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## What is Executive Functioning?

It is a neuroscience term that refers to a person's ability to organize thoughts, plan behaviors, say no to impulses, and manage between what he/she is feeling and what he/she does.

Source: [www.pearson.com](http://www.pearson.com). The Executive Function Skills Every Kid Needs, Elizabeth Fry Larsen



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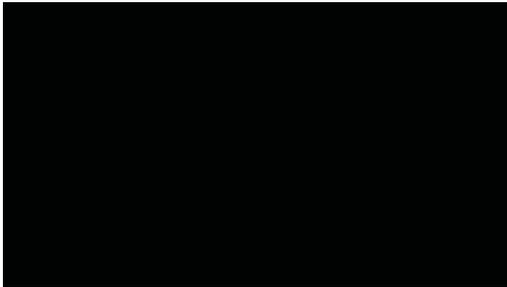
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***“If the brain is a symphony,  
then executive function is the conductor.”***

—Thomas E. Brown, Ph.D., professor of psychiatry at the Yale University School of Medicine



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### Executive Functioning Skills in Children with Hearing Loss: Highlighted Research

- Figueras, B., Edwards, L., & Langdon, D. (2008) found a correlation between language ability and Executive Functioning skills in deaf children with and without cochlear implants. The author concluded that “deaf children’s deficits in EF are not a consequence of deafness, but are linked to delayed language acquisition.”
- Working memory and inhibitory control have been shown by some to be poorer in children who are deaf and hard of hearing. (Beer, et al, 2012).
- Pisoni, Kronenberger, Roman and Geers (2011) found that high school students with cochlear implants’ spoken language outcomes could be correlated with working memory and verbal rehearsal speed in elementary school.

Source: “Executive Function in Children With Hearing Loss | Seattle Children’s Hospital”. Seattlechildrens.org. N.p., 2016. Web. 31 Mar. 2016.

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## Working Memory

The ability to hold information in mind and use it.

Source: "Enhancing and Practicing Executive Function Skills With Children From Infancy to Adolescence" Center on the Developing Child at Harvard University.



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## Working Memory

The ability to:

- Reorganize thoughts to accommodate new information
  - Follow complex and multi-step directions
- Apply previously learned information to new situations

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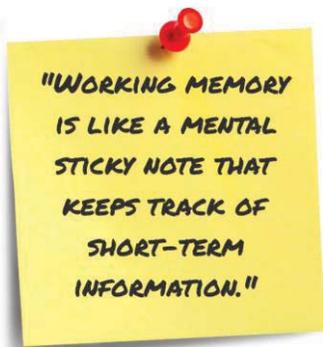
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## Two Types of Working Memory

- Auditory Memory-the ability to hold on to information you **hear** long enough to use it.
- Visual Spatial Memory-the ability to use your “**mind’s eye**” to hold onto **visual** information long enough to use it. It’s like a camera in your brain.

Source: [WWW.LANDRISTODOO.COM](http://WWW.LANDRISTODOO.COM) © Terms To Know If Your Child Struggles With Executive Functioning Issues, Amanda Morin

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## Auditory Memory



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## Visual Spatial Memory



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## What does Working Memory look like?

- A young child can recall 1-2 step directions to remember what to do during a board game when it is their turn
  - A kindergartner can name rhyming words for a given word
- A child can pick out important pieces of information in directions (critical elements)
- A child can listen to a story and then answers questions about the story.
- A student can read an assigned passage and then listen and retain the additional instructions the teacher just gave to the class

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## Signs of Executive Functioning Delays in Working Memory

- Unable to remember rules to a game
- Difficulty remembering steps of a task
  - Information just “doesn’t stick”

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## Self Control



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## Self Control

The ability to master thoughts and impulses so as to resist temptations, distractions, and habits, and to pause and think before acting.

Source: "Enhancing and Practicing Executive Function Skills With Children From Infancy to Adolescence" Center on the Developing Child at Harvard University.

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## Self Control

The ability to:

**-Delay gratification**

**-Resist and not act on impulse**

**-Self-regulate physical, emotional, and verbal responses**

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## What does self control look like?

