goes far deeper: we want to combat obesity and enhance brain development at the same time. Research backs our efforts. Rhythm helps with reading speed and speech development; cross lateral movement develop faster synapses to the brain; and pattern progression on the Learnercise mat leads to critical thinking skills.

The program:

- Provides activities that engage children of all ability levels
- Promote academic integration for cross-disciplinary collaboration and incorporation of academic standards.
- Provides programming that is fun – exercise is hidden in the programming.
- Uses music to motivate and popular activities that are developmentally appropriate for the age group.
- Provides a "security blanket" with each individual having their own personal space on the GeoMat or Learnercise Mat.
- Provides an emotionally safe, non-violent/ non-aggressive learning environment.
- Provides opportunities to develop the "whole child" and the use of different learning styles.
- Uses the latest brain research to develop curriculum.
- Offers options so that each individual can be successful.

Warm-up

Sequencing / Pro- Social Behavior
Thriller: Ultimate Dance # 3 CD

*Partner routine- One person stands on #1 and the partner stands on # 9 facing each other.

1 - The person standing on # 1 is going to squat to # 3 and perform a shimmy x 4 counts
The person standing on # 9 is going to squat to # 7 and perform a shimmy- (Shimmy: is a dance move in which the body is held still except for the shoulders, which are alternated back and forth)

After performing the shimmy both return to their original number # 1 and # 9

2 - Werewolf dance move- The person standing on # 1 is going to step on number 2 and then on # 3 x 4 counts
Both arms are going to move into the mat, away from the mat and into the mat (in-out-in) and pause x 4 counts
The person standing on # 9 is going to step on number 8 and then on # 7 x 4 counts

Both arms are going to move into the mat, away from the mat and into the mat (in-out-in) and pause x 4 counts

Reverse it- Repeat the same werewolf move going back to its original numbers # 1 and # 9 x 8 counts

3- Dealing cards dance move- The person standing on # 1 is going to tap # 4 and perform the dealing cards move with the right arm and leg x 4 counts and repeat the same move to # 2 with the left arm and leg x 4 counts
The person standing on # 9 is going to tap # 6 and perform the dealing cards move with the right arm and leg x 4 counts and repeat the same move to # 8 with the left arm and leg x 4 counts

4- Swim move- Person standing on # 1 is going to swim towards # 7 and then swim towards # 9 x 8 counts
Person standing on # 9 is going to swim towards # 3 and then swim towards # 1 x 8 counts
At this time both switch sides

5- Zombie Move- In order to return to their original numbers both are going to perform the zombie move following the same number pattern used on the previous move.

Fundamentals Routine (64 counts)
2 x Tri-steps – 8 beats
2 x Square Steps - 8 beats
1 x X – Step – 8 beats
2 x Wide- together – 8 beats

1 x Around the world
2 x rock corner
2 x jumps on 5
2 x step- tap behind- back to home / step left- tap behind- back to home

Safety Lesson- "911" – Song- Body Heart and Mind CD / GeoVariety K-2 DVD
Number Awareness
Chorus: (Seated on 7) – Raise both arms up to the ceiling
Pick up the phone on 5
Tap 9-1-1

Academic Integration Lessons– Basic Fact Fluency
(Adding Animals and Subtracting Animals Music CD)

- Number Recognition – move and perform actions as a number is called
  Move to 2 and run as fast as you can / Jump on 5 – then jump 5 times / Balance on 1 foot on 8
- Addition activities with a partner
- Addition body part balance activity with a partner (Body awareness)

Multiplication – Counting Backwards- Counting by Active Academics with Music
(Multiplication Moves Music CD, Counting Backwards Music CD, Counting By music CD, Divide and Conquer Music CD)

- Surfing 7's
- Disco Multiply by ten
- Bluesy Multiplication
- Place value activities – Utilizing different body parts
- Directions – move to learn directions of N, S, E, & W – Examples:
  Stay on 5 facing North – jump ¼ turn and face E / Jump ½ turn and face W
  Jump ¾ turn to face N

" If you are Happy and you Know it" - Phone Mat Fun CD
Color Awareness
Students will recognize colors and follow prompts to perform movement actions
Encourage children to show emotion in their movements.

