

Action Based Learning Pre-K Lab

Academic & Research Rationale for 4–5-Year-Old Students

Purpose of the Proposed Pre-K Lab

The proposed Action Based Learning (ABL) Pre-K Lab is designed to integrate purposeful physical movement with early academic learning and school-readiness development for children ages 4–5.

The goal is not to replace traditional classroom instruction or physical education. Instead, the ABL Lab provides teachers with an additional instructional environment in which movement, sensory experiences, motor development, cognitive challenges, and academic concepts can be intentionally combined.

The equipment included in the proposed Pre-K Lab addresses twelve foundational areas identified in the ABL quote:

1. Crossing the Midline / Cross Lateralization
2. Body in Space / Vestibular & Proprioception
3. Balance
4. Visual Development
5. Rhythm
6. Tactile Learning / Sensory-Motor / Fine Motor
7. Motor Skills / Locomotor & Non-Locomotor
8. Manipulative Skills / Eye-Hand-Foot Coordination
9. Physical Fitness / Strength, Endurance & Flexibility
10. Cardiovascular Development
11. Problem Solving / Embodied Cognition
12. Self-Management / Self-Awareness

The current Pre-K quote includes one item or package addressing each of these areas, creating a comprehensive movement-based learning environment rather than a collection of unrelated physical-activity equipment. The quote also includes academic materials such as ABC, number, color, and shape cards and activity guides. [Quote #3698, August 10, 2026]

Why Movement-Based Learning Matters in Pre-K

Young children learn through active exploration. At the preschool age, learning frequently involves the integration of movement, sensory information, language, memory, attention, problem solving, and social interaction.

Research increasingly supports the use of appropriately designed physical activity and motor-skill experiences as part of early-childhood learning.

A 2022 systematic review examined 35 studies involving 2,472 typically developing children ages 3–7. Seventy-one percent of the studies reported beneficial effects of motor-skill and physical-activity interventions on cognitive or academic skills. The strongest evidence was reported for executive functions, language, and numeracy, with particularly large effects reported for memory. The review also found that interventions combining physical activity or motor skills with additional cognitive or academic components tended to produce larger effects than physical activity alone. The researchers appropriately cautioned that much of the existing literature had methodological limitations, so the evidence should be characterized as promising rather than conclusive.

A more recent 2026 meta-analysis provides additional evidence specifically relevant to preschool children. Researchers analyzed 31 randomized controlled trials involving 2,330 preschool children ages 2–6. Physical-activity interventions produced small-to-moderate improvements across the three major areas of executive function studied: inhibitory control, working memory, and cognitive flexibility. The strongest overall effect was found for inhibitory control. The study also found that game-based interventions were particularly beneficial for cognitive flexibility and that cognitively engaging physical activities produced greater benefits for working memory.

These findings are particularly relevant to an Action Based Learning model because many ABL activities do more than ask children to exercise. They require children to **move while thinking, remembering, recognizing, sequencing, choosing, tracking, counting, or following directions**.

This combination is consistent with the concept of **cognitively engaging physical activity** and with embodied-cognition approaches, in which learning can be supported through physical action, gestures, object manipulation, and whole-body activity.

Connecting Movement to Academic Readiness

For 4–5-year-old children, academic readiness involves much more than knowing letters and numbers.

Children also need opportunities to develop:

- Attention and sustained engagement
- Working memory
- Inhibitory control
- Cognitive flexibility
- Visual attention and tracking
- Bilateral coordination
- Motor planning
- Fine- and gross-motor skills
- Spatial awareness
- Sequencing and pattern recognition
- Following directions
- Problem solving
- Self-awareness and self-regulation

These foundational abilities support children's ability to participate successfully in classroom instruction.

The ABL Lab provides teachers with equipment that can be used to intentionally connect these developmental foundations with early literacy, mathematics, science, language, and classroom-readiness activities.

Pre-K ABL Equipment and Academic Benefits

Equipment / Package	Description	Academic & Developmental Benefit
Cross the Midline Mat Pattern Jump Strip	A movement mat designed around patterned jumping and crossing-the-midline activities.	Supports bilateral coordination, motor planning, sequencing, spatial awareness, and following directions. Teachers can incorporate letters, numbers, colors, patterns, or movement sequences into activities.
Green Reading Rockin' Turtle Shell	A rocking/balancing seating and movement tool that provides controlled movement and sensory-motor input.	Can support balance, body awareness, core stability, attention, self-regulation, and participation during reading or teacher-directed activities. Its movement-based seating option can be incorporated into small-group literacy and classroom activities.
ABL Ladder Package	Includes the ABL Ladder, manual/activity guide, and three sets of academic cards covering ABCs, Numbers, and Colors/Shapes.	Provides direct integration of movement and academic content. Students can practice balance, sequencing, motor planning, following directions, alphabet recognition, number recognition, colors, shapes, and patterning.
ABL Handheld Pathways Eye Tracking Board	A handheld activity designed around visual pathways and eye-tracking activities.	Supports visual tracking, visual attention, hand-eye coordination, concentration, sequencing, and early literacy-related visual skills. These abilities can contribute to readiness for tracking print and coordinating visual information with hand movements.
ABC Pathways Package	Includes 30 student cards, a teacher cue card, and activity guide.	Provides opportunities to practice alphabet recognition, letter sequencing, visual discrimination, following directions, and literacy concepts while incorporating movement.

