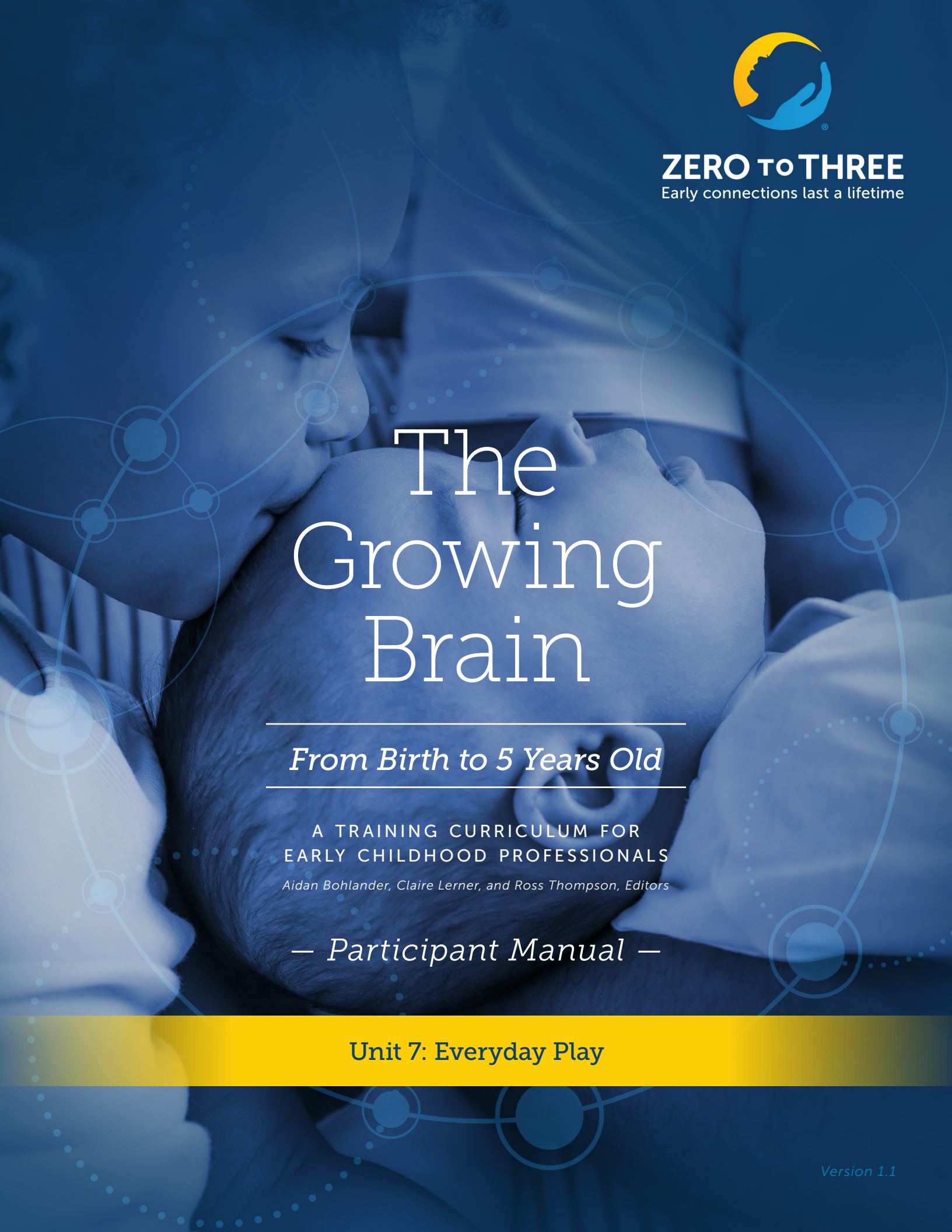

ZERO TO THREE
Early connections last a lifetime

The Growing Brain

From Birth to 5 Years Old

A TRAINING CURRICULUM FOR
EARLY CHILDHOOD PROFESSIONALS

Aidan Bohlander, Claire Lerner, and Ross Thompson, Editors

— Participant Manual —

Unit 7: Everyday Play

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Preface

"The brain is a social organ of adaptation built through interactions with others." (Cozolino, 2014, p. xvi)

The development of the growing brain is one of the most important topics in early childhood development, with significant implications for early childhood professionals. Research on infant brain development is exploding. With the advent of the magnetoencephalography (MEG) for infants, researchers can now see more clearly into a young child's brain activity and learn what impact interactions have on certain aspects of development.

