***Building Brains and Futures:***

***Enhanced Curriculum***

Drs. Robbin Gibb [Neuroscience], Noella Piquette [Education] & Claudia Gonzalez [Kinesiology]

University of Lethbridge

**Overview**

Executive Function

Being able to focus, hold, and work with information in mind, filter distractions, and switch gears is like having an air traffic control system at a busy airport to manage the arrivals and departures of dozens of planes on multiple runways. In the brain, this air traffic control mechanism is called executive function; a group of skills that helps us to focus on multiple streams of information at the same time, and revise plans as necessary. Acquiring the early building blocks of these skills is one of the most important and challenging tasks of the early childhood years, and the opportunity to build further on these rudimentary capacities is critical to healthy development through middle childhood, adolescence, and into early adult life.

Emergent Literacy

Being able to communicate and to take in communication is a crucial developmental skill that is necessary in all aspects of one’s academic and social life. Children start to learn language from the day they are born. As they grow and develop, their speech and language skills become increasingly more complex. They learn to understand and use language to express their ideas, thoughts, and feelings, and to communicate with others. During early speech and language development, children learn skills that are important to the development of literacy (reading and writing). This stage, known as emergent literacy, begins at birth and continues through the preschool years. These emergent literacy skills are everything children know about speaking, listening, reading and writing before they can actually read and write. Early literacy skills are essential building blocks for later reading and writing. In addition, there is more and more evidence suggesting that having a good command of language goes hand- in-hand with the ability to imagine and think up new ideas. If the executive function skills are the air traffic control, then emergent literacy skills are the airplanes as they are enabling the child to get to their destination of understanding and using communication.

These skillswill be addressed in this study through 5-minute activities taught and modeled in the Stay and Play program, and then sent home to be reinforced with a parent for at minimum, a 5-minute period. In addition, a weekly video or short reading will be sent home as a support for more information on EF and/or EL.

**Executive Function Skills**

* ***Inhibit*:** Ability to control impulses (inhibitory control) and to stop engaging in a behavior.
* ***Shift*:** Ability to move freely from one activity or situation to another; to tolerate change; to switch or alternate attention.
* ***Emotional Control*:** Ability to regulate emotional responses appropriately.
* ***Initiate***: Ability to begin an activity and to independently generate ideas or problem-solving strategies.
* [***Working memory***](http://en.wikipedia.org/wiki/Working_memory)**:** Ability to hold information when completing a task, when encoding information, or when generating goals/plans in a sequential manner.
* ***Plan/organize*:** Ability to anticipate future events; to set goals; to develop steps; to grasp main ideas; to organize and understand the main points in written or verbal presentations.
* ***Organization of materials*:** Ability to put order in work, play, and storage spaces (e.g., desks, lockers, backpacks, and bedrooms).
* ***Monitor*:** Ability to check work and to assess one’s own performance; ability to keep track of the effect of one’s own behavior on other people.

**Emergent Literacy Skills**

* ***Concepts about print*:** Understanding that written language has meaning. Connecting speech sounds to print/decoding, noticing environmental print [signs and logos], differing print, handling books, and following pictures/words on a page.
* ***Print motivation***: Being interested in and enjoying text, including books.
* ***Oral language***: The ability to produce and comprehend spoken language; includes listening comprehension, vocabulary, and grammar.
* ***Rapid naming of letters and digits***: Recognizing and identifying individual alphabets and numbers.
* **Rapid naming of objects and colors**: Recognizing and identifying common items and basic colors.
* **Writing/drawing**: Scribbling, drawing, uses of space and attempts at creating words or meaning with a variety of writing tools.
* ***Vocabulary***: Receptive vocabulary - Knowing the names of things; words needed for understanding what is heard and read. Expressive vocabulary –Words used for speaking and writing.
* ***Narrative skills***: Being able to describe things and events and to tell stories.
* ***Alphabet knowledge***: Understanding letters are distinct symbols, are different from each other, knowing their names and sounds, and recognizing letters everywhere.
* ***Phonological awareness or sensitivity****:* Being able to hear and play with the smaller sounds in words.

**Week 1 Activity for BBF**

**Red Light Green Light** [5 minutes]

Activity Description: Younger children should attend to the oral instruction; Older children should attend to the sign and oral instructions.