- A young child can state their emotions, take deep breaths when upset, and take turns during a game.
- Putting toys away upon request.
- Plays cooperatively in a group of 2-3.
- A kindergartner can self monitor for speech and language errors.
- An older child can make the decision not to go to the movies with their friends because they have a school assignment that needs to be completed.

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## Sign of Executive Functioning Delays in Self-Control

- Impulsivity
- Remorse after breaking rules, but continues the behavior
- Difficulty following directions or completing a task when worried or upset

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## Mental Flexibility



www.walrus.com - EOPBSE

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## Mental Flexibility

The capacity to switch gears and adjust to changing demands, priorities, or perspectives.

Source: "Enhancing and Practicing Executive Function Skills With Children From Infancy to Adolescence" Center on the Developing Child at Harvard University.

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## Mental Flexibility

The ability to:

- Switch gears and look at things differently.
- To “unlearn” old ways of doing things.
- To see things from another person’s perspective.

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## What does Mental Flexibility look like?

- Younger children can wait their turn, even when extra people unexpectedly join the game.
- Children can deal with changes to their daily routine/schedules.
- Children can create a new ending to a familiar story.
- Children are able to understand a character’s point of view.

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## Sign of Executive Functioning Delays in Mental Flexibility

- Not able to think “outside the box”.
- Difficulty understanding other people’s emotions.
- Has trouble problem solving.

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# Additional Factors Affecting Executive Functioning

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## Poverty

According to one new study, living in poverty is equivalent to losing 13 IQ points. The brain is so preoccupied with trying to meet basic needs and has less mental energy available for processing other decisions.

Source: Watson, Angela. "How Working Memory Games Can Improve K-2's Executive Function in 5 minutes a Day." [thecornerstoneforteachers.com](http://thecornerstoneforteachers.com).

"In a predominantly low-income, population-based longitudinal sample of 1,259 children followed from birth, results suggest that chronic exposure to poverty and the strains of financial hardship were each uniquely predictive of young children's performance on measures of executive functioning"

Source: Dev Psychol. 2013 Feb;49(2):250-264. doi: 10.1037/a0028243. Epub 2012 May 7.

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## ADHD

- "Most current studies on D/HH students show significantly higher rates for behavior disorders in nearly all important domains compared with hearing students."  
(Dammeyer, 2010; Fallinger, Hübinger, Sabal, & Lucht, 2008; Hreniwka, 2007; van Balk, Truffels, Vaerman, & Vanhulst, 2004; van Gert, Goudhart, Horday, Truffels, & Philip, 2007)
- "Children who had problems with their executive functions had more conduct problems, a greater degree of hyperactivity, more problems with peers, and also displayed less pro-social behavior"  
Peters D. B., Conway C. M., Koeninger W., Henning S., Araya E. (2010).
- ADHD affects how the brain processes information, relates to stimuli and regulates emotion. In other words, ADHD affects a child's Executive Functioning skills. As ADHD is a spectrum disorder it's affect on a child's Executive Function will vary. It's important to keep in mind that a child with hearing loss is more likely to have EF difficulties as well as a child with ADHD. Therefore, Executive Functioning skills should be regularly monitored for a child with both hearing loss and an Attention Deficit Disorder.

Executive function, cognitive control and sequence learning in deaf children with cochlear implants. In Marschark M, Spencer P. E (Eds.), Oxford handbook of deaf studies, language, and education. (pp. 439-457). New York: Oxford University Press.

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## What do we do about it?

The great news is that there is so much you're already doing!!



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## Improving EF Skills

### LANGUAGE IS EVERYTHING!!!

Facilitating language development is the key to it all. A child can not fully develop EF skills without developing appropriate language skills.

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## “Beefing” up the WHY

As teachers of young children, we need to be cognizant of the skills we are helping shape and develop. We want to make sure in our sessions that we are giving children opportunities to plan, problem solve, and think through things. We often automatically work on tasks that develop executive functioning skills when working with children on their speech, language and audition skills. Helping them develop executive functioning skills is not something extra that we need to include in sessions, rather, it's a way of understanding how what we are already doing is increasing brain development and then being able to explain that to families.