The greatest rate of brain growth and development is during the first few years of life. This rapid development occurs at the same time a child is making critical connections with his or her outside world. Because of such rapid brain growth during the first few years, early experiences have a disproportionately greater impact on the newly growing brain's development.

Often, an early childhood professional provides one of the earliest human interactions an infant or young child will experience. The professional will play a significant role in determining the experiences and environment that shape and influence the construction of the early brain. When an early childhood professional and an infant interact together, each is inducing the other's internal states of being. It's the basic day-to-day experiences, be they nurturing or non-nurturing, that set the young child on his or her course of brain development.

It is for these reasons that ZERO TO THREE, in partnership with the University of Arkansas Early Care and Education Projects, developed The Growing Brain (TGB) curriculum for early childhood professionals. Since 1977, ZERO TO THREE has been translating research that helps us understand how the young¬est children think, learn, and interact with the important adults in their lives. We turn that scientific knowledge into helpful tools and practical resources for parents, policymakers, and professionals, like yourself, to help make the lives of babies, toddlers, and their families better.

This Participant Manual, along with the other curriculum materials you've received, is intended to support your learning experience. In the Manual you will find key points from each presentation as well as discussion questions. Please use this Manual as a workbook during the course to record presentation and discussion highlights. Together with the other TGB materials, we hope it will serve as a valuable record of your learning and resource on early brain development that you will return to again and again as you work with young children.

Thank you for what you do each and every day to support the youngest and most vulnerable members of our society. Each interaction that you have with each young child is helping to shape the very structure of his or her brain. That is an incredible responsibility and privilege! Thank you for your participation in this course and your commitment to be a positive influence on the children and families you serve.

Reference

Cozolino, L. (2014). *The neuroscience of human relationships: Attachment and the developing social brain* (2nd ed.). New York, NY: WW Norton & Company.

Introduction

How wonderful to have this new resource on the brain and child development! I remember when we wrote our curriculum, *Early Development and the Brain: Teaching Resources for Educators* (Gilkerson & Klein, 2008), a colleague asked: "Is the brain a fad? What will be next?" The brain has hardly been a fad; as one of the central regulators of the body and of our experience with the world, its critical importance in understanding young children's development and how best to nurture their growth will always be supremely important for anyone who cares about young children and is invested in nurturing their healthiest development.

We wrote the former curriculum for early childhood faculty and trainers so they could confidently teach about the brain and its role in early development to their students. While early educators had long focused on the whole child, brain imaging brought a seismic shift in our understanding about biopsychosocial development. Now students in early childhood development, as well as faculty, fully appreciate the power of brain health and functioning and are eager to learn how they can best build the brainpower of the children they serve.

This new curriculum, *The Growing Brain (TGB),* addresses the same vital areas that we covered: the structure and function of the brain; factors and experiences that can harm the growing brain, especially stress, and how to protect the brain from harm; and the connections between the brain, language development, and sensory functioning.