Equipment / Package	Description	Academic & Developmental Benefit
Beat Sheets Card Set	A card set designed for rhythm and movement activities.	Supports auditory attention, rhythm, sequencing, memory, pattern recognition, coordination, and following multi-step directions. Rhythm activities can also be connected to syllables, counting, phonological awareness, and classroom routines.
Whaler Sensory Board – Blue	A tactile sensory-motor activity board.	Provides opportunities for tactile exploration and fine-motor manipulation. Supports hand strength, dexterity, tactile discrimination, attention, and sensory-motor development that can contribute to readiness for classroom tools and handwriting-related tasks.
Animal Round Up Wall Mount	A wall-mounted activity addressing locomotor and non-locomotor movement. Includes an activity guide.	Develops fundamental movement patterns, motor planning, body control, listening, and following directions. Teachers can integrate animal movement with vocabulary, sequencing, storytelling, science concepts, and imaginative play.
Monkey See Eye Tracker Station	A station focused on visual tracking and coordinated movement.	Supports visual attention, eye-hand coordination, concentration, motor planning, and tracking. These skills can be connected to locating letters, numbers, objects, patterns, and other visual information.
Frog Hop Number Line Mat	A movement-based number-line activity with an activity guide.	Provides a concrete, whole-body way to practice counting, number recognition, sequencing, number relationships, and early mathematical reasoning. Movement can be paired with counting forward/backward and simple number problems.
Cardio Kids Boomerboard	Cardiovascular activity equipment with an activity guide and training video.	Supports gross-motor development, endurance, active participation, body awareness, and the development of healthy movement habits. Teachers can incorporate movement challenges with counting, timing, directions, and classroom routines.
Geo Color Hop Mat	A whole-body movement mat using colors and geometric shapes. Includes an activity guide.	Supports color and shape recognition, sorting, classification, pattern recognition, spatial concepts, decision-making, listening, and motor planning. Academic concepts can be reinforced through movement rather than solely through seated activities.

Equipment / Package	Description	Academic & Developmental Benefit
Breathing Techniques Wall Graphics Set	Visual graphics supporting breathing activities and techniques.	Provides a classroom tool for practicing self-awareness, controlled breathing, attention, and self-regulation. Can be incorporated into transitions, pre-learning routines, and activities designed to help children return to a calm and attentive state.

How the ABL Lab Can Be Used Academically

The equipment is most effective when teachers intentionally connect movement to an academic learning objective.

Early Literacy

Teachers can use movement to reinforce:

- Letter identification
- Alphabet sequencing
- Visual discrimination
- Letter/symbol recognition
- Vocabulary
- Listening comprehension
- Phonological-awareness activities
- Sequencing and patterning

For example, a teacher may have students move to a designated letter, follow an alphabet pathway, or combine movement patterns with letter-recognition activities.

Early Mathematics

The ABL equipment provides opportunities to reinforce:

- Counting
- Number identification
- Number sequencing
- One-to-one correspondence
- Patterns
- Colors
- Shapes
- Sorting and classification
- Spatial relationships
- Beginning mathematical problem solving

The Frog Hop Number Line and Geo Color Hop Mat are particularly suited to this type of instruction.

Executive Function

Movement activities can also create opportunities to practice:

- Working memory
- Inhibitory control
- Cognitive flexibility
- Attention
- Following multi-step directions
- Decision-making
- Sequencing

For example, students may be asked to remember a movement sequence, change the sequence when a signal is given, or move to a particular color, number, shape, or letter according to a teacher's directions.

Self-Regulation and School Readiness

The ABL Lab also provides tools for developing children's ability to regulate their bodies and attention.

Breathing activities, controlled movement, balance activities, rhythm, and sensory-motor experiences can be incorporated into classroom transitions and learning routines.

The objective is not simply to make children more active. It is to help children learn how to **control, coordinate, and use movement purposefully while participating in learning.**

The Science Behind the Approach

The research base supports several important principles that are reflected in the proposed ABL Lab.

1. Physical activity can support executive function.

The 2026 meta-analysis of 31 randomized controlled trials found small-to-moderate improvements in inhibitory control, working memory, and cognitive flexibility among preschool children participating in physical-activity interventions.

These executive-function skills are directly relevant to classroom learning because young children must remember instructions, control impulses, shift between activities, maintain attention, and use information while completing tasks.