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## Toddlers

### Working Memory

- Active games: Running up an incline, walking on a balance beam, even jumping up and down can work on working memory just by adding simple rules (jump and run, hop to the finish line and back).
- Movement songs require the child to attend to the songs words, hold them in their working memory as they perform the song- "The Hokey Pokey", "Teddy Bear", "I'm a little Tea Pot".
- Games that require the child to attend and remember different concepts such as going fast then slow- Go/Stop, Motorboat, Motorboat, Jack in the Box.
- Experience Books-Experience Books not only help develop language but they also help develop the child's memory for things that they have experienced.

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## Toddlers

- Hiding games- Let the child see where you hid something and encourage them to find it is a great way to build working memory. As the child develops that skill, use multiple objects and have the child find them (under the couch, beside the bed) to strengthen it even more. Giving the child directions like, "I see something is on the table" encourages them to hold that information in their head to find what they are looking for. Things to hide: toys, animals, Easter eggs, toy people, anything!!



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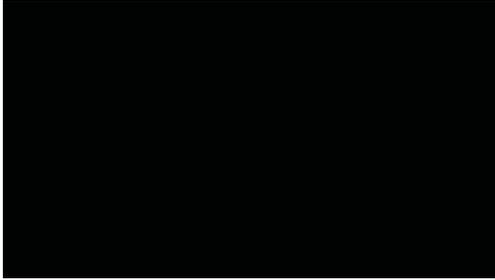








## Working Memory



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## Elementary

### Self Control

- Games that require quick responses such as Slapjack and Freeze Dance, Red light, Green light
- Activities that require focusing on moving the body in specific ways--yoga, Twister, body movement games
- Adaptations of Slap Jack can be played with any type of cards- sight words, addition facts, colors, shapes, feeling cards, vocabulary targets, etc.
- Board Games that require focus and patience-Jenga, Operation, Blockus, Rush Hour
- Board Games are FANTASTIC tools for building Executive Functioning Skills. They require children to strategically think, plan, focus on the game, take turns, remember rules and other players moves as well as mental speed.



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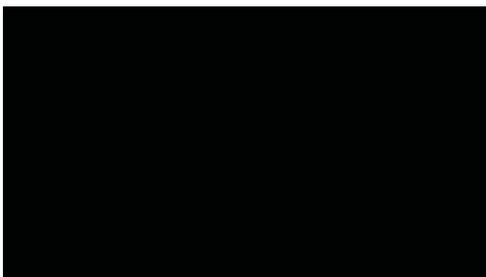
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## Calm Down Yoga



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## Auditory Learning Guide and Executive Functioning

### • Mental Flexibility

- Following a conversation with & without the topic disclosed
- Retelling a story with & without the topic disclosed
- Identifying an object from several related descriptors
- Processing in noise and various distances
- Processing group conversations

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## Additional Strategies for Increasing EF Skills

### Set the stage

Use visual reminders. Pictures, schedules, and calendars can be great support to verbal directions.

### Establish routine/schedules

Children are successful in predictable environments. However, life isn't predictable. Be prepared to modify /adjust routine. Engage the child in the brainstorming process on how to improve the plan. Alert children before changes if possible.

### Reward success

Provide praise and specific positive feedback. Provide feedback that encourages the child to internalize their feelings. Saying things like "You look like you feel proud of that. Wow! That was a lot of hard work!" Encourages the child to rely on their own feelings and not outside approval. Seek advice from the child regarding preferred rewards.

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## Wrap up/Conclusion

- Language is KEY.
- The longer the brain is deprived of language, the greater the risk of developing delays in Executive Functioning.
- A person who has significant Executive Functioning delays will have difficulty functioning appropriately in everyday life.
- When working with a child, Executive Functioning should always be kept in mind. If a child should be able complete a task, but they can't, then EF skills should be assessed.