DIRECTIONS

1. Have the children line up (side by side) at one end of your space facing the adult.
2. The adult stands opposite of the children and faces the children.
   1. Instructions are provided to the children at this point.
   2. All children must attend to the oral directions and or to the color sign
   3. Children can either start the game at the back of the room or move toward the adult during the game [goal is to get to the adult] OR to play within one-minute segments and see how much space the child can travel within the room.
3. When the adult shouts “Green Light!” The children walk quickly or run (depending on your space) towards the adult or around the room if that is the instruction [re: 2c].
4. When the adult shouts “Red Light!” The children stop where they are and freeze.
5. The adult continues to shout “red light or green light” until the children get to her and then all the children go back to the starting line and the game starts again.
6. Play the game again [attend to the directions in #2] but this time alter the words to words that are similar to “Red” and “Green” but change either the beginning sound or ending sound. For example, Red = bread, said, Ned, sted and Green = greel, greek, greed.

Optional: Children also take turns being the ones to shout “red light and green light”, to display the color signs or for older students to create differing words for red and green.

SKILL DEVELOPMENT:

EF: Supporting 2 big concepts; **Inhibit** to respect the red light and **Shift** the behavior. In addition, **Working Memory** to remember the instructions so that you what you are supposed to be doing, **Monitoring** what you are doing [looking around, hearing feedback], and **Emotional Control** related to achieving successful completion of the game [or alternately controlling one’s emotions if not successful].

EL: Supporting 2 big concepts: **Listening comprehension** for attending to the directions prior to the game and during the game, and **Concepts about print** for connecting the words to the print on the signs. In addition, ***Rapid naming of objects and colors*** for the identifying the signs, and **Phonological awareness or sensitivity**to distinguish between the sounds in the words.

**Week 2 Activity for BBF**

**SIMON SAYS** [5 minutes]

Activity Description: Younger children should attend to the oral instruction all the way through the game – attempting all directions; Older children should attend to the oral instructions and have to stand still once they are “out”.

DIRECTIONS

1. Line up the group across from you, 2 – 3 metres away.
2. Tell the players that they should all obey you if you first say the words "Simon says."
3. Tell them that they are out of the game if they follow an order that doesn't begin with "Simon says," or if they fail to do what Simon says to do”
4. Begin by saying something simple like, "Simon says, put your hands on your head." Look to make sure everybody has put their hands on their heads.
5. Give another order such as, "Simon says, stand on one foot." Check again.
6. Continue giving orders. Mix it up and say something like, "Raise your right hand," without the preface "Simon says."
7. Call out the players who raise their hands. Play until one person is left. This is the winner i.e., Best instruction follower.
8. Let that person give the commands for the next round or create a few of the commands for the adult to deliver.
9. Keep the pace moving fast. Everyone will be laughing so hard, they won't care who's in or out, or who wins or loses.

Optional: [1] Give the orders fast, in increasingly rapid succession. [2] Cut the orders short, saying, "Simon says, do this," and make the motion you want mimicked, such as putting your hands on your shoulders. [3] Give the orders verbally but have the children turn their backs to you so they rely on the words only for a whole game.

SKILL DEVELOPMENT:

EF: Supporting 2 big concepts; **Inhibit** to respect the oral instructions and **Shift** the behavior. In addition, **Working Memory** to remember the instructions so that you what you are supposed to be doing, **Monitoring** what you are doing [looking around, hearing feedback], and **Emotional Control** related to achieving successful completion of the game [or alternately controlling one’s emotions if not successful].

EL: Supporting 2 big concepts: **Listening comprehension** for attending to the directions prior to the game and during the game, and **Receptive vocabulary** development for isolating the words needed for understanding what is being heard

**Week 3 Activity for BBF**

**STROOP** [5 minutes]

Activity Description: Children will work in pairs or on teams.

DIRECTIONS

1. All children should be shown 2 pictures in a deck of 10 that have “opposite” depictions.
2. Tell the players that they should respond to pictures with the “false” answer. For example when shown the sun – the player should respond “night” and when shown the moon the player should respond “day”.
3. Players should be encouraged to do this as quickly as possible.
4. Keep a tally of how many cards the player got correct. Encourage the player to try to get more right next time.
5. This game can be played one instructor for one player or one instructor for multiple players
6. Decks of cards can be compiled based on stop-go (using a stop sign, green light) hot-cold (using a lit match and a snowflake) etc.
7. Once the player has mastered a deck of cards with a single theme, try adding another theme in the same deck. As the player achieves mastery several themes can be added to a single deck.
8. Remember to encourage children to respond as quickly as possible.

