ECSTEM/Pasadena – February 23, 2019

How Learning Begins

A Two-part Session on 0- to 3-Year-Old Development
Presenter: Ann Lewin-Benham

BEFORE WE BEGIN:
Do a 60-second free association with yourself: Jot down every word that comes to mind when you hear the words infant and toddler. Revisit what you wrote *after* Part 2.

DURING THE PRESENTATION:
Jot down notes on these questions:

Who is an infant?
Who is a toddler?
What drives early development?
Where do you see STEM in infant/toddler experiences shown in this presentation?

AFTER PART 2:
Reread what you wrote. Make additions or changes, if any.

Outlines

Part 1

"Materials That Build Brain Functions"

Theme: Infant/toddlers' competence and teachers' intentionality

I. Introduction

1. A Ten-Month-Old
2. An Infant's Competent Cognitive Performance
3. A Teacher's Intentional Listening
4. Who Is An Infant?

II. Observing Five Innate Imperatives in Early Development

1. a. Observing the Infant/Toddler Brain **Seek Novelty and Complexity**
   b. As a result, children's interest is spurred, causing them to focus their attention.
2. a. Observing the Infant/Toddler Brain **Forge Reliable Eye/Hand Connections**
   b. As a result, the hand is enabled to press, stroke, crumple, cut, curl, twirl, twist, and far more.
3. a. Observing the Infant/Toddler Brain **Evolve Coordinated Movement**
   b. As a result, the brain builds solutions to diverse problems that are prerequisites for movement.
4. a. Observing the Infant/Toddler Brain **Engage Socially to Form Emotional Intelligence**
   b. As a result, children learn to collaborate, feel compassion, and use myriad other interpersonal skills.
5. a. Observing the Infant/Toddler Brain **Develop the Language Instinct (spoken and written)**
   b. As a result, the brain builds a mental dictionary of content and concepts and how use them.

III. Summary: Fostering Innate Imperatives to Build Infant/Toddler Intelligences

Part 2

I. Environments for Infants and Toddlers

Theme: How environments and others (adults and peers) foster infant/toddlers' effectiveness

BEFORE WE BEGIN:
Do a 60-second free association with yourself: Jot down whatever comes to mind when you hear the words infant/toddler environments. Revisit what you wrote *after* Part 2.

1. Designing Spaces
2. Design Principles
3. The Design Mantra

AS YOU SEE IMAGES OF ENVIRONMENTS
Jot down your thoughts: What is notable about these environments?
Why are they "responsive"?

II. A Story Illustrating Socio-Constructivist Theory
"Little Ones of the Silent Pictures: A Drama in Four Acts"

1. Prologue
2. Acts I through IV
3. Conclusion: A Socio-Cultural Theoretical Perspective

DURING THE "DRAMA"
Watch for: The evidence that infant/toddlers converse before they speak
Consider: The role of collaboration in the Drama

III. Conclusion: The Infant/Toddler Brain and Literacy

1. An Open Window for Language Development
2. Building a Basis for Literacy

Ann Lewin-Benham ◆ 1010 Newton Road Santa Barbara, CA 93103 ◆ Phone (805) 770-7484 ◆ bigfootr@aol.com
Web Site: AnnLewin-Benham.com

Materials That Build Brain Functions
Presentation by Ann Lewin-Benham, ECSTEM 23 February 19

From *Materials That Build Brain Functions* (In order seen)
Number in parenthesis is how many different images in which the item is seen
Items in italics are either found (F) or natural (N) objects