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## Questions



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## Brain Splat



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## Contact

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Executive Functioning Milestones by Chronological Age

Neena Malosky, M.Ed, ITFS

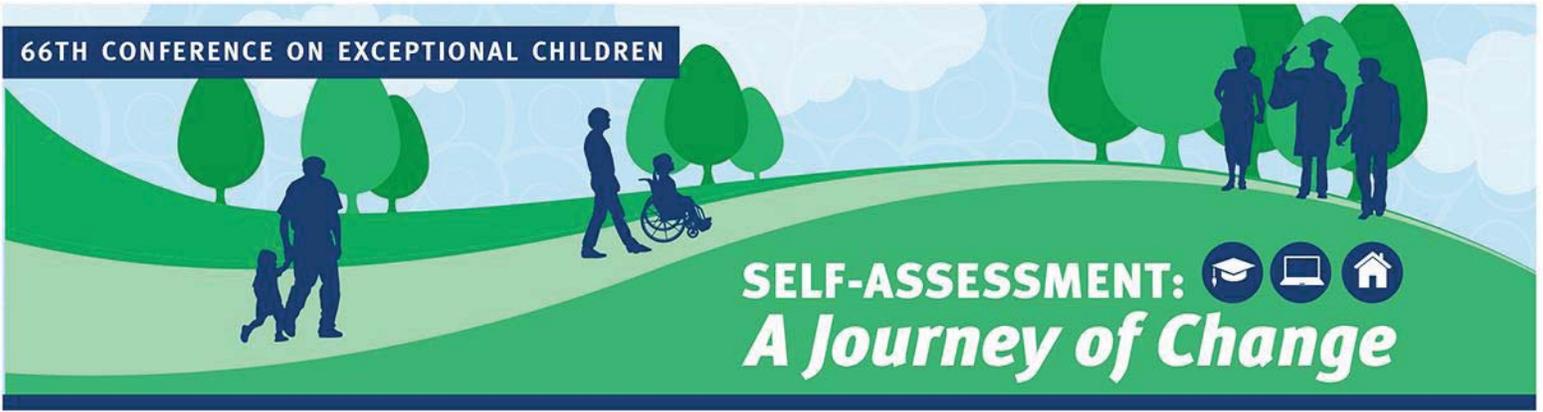
Chris Czajkowski, B.S. NBCT. ITFS 2016

Ages	Working Memory (holding on to info)	Self-Control (attention/focus)	Mental Flexibility (cause and effect, perspective taking)
<p><b>1-2 Years of Age</b></p>	<p>Identifies 2-6 body parts</p> <p>Follows 2 step directions</p> <p>Identifies 2 critical elements in a message</p> <p>Looks for a hidden toy</p> <p>Remembers the sequence of finger plays and rhymes</p> <p>Begins to sort toys by category</p>	<p>Puts toys away on request</p> <p>Selects 1-2 object(s) out of a group by request</p> <p>Plays interactive games such as (peekaboo, pat a cake, Trot to Boston)</p> <p>Follows one step directions</p>	<p>Asks for more</p> <p>Plays hide and seek</p> <p>Communicates desires with gestures (pointing to an object)</p> <p>Pulls string to get object</p> <p>Looks for source of object thrown</p> <p>Begins simple role plays with objects</p>
<p><b>2- 3 years of age</b></p>	<p>Labels feelings in oneself and others</p> <p>Points to pictures in photos</p> <p>Develops object permanence</p>	<p>Listens to a story for at least three minutes</p> <p>Becomes increasingly possessive of objects</p>	<p>Seeks to understand how things work</p> <p>Assigns roles in pretend play</p> <p>Undresses by them selves</p>