“ Bunny Hop Jump” - Moving Around the Clock CD
Counting
Movement Concepts: Directions: right
Body Parts: hands, paws(hands), head, ears,thighs
Body Surfaces: front
Non- Locomotor: flop, sway
Locomotor: jump, bend, turn
Ways to move: - Animal: bunny
Relationships: on

Exercise your Smarts

- **Parts of an Exercise Bout**: Students learn that there are five different parts of an exercise bout:warm-up, dynamic stretch, actual workout (either for muscular strength/endurance and cardiovascular), cool-down, and the static stretch.
- **Where are my muscles?** - Students learn 13 different muscles names and their location while moving and listening to educational lyrics

Kickboxing- Strength / Agility Activities (Upper Elementary/ Middle School and High School)

- Jab- Cross- Uppercut- side-kick
- Kickboxing Combination
- Creative push-up ideas
- Agility drills
- Core strength ideas
- Partner circuit fitness training – Strength training stations, cardio stations and a mixture of the two)

Partner Routine Example - Corner Rock - Begins in 7 facing NE

Move 1 – Wide March = 8 beats

Beat 1	Beat 2	Beat 3	Beat 4
March 8 R	March 4 L	March 8 R	March 4 L

Repeat for Beats 5-8

Move 2 = Heel Touches = 8 beats

Beat 9	Beat 10	Beat 11	Beat 12
Heel 5 R	Step 7 R	Heel 5 L	Step 7 L

Repeat for Beats 13-16

Move 3 = 2 Tri-Step = 8 Beats

Beat 17	Beat 18	Beat 19	Beat 20
Step 8 R	Step 4 L	Step 7 R	Step 7 Left

Repeat for Beats 21-24

Move 4 = Slow Squat ¼ Turn (Angle Turn) = 8 Beats

Beat 25	Beat 26	Beat 27	Beat 28
Squat ¼ Turn - Step R foot in 1 - Facing W Keep L foot in 7		Up from Squat -Bring and Tap L foot in 1 Face S	

Squats = 4 Beats

Beat 29	Beat 30	Beat 31	Beat 32
Squat ¼ Turn - Step L foot in 3 - Stay Facing S Keep L foot in 1		Up from Squat Bring and Tap R foot in 3 - Stay facing S	

REPEAT Routine – Starting in 3 facing SW with R foot lead

Practice several times until the routine can be repeated facing North or South

To make it a partner routine – Partner A begins in 7 facing NW (Partner B begins in 3 facing SE) -

Hip Hop

Adolescents and young people love hip hop. You can do many of the basic GeoMotion moves but do them with style.

Triangle X - Begin in 5 facing N – Can Perform each part 2 times

PART 1 = 16 Beats Move 1 = Tap Front = 4 beats

Beat 1	Beat 2	Beat 3	Beat 4
Tap R 3	Step R 5	Tap L 1	Step L 5

Move 2 – Forward Triangle = 4 beats

Beat 5	Beat 6	Beat 7	Beat 8
Step R 3	Step L 1	Step R 5	Step L 5

Move 3 – Tap Back = 4 Beats

Beat 9	Beat 10	Beat 11	Beat 12
Tap R 9	Step R 5	Tap L 7	Step L 5

Move 4 – Backward Triangle = 4 Beats

Beat 13	Beat 14	Beat 15	Beat 16
Step R 9	Step L 7	Step R 5	Step L 5

PART 2 - X Step = 8 Beats

Beat 17	Beat 18	Beat 19	Beat 20
Step R 3	Step L 1	Step R 5	Step L 5

Beat 21	Beat 22	Beat 23	Beat 25
Step R 9	Step L 7	Step R 5	Step L 5

PART 3 = 2 Tap 4 Combo - 8 Beats

Beat 25	Beat 26	Beat 27	Beat 28
Step R 2	Tap L 3	Step L 5	Step R 5

Beat 29	Beat 30	Beat 31	Beat 32
Step L 4	Tap R 7	Step R 5	Step L 5

REPEAT Routine –

Latin & Dance Combination Examples

Teaching dance movements is very easy using the GeoMat®. Try the new *Latin Cardio*!

