

# Learn with Me

## Promoting Cognitive Development

Part of the *CIRCLE Infant & Toddler Teacher Training: Play with Me* series

### companion workbook

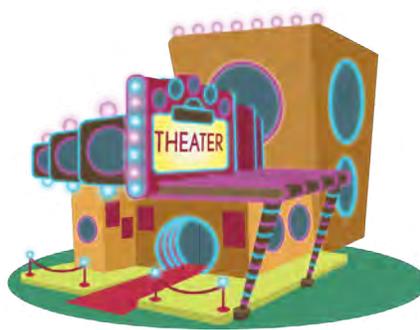
**This workbook belongs to:**

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**This workbook will help you review:**



instructional strategies viewed in the workshop



cognitive development topics discussed by experts in the theater



cognitive development milestones, theories, and academic outcomes from the library

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# Navigating this Workbook

This companion workbook covers three parts (i.e., course modules) of the *Learn with Me* series. Parts 1 through 3 are organized by the three categories below:



THE WORKSHOP:  
**Instructional Strategies**

The workshop in the *Learn with Me* course series contains videos filmed with real caregivers that demonstrate the key instructional strategies for supporting infant and toddler cognitive development. There are a total of 13 strategies between the three course parts. These strategies are summarized in this workbook. You may find it helpful to review them as you practice implementing strategies in your classroom.



THE THEATER:  
**Hear from the Experts**

The theater in the course contains interviews with experts on a wide variety of topics related to infant and toddler cognitive development. Each part in the course series contains new expert videos. The key concepts presented in these videos are summarized in this workbook.

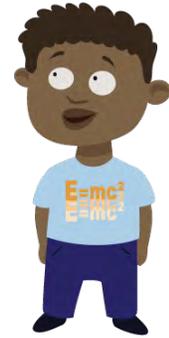


THE LIBRARY  
**Dive Deeper**

The library provides resources for you to dive deeper in your learning about early childhood development concepts.

# What is Cognitive Development?

When we talk about cognitive development, we are talking about how a person learns to use their brain to think and understand. Researchers who study cognitive development focus on a wide range of brain processes, such as attention, visual and spatial processing, memory, language, complex motor skills, and executive function. These foundational skills are often used together to produce more complex thinking processes. In fact, most cognitive psychologists would say that any skill that requires mental effort is a cognitive skill; some are simply more or less complex than others.



Educators often focus on cognitive skills in relation to academic skill areas such as science, technology, engineering, and mathematics. Cognitive skills help children generate ideas, think of questions to ask, and make connections between what they are learning and what they already know. In recent years, educators have shown increasing



interest in the cognitive skills that are called executive function. This term refers to skills such as attention shifting, memory, and inhibition (which means holding back a response). Together, these skills help us to make plans, set goals, and self-regulate (which is how we manage our thoughts, emotions, and behaviors). Executive function skills play a particularly important role in predicting academic success and lifelong achievement.

This course will help teachers support infants' and toddlers' cognitive development in many different ways. In this course, we present teaching strategies that support skills across many cognitive areas, such as executive function, imagination, sensory exploration, problem solving, math, and science.

# Part 1



## THE WORKSHOP:

# Instructional Strategies

The workshop in the *Learn with Me* course contains videos filmed with real caregivers that demonstrate the key instructional strategies for supporting infant and toddler social and emotional development. These strategies are summarized below, and you may find it helpful to review them as you practice implementing strategies in your classroom.

## 1 Promote Sensory Exploration

Young children use their senses to explore and learn about the world around them. Infants and toddlers need to have varied experiences in which they can touch, taste, hear, see, and smell to properly stimulate the sensory areas of their brain and make connections between descriptive words and their meanings. For example, to understand concepts such as “wet,” “sticky,” “loud,” “cold,” “stinky,” “sweet,” and “sour,” children must experience them with their bodies. Sometimes sensory exploration is messy—children like to taste, squish, splash, and make loud noises with objects, and this is all part of sensory learning.

Teachers can encourage sensory exploration by providing objects and activities that stimulate more than one sense. For example, a teacher may encourage children to touch a flower or plant to feel the leaves and petals, and then to smell the flower and talk about its scent.

Everyday objects that are normally found in the home and classroom, natural objects found outside, and toys all can be used to help children make sense of their world by examining, categorizing, and discovering. Art activities are also fun ways for young children to explore with their different senses. Teachers should keep in mind that the process of exploring and experimenting is much more important than the final product. Sensory activities help children integrate information and understand descriptive vocabulary words.

### Tips

- Some babies might be nervous about engaging in sensory activities. Be patient and gently encouraging, and always follow the baby’s lead. Let the baby stop or move away if the activity feels overwhelming to them. You can help toddlers by providing many opportunities for sensory exploration over time, modeling actions, encouraging, reassuring, and waiting patiently as they increase their level of comfort and confidence.
- Combine sensory exploration with pretend play to create enhanced experiences for toddlers. For example, a teacher might set up a pretend play farm that includes sensory materials like straw and grains.

### Rate Yourself!

*How comfortable do you feel promoting sensory explorations in your classroom?*

Not at all comfortable	Somewhat comfortable	Very comfortable
<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6

## Stop and Reflect: Promote Sensory Exploration

What are some new sensory exploration activities you might try? Why do you think it is important to allow children to get messy during these explorations?

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## 2 Encourage Observation

Babies show interest in observing, exploring, and experimenting long before they understand concepts such as “science.” As infants and toddlers explore their environment, teachers can help them learn by encouraging them to observe specific objects, actions, and events, and then helping them put words to their observations. One way to entice children to observe closely is to provide interesting things for them to engage with, such as natural materials (e.g., things found outdoors such as plants and trees, insects, soil, water), toys that encourage mechanical experimentation (e.g., building, balancing, twisting, hammering, taking apart and putting together), and substances that can be mixed or changed by children’s actions (e.g., paint colors, wet and dry sand, play dough, cooking ingredients). Another way to encourage observation is to provide activities that require children to compare and match objects, such as finding two of the same color, shape, or animal. Older toddlers often enjoy simple matching games with picture cards or real objects. These kinds of games help them learn about the concepts of “same” and “different” and practice comparing two or more items. Teachers can draw young children’s attention to details by using gestures, narrating actions/events, naming objects, and explaining how things work. For example, a teacher could say, “Look, Jaime—do you see the caterpillar on that leaf? See how she moves her body up and down to walk along the branch? What’s she doing now?” Teachers can also help children put words to their experiences and encourage them to share their own observations by asking questions such as, “What does it look like?”, “What sound does it make?”, and “How does it feel?” These questions and interactions encourage children to observe, focus, and pay attention to details, which helps them learn.

### Tips

- It is important to notice babies’ signals to figure out when they are ready for the next new thing. They may need more time to explore and observe one object before wanting to attend to something else. Always remember to match your pace, words, and actions to what the baby is doing or looking at.
- Even if some children are focused on their own exploration and might not seem to be paying attention to you, they can still benefit from your modeling of important vocabulary and from encouragement to share their own observations.

## Rate Yourself!

How comfortable do you feel encouraging observation in your classroom?

Not at all comfortable

Somewhat comfortable

Very comfortable

1

2

3

4

5

6

### Stop and Reflect: Encourage Observation

Think back on last week. Which of your planned activities encouraged children to make observations? Were there times when you and a child engaged in observation spontaneously? How did you encourage observation and how did the child respond?

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## 3 Encourage Effort and Persistence

Encouraging young children's effort teaches them that they can improve their skills by continued effort or hard work. This makes it more likely that children will persist when a task is challenging and experiment with other ways to solve a problem, which is a trait that predicts positive developmental outcomes.

Teachers can encourage effort and persistence by saying things like:

- "You are working hard on building that tower."
- "You are so close to reaching the red cup. Keep going!"
- "Wow, you worked on that puzzle for a really long time. That was great!"



### Tips

- When a baby or toddler is struggling to try something new and challenging, frustration and unsuccessful attempts are a natural part of the process. It's also natural for caregivers to want to provide comfort and help right away. So how do we know when to step back and when to step in? The best approach is to try verbal encouragement first, allowing children time to try on their own as you cheer on their efforts. When the baby starts to fuss or seems frustrated, see if a little bit of help will make the task easier and keep her going. If the baby's distress increases, then it's time to offer verbal and physical comfort and try again another time.

- Working on gross and fine motor skills provide excellent opportunities to encourage effort and persistence. For example, babies can be encouraged to persist at tummy time, rolling over, sitting up, crawling, and using fine motor skills like hand-eye coordination. Use words, gestures, and hand-over-hand assistance to keep babies working hard at these challenging tasks.
- Toddlers may need some help to complete a multi-step task successfully, but they get great satisfaction from doing things on their own. As you work with individual children in your class, take time to watch carefully to see how much each child can do on her own. When a child asks for help or is getting frustrated, give small amounts of help, and then encourage her to finish the job herself.

### Rate Yourself!

How comfortable do you feel encouraging effort and persistence in your classroom?

Not at all comfortable		Somewhat comfortable		Very comfortable	
<input type="checkbox"/>	1	<input type="checkbox"/>	2	<input type="checkbox"/>	3
<input type="checkbox"/>	4	<input type="checkbox"/>	5	<input type="checkbox"/>	6

### Stop and Reflect: Encourage Effort and Persistence

Providing encouragement and commenting on a child’s effort can help them to persist, for example: “You’re almost at the top of the slide! Just two more steps. Keep going!” Why do you think commenting on specific behaviors may be more helpful than general praise such as “good job”?

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## 4 Maintain Children’s Attention

Maintaining infants’ and toddlers’ attention means helping them stay focused on an activity for a period of time. Research shows that when children stay focused for longer periods, they are able to learn more from the activity. Teachers will need to consider a child’s age and developmentally appropriate expectations when planning activities or determining how long a child is expected to attend to an activity (e.g., 30-minute circle time is too long for toddlers). Teachers can maintain children’s attention by following the child’s lead (noticing what the child is interested in or attending to) and then labeling, explaining, narrating, pointing out specific details, demonstrating, and being an enthusiastic and engaged play partner.

Teachers should try to minimize distractions and redirections (when safety/health is not a concern). It takes mental energy for young children to switch the focus of their attention. When a child’s attention is repeatedly interrupted, she is not learning how to stay engaged with people, objects, and activities for sustained amounts of time. By helping a child to maintain attention, teachers are conveying that the child’s interests are important.

The videos for this strategy found in the course are a bit longer to show how the teachers use a set of toys in several different ways to maintain children’s attention.

 **Tips**

- Remember to maintain babies’ interest in warm, playful ways, as they are more likely to maintain their attention if they are entertained!
- Maintaining children’s attention often works best when using open-ended toys or materials that can be used in many ways, for example, showing babies how balls can be thrown, caught, squeezed, counted, and sorted.
- Balance demonstrations and guidance with letting children explore toys in their own ways. Be flexible in letting the babies move around and make their own choices about what to do.

**Rate Yourself!**

*How comfortable do you feel maintaining children’s attention in your classroom?*

Not at all comfortable		Somewhat comfortable		Very comfortable							
<input type="checkbox"/>	1	<input type="checkbox"/>	2	<input type="checkbox"/>	3	<input type="checkbox"/>	4	<input type="checkbox"/>	5	<input type="checkbox"/>	6

**Stop and Reflect: Maintain Children's Attention**

Why should teachers encourage children to focus on one object or activity at a time? Are there times you tend to rush through activities, or introduce a new toy or object while a child is still engaged with the one they have?

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**5** Encourage Imitation

Imitation is when infants and toddlers copy others’ facial expressions, sounds, words, actions with objects, gestures, or body movements. Young children often imitate during social interactions. It helps them learn new things about their world.

Teachers can encourage imitation by first paying attention to what the child is doing and then imitating the child’s action (e.g., clapping hands, banging on a toy). This often leads to the child imitating the teacher, and a back-and-forth social exchange begins. To encourage this type of interaction, teachers can be enthusiastic, talk about their actions, and pause to allow the child time to imitate the teacher.