In the 9 years since we wrote our curriculum, much more has been discovered about the brain, especially regarding emotional regulation, the role of caregiving relationships, and the impact of trauma. Evidence that young children's early experiences shape the actual architecture of the brain and how it functions has grown dramatically, and it has put a spotlight on the importance of the interface between the brain and the environment and on the centrality of human interaction and relationships in brain development. Accordingly, *TGB* focuses heavily on the growing field of "affective neuroscience"—the science of emotions and the brain—and how the earliest interactions shape lasting patterns of relatedness. The link between brain, body, and behavior is ever clearer. Unmediated adverse childhood experiences (ACEs) are linked with problems in adult physical and mental health in ways we might not have imagined. Synchrony in mother-infant behavioral interactions also has a significant influence on the growing brain, as this synchrony is mirrored physiologically in the child's heart rate synchrony—heart to heart and brain to brain. This early synchrony relates to self-regulation in infancy and toddlerhood and even shapes the adolescent's capacity for empathy. In this *TGB* curriculum, you will learn about the impact of disrupted synchrony and how factors such as maternal depression affect the child's ability to read emotions. *TGB* also includes very important content on the impact of stress on the developing brain, which is heavily influenced by the availability of a caring adult to help mediate the stress—to provide protection and help make the experience manageable. One of the most powerful features of this curriculum is that it translates very complex concepts in a way that is digestible, is meaningful and relevant, and provides a range of interactive exercises that enable trainees to integrate and apply these concepts in their daily work supporting young children. In short, it engages trainees' brainpower in active learning!

Further, while professionals must be critical consumers of neuroscience, how do we help parents absorb this new information from science and build their confidence in what *they know* about their child? How can we help protect and grow parents' intuitive competence—a concept well-documented decades ago in studies of parenting? While brain and behavior research will continue to bring new discoveries, we are reminded of one of the most fundamental ideas of early care and education: the essential value of observation as a way of knowing. A child's behavior is one of the best windows into brain functioning. Our role is to encourage parents, teachers, and other caregivers to pause, watch, and truly notice the child's responses to his world—to see what this child can take in at this moment on this day. What experiences does he approach? What experiences does she pull away from—even a bit? What is too much input for him? What is too little for her? Where is the sweet spot—the space for moderate novelty in which the brain thrives?

The science of early development is an integrated science, and you are an integrated professional. Enjoy deepening your understanding of child development and the brain and sharing that knowledge with others!

Linda Gilkerson, PhD
Professor, Erikson Institute

Note for Participant Manual: Unit 7

This section of the participant manual is comprised of important content and reflections related to Unit 7, Everyday Play of *The Growing Brain.* All 7 Units are available separately from ZERO TO THREE, as well as available as a complete publication package. Please see the participant manual table of contents on page 3 for a list of all 7 Units.

We are proud of the participant manual as a way of enhancing participants' understanding of *The Growing Brain* as an interactive curriculum: it is a fully designed and functional workbook for learners to explore and exchange ideas. They can be purchased individually, or as a group purchase. Your learners can make the purchases or you can on their behalf.

Unit 7 covers:

- how play builds children's capacities in all areas of their development;
- how children benefit from both free play—with no adult scaffolding—and guided play; and
- how the adult's role is to support the child's testing of ideas so the child can embark on their own solutions.

The participant manual is available from the ZERO TO THREE bookstore as a digital download. This download is a single-use license for either you or your learners to print—in order to make best use of the workbook features.

Teaching *The Growing Brain: Birth to 5 Years Old*

The Growing Brain: From Birth to 5 Years Old is a 21-hour course. The following is a suggested time schedule for teaching each unit based on the field test. Times may vary from trainer to trainer and based on the needs of participants.

Unit 1: The Growing Brain: The Basics	3 hours
Unit 2: The Growing Brain: The Factors Affecting Brain Growth and Development	3 hours
Unit 3: The Growing Brain: Communication and Language Development	3 hours
Unit 4: The Growing Brain: Cognition and Executive Function	3 hours
Unit 5: The Growing Brain: Social-Emotional Development	3 hours
Unit 6: The Growing Brain: Understanding Behavior	3 hours
Unit 7: The Growing Brain: Everyday Play	3 hours

*Note: The 21 hours is training time and each unit includes only one 10-minute break. *Additional time must be scheduled for additional breaks of any kind.*

Critical Competencies Areas and Sub-Areas

The *ZERO TO THREE Critical Competencies for Infant-Toddler Educators™* define the specific evidence-based teaching methods and practices that support and nurture young children's social-emotional, cognitive, and language and literacy development and learning.