Salsa Right Foot Lead – Side-to-Side

Beat 1	Beat 2	Beat 3	Beat 4
6 R	5 L	5 R	Hold
Quick	Quick	Slow	

Beat 5	Beat 6	Beat 7	Beat 8
4 L	5 R	5 L	Hold
Quick	Quick	Slow	

Cha – Cha – Forward and Backward - Right Foot Lead

Beat 1	Beat 2	Beat 3	Beat 4
2 R	5 L	5 R / 5 L	5 R
Fwd	Bwd	Step/step	Step

Beat 5	Beat 6	Beat 7	Beat 8
8 L	5 R	5 L / 5 R	5 L
Bwd	Fwd	Step/step	Step

GeoMetrix – Speed and Agility Examples

GeoMetrix is for athletic performance and the development of speed and agility. It is safer due to the cushioning of the mat and also gives more options than the traditional 5 dot drills.

Zig-Zag – Both Feet - Repeat five times.

Move1	Move 2	Move 3	Move 4	Move 5	Move 6
1	3	4	6	7	9

Jump the Corners

Both feet start on Number 3 - Jump to number 9, then 7, to 1 and back to 3.

Clock Drill

Begin on 5, Jump to 3, Jump to 5, Jump to 6, Jump to 5, Jump to 9, Jump to 5, Jump to 8, Jump to 5, Jump to 7, Jump to 5, Jump to 4, Jump to 5, Jump to 1, Jump to 5, Jump to 2, Jump to 5.

Can also hop on one leg around the clock.

Jump Rope Examples

Bell – Forward and Back

Beat 1	Beat 2	Beat 3	Beat 4
Jump	Jump	Jump	Jump
2	5	2	5

Jump forward to 2 then jump backward to 5

Skier – Side to Side

Beat 1	Beat 2	Beat 3	Beat 4
Jump	Jump	Jump	Jump
6	4	6	4

Jump to R into 6 then jump L into 4

Jump Straddle – Jump Together

Beat 1	Beat 2	Beat 3	Beat 4
Straddle	Together	Straddle	Together
4-6	5	4-6	5

Jump to straddle position with R foot in 6 and L foot in 4 – then jump both feet together in 5

Straddle Cross (X)

Beat 1	Beat 2	Beat 3	Beat 4
Straddle	Cross	Straddle	Cross
4-6	5	4-6	5

Jump to straddle position. In the cross – jump to 5 crossing one leg over the other leg – alternate the leg in front

Circle Activity

Cupid Shuffle routine

Improved Multiplication Scores with Physical Activity Enhanced Math Instruction

By Dr. Mike Kehoe
University of Central Florida

Children are smiling and laughing. They are jumping around on colored mats with numbers on them and are being physically active while at school. If asked, most people would initially guess the students were either at recess or possibly in a physical education classroom. In most schools that guess would probably be correct. However, at Bonneville Elementary a much different scenario is taking place – one that was unimaginable a decade ago. These students are actually preparing for the Florida Comprehensive Assessment Test (FCAT) by studying mathematics **and** they are enjoying themselves. Not only that, these students are learning 30% more than their fellow students who are being taught in the traditional manner of sitting behind desks.

With the numbers of children affected by youth obesity at epidemic proportions, the last thing that young children needed was to have physical activity levels reduced as the trend over the last 10-15 years has been to reduce physical education minutes per week with greater and greater emphasis placed on standardized test preparation (Eaton et al. 2006). However, a growing body of research is beginning to demonstrate that maybe the whole approach has been upside down. Dr. James Ratey from Harvard Medical is one of many researchers who have begun looking to see how physical activity impacts learning and academic achievement. The amazing findings are revealing that children who are actively

engaged in physical activity and movement while learning are more likely to perform better and achieve higher academically
(Ratey 2008).

Additionally young children who are engaged in physical activity also demonstrate a host of other characteristics that all contribute to the entire process. Children who receive recess before lunch have better nutrition (Bergman et al. 2003) and those children with better nutrition have been scoring higher academic achievement for some time (Pollitt 1995; Murphy 1998).

Incidence levels of behavioral issues decrease with physical activity during the school days as well, once the young children who are designed to move and run are not locked to their desks for hours at a time but are allowed to run off some of their naturally high energy levels (Kirkcaldy et al. 2002). Finally, self-esteem, self-confidence, and socialization all improve as children are allowed to move, interact and simply play (Kirkcaldy et al. 2002; Sonstroem et al. 1994; Ratey 2008).