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	Remembers prepositions	Stacking blocks in order to knock them down  Responds to simple questions	Identifies likes and dislikes
<b>3-4 years of age</b>	Asks about future tasks  Answers “How many?” questions  Gives last word of a predictable sentence (“Put on your socks and..”)  Tells two events in order	Follows simple rules in games  Decides between two or three desirable options  Waits for small periods of time  Apologizes by saying I’m sorry	Takes 4-5 conversational turns  Answers questions about self  Begins to problem solve without prior knowledge-What would happen if?  Imaginary play includes complex sequences
<b>4-5 years of age</b>	Memorizes lines of a song  Recites nursery rhymes  Retells events from a 3-4 sentence story  Matches sets and categories  Sequences 3 critical elements  Identifies rhyming words	Plays cooperatively in groups of 2-3  Looks at books for longer periods of time  Shows concern by helping others  “Reads” to adults	Tells story mixing real and unreal events  Acts as different people and characters in play  Answers “What would happen if? “  Asks Future Questions- “Will I?”  Jokes/teases
<b>5-6 years of age</b>	Follows rules of a game  Names days of the week  Knows letters, numbers to 30	Uses 1:1 correspondence  Stays on topic for 10 turns  Self-monitors for speech, language	Completes analogies  Negotiates  With others, acts out long play sequences with different character roles

	<p>Develops letter/sound correspondence</p> <p>Can tell phone number</p>	errors	
<b>6-8 years of age</b>	<p>Uses verbal rehearsal to deliberately remember</p> <p>Names months for a given holiday</p> <p>Names categories, list objects in a category</p> <p>Follows complex game rules</p> <p>Has sound-letter correspondence for all consonants and vowels</p>	<p>Check's listener's comprehension</p> <p>Apologizes and responds to apologies appropriately</p> <p>Plays games by the rules</p> <p>Attends for longer periods of time</p> <p>Produces full explanations</p>	<p>Participates logic and reasoning activities such as brain teasers, word finds, puzzle games, 20 questions</p> <p>Identifies semantic absurdities</p> <p>Can explain why an object doesn't belong in a group</p> <p>Categorizes items (better/best, worse/worst)</p> <p>Completes similes</p>



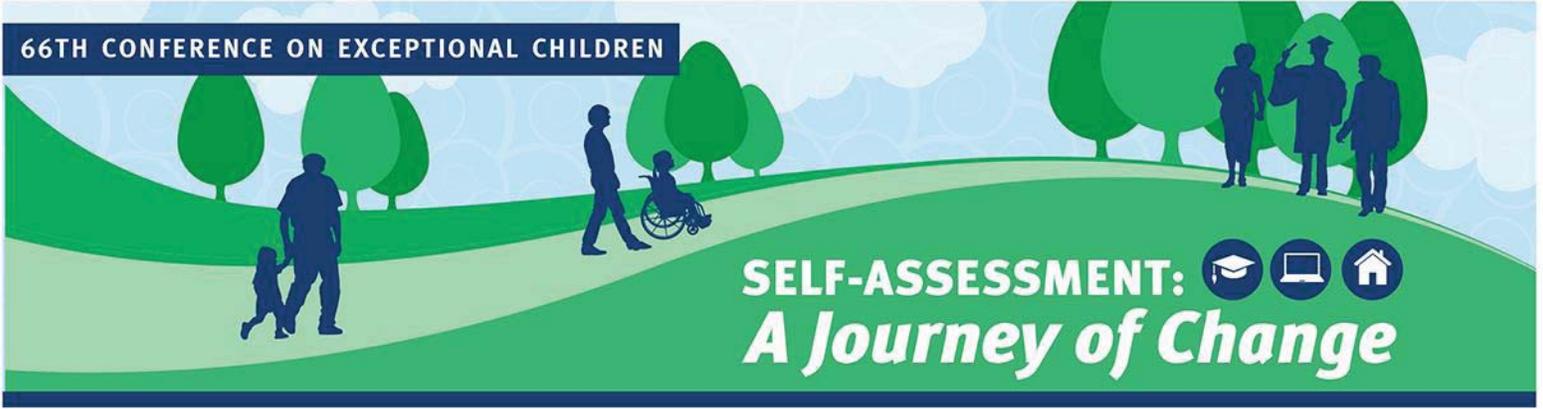
### Auditory Learning Guide and Executive Function