ZERO TO THREE has completed a crosswalk between the *ZERO TO THREE Critical Competencies for Infant-Toddler Educators™* and *The Growing Brain: From Birth to 5 Years Old* training curriculum. Significantly for learners, these two professional development curricula and resources now closely align and complement each other. For more information on the *Critical Competencies* and how you can use them to inform your professional development goals, visit www.zerotothree.org/criticalcompetencies.

Critical Competencies Sub-Areas

Area 1: Supporting Social–Emotional Development

- SE-1 Building Warm, Positive, and Nurturing Relationships
- SE-2 Providing Consistent and Responsive Caregiving
- SE-3 Supporting Emotional Expression and Regulation
- SE-4 Promoting Socialization
- SE-5 Guiding Behavior
- SE-6 Promoting Children's Sense of Identity and Belonging

Area 2: Supporting Cognitive Development

- C-1 Facilitating Exploration and Concept Development
- C-2 Building Meaningful Curriculum
- C-3 Promoting Imitation, Symbolic Representation, and Play
- C-4 Supporting Reasoning and Problem Solving

Area 3: Supporting Language & Literacy Development

- L&L-1 Promoting Communication Exchange
- L&L-2 Expanding Expressive and Receptive Language and Vocabulary
- L&L-3 Promoting Early Literacy

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Unit 7

Everyday Play

Goal: To understand the stages and types of play that unfold in early childhood, the role of the brain in this process, and how to maximize children's learning through play

Objectives

1: Learn About the Development of Play

2: Learn About the Difference Between Free Play and Guided Play

3: Learn About the Core Skills Children Develop Through Play and How to Promote These Skills

1 Learn About the Development of Play

What Exactly Is Play, and Why Is It Important?

Play is a way that children learn:

- how objects in the world work,
- how people think, feel, and act,
- how to problem solve.

Everyday Play

Direct Instruction, Guided Play, and Free Play

What are the different types of play? Jot down the differences below.

- Free play

- Direct (or didactic) instruction

- Guided play C-3 C-4

Think About It: The open-ended nature of play encourages children to make their own discoveries about how the world works, engages them in creative problem-solving, and helps them to **self-regulate.**

Stages of Play

There are specific stages of play that naturally correspond to children's developmental capacities.

Everyday Play

What's going on in the brain?

- Learning about the world through the five senses develops pathways between the **neurons.**
- Information from all the senses generally passes through the **thalamus** to reach the **cerebral cortex,** where these sensations are processed.
- Information from the senses may connect to wide and diverse areas of the brain.

Sensory Exploration: Birth to 15 Months

Between birth and 15 months old, babies play using their senses—touch, taste, and smell—to understand how objects and people work. Play at this stage involves mouthing, banging, shaking, batting, and gazing at objects.

➡ What are some additional ways that babies engage in sensory play at this age?

Everyday Play

What's going on in the brain?

- The cerebral cortex processes the information that children take in through their senses to form ideas about the properties and functions of objects.
- The **limbic system** (especially the **hippocampus**) is also involved: it is responsible for forming memories of how these objects work.

Functional Play: 15 to 24 Months

Functional play involves a child using one or more objects in the way they are intended to be used, such as talking on a toy phone, or sweeping up using a child-size broom.

➡ In what ways have you seen toddlers in the classroom engage in functional play?

Everyday Play

What's going on in the brain?

- As children make the link between an object and what it represents, they are using areas of the cerebral cortex, especially those involved in thinking, language, and problem-solving.

Early Symbolic Play: 15 to 24 Months

In children as young as 15 months old, you will see the beginnings of symbolic thinking, which means that children understand that an object can be a symbol for something else.

- In what ways have you seen children in the classroom engage in early symbolic play?

Everyday Play

What's going on in the brain?