SKILL DEVELOPMENT:

EF: Supporting 2 big concepts; **Inhibit** the natural tendency to respond with the correct answer to the picture and to respect the oral instructions. When more than one theme is added to the deck the child is required to **Shift** their responses to be successful. In addition, **Working Memory** to remember the instructions so that you what you are supposed to be doing, **Monitoring** what you are doing [looking around, hearing feedback], and **Emotional Control** related to achieving successful completion of the game [or alternately controlling one’s emotions if not successful].

EL: Supporting 2 big concepts: **Listening comprehension** for attending to the directions prior to the game and during the game, and **Receptive vocabulary** development for isolating the words needed for understanding what is being hear. Rapid naming of objects and colors; recognizing and identifying common items and themes.

**Week 4 Activity for BBF**

**MUSICAL FREEZE** [5 minutes]

Activity Description: All children should attend to the oral instruction. All mobile children can be included in this activity. Older children should look for the stick man cue for a posture to assume when the music stops and then “freeze”. Younger children should “freeze” when the music stops.

DIRECTIONS

1. With a musical device that can be stopped and started mid-way through a song, the instructor selects a pose from a series of poses depicted by stickmen.
2. Tell the players that they should respond to picture by assuming the pose when the music stops.
3. Players should be encouraged to do this as quickly as possible. Older children need to assume the pose correctly. Incorrect responses or being the last one to freeze results in the player being counted out.
4. Continue the game until there is a clear winner in the older children age group.
5. Younger children should be encouraged to practice the “freeze” and then as they get more familiar with the game they too can try the pose and freeze along with the older children
6. A deck of cards can be compiled based on a series of poses. The poses then can be randomly selected to be shown at a break in the music.
7. Once the player has mastered a deck of cards with simple poses try adding more complex ones.
8. Remember to encourage children to respond as quickly as possible.

SKILL DEVELOPMENT:

EF: Supporting 2 big concepts; **Inhibit** the natural tendency to continue to move when the music stops.. In addition, **Working Memory** to remember the instructions so that you what you are supposed to be doing, **Monitoring** what you are doing [looking around, hearing feedback], and **Emotional Control** related to achieving successful completion of the game [or alternately controlling one’s emotions if not successful]. **Initiate** movement when the music starts and initiate a pose when it ends.

EL: Supporting 2 big concepts: **Listening comprehension** for attending to the directions prior to the game and during the game, and **Receptive vocabulary** development for isolating the words needed for understanding what is being heard.

**Week 5 Activity for BBF**

**PRETEND PLAY** [10 minutes]

Activity Description: Children will work in pairs. Simple props that represent lead characters such as fireman, teacher, policeman, doctor, waiter etc. should be made available and children should be assisted to select an activity to engage in. On the doctor team there should be at least one patient (but there could be more). After 5 minutes of play the children should change roles with their partner- if more than two are on a team the play should be extended so each child gets a turn to portray the lead character.

DIRECTIONS

1. In teams of two children should be encouraged to assume “role” play.
2. The play should proceed in an unstructured manner but some guidance may initially be required to keep the players mindful of their roles.
3. The child playing the lead character should be challenged to start the game by announcing his/her intentions on what is to be done. The other child(ren) will respond by playing their assigned roles. After approximately 5 minutes of role playing- the children should reverse roles so for example the previous patient is now the doctor.

SKILL DEVELOPMENT:

EF: Mainly supporting 5 concepts; **Initiate:** a play scenario with the partnering child.The child must develop a **Plan** as to how to proceed with the play. **Inhibit** the tendency act out of character. **Working Memory** to remember who you are supposed to be what you would do as that character. Once the partner in the scenario responds the child must flexibly **Shift** their responses keep the play successfully going. In addition, 3 other concepts may be at work in this activity. **Monitor** what is happening and assess how this corresponds to the plan. **Emotional Control** in relating to the play partner appropriately- even if the original plan is not respected. **Organization of materials:** appropriate to the play scenario to enhance the play activity.

EL: Supporting at least 2 concepts: **Oral Language: Listening comprehension** for attending to the conversation of the play partner during the game, and both **Expressive vocabulary for making it clear what the child’s role in the role play is about and** **Receptive vocabulary** development for isolating the words needed for understanding what is being heard from the play partner. **Narrative skills:** may also be stimulated as the child is required to reveal the “Play Plan”.

**Week 6 Activity for BBF**

**CIRCLE TIME WITH LIPS AND EARS** [5 minutes]

Activity Description: Children will be handed ears to remind themselves to be good “listeners”. One child will be handed a pair of lips and asked to share something briefly with the others. This could be, for example, a favorite toy, activity, or person or a recent event. The other children must wait their turn to hold the lips picture so they can share.