2. Cognitively engaging movement may be particularly valuable.

The same 2026 research found that game-based physical activity was particularly effective for cognitive flexibility and that activities requiring greater cognitive engagement were associated with stronger working-memory benefits.

This is an important distinction for the proposed ABL Lab: the goal is not simply to provide exercise. Many activities can be structured so that children are required to **think while they move**.

3. Motor development and academic development are interconnected.

The 2022 systematic review of 35 studies involving 2,472 children ages 3–7 found the strongest evidence for relationships involving executive functions, language, and numeracy. The review concluded that motor-skill and physical-activity interventions may support cognitive and academic learning in typically developing preschool children, while also noting limitations in the quality of the existing evidence.

4. Movement can be integrated with—not separated from—academic instruction.

The research suggests that combined approaches can be particularly useful. Instead of treating physical activity, motor development, and academic instruction as completely separate areas, teachers can design activities in which children practice an academic concept while simultaneously engaging in purposeful movement.

This is the central instructional opportunity presented by the ABL Lab.

A Note About the Evidence

The proposed ABL Lab should be viewed as a **research-informed instructional environment**, not as a medical or therapeutic intervention.

The research cited above examines physical activity, motor-skill development, cognitively engaging activity, and executive function in young children. It does not establish that each individual piece of ABL equipment independently causes improvements in academic achievement.

The strongest and most supportable claim is that the ABL Lab provides developmentally appropriate tools through which teachers can implement **research-supported principles of purposeful movement, cognitive engagement, motor development, and self-regulation**.

ABL itself also maintains a collection of case studies and research resources describing the relationship between movement and learning.

Expected Educational Value for the Pre-K Program

The proposed equipment provides teachers with a flexible learning environment that can be used across the school year and integrated into multiple areas of the Pre-K curriculum.

The anticipated educational benefits include opportunities for students to:

Move

Develop balance, coordination, strength, endurance, motor planning, and body awareness.

Think

Practice memory, attention, sequencing, problem solving, decision-making, and cognitive flexibility.

Learn

Reinforce letters, numbers, colors, shapes, patterns, vocabulary, and early academic concepts.

Regulate

Develop self-awareness, controlled movement, attention, and strategies for transitioning between active and quiet learning.

Engage

Experience academic concepts through active, developmentally appropriate learning experiences.

The overall purpose is to create a learning environment in which physical activity becomes an instructional tool rather than a separate activity from academics.

Alignment With the Pre-K Developmental Stage

Children ages 4–5 are developing rapidly across physical, cognitive, language, social-emotional, and self-regulation domains. A classroom environment that provides opportunities to learn through movement can address several of these developmental areas simultaneously.

The proposed ABL Lab is therefore particularly appropriate for Pre-K because it gives teachers multiple ways to adapt activities to children's developmental levels while maintaining a common academic objective.

For example:

Learning objective: Identify numbers 1–10

Traditional approach: Identify numbers on a worksheet or card.

ABL approach: Move through a number line, identify the target number, count movements, and respond to teacher-directed number challenges.

Learning objective: Recognize letters

Traditional approach: Identify letters on cards or worksheets.

ABL approach: Move through an alphabet pathway, locate a target letter, identify it, and follow a movement sequence associated with the letter.

Learning objective: Identify colors and shapes

Traditional approach: Sort or identify objects while seated.

ABL approach: Move to the correct color or shape while responding to teacher directions and pattern challenges.

These approaches allow teachers to reinforce the same academic objective through multiple learning modalities.

Proposed Outcome

The proposed Action Based Learning Pre-K Lab will provide teachers with a structured collection of tools for integrating purposeful movement into daily instruction for 4–5-year-old students.

The lab is intended to support a broad definition of school readiness—one that includes not only early academic knowledge, but also the attention, executive function, motor coordination, visual skills, self-regulation, problem solving, and physical confidence children need to participate successfully in kindergarten.

By providing opportunities to **move, think, interact, practice, and repeat**, the ABL Lab can help teachers create engaging learning experiences that connect physical development with early academic instruction.

Source Documentation

Action Based Learning, Estimate #3698, August 10, 2026. The quote identifies the proposed Pre-K Lab equipment, quantities, activity foundations, included academic materials, activity guides, and total project cost of \$4,975.

Jylänki, P., et al. (2022). *The effects of motor skill and physical activity interventions on preschoolers' cognitive and academic skills: A systematic review.* Preventive Medicine, 155, 106948.

Liu, W., Wang, Z., Yi, J., & Li, X. (2026). *The effects of physical activity on executive function in preschool children: a meta-analysis of randomized controlled trials.* Frontiers in Psychology, 17. The review analyzed 31 randomized controlled trials involving 2,330 preschool children.

Action Based Learning. *Case Studies Review – The Link Between Movement and Learning.* ABL provides additional case studies and research resources concerning movement and learning.