Magazine, large format (F)
Wristwatch, ticking (F)
Another human (17)
Shadows (3) (N)
Test tubes and rack (F)
Prism
Magic sand (also called Moon sand)
Large hose, funnels, pipes
Clay (not playdough) (5)
Mystery boxes
Markers (4)
One's own hand (3)
Wooden "play food"
Slinky (F)
Paint, tempera (4)
Paint, watercolor
Pitcher/water (F/N)
Embroidery hoop/needle & thread (F)
Plastic water bottle w/ top on (F)
Kitchen paring knife (F)
White paper dinner napkin, large, soft (2) (F)
Mirrors (2)
Live cat (N)
Clear plastic fruit container (F)
Newspaper (F)
Table stretcher (F)
Easily graspable misc. common objects – example: lint roller (4) (F)
Plastic balls to cover floor (F)
Crawl-over/roll-into space definer
Large square, sturdy cushions, 2' square x 3" thick (F)
Cardboard boxes, large (F)
Sheets of silver foil (F)
Books (3)
"Secret" place, defined by cushions and hanging fabric (F)
Live turtle (N)
Glue
Leaves (2) *(N)*
Scissors
Overhead projector (F)
Pegboard (F)
Lawnmower (real) (F)
Inner tube (F)
Photos of classroom (2)
Metal car, large enough for 2 children to sit in (F)

This list is a fraction of the hundreds of different materials that can be used with infants and toddlers.

Ann Lewin-Benham ♦ 1010 Newton Road, Santa Barbara, CA 93103 ♦ 805-770-7484 ♦ bigfootr@aol.com
Website: AnnLewin-Benham.com

Quotations from *The Dynamics of Learning, 0-3*

3-hour Presentation – 2-part Workshop: Ann Lewin-Benham

Quotes from Part I: Materials that Build Brain Functions

"Infants are cognitive, that is, *capable of using complex thinking* long before they are verbal."
Ann Lewin-Benham (2010): *Infants and Toddlers at Work: Using Reggio-inspired Materials to Support Brain Development* [14]

"Intentionality Checklist (partial): Be aware. Be present. Observe. Focus. Reflect. Choose a response. Exercise restraint. Provoke interaction. Prepare the environment. Select material. And . . ."
Ann Lewin-Benham (2011): *Eight Essential Techniques for Teaching with Intention: What Makes Reggio and Other Inspired Approaches Effective* [18]

"Who Is an Infant? Equipment at birth: Capacity for social engagement. Ability to move. Five ways to perceive. Potential for language. Intense brain activity.
Ann Lewin-Benham (2010): *Infants & Toddlers at Work: Using Reggio-inspired Materials to Support Brain Development [23]*

"The brain sets itself tasks to wire itself and can build a virtually unlimited number of networks. "Anything we do builds and involves separate brain networks." Michael Posner (2004): C*ognitive Neuroscience of Attention* [26]

"An intentional relationship, called mediation, can both stimulate and satisfy the human drive for novelty and complexity."
"The brain is plastic; therefore, human intelligence can be modified."
Reuven Feuerstein, Psychologist, Ann Lewin-Benham, Educator (2012): *What Learning Looks Like: Mediated Learning K – 6* [29]

"Actions like focusing on, moving toward, reaching for, grasping, and manipulating enable infants to learn about *things and kinds of things and actions* and thereby form the basis for thinking."
Steven Pinker (1994), Psychologist/Linguist, Harvard: *The Language Instinct: How the Mind Creates Language* [31]

"Novelty and complexity spark attention, arouse interest, and promote focus. Focus is *the* most important school readiness skill." Ann Lewin-Benham (2010): *Infants and Toddlers at Work: Using Reggio-Inspired Materials to Support Brain Development* [44]

"Hand skills begin in early hand/eye connections as infant/toddlers: respond visually, maintain their head's balance, reach toward, grasp, hold on, handle increasingly new materials, manipulate more complex objects, wield single purpose tools, use symbolic representation." Ann Lewin-Benham (2010): *Infants & Toddlers at Work* [46]

"The hand can be configured into: a hook grip (to lift a pail); a scissors grip (to hold a cigarette); a five-jaw chuck (to life a coaster): a three-jaw chuck (to hold a pencil): a two-jaw pad-to-pad chuck (to thread a needle); a two-jaw pad-to-side chuck (to turn a key); a squeeze grip (to hold a hammer): a disc grip (to open a jar); and a spherical grip (to hold a ball). Each requires a precise combination of muscle tensions that mold the hand into the right shape and keep it there as the load tries to bend it back.
Steven Pinker (1997): *How the Mind Works* [59]