Imitation also helps young children experiment with roles and ideas, especially during play interactions. Teachers can encourage children’s imitation of routines (e.g., pretending to brush their hair or sweep the floor), making animal sounds, imitating characters in stories, and taking on familiar roles (e.g., baby, doctor, cook).

 **Tips**

- Remember that babies do not always respond immediately to directions for imitation. Be sure to give them plenty of time and encouragement, as well as opportunities to explore a toy in their own way, when trying to get them to imitate. For example, infants are just learning how to imitate simple motor behaviors like banging objects or clapping hands. Waiting patiently after you demonstrate an action is important, since infants may need extra time to organize a response.
- Imitating actions related to a book is a great way to get toddlers engaged in story time and make connections between what they see in a picture and what the picture represents.
- When teaching children a complex task, you will often need to break it down into smaller steps and encourage the child to imitate each step after you demonstrate. For example, a pretend play sequence about dishwashing may include pauses to let the child imitate washing, rinsing, drying, and putting away dishes.

**Rate Yourself!**

*How comfortable do you feel encouraging imitation in your classroom?*

Not at all comfortable		Somewhat comfortable		Very comfortable	
<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6

**Stop and Reflect: Encourage Imitation**

What are some ways you already encourage imitation in your classroom? Can you think of a few new ways to use this strategy?

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THE THEATER:

# Hear from the Experts



The theater in the *Learn with Me* course contains interviews with experts on a wide variety of topics related to infant and toddler cognitive development. The key concepts presented in these videos are summarized below.

WATCH  
FILM

## What is cognitive development, and why is it important to know about cognitive milestones?

Cognitive development is the development of a set of skills that allow children to perceive, process, and remember information. As they practice cognitive skills, children become better at problem solving and decision making. It is critical that teachers understand the developmental stages of young children so that they know how to provide the right amount of support—the goal is for teachers to avoid providing too much or too little support. Teachers give too much support when they do every task for a child without letting the child practice new skills. Teachers provide too little support when the child is often frustrated by tasks. By understanding children’s cognitive milestones, teachers can get a better sense of when children are ready to be challenged and when they need more support.

WATCH  
FILM

## What is the importance of sensory exploration for infants’ and toddlers’ learning?

Our brains take in lots of information through all of our senses, and it’s one of the primary ways babies learn about the world around them. It’s important to provide experiences for children to touch, taste, feel, and hear, such as:

- Crawling around and putting things in their mouths in safe ways
- Playing in water
- Finger painting with pudding
- Using textured objects made from different materials
- Playing with toys that make noises

WATCH  
FILM

## How do infants learn about objects with their mouths and hands?

Infants learn best through exploration. Babies as young as two or three months old will begin to put objects in their mouths to explore. They can learn a lot about textures, sizes, shapes, and tastes by investigating toys and objects. This is a time when caregivers need to provide appropriate items for these kinds of experiences.

At around three to five months old, babies begin to bring objects closer by increasing their reach and stabilizing their grasp, and in doing so they can investigate objects using more of their senses. At this time, they start to change the way they think about objects and can begin to use different viewpoints, enriching their understanding of dimension and their depth perception.



## How do teachers know when children are ready for a challenge?

Teachers should look for opportunities to introduce challenging but achievable tasks that can help children learn a new concept or skill. First, look for signs the child may be ready for a challenge. Often if a child is completing a task very quickly or automatically, it's a sign they are ready for something more challenging. Another sign that a task is too easy is the child becoming bored with or uninterested in the task. Likewise, children tend to shut down or disengage when tasks are too difficult. If you're not sure what the child is signaling, try moving from easier tasks to slightly more challenging tasks, and vice versa, to see how the child responds.

A helpful reference is to keep in mind the child's zone of proximal development. The zone of proximal development is a concept developed by Lev Vygotsky that refers to challenging but achievable tasks, or tasks that the child can learn with the help of an adult who scaffolds their understanding. Tasks that are not in the zone of proximal development are tasks that the child can do without help (tasks they have mastered) and tasks the child cannot do even with help (tasks that they aren't quite ready for). When thinking about how much to challenge children, remember the  $\frac{3}{4}$  rule: we know children tend to stay motivated if they are successful in a task about three out of four times. Maintaining motivation is tied to maintaining attention, another important cognitive skill.



Represents the child's current level of understanding or mastery.



## How can teachers support children with challenging tasks?

Encourage young children to persist by using language that supports their effort. For example:

- "I know you can figure this out."
- "I know that you are trying really hard, and that's awesome!"

At times, you may need to hold back providing support for completing a task by waiting to see what happens when you give the child a little time to figure out what they are doing. Some children will find their way through the frustration, and that independence supports their continued persistence.



## What is sustained attention and why is it important?

Sustained attention means being able to stay focused on an object or activity for a long period of time. It allows us to concentrate on a task long enough to finish it without being distracted. This developmental skill is critical for learning, remembering, and retrieving information. Sustained attention is a core principle for cognitive development and a predictor for later academic achievement.



## How can teachers help infants and toddlers sustain attention?

Teachers can help infants and toddlers sustain attention by:

- Paying attention to what the child is doing and helping the child stay focused on the item or activity, rather than introducing something new or distracting
- Showing a new way to play with a toy or adding challenge to an activity
- Showing, naming, and talking about objects and activities that interest children
- Slowing down their pace when interacting with children



## How do we know when babies are thinking?

The word “thinking” is tricky. There is no way that you can ask babies what they are thinking. However, researchers have figured out very clever methods to determine what might be going on in their minds. We know from studies that babies look longer at unexpected events and complex visual information. When babies become bored, they look away. Infants as young as five months old look longer at “impossible” events, such as objects disappearing. These give us clues that babies are noticing meaningful changes in what they see and might be “thinking” about the things they are interested in.



## THE LIBRARY

# Child Development: Cognitive Skills

The library provides resources for you to dive deeper in your learning about early childhood development concepts. In Part 1 of the *Learn with Me* course, the library introduces milestones for children's cognitive development.

## FROM BIRTH TO ONE YEAR

Babies are born ready to learn. Their cognitive skills develop as they respond to their environment. During the first three months, babies become more awake and alert and are able to track people and objects. Babies are also ready for interactions and sensory experiences. Toys can stimulate an infant's senses. But they are also very interested in faces, sounds, and physical movements. In fact, the face of the caregiver has been called the most fascinating item a baby can have access to.

By the baby's third month, he or she spends more time awake and alert, tracks or follows objects with eyes, and looks back and forth briefly from one object to another.

As babies spend more time awake and alert, they notice what is around them. Caregivers play an important role in watching infants' cues and providing opportunities for social games, as well as play with objects. As they interact, babies track people and objects with their eyes.

The 3-to-6 months age range is a time of curiosity. As babies gain mobility, their natural motivation is to explore what is around them. Babies at this age show curiosity about objects by looking and reaching. They begin exploring objects by banging, grasping, and mouthing. They are little scientists and begin experimenting with cause and effect, such as shaking a rattle to make noise. They learn that by rolling, kicking, or reaching, they can physically interact with objects. Babies show signs of boredom or even fuss if an activity is no longer engaging. They don't understand object permanence yet. This means that at this age, babies forget about objects when they are covered or removed from view.

At 6 to 9 months old, babies are becoming more active explorers in their environment. They enjoy handling and shaking objects as they watch closely to see what will happen. If an action gets a reaction, they will repeat it just because it's fun. For example, an infant may drop the same toy over and over if someone is willing to pick it up, so that he can do it again. At about 7 to 9 months, infants begin to realize that objects exist even if they can't see them. This milestone is called object permanence, and it signals that their memory is developing. At this stage, infants enjoy games like peek-a-boo and finding partially-hidden objects.

Infants take great joy in repeating an action that makes things happen, especially when there is a back-and-forth play with the caregiver.

Infants in the 9-to-12 month range are beginning to show more intention in their play by having a goal in mind. An infant may give an item to the adult but expect it to be promptly returned. Older infants are getting better at remembering and finding hidden objects. They become very interested in putting objects in containers and taking them out and are learning to enjoy challenges, such as stacking rings on a peg.

Older infants begin to connect pictures in a book to real-life objects. For instance, they may see a picture of a dog in a storybook and understand that the dog in the picture is like the dogs they see in real life. Infants are now able to take action with a goal in mind, such as wanting to get a toy from another child.

## FROM ONE TO TWO YEARS

From 12 to 18 months, toddlers demonstrate their growing cognitive skills in many ways. As they become increasingly more coordinated, agile, and mobile, their interest in how things work also peaks. They like exploring how objects go together, like how a spoon goes in a bowl. They're interested in how to make mechanical things work. For example, they might use a wind-up toy after seeing how it works. They experience great delight as they figure out how to open cabinet doors, take off their own socks, shoes, or diaper, and they may even try to climb out of their cribs.

Engaging in simple pretend play also begins at this age. Having a pretend meal with simple food items and dishes allows toddlers to use child-sized replicas to reenact a familiar routine.

From 18 to 24 months, toddlers like to play hide-and-find games, match two similar items, and figure out shapes orders. Older toddlers are very interested in taking things apart, such as snap together toys, or taking lids off of containers. They like to push buttons, turn doorknobs, unhook latches, and investigate materials and items while exploring their environments. Toddlers love to use everyday objects to reenact familiar experiences, such as sweeping or talking on the phone.

They have a growing ability to make symbolic connections as they interact in pretend play. This includes pretending that an object is something else. For example, they may drive a wooden block as if it's a car.

## FROM TWO TO THREE YEARS

Around two years old, toddlers can imagine and remember more clearly. They know their own cubby in the classroom, and during the day, they can help put away toys at clean-up time because they know where the objects belong. They are driven to learn about the world around them by exploring everything in their environment.

If they see something interesting, two-year-olds may find a stool and push it to where the action is. At this stage, toddlers can complete simple puzzles and engage in pretend play that is more complex. Pretend play may involve stringing together a series of events into a longer play sequence, like first making crying noises to indicate the doll is sad, then preparing food for the doll and feeding it, and finally putting it to bed.

Play topics or themes become more varied by three years of age.

## FROM THREE TO FOUR YEARS

From three to four years of age young children are learning to name basic colors and shapes and copy simple patterns. They are often interested in counting things. They are able to notice two different features of objects, which allows them to sort into more specific categories. For example, they can learn to sort teddy bear counters into groups based on size and color. Three-year-olds begin to understand concepts of volume, such as what it means to pour their own juice to half full. They also are beginning to have some understanding of time. Even though they can't tell time yet, they can anticipate an upcoming birthday or holiday.

Three- and four-year-olds notice and remember many details of their daily experiences. Their increasing memory skills allow them to remember things that happened yesterday or last week and to notice and remember familiar things, such as a store en route to grandma's house. As their attention skills improve, they can focus more intentionally on a task and can ignore distractions as they concentrate. At this age, children may experiment with objects or toys to compare the features and effects. For example, they may try to stack and compare different kinds of blocks or race different kinds of cars down ramps to see which is fastest.

Repetition of activities and extended time to play build stronger neural connections. As they repeat actions, their skills improve. For example, a three-year-old may be able to master a 12-piece puzzle after several attempts or learn how to efficiently climb a tall rock by repeating this action multiple times. Pretend play becomes more organized as children assign themselves roles and add more complex scenarios and dialogue. A child at this age might say, "let's play bakery. I'll be the baker and you be the customer. How can I help you today?"