- Connections are building in the **pre-frontal cortex** and children's **executive functioning** skills are developing rapidly.

Dramatic Play: 24 Months Onward

Document below how dramatic play develops for each age range.

➡ 24–30 months:

➡ 30–36 months:

➡ 36–42 months:

➡ 42–48 months:

➡ 49–60 months:

➡ In what ways have you seen children in the classroom engage in symbolic play? How do you see children engage in more complex pretend play as they grow?

Stages of Social Interaction In Play

There are four main stages to describe the ways in which social skills appear in children's play. Note what happens at each stage below.

1. **Solitary play**—from birth to about 15 months

2. **Parallel play**—around 15 months

3. **Associative play**—around 18 to 24 months

4. **Cooperative or collaborative play**—from 30 to 36 months

2 Free Play Versus Guided Play

Free Play

➡ What are some characteristics of free play? Jot down the characteristics below.

Everyday Play

Guided Play

In **guided play,** there is a clear learning goal that the adult has in mind that is connected to what the child is showing interest in.

Guided play is not direct instruction (Fein & Rivkin, 1986; Hirsh-Pasek et al., 2009; Marcon, 2002; Resnick, 1999; Schweinhart, 2004). It is **scaffolded** by adults and guided by the child.
SE-4 C-1 C-3 C-4 L&L-1

Think About It: Research shows that young children benefit from both free and guided play (Weisberg, Hirsh-Pasek, & Golinkoff, 2013).

➡ How have you used free play and guided play in the classroom, and how have you seen these different approaches lead to different types of learning for children?

For a handout about how toys could assist strategies for play, see handout 7.1 at the end of this chapter.

3 Learn About the Core Skills Children Develop Through Play and How to Promote These Skills

Core Skills for Success: The 6 C's

Kathy Hirsh-Pasek and Roberta Golinkoff, who study play and learning, have come up with a very elegant model to describe the key elements, or core skills needed for success.

They call it the 6 C's, which include: **collaboration, communication, content, critical thinking, creative innovation,** and **confidence.** Document what each element entails in the spaces provided over the next few pages.

Collaboration: C-3 SE-1 SE-5 SE-6

➡ At what ages do you start to see this kind of play emerging?

➡ What are some examples you can think of that show children who are starting to play more collaboratively?

Everyday Play

Communication: SE-1

Content: C-1 C-3 L&L-1

Everyday Play

Critical Thinking: C-4

Creative Innovation: C-4

Everyday Play

Confidence: SE-1 SE-2

For a worksheet to fill out example strategies for the 6 C's, see handout 7.2 at the end of this chapter.

Putting the C's Into Action

- What are some additional strategies to put the 6 C's into action in the context where you encounter children?

Let's Review! Key Messages:

- Play builds children's capacities in ALL areas of their development.
- Children benefit from free play—with no adult scaffolding—*and* guided play.
- The adult's goal is to support the child's testing of ideas and coming up with their own solutions.

For a Reflection and Application worksheet covering concepts you have learned and how to put them into practice, see handout 7.3 at the end of this chapter.

Notes

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Handout 7.1

Learning Through Play

Choose three toys that might be found in a classroom for children under 5 years old, and write each in the space provided in the chart below. In the left-hand column, describe how a child might use the toy at each stage of play. In the middle column, list skills that could be built at each stage. In the right-hand column, suggest ideas for expanding on a child's learning with each toy, at each stage.

Sensory: *Play that involves using their senses—such as touch, taste, and smell—to understand how objects and people work.*

Functional: *Play that involves using objects in the way they are intended to be used, such as talking on a toy phone or sweeping with a child-sized broom.*

Pretend: *Play that involves understanding that an object can be a symbol for something else; for example, that a baby doll is a symbol of a real baby (includes both "early symbolic" and "dramatic play" stages).*

	Skills This Toy Could Build	What You Can Do to Expand Children's Learning
Toy #1: **Sensory:** **Functional:** **Pretend:**		
Toy #2: **Sensory:** **Functional:** **Pretend:**		
Toy #3: **Sensory:** **Functional:** **Pretend:**		

Handout 7.2

Putting the 6 C's Into Practice

For each stage of play, write a strategy that you would use to promote each of the 6 C's.