"Mounting evidence shows that MOVEMENT is crucial to every other brain function including memory, emotion, and language . . .. The whole front half of the brain is devoted to organizing action, both physical and mental. At their base, 'higher cognitive processes,' as we call so many of our brain activities, are about organizing actions."
John Ratey (2001): *Users Guide to the Brain: Perception, Attention, and the Four Theaters of the Brain* [63]

"It is in the baby's earliest experiences in practical physics – watching, locating with both hand and eye, then intercepting moving objects – that the nervous system builds its own unique library of solutions to the computational problems presented by coordinated movement." Frank R. Wilson (1998): *The Hand: How Its Use Shapes the Brain, Language, and Human Culture* [79]

"Explosive social development occurs between 9 and 36 months." Greenspan, Stanley & Shanker, Stuart (2004): *The First Idea [*82]

"True social problem solving emerges . . . *if* caregivers read and respond to toddlers' emotional signals and *if* they engage in long chains of shared social problem solving." Greenspan, Stanley & Shanker, Stuart (2004): *The First Idea:*

How Symbols, Language, and Intelligence Evolved from our Primate Ancestors to Modern Humans. [101]

"Explosive social development takes place between 9 and 36 months. True social problem solving emerges *if* caregivers read and respond to toddlers' emotional signals and engage in long chains of *shared social problem solving."*
Greenspan, Stanley & Shanker, Stuart (2004): *The First Idea* [82]

"Thought and speech have different roots. At a certain point in a baby's development they merge. Then, they develop together under reciprocal influence as one system." Lev Vygotsky (1934/1986): Psychologist: *Thought and Language* [104]

"Universal drawing sequence: Marks, forms, objects, scenes, fledgling artistic works."
Howard Gardner (1980): *Artful Scribbles: The Significance of Children's Drawings* [115]

"When innate imperatives are recognized, fed and furthered, infants and toddlers develop a disposition to learn, inquire, discover and acquire the capacities for higher cognitive functioning."
Ann Lewin-Benham (2010): *Infants and Toddlers at Work: Using Reggio-Inspired Materials to Support Brain Development* [121]

"The hand's movement is so widely represented in the brain, its neurological and biomechanical elements are so prone to spontaneous interaction and reorganization, and the motivations and efforts which give rise to individual movements are so deeply and widely rooted, that we must admit we are trying to explain a basic imperative of human life."
Frank R. Wilson (1998): Prof. Neurology, Stanford Univ. School of Medicine (retired): *The Hand: How Its Use Shapes the Brain, Language, and Human Culture* 1998 [124]

Quotes from Part II: Environments that Foster Brain Development

1. Classrooms

"Designing spaces that are complex, subtle, relation-full, provoking, light/shadow inducing, beauty-full."
Ann Lewin-Benham (2011): *Twelve Best Practices for Early Childhood Education: Integrating Reggio and Other Inspired Approaches* [3]

"The New Mantra for Classroom Design: The organization of space determines how time can be used."
Ann Lewin-Benham (2011): *Twelve Best Practices for Early Childhood Education* [10]

"The Time/Space Paradigm of Intentional Design: Space is minutely detailed and time is open-ended."
Ann Lewin-Benham (2011): *Twelve Best Practices for Early Childhood Education:* [21]

2. A Story Illustrating Social Constructivist Theory: *The Very Little Ones of the Silent Pictures*

"Children, though naturally endowed with the art of making friends or acting as teachers among their peers, do not refine this art by means of instinct or books. They steal and interpret adults' patterns, even more so when adults are capable of working, discussing, thinking, and researching together."
Loris Malaguzzi, Founder, Reggio Schools (1991): *The Very Little Ones of the Silent Pictures* [64]

8 Tenets of Social-Constructivist Theory

1. Adults are apprentices of their own culture and job who must extract the nature of their thoughts and actions and accept the following 7 facts about children:
2. Children are born with genetic tools and the will to act and think together with their peers.
3. Children need proof that adults believe they have these capacities.
4. Adults must support, intervene, but especially abstain from providing the meaning and knowledge in children's interactions.
5. Conflict in children's interactions transforms individual cognition and triggers intellectual development, especially when children themselves perceive the dissonance.
6. Children's interactions also arouse non-confrontational situations in which, through cooperative agreement, children co-construct solutions to problems.