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# Cognitive

## DEVELOPMENTAL MILESTONES

### 0-3 MONTHS

- ⑧ By 3 months, spends more time awake and alert
- ⑧ Tracks or follows objects with eyes
- ⑧ Looks back and forth briefly from one object to another

### 3-6 MONTHS

- ⑧ Looks around and shows curiosity about things nearby in environment
- ⑧ Reaches for objects
- ⑧ Begins to explore objects (e.g., banging, putting in mouth)
- ⑧ Begins to experiment with cause and effect (e.g., shaking a rattle to make noise)
- ⑧ Begins to act bored or fuss if activity does not change
- ⑧ Forgets about object when removed from views

### 6-9 MONTHS

- ⑧ Explores objects by visually inspecting them, turning them around, feeling all surfaces, shaking, and dropping them
- ⑧ Begins to repeat actions to get an effect
- ⑧ Searches for partially hidden objects

### 9-12 MONTHS

- ⑧ Takes action with a goal in mind (e.g., avoids diaper change by crawling away)
- ⑧ Gives an object to adult on request, expects to have it returned immediately
- ⑧ Remembers and finds object hidden under cloth or cup
- ⑧ Shows interest in putting objects in and out of containers
- ⑧ Stacks rings on peg
- ⑧ Understands that an illustration or photo in a book represents a real object

### 12-18 MONTHS

- ⑧ Shows understanding of how objects go together (e.g., cup on saucer, spoon in bowl)
- ⑧ Tries to make mechanical objects work after watching someone else do it
- ⑧ Solves problems by trial and error (e.g., inverts bottle to obtain object)
- ⑧ Engages in simple pretend play (e.g., pretends to drink from an empty cup, feed a doll/stuffed animal, roll a car, talk on a play phone)

18-24  
MONTHS

- ⑧ Plays hide-and-find with objects
- ⑧ Matches two similar objects
- ⑧ Inserts shapes into matching slots with assistance (e.g., shape sorter)
- ⑧ Activates mechanical toy without demonstration (e.g., wind-up toys, switches, buttons, knobs)
- ⑧ Likes to take things apart and experiment with how they work
- ⑧ Re-enacts familiar daily experiences (e.g., sweeping, covering a doll with blanket, talking on a play phone)
- ⑧ May pretend an object is something else (e.g., block as a car, banana as a phone)

24-36  
MONTHS

- ⑧ Knows where things usually belong
- ⑧ Uses a chair or stool to reach an object
- ⑧ Completes simple puzzles
- ⑧ Strings steps of pretend play together in a sequence (e.g., making crying noise to indicate doll is sad, preparing food for doll, feeding it, and putting it to bed)
- ⑧ By 36 months, begins to pretend play a greater variety of events (e.g., visiting the doctor, going to the zoo, birthday party)

36-48  
MONTHS

- ⑧ Identifies basic colors and shapes
- ⑧ Sorts objects using one or two features into categories (e.g., all large red cars together)
- ⑧ Copies simple patterns
- ⑧ Begins to count
- ⑧ Begins to understand concepts of volume (e.g., empty, half, large, small)
- ⑧ Some understanding of time (e.g., last night, tomorrow, yesterday, summer)
- ⑧ Recognizes familiar driving routes and locations in neighborhood (e.g., says, "That's where Grandma lives!" when approaching her house)
- ⑧ Better able to ignore distractions and focus on the task at hand, may persist in completing something that is a bit difficult
- ⑧ Experiments with different objects during play to compare their effects (e.g., cars on ramps to see which goes faster)
- ⑧ Repeats actions to improve results (e.g., blowing bubbles or pumping legs on swing)
- ⑧ Organizes and plans what to pretend, such as roles, scenarios, and dialogue (e.g., "Let's play baking! I'll be the mommy and you be the baby.")

# Part 2



THE WORKSHOP:

# Instructional Strategies

## 6 Explain and Demonstrate How Things Work

Babies and toddlers have a lot to learn about how things work. Manipulating and exploring objects continues in more complex ways as children develop. Teachers can help by demonstrating play skills with toys and explaining what they are doing. For example, teachers can demonstrate and explain how to use open-ended toys, such as building blocks, balls, or crayons, as well as cause-and-effect toys, such as a pop-up box or a wind-up toy. Then teachers can let children have a turn to try out these actions themselves. It takes lots of practice and experimentation for children to master new skills. Explaining and demonstrating how tools and other practical objects (e.g., screwdrivers, vacuum cleaners, watering cans) work is important too. Learning how things work helps children understand the world and invites them to practice skills and figure out solutions to problems.



### Tips

- Remember that babies need lots of time to experiment and master a new skill. Repeat explanations and demonstrations, and be patient and encouraging when waiting for babies to respond.
- When babies and toddlers struggle with a new skill, try breaking down the demonstrations into smaller actions that are easier for children to practice.

### Rate Yourself!

*How comfortable do you feel explaining and demonstrating how things work in your classroom?*

Not at all comfortable

Somewhat comfortable

Very comfortable



1



2



3



4



5



6

## Stop and Reflect: Explain and Demonstrate How Things Work

Oftentimes we explain something, but do not demonstrate how it works. Or we demonstrate how to use something without explaining what we are doing. What are some ways you can explain AND demonstrate how something works to the children in your class during daily activities?

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## 7 Talk About Sequence

A sequence is a set of events, actions, or objects arranged in order. Talking about sequences can include the steps in a task, such as how to wash hands or brush teeth, or it can include talking about time concepts (e.g., today, tomorrow, before, next). Talking about sequences helps children learn that there is order and pattern to our lives. Having a visual schedule with pictures to represent each part of the school day can help facilitate conversation about what happens first, next, last, etc. Picture sequences can also be used to remind children of multi-step routines, such as washing hands or using the potty. One more way that teachers can help children learn about sequences is to talk about patterns. Teachers can point out to children patterns in things they can see, such as a pattern of beads on a necklace or a geometric pattern on a classroom carpet. At this young age children are not expected to know what comes next in a pattern, but drawing attention to patterns and sequences helps lay a foundation for young children's understanding of time, order, and organization.



### Tips

- Help children recall a recent sequence of events, like what happens after meal time, by using questions and hints to help them piece the sequence together. Refer to visual schedules during these interactions if possible.
- Toys that are designed to be put in a specific order, like stacking rings from biggest to smallest, are another great way to help children grasp patterning and sequencing concepts.

### Rate Yourself!

*How comfortable do you feel talking about sequence?*

Not at all comfortable    Somewhat comfortable    Very comfortable

1     2     3     4     5     6

## Stop and Reflect: Talk about Sequence

Teachers often talk about sequence with children when they review daily routines or tasks. Can you think of some daily classroom tasks for which you could narrate a sequence of steps or actions?

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# 8 Engage Children in Math Activities

Early math skills include counting, measuring, and comparing sizes, shapes, lengths, and quantities. Research has found that children begin to notice and pay attention to concepts of quantity (e.g., objects being added or subtracted) as early as infancy, long before they can talk about adding or subtracting! Teachers can promote early math skills by introducing and modeling activities that involve counting, measuring, and comparing quantities (e.g., more/less, bigger/smaller, taller/shorter). These activities can be very simple, such as counting items on a page while reading a picture book, comparing cups of water that are filled to different levels (which cup has more water?), lining up toy cars and using words like “Let’s add another car to make our line longer,” or playing with a shape sorter and naming the different shapes. Cooking projects allow toddlers to practice measuring and counting as they add ingredients.

Classifying and sorting are also early math-related skills. Classifying means identifying a group to which an object belongs (e.g., a lion is an animal, not a vehicle). Sorting often goes with classifying—once we identify a group, we put things in that group together. Everyday activities such as cleaning up or getting ready for lunch provide opportunities for classifying and sorting, such as putting the toy animals in one bucket and the toy cars in another, or sorting spoons into one pile and forks into another. With babies, teachers can name and classify objects verbally while describing them (e.g., “Look at the cow! Cows are big animals!”). Toddlers tend to make what are called “overgeneralizations,” such as calling all big furry objects “dogs.” This is perfectly normal. With help and practice, they will be able to make finer and finer distinctions between similar things.

Being intentional about teaching words for math concepts will also help children build important vocabulary, including words such as “more/less,” “long/short,” “big/small,” “empty/full,” “number,” “count,” “measure,” and names of shapes and numbers. Remember also that children learn best when these words and concepts are embedded within many different meaningful, fun activities rather than only through rote, repetitive routines such as chanting the names of shapes or counting in unison during every circle time. Teachers can challenge themselves by including many different math words and concepts as they create daily lesson plans.

## Rate Yourself!

How comfortable do you feel engaging children in math activities in your classroom?

Not at all comfortable		Somewhat comfortable		Very comfortable	
<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6

### Stop and Reflect: Engage Children in Math Activities

Can you think of a time when you engaged children in math activities? Now think of a new math activity that you could use with children that is fun and hands-on.

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## 9 Model and Join in Pretend Play

Pretend play builds children's cognitive, language, and social skills. Although most children will not start to create sequenced imaginary scenarios themselves until about age three, they love engaging in this kind of play with an adult, starting at about 18 months. For younger toddlers, pretend play can be very basic, such as putting on a dress-up hat, kissing and patting a baby doll, or pretending to talk on a toy phone. Pretend play can be done with props and dress-up clothes, but fancy or expensive toys are not necessary. For example, a rectangular block can serve as a phone, a cardboard box for a playhouse, or a paper plate for a steering wheel. These substitutions encourage imagination and flexible thinking. Pretending to be some kind of animal is another simple game that helps toddlers imagine and learn. For example, children can learn that they can pretend to be a dog by crawling on their hands and knees, barking, and panting. Pretend play like this provides opportunities to build vocabulary about dogs: what they do, what sounds they make, and how they move. Two-year-olds can be guided to begin acting out pretend scenarios such as shopping, cooking, driving a bus, or being a firefighter. When teachers pretend along with children, the quality and complexity of play is enhanced. Teachers can scaffold by modeling pretend actions, asking questions, and offering suggestions that take the play to the next level.

**Tip**

- Beginning pretend play for young toddlers might be easier with activities that children frequently see adults participate in, like talking on the phone and eating. Familiarity helps children jump in, and as their pretend play matures, they can branch out to less familiar scenarios.

**Rate Yourself!**

*How comfortable do you feel with modeling and joining in pretend play in your classroom?*

Not at all comfortable

Somewhat comfortable

Very comfortable



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**Stop and Reflect: Model and Join in Pretend Play**

Why do you think it is important for teachers to model and join in pretend play with even very young children?

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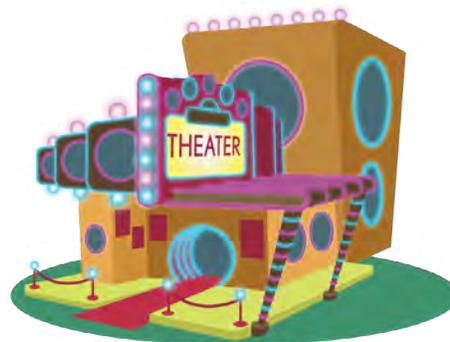
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THE THEATER:

# Hear from the Experts

WATCH  
FILM

## Why is play important for children's learning?

When children play, they become familiar with their environment through exploring and experimenting with the things around them. Simply picking up an object and moving it around can provide children with different perspectives. Play provides children opportunities to learn how to problem solve. Through play they learn multiple ways to figure out how and why things work the way they do. Play is what children do to practice skills and to develop traits such as curiosity, persistence, and independence.

WATCH  
FILM

## What kinds of toys and activities promote cognitive skills?

Toys for babies should promote exploration. Babies enjoy learning by playing with many objects that are readily available, not only commercially manufactured toys. Activities such as crawling in and out of cardboard boxes or rolling and looking through a toilet paper roll encourage babies to move and play in different ways. Providing items that have different textures and can be squeezed, like dry and wet sponges, or aluminum foil squished into a ball, stimulate children's sense of touch. Mirrors at eye level encourage children to look at themselves and each other. Toddlers like toys that allow them to stick things into holes, as well as cause-and-effect toys where they can make something happen by pushing with their hand or foot.

Toys can promote cognitive skills and problem solving for young children. Look for toys that allow children to:

- Be active and engaged (not passively watching)
- Interact socially with others
- Do something new each time they play (toy can be used in many different ways)
- Maintain interest by being fun and enjoyable

Toys and activities that allow children to problem solve include:

- Construction toys: toys that allow children to rotate objects, fit objects together, make things fall, make patterns, and categorize
- Pretend play: kitchen items, doctor kit, toolkit
- Sensory play: water/sand table
- Mathematics: shape sorters, stacking rings
- Games like hide-and-seek



## How is repetition beneficial to children's learning?

Young children love repetition. They often will select the same book to be read over and over. Like repetition in book reading, routines help children learn how to make predictions, learn common vocabulary words, and feel a sense of security. Playing games again and again also provides opportunities to practice early math skills like counting and spatial recognition (think about counting spaces on a simple board game!). Finally, by anticipating routines and repeating activities, children begin to build memory skills.



