How Does Project Work with Children Grow the Brain?

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Key Ideas

- Brain Science as informant for ECE teachers
- Importance of executive functioning to later success in school & life
- Self-regulation as priority for ECE
- Project work as vehicle for developing executive functioning
- SC Early Learning Standards (AL & SE) focus on EF skills

Note: This presentation will primarily focus on supplemental visual documentation from several long-term projects that is not included in this handout.
Brain Development

- Brain builds neurons & connections as it processes stimuli
- 100 billion neurons by age five – EC period is massively important!!!
- Use it or lose it! (neurons can die from disuse)
- Stronger connections = better memory
- Frontal lobe is where higher order thinking develops
Brain Development

- The brain is uniquely organized per individual
- Continually growing & adapting – intelligence not fixed
- “Brain compatible” classrooms make learning a positive emotional experience
- Active, meaningful learning promotes brain development

4 Key Principles (Rushton, 2011)

Hemispheric dominance not the big issue

Executive Functioning

- Frontal lobe is the “command center”
- EF is set of mental processes that allow the brain to work effectively to solve problems
- Connect past experience with present actions
- Better predictor of school success than IQ (Berk, 2001)
Executive Functioning Key Components (Brown, 2005)

- **Activation:** Organizing, prioritizing, planning
- **Focus:** Directing attention; persistence
- **Memory:** Using verbal & non-verbal working memory & recall
- **Action:** Monitoring; self-regulating actions
- **Emotion:** Managing Frustration; regulating emotions
- **Effort:** Maintaining alertness; pacing; time management
Self-regulation is ECE priority

“Self-regulation predicts effective development in virtually every domain” (Laura Berk, 2001)
Project Work

- Long-term project work requires all the elements of EF
- Long-term projects provide a context that supports the principles of brain development
Elements of Project Work vs. Thematic Units/direct instruction

- Adult anticipated
- Child directed
- Small groups
- Driven by exploration
- Time varies
- Multi-dimensional
- Document process
- Constructed knowledge

- Adult generated
- Teacher directed
- Whole class
- Teacher planned
- Set time frame
- One theme at a time
- Document ending
- Transmitted knowledge

Long-term Projects

Thematic Units

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## Project Examples & EF Elements

<table>
<thead>
<tr>
<th>EF Element</th>
<th>Project</th>
<th>EF Dimensions &amp; Characteristics Focus</th>
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</thead>
<tbody>
<tr>
<td>Activation</td>
<td><em>Pennies for Peace</em></td>
<td>Organizing; prioritizing; strategizing</td>
</tr>
<tr>
<td>Focus</td>
<td><em>24 foot Python</em></td>
<td>Getting it perfect, persistence</td>
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<tr>
<td>Effort</td>
<td><em>Owls/birds</em></td>
<td>Pacing, waiting; sustaining interest</td>
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<tr>
<td>Emotion</td>
<td><em>Fancy Dress Project</em></td>
<td>Coordinating many personalities; regulating emotions</td>
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<tr>
<td>Memory</td>
<td><em>Water Project</em></td>
<td>Accessing conceptual recall</td>
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<tr>
<td>Action</td>
<td><em>Park Project</em></td>
<td>Monitoring &amp; self-regulating behavior</td>
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</table>
Activation: Pennies for Peace (organizing)
Focus: 24 foot Python (getting it perfect, persistence)
Effort: Owls/birds (pacing, waiting)
Emotion: Fancy Dress Project (coordinating many personalities)
Memory: Water Project (conceptual recall) & Dinosaur Project (movie)
Action: Park Project (self-regulation)
SC ELS Prioritize Dimensions of Executive Functioning

Approaches to Learning:
- AL 1. Children engage in play as a means to develop their individual approaches to learning.
- AL 2. Children show curiosity, eagerness and satisfaction as a learner.
- AL 4. Children demonstrate an increasing ability to envision a goal and to accomplish it.
- AL 5. Children extend their learning through the use of memory, reasoning, and problem-solving skills.

Social/Emotional Development:
- SE1. Children will demonstrate a positive sense of self.
- SE2. Children will demonstrate self control, respect and responsibility.
- SE3. Children express feelings and show concern for others.
- SE4. Children will form healthy social relationships.
Core Standards & EF

- Make sense of problems and persevere in solving them.
- Reason abstractly and quantitatively.
- Construct viable arguments and critique the reasoning of others.
- Model with mathematics.
- Use appropriate tools strategically.
- Attend to precision.
- Look for and make use of structure.
- Look for and express regularity in repeated reasoning.

- Demonstrate independence.
- Build strong content knowledge.
- Respond to the varying demands of audience, task, purpose, and discipline.
- Comprehend as well as critique.
- Value evidence.
- Use technology and digital media strategically and capably.
- Understand other perspectives and cultures.

Mathematical Practices: (Grade 3 outcomes)

Language Arts: characteristics of graduates who have met Core Stds

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