DIRECTIONS

1. All children should receive a picture: either ears or lips.
2. The child who received the lips is asked to briefly share with the others something of personal interest to them.
3. All other children (with pictures of ears) are asked to respectfully listen to the “lips” child.
4. Allow several children to exchange their “ears” for the “lips” so they can have a turn sharing with the others.

SKILL DEVELOPMENT:

EF: Supporting the following concepts: **Inhibit** the natural tendency to speak when it is not the child’s turn. **Working Memory** to remember that the “ear” picture is to remind one that listening is the skill that they are supposed to be doing- in the case of the child with the “lips”- they are reminded that it is their time to share something with the others **Monitor:** what others are doing in order to maintain success, and **Emotional Control** related to waiting for a turn to share with the others.

EL: Supporting 2 big concepts: **Listening comprehension** for attending to the directions prior to the game and during the game, and **Expressive vocabulary** for sharing with the others about the decided topic. **Receptive vocabulary** development for isolating the words needed for understanding what is being heard. **Narrative skills**: could come in to play for entertaining the other children with the shared story.

**Week 7 Activity for BBF**

**SHARED PROJECT** [10 minutes]

Activity Description: Children will work in pairs. They are asked to work together to make a picture or other form of constructive creation.

DIRECTIONS

1. In teams of two children should be encouraged to define what the project will be and who will do what as far as the building process goes
2. Each team should negotiate how the project will proceed in an unstructured manner. This may be facilitated by having one member of the team choose a piece of paper or other construction material and the other member choose the crayons, paints, or other building materials that complement the first child’s choice
3. The team of two will have to engage in a negotiation to successful see their creation through to the end. A possible additional challenge may be to decide who will take the “art” home.

SKILL DEVELOPMENT:

**EF:** This activity challenges all aspects of EF. Six main concepts come in to play: **Initiate:** Both children must work together to initiate the project.Both children must work together to develop a **Plan** as to how to proceed with the project and **Inhibit** any tendencies to disregard the plan. Both children will engage in **Organization of materials** appropriate to the project they feel they have what they need to complete their work. **Working Memory** is required for each child to remember what their role is in assembling the project. Once the project is fully underway both children must flexibly **Shift** their activities in response to their team member’s work in order to achieve successful completion of the project. In addition, 2 other EF’s are at work in this activity. The children must **Monitor** what is happening and assess how this corresponds to the plan. **Emotional Control** in relating to the play partner appropriately- even if the original plan is not respected.

**EL:** Supporting four concepts: **Oral Language: Listening comprehension** for attending to the conversation of the play partner during the construction of the project, and both **Expressive vocabulary for making it clear what the child’s role in the project is and** **Receptive vocabulary** development for isolating the words needed for understanding what is being heard from the play partner. **Writing/drawing skills** may be required for the project and this might occur with a variety of writing tools. In addition **Naming colours and shapes** might be required to express the vision a child has for their shared project.

**Week 8 Activity for BBF**

**WAIT FOR IT…** [Time varies with repetition of this activity]

Activity Description: The facilitator passes out a tasty treat to the children. All children are asked to refrain from eating it until the facilitator says it is OK to do so. IF they are able to wait for the prescribed time to consume the treat, the child gets a second treat. Initially the time the child is required to wait is short but as the children become more familiar with the activity the facilitator should continue to extend the period of time the child must wait to enjoy a second (bonus) treat.

DIRECTIONS

1. All children are given a single treat – placed right in front them with the explicit direction that they are not allowed to eat it until the facilitator tells them they can.
2. The child is also informed that if they are able to wait for the approved time, they will be given a “bonus” treat to consume.
3. The facilitator should be busy with another activity (i.e. not watching the children- so they do not feel that their activity with the treat is being monitored)
4. At the end of the prescribed time, if the treat is still intact, the child is given a bonus treat. If it has been consumed the children should be reminded that the next time this game is played, they must wait for the signal from the facilitator in order to earn an extra treat

SKILL DEVELOPMENT:

**EF:** This activity works mainly on **Inhibit:** the desire to eat the treat immediately. **Working Memory** is required for each child to remember what the instruction was regarding the treat. The child must **Monitor** what is how their behavior is corresponding to the facilitators instructions. **Emotional Control** may come in to play if the child eats the treat before the prescribed time but still desires another treat.

**EL:** Supporting listening skills: **Oral Language: Listening comprehension** for attending to the instructions provided by the facilitator regarding the treat and the consequences of eating before the prescribed time. **Receptive vocabulary** development for isolating the words needed for understanding what is being heard from the facilitator.