## How can teachers help children learn counting and quantity?

Teachers help children learn to count by providing lots of opportunities to learn about quantity. Teachers can reinforce understanding by not just showing two objects, but by counting while pointing to each item in turn. Around the age of three, children start to remember total quantity when counting small numbers of objects. Teachers can reinforce this understanding by saying the total number of objects that have been counted. For example: “We have one, two, three cars. So we have three cars in all.”



## Why should we use mathematical terms with very young children?

Young children are sensitive to numbers starting in infancy. It's important to start talking with children and using mathematical terms to describe and explain their actions. Infuse the day with number words to encourage children to become familiar with mathematical terms. Use relational terms (longer, higher, more, etc.) whenever possible to help children understand more about mathematical concepts in their environment.



## How can teachers use modeling to support toddlers' early science, technology, engineering, and math (STEM) development?

Early experiences lay the foundation for later STEM skills. Teachers can scaffold children's understanding for early STEM development by:

- Modeling STEM activities, such as stacking blocks when children are playing to see if children will imitate
- Pausing after modeling these activities, which helps stimulate children's curiosity
- Using mathematical terms and phrases, such as “build it higher” (and encouraging children to keep stacking so that they see what “higher” means)
- Using spatial terms like “above,” “under,” and “beside”



## How do play skills develop in young children?

In the first year, sensorimotor and exploratory play happen as babies:

- Put things in their mouths
- Touch things
- Turn objects around with their hands

At around 12-18 months old, toddlers will start to play with toys in the ways they are designed to be used. This is called functional play. During functional play, children learn about cause and effect, answering the question “What happens when I...”

- Throw a ball
- Turn the page of a book
- Push a button
- Drop this toy/food off my high chair
- Shake/bang this toy
- Put things in and out of this box

Young children enjoy games played with people. At around 18-24 months old, toddlers enjoy pretend play, like:

- Talking on a toy phone
- Eating with toy food, spoons, cups, etc.
- Hugging and patting dolls or stuffed animals

Pretend play encourages:

- Imagination
- Imitation
- Sequencing of actions
- Flexible thinking (e.g., toys can be used in more than one way)



## How can teachers help children understand relational terms?

Relational terms are words that make comparisons among objects and often include more than one comparison, for example: small, smaller, smallest. To help develop children’s understanding of relational terms, teachers can have conversations with young children to talk about things that are big, medium, and small—not just big and small. Encouraging children to think about how objects fit together is important so that they start understanding the relevance of size and the sequence of things.



## How can teachers help children recognize patterns?

Young children learn about repetition very early. For example, a baby says, “ba-ba-ba” and the teacher responds with “ba-ba-ba.” As the two keep playing back and forth, the baby is learning about a repeating pattern. Later, a teacher may beat a drum with a pattern that children can repeat. Music, song, and dance are great ways to engage children in making patterns, and teachers can start labeling this play as making patterns so that children have a connection to both the concept and the vocabulary.

## THE LIBRARY



# Connecting Developmental Theories to Cognitive Development

## ATTACHMENT THEORY

Attachment theory describes the importance of a strong secure emotional connection between an infant or toddler and a primary caregiver and how this attachment affects development. The strength and quality of this connection play a role in a child's cognitive and social-emotional development.

Mary Ainsworth researched attachment patterns using the Strange Situation Procedure. The Strange Situation is conducted in a laboratory playroom and involves observing how a 12- or 18-month-old responds to separation from and reunion with the parent, as well as to interaction with a strange adult. General patterns of attachment were identified after watching hundreds of parent-child pairs in research studies:



### Secure Attachment

A *secure attachment* means that a child feels secure, understood, and safe within the relationship. Secure children develop a positive view of the world and expect that adults will be there to help them when needed. In the Strange Situation research, secure infants showed distress when their mother left the room, and they responded to her return by seeking comfort and reassurance. They were then able to return to a calm state and begin playing again. Secure infants tend to be comfortable exploring their environment and will use the primary caregiver as a secure base from which to venture out. The infant will check in with the caregiver periodically while playing independently. The parent functions as both a secure base from which the child can explore and a safe haven to which the child can return in times of distress.

*Insecure attachment* styles (including avoidant, ambivalent/resistant, and disorganized attachment styles) form when the primary caregiver does not respond to the child's needs or distress or does not respond consistently in a way that is predictable for the child. When children have learned that they cannot count on emotional support from the adults around them, they can become indifferent, unusually independent in a way that is not healthy, and wary of forming close relationships (avoidant style); or they can become clingy, whiny, and hard to soothe (ambivalent style). Children who have experienced frightening, abusive, or neglectful interactions with caregivers may experience a greater disruption in social-emotional development in which they have no organized effective strategy for getting needs met (disorganized style).

While attachment research studies are usually conducted with mothers, it is important to note that children can have different attachment relationships with different primary caregivers. For example, it is possible for a child to be insecurely attached to one parent and securely attached to the other.

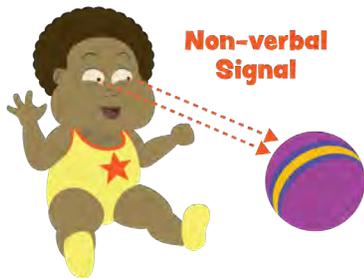


### Insecure Attachment

Teachers can also function as attachment figures, which is why consistency, predictability, and warm responsiveness in the teacher-child relationship are so important.

How does the quality of the attachment bond influence the child's cognitive ability? There are several research findings that inform the infant/toddler teacher's role:

1. We know that children learn through active exploration of their environment. Through this exploration, the child gains greater competence and acquires greater independence in future experiences. Providing a safe, predictable, and loving classroom environment will encourage children's confidence in their ability to happily explore and learn from the activities and materials you provide. Securely attached children tend to be more willing to approach and persist in tasks than their insecurely attached peers. Their brain and nervous system can more easily maintain a calm alert state, which allows them to focus their attention and emotions on exploration and playing and learning, rather than worrying about whether their basic needs will be met.
2. Insecurely attached infants may be more reluctant to explore their environment or to try new activities. They may need extra reassurance and encouragement to do so. Additionally, they may be easily frustrated and have difficulty regulating their emotions, so they may need more scaffolding and encouragement to keep trying when tasks are challenging for them.
3. Securely attached infants and toddlers have trust in their caregivers, and this trust enables them to seek out and accept their caregivers' assistance. Scaffolding may involve modeling or demonstrating how to do something, or it may involve providing verbal cues or suggestions. A sensitive teacher will engage interactively and can provide scaffolding in a natural way during playtime.
4. Infants and toddlers communicate verbally and nonverbally with their teachers throughout their daily routines, including during play interactions. The teacher's sensitivity to all of the child's verbal and nonverbal signals—along with timely, appropriate responses—allows the child to feel safe and secure in the adult-child relationship. Being tuned in and focused on the moment-to-moment experience alerts the teacher to the child's interests and motivations, and this supports the child's development and learning.



In summary, the relationship between a teacher and the children in her care affects cognitive development. When children experience a nurturing, responsive style of interaction with their teachers, based on real affection and caring, they will be more likely to explore and engage actively with their environment by playing with materials like books and toys. They will feel safe signaling their needs, seeking and accepting comfort, and approaching teachers for help with learning activities. These interaction cycles enhance cognitive development and are likely to lead to more positive learning outcomes.

## LEV VYGOTSKY

Lev Vygotsky was a Russian psychologist in the 1920s and '30s, and his work is still very relevant to educators. Vygotsky's theory of cognitive development has been called sociocultural because of its emphasis on both social interaction and the cultural environment of the child. Vygotsky believed that human knowledge is rooted in one's culture and that the everyday social environment of children must always be considered important by the

caregiver. Cultural differences lead to differences in understanding, knowing, and behaving.

Several concepts arose from his theory that are important to classroom learning. The first is the concept of **scaffolding**, which is now widely accepted as an important way in which children acquire new knowledge. Scaffolding provides the support a learner needs to reach a slightly higher level of skill. Caregivers have many chances to scaffold children's learning throughout the day, often in a natural way when they join infants and toddlers in play.

One way to understand scaffolding is to think about a toddler who is frustrated while playing with a shape puzzle. A teacher who notices this considers whether the puzzle is too difficult or whether he or she can offer help and model how to turn the pieces to fit. If the toddler has difficulty grasping and turning puzzle pieces without knobs, the teacher can offer puzzles with knobs. By providing materials that are easier to grasp, showing the toddler how to turn the pieces to fit, and staying close by to observe and offer support as needed, the teacher scaffolds the toddler's learning and the toddler has more success in putting the puzzle together. Other examples of scaffolding during play might include showing and telling children how to stack blocks, how to turn pages in a book, how to roll and catch a ball, or how to hammer pegs into a pegboard.



A second concept related to how children learn is the **zone of proximal development** (ZPD), which encompasses the knowledge or skills children cannot yet perform on their own but are capable of learning with guidance or help from a more experienced person, often the parent or teacher. By first noticing and even documenting what a child can do or understand, a skilled teacher or parent will figure out how much help is needed to get to the next skill level.

A third important contribution from Vygotsky is the importance of **imaginative play** as a way to construct knowledge. Play serves as a vital zone of proximal development. In make-believe, children act out the rules of social life. A pretend situation allows a child to use objects in creative ways and try out new vocabulary. Language is embedded in play of all kinds, especially sociodramatic play.

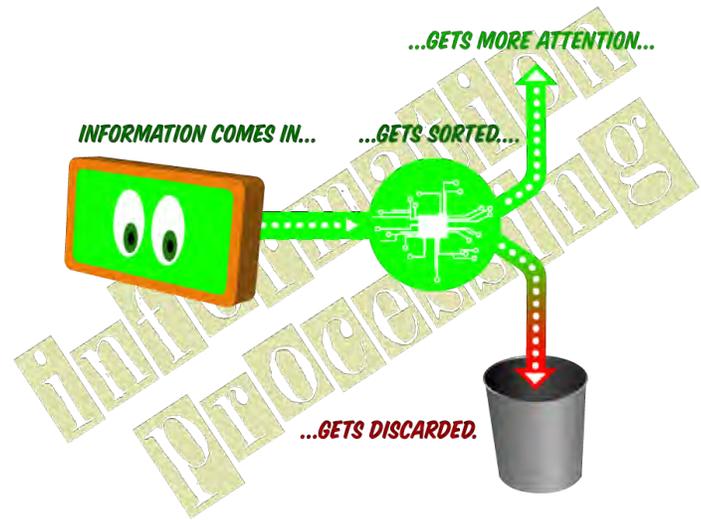
What does all of this mean for teachers of infants and toddlers?

1. Teachers can use their knowledge of children's emerging skills and interests to plan for engaging activities and learning opportunities. As they engage with children, teachers should look for ways to scaffold the play and learning. For example, a teacher notices that 18-month-old Sam loves to play with the soft plastic farm animals. The teacher finds a set of mother and baby farm animals to add to the shelf and spends time playing with Sam and talking about how the mother animals and baby animals match up. Soon Sam is able to match the sets by himself, even adding animal noises! Teachers should keep in mind that, because adult intervention can sometimes be disruptive to children's play, teachers need to observe and join the play in ways that extend learning rather than control it completely.
2. When infants and toddlers are ready for more challenging tasks and activities, the teacher can use scaffolding strategies by first modeling (or demonstrating) and explaining the activity and by then staying close by for support and coaching. At other times, a task may need to be simplified in some way. Toddlers have a strong need to be independent, so they need patience and time to practice when mastering new skills.
3. Conversations with children throughout the day are also part of scaffolding learning. Infants and toddlers are learning all the time, including during daily routines, play, and transitions. Working within the children's zone of proximal development includes teaching children new words that relate to what they are doing, asking questions children can understand and respond to, and responding to children's comments and interests by providing additional information and encouraging children's expression of ideas. A teacher may also use self-talk (or thinking out loud) to scaffold children's learning.