Unfortunately, the challenge is to convince principals, superintendents, and school districts that success stories such as Naperville, Illinois and Titusville, Pennsylvania are not simply flukes where programs developed to increase physical activity levels of the student populations before, during, and after school have resulted in increased academic performance
(Ratey 2008). Some schools are responding by walking clubs and groups before school and through a variety of programs after school designed to involve children in fun physical activities.

However, a number of truly innovative teachers are developing lesson plans that incorporate movement and physical activity into other curricular content areas such as music, science, and mathematics. This creative approach helps to meet the NASPE Guidelines of 225 minutes per week (Corbin 2003) and the state mandated physical activity minutes that many states have begun adopting but that are often unable to sufficiently meet simply through physical education and recess. Additionally, the fact that the students are out from behind their desks and moving their bodies is increasing blood flow and oxygen to the brain while increasing student interest and engagement.

One such program was developed by Dr. Debby Mitchell, an Associate Professor at the University of Central Florida, who has taught Physical Education for over thirty years. Her passion for working with kids and her concerns surrounding the youth obesity epidemic laid the groundwork for the development of GeoFitness, Inc. and her Meaningful Movement Mats that combine exercise with mathematics. The children practice their addition, subtraction, multiplication or division by stepping on the corresponding numbers on their mats that are designed to look like big calculators (See Figure 1).

The left side of the mat has spaces that the children use on for the arithmetic symbols (e.g. +, -, x, =) as well as the hand and arm motions that the children perform as they work through the mathematical equations and reinforce the arithmetic processes. The right side of the mat has spaces with money (dollar bill, quarter, dime, nickel, penny) so that the children can calculate mathematical problems using money problems. Finally, the left, front, and right sides are numbered numerically from 0 to 100 if the mathematical calculation provides the need for double digit numbers.

Two elementary school classes at Bonneville Elementary were recruited to participate in the pilot program and the classes were split so that each class was separated into ten students in the test group and eight students in a control group

that did not participate in the physical activity math integration. Both classes were given a ninety question mathematics pretest and given five minutes to complete the test. The average score for each group was 27 correct responses. The students were then taught multiplication as normal. However, the experimental group received an extra 10 minutes of physically active math instruction using the Meaningful Movement Mats twice a week for six weeks when the rest of the class participated during normal physical education time. As a result, the experimental group received an extra 120 minutes of mathematics that also elevated their heart rates and increased oxygen levels to the brain. The students were actively engaged and having fun – while learning math!

At the end of six weeks both groups with students from each class were given a post-test to measure learning. One child from the control group who had not participated in the active mathematics learning group did not take the post test. The results were impressive. The students participating in the active learning mathematics group increased their average number of correct responses to the problems by an average 29 in one class and 32 in the second class for an overall average increase of 31 correct responses. By comparison, the students who received the traditional multiplication instruction as normal but without the active learning mathematics engagement component also showed an increase in learning as measured by correct responses as one would hope. However, the two control groups only increased by an average of 17 and 24 correct responses respectively for an overall average increase of only 20.5 correct responses.

When the control and experimental groups were compared, the experimental group demonstrated a 66% greater learning increase from the pretest scores. **What makes this even more impressive is that these classes represented the average school classroom and included representation of students designated as gifted, exceptional special education (ESE), special learning disability (SLD), autistic, and speech or language services. One autistic child in the experimental group even increased his score from a pretest score of 2 correct responses to a posttest score of 30 correct responses.**

All students in both the experimental group and the control group passed their FCAT examinations and feedback from the program was extremely positive. Unfortunately, it may be difficult to a follow up study next year for one simple reason. The classroom teacher was so impressed with the outcomes that she has even started using the Meaningful Movement Mats for the control group students!

Strategies

Every classroom will be different and each teacher will have their strengths and weaknesses and level of comfort for introducing new teaching strategies into their classroom. Additionally, many teachers may be concerned that their children may not perform as well on the standardized mathematics areas if they do not teach the same way they have always taught. The following suggestions are made as ways to integrate **physical activity enhanced instruction** into your classrooms.