**Week 9 Activity for BBF**

**Dimensional Change Card Sort (DCCS)**

Activity Description: The facilitator introduces a card deck to the children that contains a colour dimension and a shape dimension. The facilitator explains to the children that the deck has cards that can be sorted or “classified” according to some feature on the card. The facilitator works with the child to help them understand the two possible means for sorting the cards and eventually how to switch from one dimension (i.e. color) to the other (i.e. shape).

DIRECTIONS

1. All children are given a deck of cards to work with that have a colour dimension and a shape dimension. They are encouraged by the facilitator to describe how they might sort the cards. Once they have settled on a dimension they are allowed to sort through the deck.
2. After the deck is sorted in a particular dimension by the child, the facilitator now encourages them to think about how else they might sort the deck. Some children may spontaneously offer the solution- the other unused dimension. For other children (especially younger children, the facilitator may have to point out the other dimension). The child should be allowed time to sort in the new dimension.
3. In the next round of sorting. The facilitator will prime the child with the challenge, “I am thinking of a way for you to sort these cards. Can you show me how you think I might like you to sort them?” This time the facilitator says no when the child is sorting inappropriately after each card sorted and yes when the preferred dimension is found after the card has been sorted according to the facilitator’s chosen dimension.
4. Eventually the child will understand that the cards have two dimensions and in order to find the correct dimension they must be willing to shift their strategy rather than to perseverate on (continued use of) an inappropriate strategy.

SKILL DEVELOPMENT:

**EF:** This activity works mainly on **Shift:** In order for continued success the child must develop the ability to shift their sorting strategy **Inhibit:** the desire to continue to sort using a previously successful strategy. **Working Memory** is required for each child to remember what the instruction was regarding the card sorting and which strategy they previously put in to play. The child must **Monitor** what is how their behavior is corresponding to the facilitators instructions. **Plan/organize** is enacted as the child manages the deck and organizes the cards into piles. **Emotional Control** may come in to play if the child fails to understand that shifting strategy is the key to success in this task.

**EL:** Supporting listening skills: **Oral Language: Listening comprehension** for attending to the instructions provided by the facilitator regarding deck and the challenge presented in the sorting task **Receptive vocabulary** development for isolating the words needed for understanding what is being heard from the facilitator. **Rapid naming of colors and objects** are both required for successful completion of the task. **Narrative skills** will help them describe their thought processes in determining how they are going to successful achieve the card sorting.

**Week 10 Activity for BBF**

**Right is Right! (…Usually)**

Activity Description: The facilitator introduces Duplo® blocks on a table surface directly in front of the child. The tabletop is roughly divided into left and right and the same blocks are placed on both sides of the table. The facilitator explains to the children that the object of this activity is to build a model (comprised of the Duplo® blocks presented on one half of the table). The purpose of this activity is twofold: 1) to identify if the child demonstrates a hand preference while picking up blocks and 2) if the child appears to exhibit a right hand preference, encourage the child to use the right hand more whilst picking up the blocks to construct the model. (Caution: some left handed children may exhibit a preference for picking up the blocks with their left hand. If this is so then they should be encouraged to use their preferred left hand more)

DIRECTIONS

1. All children are given access to the same Duplo® blocks distributed on the left and right side of the table. All of the blocks represented on half of the table are required to build the model.
2. The prebuilt model is placed directly in front of the child.
3. The facilitator watches how the child picks up the blocks in an attempt to recreate the model (i.e. which hand is used). IF the model is not built true to the model this is not a failure on the part of the child but the differences in their model and the prebuilt one should be discussed and explored.
4. The facilitator should encourage the child to try to use their preferred hand more for finding the desired blocks to build the model (regardless of where the blocks are found on the table)

SKILL DEVELOPMENT:

**EF:** This activity works mainly on **Plan/organize** as the child is attempting to recreate the displayed model. **Organization of materials** comes in to play as the child needs to identify which blocks will be required and in which order they should be selected. **Working Memory** is required for each child to remember which blocks are needed and where they can be found as well as remembering the purpose of the activity. In addition, the child must **Monitor** how their assembly of the blocks is achieving the desired goal of replicating the model- but this should not be the focus of the activity initially. Eventually this element can be highlighted.

**EL:** Supporting listening skills: **Oral Language: Listening comprehension** for attending to the instructions provided by the facilitator regarding the blocks and the assembly of the model **Receptive vocabulary** development for isolating the words needed for understanding what is being heard from the facilitator. **Rapid naming and understanding of colors** will be required for successful completion of the task.