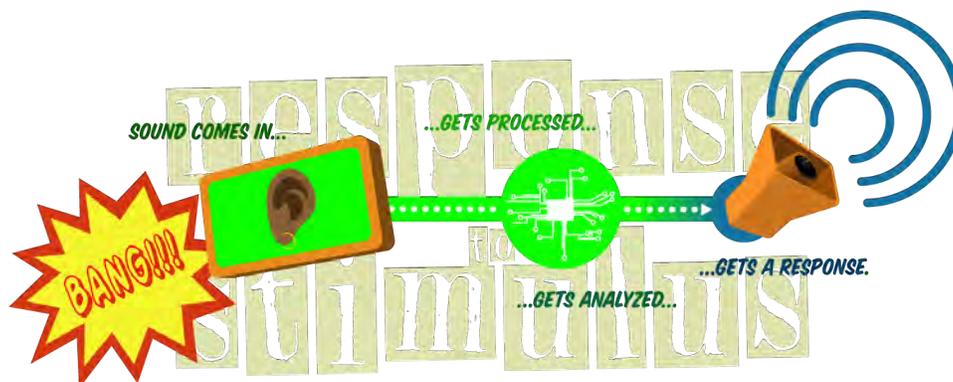
## INFORMATION PROCESSING THEORY

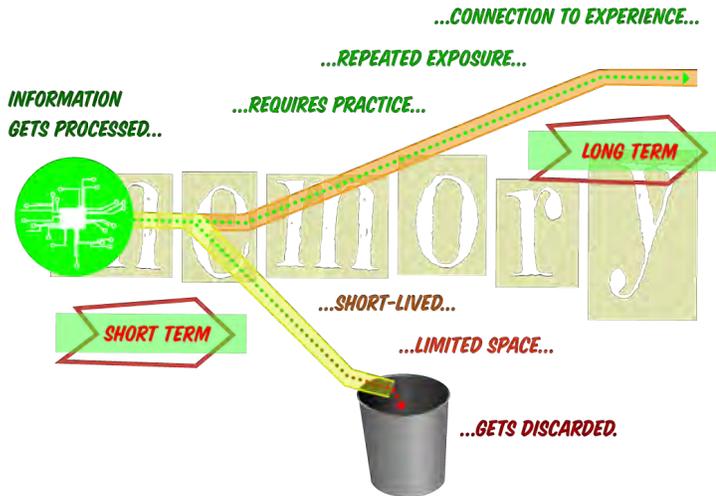
Our brains are constantly taking in information through the five senses: visual (what we see), auditory (what we hear), tactile (what we touch), gustatory (what we taste), and olfactory (what we smell). What does the brain do with all of this sensory input? One approach to answering this question is to think of the human brain as a computer. In this model, the process of making sense of the world is called information processing. Information processing theory compares many aspects of human thinking and reasoning to the way a computer takes in and analyzes information and produces output. Like a computer, the brain receives information and decides where it needs to go and what to do with it. These decisions, which often happen very quickly and out of our conscious awareness, can take several pathways depending on how our attention is focused, how the incoming information is recognized and remembered, how it gets linked to other information and past experiences, and how it triggers a behavioral response.



The first decision is whether the information is meaningful and needs to be further processed or is not meaningful (like background noise) and can be ignored. For example, when the ears hear a sound, that auditory information travels to the part of the brain that processes auditory information, which needs to decide what that sound means: Is it speech or not speech? If it is speech, is it a language that I understand? If so, what do the words mean? If it's not speech, is it just the sound of the air conditioner, which can be ignored? Or is it a sound signaling danger or excitement, or does it mean that dinner is ready or that it's clean-up time? Sight, smell, taste, sound, and touch experiences all begin the process of moving the sensory information along fast nerve pathways to various parts of the brain to determine what that information means and how to respond to it.

Responses may be emotions, thoughts, or actions. For example, the auditory experience of being startled by a loud noise may trigger a fearful response in a baby, and he or she may cry or move away from the object that made the noise. Processing visual information about two objects' color, shape, and size allows a child to compare them during a matching game and decide whether they are the same or different. Smelling lunch being served may prompt a toddler to come to the table.



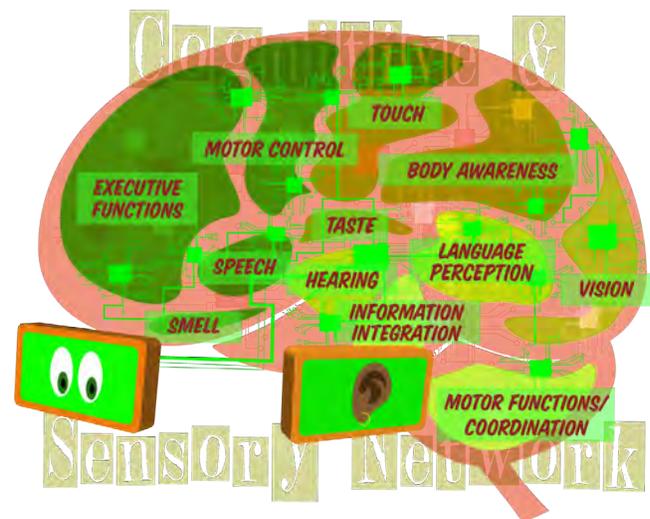


Memory is often an important part of this process. Information is often first stored in short-term memory, where our working memory allows us to remember and use the information for a short time. This is what helps us remember a phone number long enough to enter it into the phone or to follow directions someone has just given us. We may not need to remember that information for more than a few seconds or minutes. There is limited space for holding information in our short-term memory. On the other hand, when we want new information or skills to be learned and mastered, rather than briefly remembered, we need to get that information into long-term memory. Scientists believe that long-term memory capacity is limitless. However, getting new information into long-term memory often takes lots of practice, including repeated exposure, repeated experiences of using the skill or information, and links to connect the new information or skill to what a person already knows or can do.

Just as computers communicate with each other through networks to provide more powerful and efficient data management, our brains use networks of nerve connections to link information and become more efficient at using well-practiced skills. The infant brain is changing rapidly over the first several years of life, making trillions of new nerve connections between different parts of the brain. These connections are greatly impacted by experience. As the infant has stimulating experiences and interactions within relationships, neural connections are increased and strengthened. This means that children need real-life experiences to stimulate brain growth and that rich interactive experiences build broader and denser networks, which is good for learning. Connections that are frequently used get stronger. Connections that are not used die off in a process called pruning.

What does this mean for a teacher of infants and toddlers?

- Since information comes into the brain through the senses, young children need many opportunities to explore objects and their environment using all five senses. Teachers should provide interesting things in the classroom as well as outdoors for infants and toddlers to look at, listen to, touch, smell, and taste or explore with their mouths.
- Infants and toddlers need repeated opportunities to experiment with and learn about objects and actions over time. Providing play materials that children can come back to and try using in different ways will help them learn more about their meaning and properties, answering questions such as, what is it? What is it for? How does it move? What can I do with it? How does it relate to other objects or activities? As children grow and develop, they may use the same materials in new and more complex ways. For example, infants may start by simply holding and mouthing each of the rings in a set of plastic stacking rings. Later in development, they may bang two rings together, roll them on the floor, and place them onto the stacker. As they continue to grow, they begin to learn about size, color, and sequence, and they figure out how to place the rings on the stacker in order from largest to smallest, often with the assistance of an attentive teacher who models and encourages these skills. This kind of learning requires sustained attention, experimentation, memory, logical reasoning, and fine motor skills, all working together through linked brain processes that begin with sensory experiences and result in purposeful actions.



- The process is similar for learning language, emergent literacy skills, and social skills. Children need many opportunities to see examples, explore, practice, and connect new words, skills, and interactive experiences with what they already know and can do. When young children are exposed to a wide variety of learning opportunities over time, such as storybooks, songs, pretend play materials, outside time, language and conversation, social engagement, and art and sensory exploration, their brains build stronger connective networks to create a larger fund of knowledge and a wider range of skills.

## GARDNER'S MULTIPLE INTELLIGENCES

A traditional definition of intelligence is the ability to learn and apply knowledge and skills. Developmental psychologist Howard Gardner of Harvard University became interested in how humans think, which led him to develop the theory of multiple intelligences. Gardner's theory is that people naturally have specific ways of knowing; in other words, people have different ways of being smart that become evident early in life. As described briefly in the table that follows, Gardner believes that there are eight types of intelligences or ways of being smart. He said, "It's not how smart you are that matters, what really counts is how you are smart" (Gardner, 1993).

	Type of Intelligence	During childhood, may be observed as...
	<b>Linguistic:</b> Sensitivity to the meaning of words and language	Interested in words; enjoys listening to stories. May have an easier time with reading and spelling later on.
	<b>Musical:</b> Capacity to appreciate different kinds of music; mastery of music production	Enjoys music and rhymes, rhythm, dancing, and singing. Makes up songs and shows sensitivity to noises and sounds.
	<b>Logical-mathematical:</b> Understanding the logical relationship between actions and symbols	Enjoys puzzles, computer games, problem solving, and thinking activities.
	<b>Spatial:</b> Perceiving objects accurately	Is good with pictures, drawing, building, and puzzles.
	<b>Bodily-kinesthetic:</b> Ability to use whole body or parts of body in highly differentiated ways	Has well-developed fine and gross motor skills. Excels in athletic activities.
	<b>Interpersonal:</b> Ability to understand other people	Very social, likes to be with others, and enjoys group activities. Is caring and helpful to others.
	<b>Intrapersonal:</b> Understanding and knowing one's emotional strengths and weaknesses	Is independent, content to play and work alone, and self-directed.
	<b>Naturalistic:</b> Sometimes called nature intelligence	Enjoys being outdoors and has a strong interest in exploring nature, soil, plants, and insects.

Gardner's theory has been very appealing to educators, parents, and others. Many workshops have been developed to promote the concept and application of multiple intelligences theory. However, there has been very little research to validate the theory, and existing studies do not support the full array of proposed intelligences (e.g., Visser, Ashton, and Vernon, 2006; Waterhouse, 2006).

Certainly every individual has areas of interest as well as relative strengths and weaknesses. However, best practices should always be based on good quality research evidence. So what can we say about the idea that there are many ways to be smart?

We know that every child is a unique individual with potential for interests and talents in many different areas. Even if we do not call these areas intelligences, we know that diverse types of activities and experiences build brain connections and enable children to figure out what interests and excites them. For example, we cannot know whether children will have a talent or interest in music, art, athletics, or science if they have no exposure to these areas. Early childhood is a time to foster curiosity, openness to new experiences, and support for emerging signs of interest and ability.

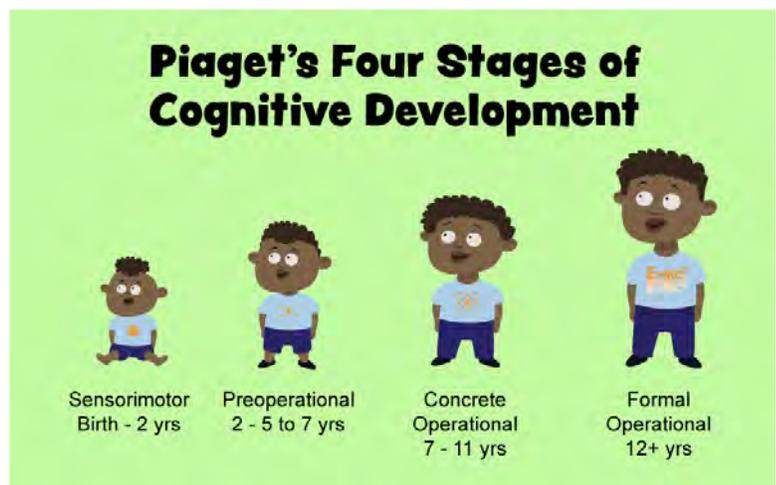
A well-rounded early childhood program will provide a variety of ways for children to learn about the world and engage in hands-on exploration. It is not necessary or recommended to place young children into highly structured programs that focus on one area of promising talent. Teachers and parents should let children lead the way and explore many options. They should also be careful not to promote stereotypes when responding to children's interests. For example, both girls and boys can be good at science and math. Both boys and girls can have talent in dance, art, and music. Likewise, racial and ethnic backgrounds should not be used to stereotype children's interests or talents. While these examples may seem more relevant for preschoolers and older children, adults may begin to convey expectations to children

or treat them differently, either consciously or unconsciously, as early as infancy and toddlerhood (e.g., Profit et al., 2017; Reby, Levrero, Gustafsson, and Mathevon, 2016; Stern and Karraker, 1989). Teachers should focus on appreciating and nurturing each child's individuality while providing opportunities for all children to develop their skills and interests in many areas.