Stage of play	Communication	Collaboration	Critical Thinking	Content	Creative Innovation	Confidence
Sensory: *Play using their senses—such as touch, taste, and smell—to understand how objects and people work.*						
Functional: *Play involves using one or more objects in the way they are intended to be used, such as talking on a toy phone or sweeping with a child-sized broom.*						

Stage of play	Communication	Collaboration	Critical Thinking	Content	Creative Innovation	Confidence
Early Symbolic: *Children understand that an object can be a symbol for something else; for example, that a baby doll is a symbol of a real baby.*						
Dramatic: *Children string together several sequences of play to begin to tell stories, which get more complex and collaborative as children move from 3–5 years.*						

Handout 7.3

Reflection and Application

Please take a moment to reflect on what you have learned or thought about today so you can apply these concepts in your own program.

Three concepts that I want to keep in mind when I get back to my program:

1.
2.
3.

Three new ways I will encourage the 6 C's with the children in my care:

1.
2
3.

Handout 7.4

Key Terms

- **Associative play:** While children are still mostly playing independently, they show interest in what other children are doing and often copy them.
- **Cerebral cortex:** The outer layer of the cerebrum that consists of four lobes: frontal, parietal, occipital, and temporal. The four lobes of the cerebral cortex are responsible for the important functions of processing cognitive, emotional, behavioral, and sensory information (Society for Neuroscience, 2016).
- **Cognitive flexibility:** The ability to adjust when we acquire new information, allowing us to think creatively, catch mistakes and fix them, and gain a new perspective.
- **Collaboration:** Collaboration includes everything that working with others entails: the ability to manage one's emotions and reactions in order to get along with peers; to share and take turns; to communicate one's ideas and feelings effectively; and to take other's thoughts, feelings, and ideas into consideration.
- **Communication:** The ability to impart information—to share thoughts and feelings through sounds, gestures, facial expressions, and words.
- **Confidence:** A combination of being willing to try and persevere to achieve a goal (Hirsh-Pasek & Golinkoff, 2016).
- **Content:** Knowledge, such as in science, math, and the arts.
- **Cooperative/collaborative play:** Interactive play in which children are co-creators of the experience—whether it is developing a story they are acting out with peers or constructing a building out of blocks. Collaborative play involves a range of social skills like cooperation, compromise and negotiation, and empathy.
- **Creative innovation:** Creative innovation is the ability to use information in new ways to solve problems.
- **Critical thinking:** Critical thinking entails objectively analyzing a situation to come up with the best way to approach the problem at hand. It involves considering different possible viewpoints or perspectives and being open to alternative explanations.
- **Didactic instruction (also known as "direct instruction"):** A teaching approach in which the teacher serves as the expert whose job it is to impart specific knowledge to the student.
- **Dramatic play:** Pretend play that involves children stringing together several sequences of play to tell simple stories.
- **Executive functioning:** A set of cognitive skills that controls impulses and filters out distractions. Executive functions allow children to focus their attention, organize information, put a plan into action, and also have a back-up plan, if necessary (Diamond, 2006).
- **Free play:** Play that is directed by the child and that is for self-amusement, without a specific goal.
- **Functional play:** Play that involves a child using one or more objects in the way they are intended to be used, such as talking on a toy phone or sweeping with a child-sized broom.
- **Guided play:** Play in which adults participate, providing materials, scaffolding, and prompts to assist children's learning. The adult follows the child's lead but provides scaffolding to extend and expand the child's play with a learning goal in mind.
- **Hippocampus:** The hippocampus is responsible for the storage of long-term memories as well as for the memory of the location of objects or people (Society for Neuroscience, 2016).