7. Children's cooperation is strengthened by the cooperation they see between their teachers and family members.
8. Children's innate observational and deductive skills enable them to judge the consistency and inconsistency of adults' behavior.

Loris Malaguzzi, Founder, Reggio Schools (1991): *The Very Little Ones of the Silent Pictures* [65]

3. Conclusion – The Infant/Toddler Brain

"By 4 months the formation of synapses in the visual system is at a peak."

Dr. Charles Nelson (2000): *Human Brain Development*, Center on the Developing Child, Harvard [67]

"The brain's executive function is rooted in the frontal cortex. *The whole front half of the brain is devoted to organizing action, both physical and mental. . ..* All computation that takes place in the cortex and is coordinated by motor neurons is *the very definition of many forms of cognition."*

John Ratey, Prof. Psychiatry, Harvard Medical School (2001): *Users Guide to the Brain:* [68]

Language – "the universal ability of humans to communicate" (1) – is acquired in the first four years. Our 21st century society places a premium on communicating in ever-increasing varieties of symbolic forms, reading foremost among them. "The human brain, but especially the infant brain, is wired to feel well-being and security from touch and from the human voice . . .. Another person's reading contributes to children's associating the very sight of a book with pleasure and comfort . . . and can be an emotional lifeline for children who, years later, find themselves struggling to learn to read. Their resilience and perseverance may be a by-product of their earliest, powerful, positive associations with reading" (2).

Ann Lewin-Benham with Ratey, 2001 (1) and Wolf 2016 (2) [75]

Ann Lewin-Benham ♦ 1010 Newton Road, Santa Barbara, CA 93103 ♦ 805-770-7484 ♦ bigfootr@aol.com
Website: AnnLewin-Benham.com

Bibliography Early Childhood Education, Emphasis Infant/Toddler
List of Classic References on Thinking, Learning, and Teaching
Developed by Ann Lewin-Benham, 2019

Berk, Laura. & Winsler, Adam. (1995). *Scaffolding Children's Learning: Vygotsky and Early Childhood Education.* Washington, D.C.: National Association for the Education of Young Children.

Bronfenbrenner, Uri (2004). *Making Humans Human.* London, U.K.: Sage.

Chugani, Harry M.D. (2004). Fine-tuning the baby brain. New York: The Dana Foundation. http://www.dana.org/printerfriendly.aspx?id=1228.

Csikszentmihalyi, Mihaly (1990). *Flow: The Psychology of Optimal Experience.* New York: HarperCollins.

Edwards, Carolyn, Gandini, Lella, & Forman, George (1998, 2nd Edition). *The Hundred Languages of Children: The Reggio Emilia Approach Advanced Reflections, 2nd Edition.* Greenwich. CT: Ablex Publishing Corporation.

Edwards, Carolyn and Rinaldi, Carlina (2009). *The Diary of Laura: Perspectives on a Reggio Emilia Diary.* St. Paul, MN: Redleaf Press.

Eliot, T. S. (1939). *Old Possum's Book of Practical Cats.* New York: Harcourt Brace.

Feuerstein, Reuven & Lewin-Benham, Ann (2012). *What Learning Looks Like: Mediated Learning in Theory and Practice, K-6.* New York: Teachers College Press.

Feuerstein, Reuven, Feuerstein, Raphael, Falik, Louis, & Rand, Yakov. (2006). *The Feuerstein Instrumental Enrichment Program: Part I and Part II.* Jerusalem: The Feuerstein Center.

Feuerstein, Reuven & Feuerstein, Raphael (2004). *User's Guide to the Theory and Practice of the Feuerstein Instrumental Enrichment BASIC Program.* Jerusalem: The Feuerstein Institute.