## JEAN PIAGET

The work of Swiss psychologist Jean Piaget has been a primary influence on preschool programs since the 1970s. Piaget (1896–1980) believed that an understanding of how children think would lead to an understanding of how children learn and construct their knowledge of the world. He believed that children modify and expand their understanding as they interact, explore, discover, and play. Play allows time for children to form an understanding of the world and advance from one stage of cognitive development to the next (Kail, 2002).

Based on his study and observations, he proposed four stages of cognitive development, starting at birth and continuing to age 12 and beyond. The four stages are briefly described in the following table.



<b>Birth to age 2 years</b>	Sensorimotor stage	Growth in thinking skills as the infant uses his five senses and his movements to learn about the environment.
<b>2 years to 5-7 years (approximately)</b>	Preoperational stage	Increased use of symbols and ability to pretend; experiences begin to be organized into meaningful categories; “centration” (inability to focus on more than one aspect of a situation at a time, and lack of understanding that properties of items remain the same even when viewed from a different perspective or put into a different container).
<b>7 to 11 years</b>	Concrete operational stage	Development of logical thought concerning concrete specific things; beginning use of reason with math problems; ability to take another person’s perspective; understanding that properties of items remain the same even when viewed from a different perspective or put into a different container.
<b>12 years and older</b>	Formal operational stage	Ability to think abstractly; use of trial and error and logic to solve problems; development of scientific reasoning skills.



According to Piaget, the first stage of cognitive development is the sensorimotor stage. Infants are born with reflexive actions that allow them to interact physically with objects. As they grow and develop, babies learn about the world through their senses and movement of their bodies. It is normal for infants to want to put everything in their mouths to learn about taste and texture. Environments for infants must provide opportunities to move and to manipulate, along with access to a variety of different materials.

During the first two years, young children show increasing interest in the world, especially when they become mobile. Caregivers will notice changes in the way toddlers think by observing the way they play, move, problem solve, and explore. Toddlers have a powerful desire to find new ways to learn more about their environment, and they may show their readiness for more challenging learning by looking for new activities or becoming bored with toys they have already mastered.

At about age two years, toddlers move to the preoperational stage. At this stage children begin to use more images and symbols, for example, understanding that words or pictures stand for real objects, and using an object to represent another (such as putting a bowl on one’s head to be a hat, or holding a block to one’s ear as a phone). This ability to use symbols leads toddlers to start engaging in pretend play. Toddlers and preschoolers continue to be egocentric (focused on self) and believe that they make things happen. They often expect to have a desired toy or food as soon as they want it, and they have difficulty understanding that others have needs too. Preschoolers may think that their angry thoughts made something bad happen.

There are several hallmarks of Piaget’s theory that are important for teachers of infants and toddlers to understand:

- One of the milestones of cognitive development in the first year is object permanence, or the knowledge that things do not cease to exist when they are no longer visible. Very young infants will not look for a toy when it disappears. Older infants will start to play peek-a-boo and hide-and-seek, enjoying these games because they understand that the person is still there even when he or she is hidden. Older infants may be upset when their special teacher is absent or leaves for a lunch break. They remember and miss people to whom they are attached.
- Older infants and toddlers develop a great interest in experimenting with objects. They want to make things happen, which sometimes means dropping food on the floor over and over again or playing with an action toy that responds when squeezed.



- Toddlers often have a desire to find new challenging ways to learn. They may become bored with toys they have mastered; for example, if a toddler has mastered a simple inset puzzle, teachers can consider offering more difficult puzzles or other new manipulatives or toys.



- Egocentric behavior is typical for toddlers, and it's completely normal. They view the world through the perspective of their needs and wants. When working with toddlers, teachers can help them by gently guiding social behavior, setting up an environment with places for them to play alone and together, having multiples of favorite toys, and continually modeling prosocial behaviors.

- Preoperational thinkers (older toddlers and preschoolers) focus their attention on one aspect of a situation at a time. This is called centration. They cannot see the whole picture or the perspective of another child very well. The ability to decentrate—to focus on details while keeping the whole in mind—will come later and is necessary before children can learn to read or begin math. Decentration does start to develop gradually, and you may see young children begin to show concern for others, for example, by patting a friend who is sad or bringing a bottle to a crying baby.

- Concreteness is a characteristic of preoperational thought. Young children can understand real objects, situations, and experiences, but they have trouble with things beyond their personal knowledge and with nonliteral language. They may misunderstand statements such as, “She has a green thumb,” “Your eyes were bigger than your stomach,” or “He needs to chill out.” A child may rote count from one to ten but be unable to count five snack items. Children need clear explanations and many concrete experiences with real objects and actions before they can understand abstract concepts such as numbers, categories, and descriptive words like sticky, smooth, or hot.



# Part 3



THE WORKSHOP:

# Instructional Strategies

## 10 Scaffolding Children's Learning by Simplifying

Children are able to learn best when tasks are challenging, but not so hard that the child feels overwhelmed or lost. This “just right” level is called the zone of proximal development. When an activity is too hard for a child, or the child is confused and needs help, teachers can scaffold the child’s learning by simplifying the task. Scaffolding means providing the “just right” amount of help to make it possible for the child to get to the next level of skill. Simplifying tasks can be done in many different ways, such as:

- Breaking down a task into simpler steps and drawing the child’s attention to each step (e.g., “Look, first I turn on the water, and then I squeeze out the soap.”)
- Demonstrating the task and prompting the child to imitate you
- Starting the task for the child and then prompting the child to finish it
- Using a hand-over-hand process (gently helping the child do the activity with the teacher’s hands guiding his hands)
- Offering fewer choices in a multiple-choice task (e.g., fewer cards in a matching game)
- Giving clues to help children remember or guess an answer to a question
- Offering a simpler version of a toy (e.g., an easier puzzle, larger beads to string)



### Tips

- Scaffolding by simplifying is a great way to encourage persistence in children and to help them maintain attention, two other strategies for building cognitive skills that we cover in this online course series. Adjusting your approach to make an activity a bit easier for the child keeps them engaged in the activity (maintaining attention) and more interested in practicing the skill (persistence).
- You don’t have to wait until babies are already actively playing with toys. Some babies show interest in toys before they understand how to play with them. Watch for these signals and begin scaffolding simply by demonstrating first how to use it!

## Rate Yourself!

How comfortable do you feel scaffolding children's learning by simplifying?

Not at all comfortable    Somewhat comfortable    Very comfortable

1     2     3     4     5     6

### Stop and Reflect: Scaffold Children's Learning by Simplifying

How do the children in your class signal that an activity is too hard? Name two simplifying strategies you can use when a child signals that an activity is too hard.

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# 11 Scaffold Children's Learning by Adding Challenge

Just as teachers sometimes need to simplify tasks, sometimes they will need to make an activity more challenging to match a child's level. This can be done in many ways, such as:

- Giving two-step directions to children who need a challenge and can start to handle two-step processes or directions (e.g., "Can you push your train fast and then slow?"; "Bring me your coat and your shoes.")
- Encouraging the child to do a harder version of the task (e.g., "You are good at making squiggly lines! Now let's try to make a circle, like this!"; if a child can complete a three-piece puzzle, offering her a five-piece puzzle.)
- Offering more choices in multiple-choice games (e.g., more cards or pairs of objects in a matching game)
- Suggesting a new challenge within play (e.g., if a child is stacking blocks, the teacher might challenge him to build a tower as tall as his friend, a castle, or a garage for toy cars)



### Tips

- When a child is able to successfully answer a question, you can follow up with slightly more difficult questions to help expand the child's thinking about a concept or help the child learn other related skills.
- When adding challenge, it's important to consider the child's zone of proximal development. This means the challenge is a little bit hard for the child, but not so hard that the child is overwhelmed. Finding the right level of challenge takes careful observation to see what the child can already do, and then encouraging them to try something just a little bit harder.

## Rate Yourself!

How comfortable do you feel scaffolding children's learning by adding challenge?

Not at all comfortable    Somewhat comfortable    Very comfortable

1     2     3     4     5     6

### Stop and Reflect: Scaffold Children's Learning by Adding Challenge

How do the children in your class signal that an activity is too easy? Name two strategies you can use to add challenge when a child signals that an activity is too hard

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## 12 Promote Flexibility in Thinking

Flexible thinking, or thinking about a problem in a new way, takes lots of practice. Teachers can help build a foundation for this skill by providing opportunities for flexible thinking in their classrooms. With babies, this often means providing gentle surprises or something out of the ordinary. For example, if a child is exploring the idea that things typically fall when they are dropped or thrown, bringing in bubbles can promote a new way of thinking (“some things rise or float”). Other examples include lap games, such as giddy-up horsey where the “horse” suddenly dips (you drop your leg). These small surprises should be fun and not scary for children, as they learn to adapt to small things that are unexpected.

Activities that require memory or problem solving, such as hide-and-find games and puzzles, also promote flexible thinking, as children must try different locations or change their strategy if their first attempt is not correct. Open-ended toys, such as blocks and construction materials, allow children to imagine many different ways to build or connect objects, and teachers can model using materials in varied ways. For example, a bag can be used to hold things or it can be used as a hat. Teachers should encourage children to experiment and try to figure things out. Older toddlers can be encouraged to make guesses and think of solutions to problems. For example, teachers can ask questions that may have many right answers, such as “Can you think of an animal that has a tail?” or “Can you think of something that flies in the sky?”

Teachers can also support flexibility in toddlers by explaining why their schedule is changing (e.g., a special event, a holiday, rainy weather) and giving children reminders ahead of time. This kind of support helps them adapt to new experiences and build coping skills.



## Tips

- Did you know that babies' brains are uniquely receptive to multiple languages? Children who are hearing and learning more than one language are practicing cognitive flexibility as they learn naturally to switch between the different languages.
- Transitions between activities can be challenging for young children, but they are a great opportunity to promote flexibility in thinking. Take time to provide children with advance notice about upcoming transitions and allow them to participate in the process, for example by helping you "count down" to the transition, or making a choice about which toys to clean up first.

## Rate Yourself!

How comfortable do you feel promoting flexibility in thinking?

Not at all comfortable    Somewhat comfortable    Very comfortable

1     2     3     4     5     6

## Stop and Reflect: Promote Flexibility in Thinking

Transitions between activities, or changes in the usual daily schedule, can be difficult for young children. What is something you learned from this course that you can use to help children build flexibility and cope with changes and transitions?

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# 13

## Model Problem Solving Aloud

One of the most important cognitive skills is the ability to think through a problem before responding and then reflect on whether the choice or solution worked. Although babies and toddlers are not ready to do this yet, they can start learning about this approach by watching the teacher. Teachers who talk as they think through a problem (e.g., "Hmm, what can we do?"), how to make a plan (e.g., "Let's try \_\_\_"), and how to revisit the outcome ("How did our plan work?") give children a model for this process that they can begin to imitate as they move into the preschool years.

One way teachers can model thinking aloud is to narrate common daily problems, for example, "I want to open this container. Hmmm, let me see... should I pop it open? Or do I need to turn the lid? Let me try turning the lid and see how this works."