1. **Addition, Subtraction, Multiplication, Division.** The teacher calls out a mathematical equation or writes it on the board and then the students repeat the equation out loud while stepping on the appropriate spaces on the mat. At the conclusion, the student must step on the final answer to the equation. **Great exercise to support quiz reviews and follow up learning after main exercise.**

2. **Multiples.** The students learn multiplication tables by increasing the counting in multiples of 2, 3, 4, 5, etc…

3. **Solving math problems with money.** Students can use the symbols on the mat to calculate mathematical calculations using dollars and cents. It is amazing that the children will feel like they are actually in possession of the money!

4. **Changing Levels and Numbers of Body Parts in Contact with the Floor.** The teacher can challenge their students by changing the direction for each exercise to modify the level that the student interacts with the mat or the floor to a low, medium, or high level and change the number and type of body part with which to give the correct answers. Creativity should always be awarded. **Remember playing Twister? (See Figure 2)**

5. **Spelling Mathematics.** The children are asked to step on the correct answer and then step on the corresponding letters to spell the number.

6. **Directional Math.** The numbers and corners of the mat or floor can be used to distinguish the points on a compass and the students can be given directions toward a destination.

7. **Geometric Math.** Students are presented with geometric shapes and are challenged to create these three-dimensional shapes on their mats or in their personal space.

Tips for Generating Enthusiasm for Learning Math

1. Make the activity a fun experience that rewards the children for hard work in class. If the activity is fun, the students will be tremendously engaged.

2. The use of music adds a great flare to the exercises and creates a sense of excitement and fun even if it is only on in the background. We all know music with a good beat will make the children want to move and dance anyway!

3. Keep the activity moving. A fast paced activity helps keep the heart pumping and the children engaged. If the activity is used as a supporting activity as with the example given, a little more latitude for fun and enjoyment can be allowed.

4. Make sure each child has their own personal space or mat and can hear the instructions.

5. Allow some children to take the lead in small groups.

6. Model the Behavior Yourself! We can also use a little more exercise and the children will love to see you so involved!

References

Bergman, E., Buergel, N., Englund, T., & Femrite, A. 2003. Relationship of meal and recess
schedules to plate waste in elementary schools. National Food Service Management Institute. *Insight - NFSMI,* Spring, 2004.

Corbin, C.B. & Pangrazi, R.P. 2003. Physical activity for children: A statement of guidelines for
children ages 5-12. Reston, VA: National Association for Sport and Physical Education 2003: 7-9.

Coe, D., Pivarnik, J., Womack, C., Reeves, M., & Malina, R. (2006). Effect of Physical Activity and
Activity Levels on Academic Achievement in Children. *Medicine and Science in Sports and Exercise* 38 (8): 1515-19.

Daley, A.J. & Ryan, J. (2000). Academic performance and participation in physical activity by
secondary school adolescents. *Perceptual and Motor Skills* 91: 531-34.

Eaton, D., Kann, L., Kinchen, S., Ross, J., Hawkins, J., Harris, W., Lowry, R., McManus, T., Chyen,
D., Shanklin, S., Lim, C., Grunbaumm, J., & Wechsler, H. (2006). Youth Risk Behavior Surveillance – United States, 2005. *Morbidity and Mortality Weekly Report* 55 (SS-5): 1-108.

Kirkcaldy, B.D., Shephard, R.J. & Siefen, R.G. (2002). The relationship between physical activity
and self-image and problem behavior among adolescents. *Social Psychiatry and Psychiatric Epidemiology* 37 (11): 544-550.

Murphy, M. J. (1998). Relationship between hunger and psychosocial functioning in low-income
American Children. *Journal of the American Academy of Child and Adolescent Psychology*, 37(2): 163-170.

NAEYC & NCTM (National Council of Teachers of Mathematics). 2002. Early childhood mathematics: Promoting good beginnings. Joint position statement. www.naeyc.org/about/positions/pdf/psmath.pdf

Pollitt, E. 1995. Does breakfast make a difference in school? *The Journal of the American Dietetic*
Association, 95, 1134-1139.

Ratey, J. 2008. *Spark: The revolutionary new science of exercise and the brain.* New York, NY:
Little, Brown, and Company.

Sonstroem, R.J., Harlow, S.L., & Josephs, L. (1994). Exercise and self-esteem: Validity of model
expansion and exercise associations. *Journal of Sport and Exercise Physiology* 16 (1): 29-42.

Vail, K. (2006). Is Physical Fitness Raising Grades? *American School Board Journal,* 193:30-33.