<p>Working Memory</p>	<ul style="list-style-type: none"> <li>▪ Imitating physical actions</li> <li>▪ Identifying &amp; imitating motions of songs</li> <li>▪ Identifying and imitating learning to listen sounds</li> <li>▪ Critical elements</li> <li>▪ Answering common questions</li> <li>▪ Speech babble</li> <li>▪ Identifying a picture that corresponds to a 3-4 scene/story</li> <li>▪ Completing known linguistic messages (closed set)</li> <li>▪ Recalling specific elements in a sentence of a story</li> <li>▪ Identifying an object from several related descriptors</li> <li>▪ Following open set directions</li> </ul>
<p>Self-Control</p>	<ul style="list-style-type: none"> <li>▪ Identifying an object from several related descriptors</li> <li>▪ Identifying a picture that corresponds to 2-3 scene/story</li> <li>▪ Processing information in noise and various distances</li> <li>▪ Processing group conversations</li> <li>▪ Speech babble</li> </ul>
<p>Mental Flexibility</p>	<ul style="list-style-type: none"> <li>▪ Following a conversation with &amp; without the topic disclosed</li> <li>▪ Retelling a story with &amp; without the topic disclosed</li> <li>▪ Identifying an object from several related descriptors</li> <li>▪ Processing in noise and various distances</li> <li>▪ Processing group conversations</li> </ul>

Neena Malosky, M.Ed, ITFS

Chris Czajkowski, B.S., NBCT, ITFS

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***A Journey of Change***

## Activities and Resources to Improve Executive Functioning Skills

### Toddlers

#### Working Memory

- Active games: Running up an incline, walking on a balance beam, even jumping up and down can work on working memory just by adding simple rules (jump and run, hop to the finish line and back)
- Movement songs require the child to attend to the songs words, hold them in their working memory as they perform the song- The Hokey Pokey, Teddy Bear, I'm a little Tea Pot
- Games that require the child to attend and remember different concepts such as going fast then slow- Go/Stop, Motorboat, Motorboat, Jack in the Box
- Experience Books-Experience Books not only help develop language but they also help develop the child's memory for things that they have experienced

#### Self Control

- Feelings, Feelings, Feelings- At this age, toddlers are just starting to understand basic feelings (happy, sad, mad).
- The more they are exposed to different feelings (what they are, what they look like, etc.) the more they will be able to identify and eventually regulate their own.
- Read books that talk about feelings, make props for children to use to share their own feelings.
- Have pictures of feelings (real faces work best) and a mirror so the child can see themselves making different faces. Use the pictures to help the child understand how they may be feeling, how their friend is feeling, etc.
- Begin teaching calming techniques (Breathing techniques, Kids yoga, Conscious Discipline Techniques such as STAR) at the toddler stage helps them develop the foundation to control their behavior and

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regulate their body as they grow. <http://consciousdiscipline.com/> <http://www.kidsyogastories.com/>  
<http://www.cosmickids.com/five-fun-breathing-practices-for-kids/>

- Let them lead. Play along with the child and let them direct the game. Give the child a chance to tell you what role to play and how to do it. Children begin to develop their own self regulation skills by first regulating the behaviors of others

### Mental Flexibility

- Guessing Games
- Drawing attention to others in stories and real life
  - “What is she thinking?”
  - “Why is he crying?”
- **Dramatic play** is a fantastic tool for developing Executive Functioning skills from toddlers to adolescents. At this stage, toddlers are beginning to imitate adults using objects they find.
- **Active Narration-** Narrate what you see happening and ask the child questions about what they are doing and what is happening.
- **Props-** Providing props help give the children framework and supports their developing imagination.

## Preschool

### Working Memory

- Write down stories children tell and read them back. Encouraging the children to draw pictures to illustrate their ideas challenges the children to use their working memory skills as well as mental flexibility.
- Group Stories- one child starts the story and the others add in parts to the story. Drawing out what the children are saying as they talk gives a visual way for the child to remember what is happening in the story.
- Having the children act out the stories they have written utilizes working memory, self-control and mental flexibility as the child has to think of ways to act out their part, negotiate with the other children, and remember directions.
- Stories/Songs that encourage children to repeat (bonus if they include body movements to remember) – “Going on a Bear Hunt”, “ Boom Chick a Boom”, “Baby Shark”, “Tooty Tah”, “Move and Freeze”.