The teacher can then reflect on how the plan worked. For example, “This lid was screwed on really tight, so I had to turn it really hard to get it to open.” This offers reflection both for the teacher and the child. When teachers model thinking out loud in this way, it teaches children both the language and the steps of problem solving. It also often provides teachers an opportunity to slow down the pace of a task to decrease a child’s frustration. The child can “borrow” the teacher’s calm mentality and work through a problem more successfully.



### Tips

- When caring for infants, one of the most natural ways we can model problem solving aloud is when we narrate our observations of infants’ signals and how we will respond to those signals (for example, “I see you’re uncomfortable, let’s go check your diaper and see if it needs changing. Changing your diaper might make you more comfortable.”)
- Transition time is another opportunity for teachers to model problem solving. Perhaps the “problem” is putting away toys, getting hands clean for meal-time, or getting ready to go outside. Use language that gets them thinking about “how can we go from this thing to the next?” This engages children in the transition and models problem solving.

### Rate Yourself!

*How comfortable do you feel modeling problem solving aloud?*

Not at all comfortable    Somewhat comfortable    Very comfortable

1     2     3     4     5     6

### Stop and Reflect: Model Problem Solving Aloud

How often do you narrate or say aloud the steps you take to solve a problem? Can you give an example of a time you think you did this well?

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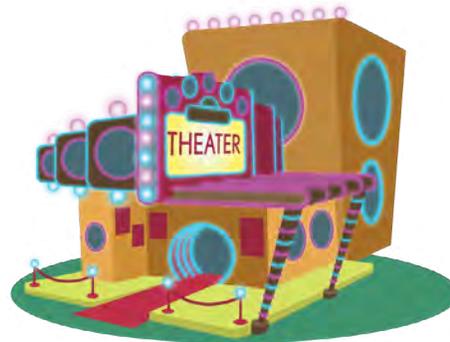
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THE THEATER:

# Hear from the Experts



The theater in the *Learn with Me* course contains interviews with experts on a wide variety of topics related to infant and toddler cognitive development. The key concepts presented in these videos are summarized below.

WATCH  
FILM

## What is scaffolding and how can it be used to help infants and toddlers learn as they play?

Scaffolding is the support that teachers give children when they are attempting to accomplish a task. As children become more efficient at doing the task, teachers gradually remove that support so that the children are doing things on their own. For example, as toddlers first learn to build with connecting blocks, a teacher may take a few of these blocks and snap them together, showing the children how to secure them. As children start snapping the blocks together themselves, the teacher stops and watches to see if more support is still needed.

WATCH  
FILM

## How can teachers tell if a task is too easy?

When children can perform a task with little or no effort, the task is too easy. However, if the child becomes frustrated, then the task is too challenging. Finding the right balance of “just right” activities can be difficult for teachers. When children can complete tasks automatically and quickly, think about adding a little challenge. For example, when infants can put the rings on the holder, add a little challenge by having them stack the rings from biggest to smallest. When toddlers line blocks up along the floor, encourage them to stack the blocks. By adding new and challenging tasks to activities and toys, you are also encouraging children to use their imagination and sustain their attention.

WATCH  
FILM

## Can caregivers make kids “smarter” through early experiences?

Intelligence is malleable, which means we can improve or enrich brain development by providing developmentally appropriate activities. Setting up an environment rich in materials and toys that excite and encourage children to experiment and explore will support their learning. This will encourage young children to ask fundamental questions about the world around them, such as “Why do things fall down?” or “Why do things go fast?” Teachers can have conversations with children to discuss their own theories and model ways to figure out the answers to these questions. Teachers can ask questions like “How do you think we can find out?” or “What do you think will happen?” In addition, teachers can support children’s curiosity and broaden their interests by providing activities that encourage children to question and investigate rather than having them memorize “smart sounding” answers. Above all, accept that children have different temperaments and needs, and the teacher’s job is to offer support and reassurance.

WATCH  
FILM

## When and how should you praise young children?

Praise children by using specific language tailored to what they are doing, particularly during times when children might be struggling to complete a task. This makes it more likely that children will persist when a task is challenging and experiment with other ways to solve a problem. For example, when a child has struggled to stack building bricks, teachers should say while demonstrating, “Wow! You put a lot of time and effort into building with the blocks. Let’s see if I can show you how to stack these so that they don’t fall.” Teachers can also encourage and praise cooperation in children, such as when dressing (e.g., putting on socks and shoes) or doing chores (e.g., cleaning up toys).

WATCH  
FILM

## Can technology be used to support early cognitive and STEM skills?

There is some research evidence that focused, well-designed games and activities that use technology can support children’s early STEM skills. However, teachers should be careful when choosing technology-based activities, as many are developmentally inappropriate for infants and toddlers. Remember that we don’t want young children on screens for too long. Teachers should select focused activities that help children practice developmentally appropriate skills for short periods of time.

WATCH  
FILM

## Is technology distracting for infants and toddlers?

Children watch what we do, and young children understand when we are watching a screen and not paying attention to them. When we focus on screens and not the children in our care, we miss opportunities to build relationships with children and support their early development. Screens in the environment are deeply distracting even if you are not focused on them—a child’s attention is often diverted from interactions and activities when a screen is on. Hide screens from children unless you have some type of planned activity connected to watching the screen.

WATCH  
FILM

## What is object permanence and what does it tell us about babies’ memory?

Object permanence is a child’s understanding that an object still exists even when he can no longer see it. This skill typically develops when a child is between 9 and 12 months of age. When babies have attained object permanence, they will keep searching for objects that are hidden. One way to see if babies have attained object permanence is to show an object to the baby and then place a scarf or blanket over the object. Watch to see if the baby still reaches for the object. Young babies will not reach for it and will lose interest quickly, while older babies will search for the object that is hidden. To promote early memory, between 4 and 8 months, show an object to a baby, then show a little part of the object hiding under the blanket. The baby will remember and reach for the object. This is the early stage of remembering.

WATCH  
FILM

## When do young children begin to understand and use technology?

Young children begin to notice and pay attention to screens, such as iPads and TV, within the first year of life. However, viewing videos is not helpful for babies under 18 months, and especially within the first 12 months, because media on a screen often moves faster than real life, and can therefore be overstimulating and not good for promoting attention skills. Many skills, particularly interpersonal social skills, don’t transfer from screens to real life; infants and toddlers need interactions with real people to form relationships and develop social skills.

Toddlers may benefit from limited (up to 30 minutes) viewing of high-quality media. Look for programs that have been evaluated by research and endorsed as appropriate for young children. Be careful of media that is very fast-paced and overstimulating, as too much exposure to these kinds of shows or games may negatively impact children's learning and attention skills. Make sure to balance screen time with opportunities for physical activity and social interactive play.



## THE LIBRARY

# Cognitive Outcomes

The library provides resources for you to dive deeper in your learning about early childhood development concepts. In Part 3 of the Learn with Me course, the library gives us a look at the long-term academic and social outcomes of early cognitive experiences.

## UNDERSTANDING COGNITIVE SKILLS FROM INFANCY TO ADULTHOOD

Cognitive skills refer to how people use their brains to see, think, and gain understanding about the world around them.

In this section, we'll look at how early cognitive skills lay a foundation for later academic and life success. Specifically, we'll look at what research tells us about **early memory, attention, executive function, and self-regulation**.

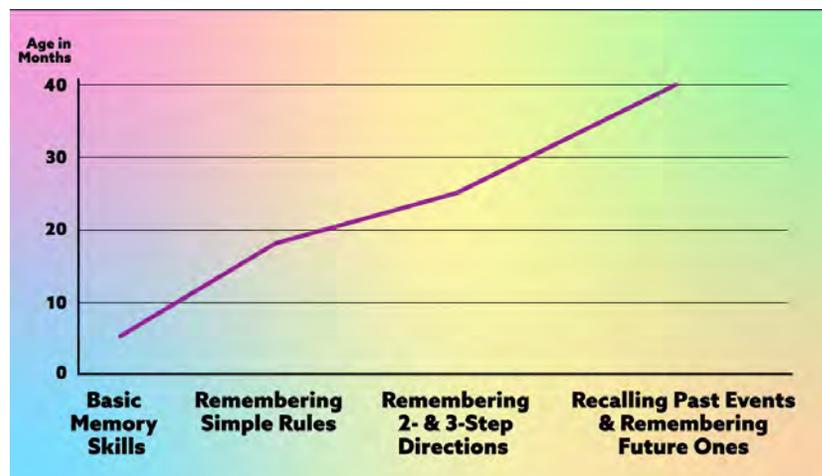
Just as babies have to crawl before they can walk and walk before they can run, they develop cognitive skills in infancy and toddlerhood that provide the building blocks for later, more difficult skills. Sometimes we think of skills like math or problem solving as skills for older children. But cognitive development starts in utero, for example, with the baby's ability to perceive their mother's voice! As infants' **vision, hearing, and motor coordination** continue to develop, they begin exploring what the world looks like and how it feels, sounds, tastes, and smells. They learn to focus and shift their attention and observe what others are doing.

These early perceptual and cognitive skills prepare them for the toddler period, when children begin to use their sensory experiences for more complex skills such as **comparing, sorting, and classifying** different objects. Put another way, basic cognitive skills give children a good foundation for learning more complex thinking skills.

One of the key cognitive milestones children reach is **object permanence**, an understanding that when a person or object is hidden, it continues to exist. This is why games like “peek-a-boo” are so valuable—they allow babies to playfully gain an understanding of object permanence and to practice using basic memory skills to remember where an object, toy, or person is hidden.

These **basic memory skills** set the stage for children to start to remember simple rules when they are toddlers, like “Use soft touches with your friends.” Later in preschool they will learn more difficult **two- and three-step rules or directions**.

As a child grows, memory development also makes it possible to track information in time, for example, **recalling past events or planning for events** that have not yet happened. In other words, children learn that an event can exist in the future, even if you cannot see it yet! Basic thinking skills such



as remembering and paying attention are also building blocks for academic skills such as math and science. For example, early skills, such as **paying attention to an object's shape**, come before later skills, such as **comparing different shapes**.

Moreover, children who are exposed to mathematics and science concepts early are more likely to be on track in these subjects once they reach 4th grade.

Because **complex skills build on simple skills**, it is not surprising that many of the outcomes we want children to achieve rely on mastering two early cognitive skills: **executive function** and **self-regulation**.



Executive function includes children's ability to pay attention to and remember information even when there is a delay or distraction. Self-regulation is children's ability to manage their thoughts and behaviors. Self-regulation develops gradually over the first three years of life and takes many more years to mature. Both executive function and self-regulation skills help children grow in academic skills by enabling them to **focus, maintain their attention**, and **remember academic concepts**.

Research has shown that higher levels of executive function and self-regulation in preschool *help children develop* better language, literacy and math skills, helping children become more ready for kindergarten. This is like giving children an early boost to help them on the road to school success! But children who start preschool with lower executive function and self-regulation—and who make few gains in these skills during preschool—start kindergarten **at risk for delays** in their language, literacy, and math development.

They also struggle to adjust to formal school and are more likely to be held back a grade. Because complex skills build on simple skills, young children who struggle with basic cognitive skills tend to struggle in the early school environment.

They may have a hard time paying attention or following directions. It can be much harder for them to keep up and make gains in academic skills, and these challenges often lead a child to not like school as much. If children continue to fall behind, struggle, and feel that school is not a fun place, they may also struggle later with finishing high school and college.

On the other hand, studies have shown that children with higher executive function skills are more likely to graduate from college on time. Children who develop cognitive self-regulation skills are less likely to commit crimes or use illegal drugs and they are more likely to have strong careers and higher incomes.

## SUPPORTING POSITIVE COGNITIVE OUTCOMES

Caregivers may wonder about cognitive skills: can they grow, or are some children just “smarter” than others?

While it is true that cognitive skills are strongly influenced by genes, recent research suggests that children's unique experiences play a role in how genes are translated into children's behavior. This can result in different outcomes for the child based on what environment he or she has they have been a part of.