- **Limbic system:** A complex set of structures that lies on both sides of the thalamus, just under the cerebrum. It includes the hypothalamus, the hippocampus, the amygdala, and several other nearby areas. It is primarily responsible for our emotional life. It controls the basic emotions (e.g., fear, pleasure, and anger) and drives (e.g., hunger, sex, dominance, and care of offspring). It also plays a major role in the formation of memories.
- **Neuron:** A nerve cell used to pass messages across the nervous system.
- **Parallel play:** Play that entails children playing next to one another while engaged in their own separate activities. They may carefully observe another child, listen to each other, and even imitate what they see peers doing, but they are not playing interactively.
- **Play:** The means through which children learn: how objects in the world work; how people think, feel, and act; and how to problem solve. Play also creates natural opportunities to practice and build important skills like communication, advance planning, managing emotions, building relationships, developing logical and critical thinking, and creativity and imagination—pretty much everything a child needs to be successful socially and academically. Play is not just fun; it is a critical aspect of a child's overall learning and development.
- **Prefrontal cortex:** The front part of the frontal lobe. This region of the brain is widely considered the center of executive functions and is responsible for regulating thought, emotions, and actions.
- **Scaffolding:** Providing just enough structure or support for a child to manage a task or challenge on her own.
- **Self-regulation:** The ability to exert control over one's attention, emotion, thinking, and behavior. It is used interchangeably with self-control.
- **Sensory play:** Play that involves use of the senses—such as touch, taste, and smell—to understand how objects and people work.
- **Solitary play:** Play that is done independently, without other children.
- **Symbolic play:** The ability to use objects, actions, or ideas to represent other objects, actions, or ideas; for example, using a piece of plastic food to feed a stuffed animal.
- **Symbolic thinking:** A developmental milestone beginning around 18 months old, where children represent people, objects, ideas, or events with images, words, or in play. For example, holding a banana up to one's ear and mouth as though it were a phone.
- **Thalamus:** The thalamus relays sensory impulses from receptors in various parts of the body to the cerebral cortex. A sensory impulse travels from the body surface toward the thalamus, which receives it as a sensation. This sensation is then passed on to the cerebral cortex. The thalamus serves as a kind of "gate," filtering which information from various channels is allowed to be relayed by it for processing.

Play and the Developing Brain

Facts About Play

- Play is how young children learn about the world. Here's what kids learn when they're playing:
    - how objects work
    - how people think, feel, and act
    - how to problem solve
    - to communicate
    - to work well with others
    - to think logically, critically, and creatively
    - to manage emotions

Play is critical for healthy brain development: It builds the parts of the brain that think creatively and solve problems.

Children need opportunities for both free play and guided play.

- **Free play** is completely directed by the child. He's the boss, and it's just for fun.
- **Guided play** means you have a goal in mind and use strategies to help your child learn specific concepts as you follow her lead and interests. For example, you may ask your child how many pretend cupcakes she is making for her dinosaurs to help her work on counting.

What You Can Do to Expand Your Children's Learning Through Play:

Join in your child's play. Delight in her discoveries. When learning takes place in the context of loving relationships, children become eager, lifelong learners.

Provide the support your child needs to accomplish his goal. Does he need you to lift him up to touch an interesting object, stand behind him to help him make it up the stairs of the slide, or provide more blocks to make a taller tower?

Present new challenges when you see your child is ready. When she's learning to crawl, move a desired object a little farther away so she can experience the power and joy of movement. When she starts to engage in pretend play, suggest new ways to use toys. For example, a stack of blocks might also become a barn for her play animals. Offer new props or materials to expand her play. For example, put out some plastic food to see if maybe the animals are hungry.

Help children 2 years and older become critical thinkers and problem solvers. Ask preschoolers open-ended questions about their play. Encourage them to explain their ideas. Ask "I wonder" questions: "I wonder what will happen if you use bigger blocks at the bottom, instead of the small cubes?"

Be spontaneous and have fun. Playing should not feel like work. It should be a joyful, exciting time that you and your child share. So relax and enjoy yourself. Play is good for you, too.