### Self Control

- Trying new and different activities requires focusing attention & persistence.
- Make obstacle courses that include different activities that require multiple movements-jumping in the hula hoop, running to the bench, crawling under the bench, hop on one foot, etc.
- Following choreographed movements increases self control and attention skills as well as working memory. Activities such as Kids Zumba, “If you’re a kid” videos, Cosmic Kids yoga, etc. are fun, engaging ways to strengthen a child’s ability to sustain attention and control their bodies.
- Feelings- Stories, games and activities that help children learn the words for, identify, model and explain feelings are great ways to develop emotional regulation skills.
- Songs-“Any Way I Feel”, “If You’re Happy and You Know It” instead of using motions, make the facial expressions “make a sad face” or make the expression with the words “say I’m sad” (adding different emotions-worried, excited, scared). You can even talk about feelings during transitions!
- Books/Stories- Reading stories that talk about emotions and feelings help children relate their own feelings to the feelings of the characters.

### Mental Flexibility

- At this age children are able to act out longer, complex stories. Encouraging dramatic play activities allows the children to practice taking other’s perspectives, creativity with props, engage working memory skills, and sustain longer attention.
- Imaginary play can be used open ended by providing props and allowing the children to explore the area. Strengthen the child’s mental flexibilities by playing along with the child, asking questions, suggesting different ways to use materials. Switching characters (especially from more to less expected) such as the grumpy bear to the happy peacock requires the children to think in a unique way.
- Imaginary play can be acting out stories, encouraging the children to develop a different ending. Changing the setting of a familiar story such as Little Red Riding Hood in outer space gives children support as they know the characters, but changes an expected item of the story encouraging flexible thinking.
- Using well known stories/rhymes such as “The Three Little Pigs” but changing the characters “The Three Dinosaurs” gives the child a framework for the story, but requires them to think about how the new characters would act within that framework.

## Elementary

### Working Memory

- Card Games such as Go Fish, Concentration
- Action games where the child has to remember a sequence--Mother May I, Jump Rope Games, adapted Simon says (Simon says touch your toes and scratch your knee).
- Word games- Going on a Picnic (Beach trip, camping trip) where the child has to remember what the other players said.
- Cooking/Making Snacks-Following recipe cards-with pictures, words and pictures, etc. help children to understand and follow sequences.
- Treasure Hunts/Scavenger Hunts- Help children to remember and follow directions and to pursue a goal. Scavenger hunts are a great way to work on vocabulary as well. Hiding objects or pictures around the room and using clues to lead the children to each item not only builds working memory, but also gives them more exposure to the target vocabulary.

### Self Control

- Games that require quick responses such as Slapjack and Freeze Dance, Red light, Green light
- Activities that require focusing on moving the body in specific ways--yoga, Twister, body movement games
- Adaptations of Slap Jack can be played with any type of cards- sight words, addition facts, colors, shapes, feeling cards, vocabulary targets, etc.
- Board Games that require focus and patience-Jenga, Operation, Blockus, Rush Hour
- Board Games are FANTASTIC tools for building Executive Functioning Skills. They require children to strategically think, plan, focus on the game, take turns, remember rules and other players moves as well as mental speed.

### Mental Flexibility

- Games that require strategic thinking: Checkers, Chess, Dungeons and Dragons
- Do as I say: Played like Simon says except the child does what you SAY not do (Say touch your head and actually touch your arm) This requires the child to focus and think about things in a different way. Added Bonus- develops auditory attention and memory as well!
- Charades- scaffold by giving more specific boundaries at first and then take those away (going from closed set to open set). For example- All the children know the person is acting out an animal that lives on a farm. Eventually going to an animal and then no clues. The child who is acting out has to think about how to portray the animal (or person or activity) and what would help the other children guess it correctly. The children have to take clues from what the child is doing and put them together to figure out the right answer.