Early cognitive stimulation by caregivers creates greater potential for children to change and grow in cognitive skill. In fact, recent studies have shown that many young children who showed some weaknesses in cognitive skills were able to strengthen those skills when caregivers provided developmentally appropriate support and stimulation. Importantly, this ability to shift from weaker to stronger skills seems to be most achievable during the early years *and* when the child has access to high quality school environments.

When we consider the role that early cognitive skills play in positive developmental outcomes, it's no wonder we're eager

to promote these skills in young children. So how can we best help babies and toddlers along this path?

Cognitive research has shown that some of the most important aspects of supporting cognitive skill development include:

- **Having an enriched environment that promotes active exploration.**

Research shows that babies who are more able to actively explore their environment (and thus use both their bodies and minds to connect to their world) have higher levels of academic achievement in school than their peers who were not as able to actively explore. We can offer babies and toddlers a variety of age-appropriate toys, safe household objects, and natural materials that promote sensory exploration and perception. Babies and toddlers also need a caregiver who encourages them to try new things and guides them toward increasing levels of independent exploration. For toddlers, the availability of puzzles; construction toys; measuring, matching, and sorting toys; and other materials provides multiple opportunities for exploration. After receiving some adult guidance with new materials, children need plenty of time to try things for themselves and practice problem-solving. This gradual independence facilitates growth in skills.

- **Supporting cognitive skills through warm interactions.**

Children who are isolated from loving and responsive adult caregivers who model and reinforce cognitive skills often fall behind in their development. On the other hand, children who receive warm and responsive early care tend to demonstrate more advanced cognitive skills once they reach preschool and make greater gains in cognitive skills, even if they were originally at risk.

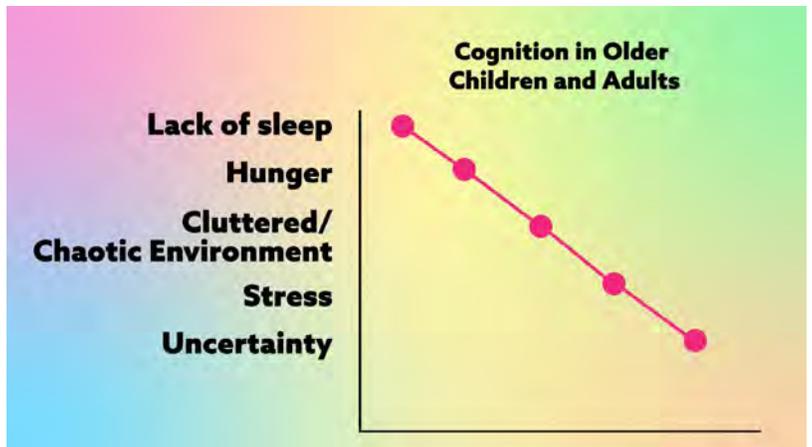
- **Reducing overstimulation.**

Even though research supports enriched environments, research also suggests that teachers and caregivers need to be aware of children's cognitive, physical, and emotional limits. If children have too many objects or noises competing for their attention, they often struggle to stay engaged with cognitive tasks and become frustrated. This is because their developing attention and memory systems become overloaded.

This also happens when a child feels tired, hungry, frustrated, fearful, or uncertain.

Studies of cognition in older children and adults demonstrate that lack of sleep, hunger, cluttered and chaotic environments, and feelings of stress and uncertainty drastically reduce cognitive skills in that moment.

Likewise, babies in loud or busy environments, and toddlers who do not get naps when they need them, also show decreases in cognition. When these conditions persist over time, they limit children's ability to rapidly develop cognitive skills. This means teachers and caregivers must work hard to provide the right level of stimulation for the children in their care.



Learning the instructional and caregiving strategies across all three parts of this course series will give you the tools you need to support the development of children's early cognitive skills!

# Toys and Materials that Support Cognitive Development

There are many types of toys that can help promote early cognitive development. This list provides some examples of common classroom toys and how to use them to support children's flexible thinking, experimentation, imitation, and problem-solving, which are important aspects of cognitive development.

## Building and Construction Toys

Building and construction toys, such as blocks and sets of connecting pieces, promote cognitive development. They are considered "open-ended" toys, which means that children can use the toys to create structures or designs in many different ways. To figure out how to make something stand on its own or how to stack the pieces in just the way they want to, children must pay attention to how the materials fit together, use impulse control to avoid knocking over their construction, and engage in flexible thinking as they move pieces around in different ways. These kinds of toys also allow children to create something different each time they play with them, which helps them to think flexibly.

### Infants:

- Blocks
- Stacking tower
- Nesting cups

### Toddlers:

- Block sets (wooden, cardboard, foam)
- Connecting block sets (interlocking building bricks, bristle blocks)
- Magnetic building sets
- Stacking tower
- Nesting cups
- Linking toys



## Pretend Play Toys

Pretend play toys support cognitive development in many ways. They allow children to make choices about what roles to take on, what situations to act out, and how to interact with props, costumes, or toy figures. Pretend play can stimulate children's memory for events and activities in their homes or communities, as children sometimes re-enact these events and activities. Pretending also allows them to practice sequencing, as they string together actions to act out a story or play idea.

### Infants:

**Puppets:** Puppets can be used to encourage observation (e.g., "The zebra puppet is black and white and has stripes. Hmmm, let's see if any other puppets have stripes?") and sensory exploration (e.g., "This puppet is an elephant. Does he feel soft? He has big ears.") which are both aspects of cognitive development.

The teacher can animate the puppet and use it during play to demonstrate skills that babies are not ready to do themselves yet, such as counting objects. The puppet can also be used to encourage the baby to imitate sounds or actions.

**Baby dolls and stuffed animals:** Teachers can use baby dolls or stuffed animals to model pretend behaviors such as hugging, feeding, comforting, and putting to sleep, as well as encourage older infants to start to imitate these behaviors.

**Toy vehicles:** Teachers can demonstrate how to push and “drive” toy cars or trucks, make motor sounds (e.g., “Vroom!” “Beep-beep!”), and encourage older infants to imitate.

## Toddlers:

**Pretend doctor kits:** Doctor kits are often popular with toddlers. Nearly all children have been to the doctor’s office many times and are familiar with common medical exam routines. Pretending to be the doctor encourages toddlers to remember and act out the sequence of events that happen in this setting. Teachers can help children understand what each item in the doctor kit is called, and what it is used for. Teachers can encourage and scaffold pretend play about checking different parts of the body with the appropriate kit item, deciding whether the patient is healthy or sick, and choosing what treatment is needed (Medicine? Bandaid? Rest? A shot?). Incorporate toy animals to pretend to be a vet.

**Pretend food/kitchens:** Pretend kitchens offer wonderful opportunities for children to engage with math and science concepts such as counting utensils, cups, and plates, pretending to measure ingredients, stirring/mixing/pouring, and talking about concepts such as hot and cold (ovens, stoves, refrigerators, water in sinks). Preparing a meal also follows a sequence, such as setting the table, cooking and serving the food, and washing dishes and putting them away. Finally, pretend cooking allows children to be flexible in their thinking—they can choose to make a broccoli cake or apple soup!

**Baby dolls:** Playing with baby dolls offers many opportunities to talk about sequence (e.g., “First we need to undress the baby before we wash him.”), encourage imitation (e.g., “How do mommies/daddies help babies go to sleep?”), and encourage persistence and creative thinking (e.g., “The baby is still crying. What shall we try next to help baby feel better?”).



**Hats and dress-up clothes:** Dress-up clothes and props enhance pretend play and can lead to conversations about what jobs people do and how they do them. Talking with children as they pretend to be a firefighter, a construction worker, a dancer, or a chef invites children to recall and share what they know about these roles. Teachers can then teach new vocabulary words and provide more information during these pretend play activities.



## Puzzles and Open-Ended Fine Motor Toys

Puzzles and other fine motor toys help children explore many cognitive concepts. Children have to observe each puzzle piece and then fit it into the correct spot. They have to maintain their attention to the task as they turn the pieces to fit. Shape puzzles and shape sorters can help children explore math concepts such as geometric shapes and sizes. They can also be an excellent opportunity for teachers to model thinking out loud (e.g., “Let’s see, I am going to start with this piece because I know exactly where it goes. Oh no! It doesn’t fit. I will try turning it, let’s see if that will help…”). Lacing beads and pegboards can be used to point out patterns, such as alternating colors of the beads or pegs, as well as talking about math concepts such as longer/shorter and taller/shorter.

**Infants:**

- Rattles
- Busy gears
- Baby activity centers
- Pop-up boxes

**Toddlers:**

- Puzzles
- Shape sorters
- Matching games
- Lacing beads
- Peg boards
- Toddler-safe magnets

**Cause and Effect Toys**

Cause and effect toys—toys on which the child pushes buttons, slides a slider, or turns a handle to make something happen—help children learn about cause and effect, and they promote the development of children’s motor skills. Look for toys where the effect of each action is relatively brief (e.g., a noise or a short musical tune) and not overstimulating (e.g., low intensity lights and sounds).

**Infants:**

- Busy gears
- Baby activity centers
- Pop-up boxes

**Toddlers:**

- Magnetic maze
- Musical instruments
- Ball drop toys

**Sensory Exploration Toys and Materials**

Sensory play is part of the foundation for cognitive development. Children need opportunities to explore different textures and substances with their hands in safe, supervised ways. This can be as simple as putting sand or rice into a plastic tub for toddlers to play with, or blowing bubbles for infants. Here are some more ideas:

**Infants:**

- Bubbles
- Touch-and-feel books
- Finger painting (try with whipped cream or pudding)
- Water play (with sponges, bath toys, plastic cups, and funnels)



## Toddlers:

- Water play (with water-safe toys, water wheels, ice cubes, food coloring, or dish soap for bubbles to create added interest)
- Bubble wrap
- Finger paint (try with shaving cream or pudding)
- Play dough
- Cornstarch and water
- Sensory tables or bins: These can be filled with many kinds of materials for children to explore besides water, including grains (rice, corn kernels, oats), sand, soil or mulch, pine cones and pine needles, leaves, shaving cream, and other items. Children can fill and dump materials using cups, bury and uncover objects, and play with funnels.



## Household Items and Natural Materials

Everyday objects that are normally found in the home and classroom, and natural objects found outside, can be used to help children make sense of their world by examining, categorizing, and discovering.

### Infants and Toddlers:

- **Household kitchen materials:** Big wooden and plastic spoons provide opportunities for infants to explore by grasping, mouthing, and banging. Plastic storage containers, pans, and plastic cups can be used for pretend play, to make a drum, or as building materials to stack and nest. Toddlers can learn how to put lids on and take them off, and teachers can compare their shapes and sizes. Muffin tins can be used to sort and count objects in each compartment. They can also be used for pretend cooking, along with other kitchen items.
- **Teacher-made sensory bottles:** Fill clean, empty water bottles with various materials, and then seal. Use dry materials, such as small beads, rice, or beans, to make a shaker. Use liquids, such as water and oil with glitter or small beads, to make a visual sensory toy. Teachers can narrate children's actions with the bottles and compare and contrast their features (e.g., loud or quiet; different colors; fast and slow movements)
- **Sensory floor:** Tape down different textured materials for babies to crawl on, such as sandpaper, bubble wrap, soft cloth, and sticky paper. Teachers can then describe these textures and experiences to babies as they explore them.
- **Paper towel rolls:** There are many ways to use these! They can be used in pretend play as binoculars or telescopes, drumsticks, swords, or microphones. They can also be taped together to make a tunnel for a small ball or pom-pom to travel through.
- **Cardboard boxes:** A big box can be used to climb in and out of, and to pretend it is a house, a cave, or a spaceship. It can be used for a game of peek-a-boo. Attaching several boxes together can create a maze or tunnel for children to crawl through. Smaller boxes can be used to build or stack and knock down.
- **Grass, plants, and trees:** Take babies outdoors and let them touch and gently explore these natural objects. Encourage toddlers to feel the leaves and petals, and then smell the flower and talk about its scent.



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