Gandini, Lella and Edwards, Carolyn (2001). *Bambini: The Italian Approach to Infant/Toddler Care.* New York: Teachers College Press.

Gardner, Howard (1980). *Artful Scribbles: The Significance of Children's Drawings.* New York: Basic Books.

Gardner, Howard (1982). *Frames of Mind: The Theory of Multiple Intelligences.* New York: Basic Books.

Gardner, Howard (1993). *Multiple Intelligences: The Theory in Practice.* New York: Basic Books.

Gazzaniga, Michael S. (1988). *Mind Matters: How Mind and Brain Interact to Create Our Conscious Lives.* Boston: Houghton Mifflin Company.

Gelman, Rochel (2009). Learning in Core and Non-core Domains. In L. Tommasi, L. Nadel, & M. Peterson (Eds.) *The New Cognitive Science.* Cambridge, MA: MIT Press.

Gopnik, Alison, Meltzoff, Andrew, Kuhl, Patricia (1999). *The Scientist in the Crib: Minds, Brains, and How Children Learn.* New York: William Morrow and Company, Inc.

Greenspan, Stanley & Shanker, Stuart (2004). *The First Idea: How Symbols, Language, and Intelligence Evolved from our Primate Ancestors to Modern Humans*. Cambridge, MA: Da Capo Press.

Greenspan, Stanley (1995). *The Challenging Child: Understanding, Raising, and Enjoying the Five "Difficult" Types of Children.* New York: Addison Wesley.

Hawkins, David (1974). *The Informed Vision: Essays on Learning and Human Nature.* New York: Agathon Press.

Hawkins, Frances (1969). *The Logic of Action: Young Children at Work.* New York: Pantheon Books.

Huttenlocher, J. Haight, W., Byrk, A. Seltzer, M, and Lyons, T. (1991). Early Vocabulary Growth: Relation to Language Input and Gender. *Developmental Psychology, 27,* 236-248.

John-Steiner, V., Panofsky, C. P., & Smith, L. W. (1994). *Sociocultural approaches to language and literacy.* New York: Cambridge University Press.

Jones, Chuck (1994). *Chuck Amuck: The Life and Times of an Animated Cartoonist.* New York: Avon Books.

Kagan, Jerome (1998). *Galen's Prophecy: Temperament in Human Nature.* Boulder, CO: Westview Press.

Karr-Morse, Robin & Wiley, Meredith (1997). *Ghosts from the Nursery: Tracing the Roots of Violence.* New York: The Atlantic Monthly Press.

Kipling, Rudyard (1892). "When Earth's Last Picture Is Painted." http://www.online-literature.com/kipling/918/

Lewin-Benham, Ann
(2015). Eight Essential Techniques for Teaching with Intention: What Makes Reggio and Other Inspired Approaches Effective. New York: Teachers College Press.
(2011). *Twelve Best Practices for Early Childhood Education: Integrating Reggio and Other Inspired Approaches.* New York: Teachers College Press.
(2010). *Infants and Toddlers at Work: Using Reggio-Inspired Materials to Support Brain Development.* New York: Teachers College Press.
(2008). *Powerful Children: Understanding How to Teach and Learn Using the Reggio Approach.* New York: Teachers College Press.
(2006). *Possible Schools: The Reggio Approach to Urban Education.* New York: Teachers College Press.

Longfellow, Henry Wadsworth (2003). *The Song of Hiawatha: Selections from the Poems.* Illustrated and adapted by Margaret Early. Brooklyn, New York: Handprint Books.

Malaguzzi, Loris & Filippini, Tiziana (1991). *The Very Little Ones of Silent Pictures.* Reggio Emilia, Italy: Municipal Infant/Toddler Centers of Reggio Emilia.

Milne, A.A. (1927). *Now We Are Six.* New York: E. P. Dutton.

Mischel, Walter & Shoda, Yuichi (1995). A Cognitive-Affective System Theory of Personality: Reconceptualizing Situations, Dispositions, Dynamics, and Invariance in Personality Structure. *Psychological Review102* (2), 246-268.

Mix, Kelly, Huttenlocher, Jan Ellen, & Levine, Susan Cohen. (2002). *Quantitative Development in Infancy and Early Childhood.* New York: Oxford University Press.

Montessori, Maria (1949). *The Absorbent Mind* (C. A. Claremont, Trans.*)* New York: Henry Holt.

Montessori, Maria (1936). *The Secret of Childhood* (B. B. Carter, Trans.) Bombay: Orient Longmans.

Municipality of Reggio Emilia, Department of Infant Toddler Centers and Kindergartens (1990, November). *An Historical Outline, Data, and Information.*

National Center for Education Statistics. First Looks, May 2015. Early Childhood Program Participation, From the National Household Education Surveys Program of 2012. https://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2013029rev

National Education Association, Policy Brief, 2008: Parent, Family, Community Involvement in Education. Washington, D. C. http://www.nea.org/assets/docs/PB11_ParentInvolvement08.pdf

Nelson, Charles (2008). *The timing and quality of early experiences combine to shape architecture: Working Paper 5.* National Scientific Council on the Developing Child. Cambridge, MA: Harvard University.

Papert, Seymour (1980). *Mindstorms: Children, Computers, and Powerful Ideas.* New York: Basic.

Perkins, David (1986). *Knowledge As Design.* Hillsdale, NJ: Lawrence Earlbaum.

Pinker, Steven
(1997). *How the Mind Works.* New York: Norton.
(1994). *The Language Instinct: How the Mind Creates Language*. New York: HarperCollins.

Posner, Michael (2004). C*ognitive Neuroscience of Attention.* New York: Guilford Press.

Posner, M., Rothbart, M., Sheese, B., & Kieras, J. (2008). How arts training influences cognition. In Dana Consortium, *Learning, Arts, and the Brain: The Dana Consortium Report on Arts and Cognition* (M. Gazzaniga, C. Asbury, & B. Rich, Eds., pp. 1 – 10. New York: Dana Press.

Postman, Neil & Weingartner, Charles (1969). *Teaching as a Subversive Activity.* New York: Delta.

Rambusch, Nancy (1962). *Learning How to Learn: An American Approach to Montessori.* Baltimore: Helicon.

Ratey, John (2002). *A User's Guide to the Brain: Perception, Attention, and the Four Theaters of the Brain.* New York: Vintage Books.

Rinaldi, Carlina (2006). *In Dialogue with Reggio Emilia: Listening, Researching, and Learning.* New York: Routledge.

Seligman, Martin (2012). *Flourish: A Visionary New Understanding of Happiness and Well-being.* New York: Simon & Schuster.

Spelke, Elizabeth & Kinzler, Katherine. (2007). Core Knowledge. *Developmental Science, 10* (1), 89-96.

Vecchi, Vea & Giudici, Claudia (2004). *Children, Art, and Artists.* Reggio Emilia, Italy: Reggio Children.

Vygotsky, Lev (1934/1986). *Thought and Language.* Translated by: Alex Kozulin. New York: Oxford University Press.

Wilson, Frank R. (1998). *The Hand: How its Use Shapes the Brain, Language, and Human Culture.* New York: Pantheon Books.

Wolf, Maryanne (2007). *Proust and the Squid: The Story and Science of the Reading Brain.* New York: Harper

Wolf, Maryanne (2016). *Tales of Literacy for the 21st Century.* Oxford, U.K. Oxford University Press

Reggio Environment and Furnishings

ISAFF (2002). *ATELIER3: Furnishings for Young Children.* Reggio Emilia, Italy: Grafitalia

PLAY+ (2005). *furniture for children.* Reggio Emilia, Italy: Grafitalia.

Ann Lewin-Benham ♦ 1010 Newton Road, Santa Barbara, CA 93103 ♦ 805-770-7484 ♦ bigfootr@aol.com
Website: AnnLewin-Benham.com