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Project-based Preschool Curriculum



**ILLUSTRATIONS FROM A
CHILD-CENTERED
INVESTIGATION ON
BONES**

Agenda



- Introductions
- What is Investigations Curriculum?
- Phases of Investigation
 - Topic selection
 - Research and planning
 - Awareness
 - Inquiry across contexts
- Assessment
- Discussion and Reflection

Introduction



CHILD AND FAMILY DEVELOPMENT RESOURCE CENTER
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[HTTP://WWW.EASTERNCT.EDU/CFDRC](http://www.easternct.edu/cfdrc)

A Brief History of a Curriculum



- Child and Family Development Resources Center opened in 2007 as a “model” program.
- CFDRC staff resisted the idea that a curriculum must be purchased and packaged.
- Began a two-year development process involving all staff, faculty, families, even students:
 - Reviewed previous research and practice
 - Examined state and national standards and key components of a curriculum.
 - Discussed, debated, sought consensus on every element.
 - Implemented the curriculum two years ago; are analyzing fidelity and outcomes.

Who Inspired Us?



Lillian Katz, Judith Harris Helm: The Project Approach

Lella Gandini: Reggio Emilia-Inspired Practice

Elena Bodrova , Debbie Leong: Play Scaffolding and Tools of the Mind

David Weikart, Lawrence Schweinhart: Child Planning and Reflection

George Forman: Constructive Play and Video Revisiting

Rheta DeVries and Constance Kamii, Games and Sociomoral Classrooms

Doris Fromberg, James Johnson, Doris Bergen, Stuart Reifel: Play

Jean Piaget: All Things Child Development

Lev Vygotsky: Sociocultural Theory

Jeffrey Trawick-Smith, Sudha Swaminathan, Niloufar Rezai, Jamie Klein

Teachers, families, and children of the CFDR

Our Quest



Integrate the ideas of these disparate and wonderful thinkers into a single, coherent, and powerful curriculum.

What is the *Investigations Curriculum*?



A project-based curriculum for children aged 18 months to 5 years

Reflects constructivist and sociocultural theories

Designed to meet state and national learning standards, as well as family-valued competencies.





We use a “carpentry metaphor”

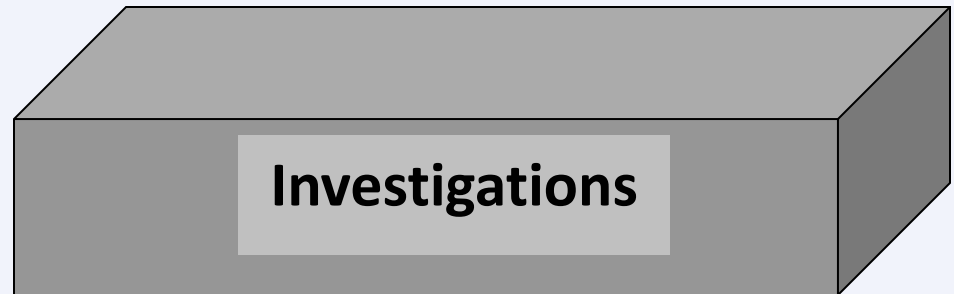
Children actively **construct** knowledge and abilities.

We begin with a **foundation** of constructivist theory

We integrate five **pillars** of learning and teaching . . .

. . . that support five **platforms** of daily experience

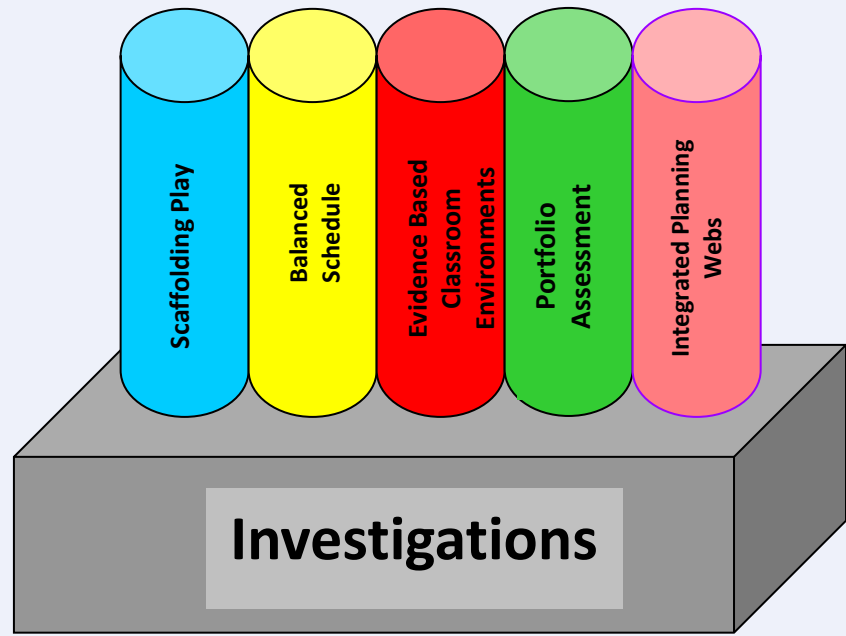
What is the *Investigations* Curriculum?



Five Pillars

1. Scaffolding children's social participation, thinking, and language in play
2. Purposeful balance in daily scheduling
3. Evidence-based classroom arrangement
4. Portfolio assessment
5. Integrated Planning Webs

The pillars underlie learning and teaching at group times, play times, transitions, and even lunch and snack.



Pillar One: Scaffolding Play



Teachers follow the ***OREO*** method of play interactions (Trawick-Smith & Dziurgot, 2010 a; 2010b):

O = ?

Observe

R = ?

Respond

E = ?

Exit

O = ?

Observe

Balanced Schedule



Active-quiet-active pattern

Child-guided-Teacher-guided Balance
(50/50 rule--EPPE Study)

Strategic Placement of Outdoor Play
(Pellegrini's research)

A schedule that, "children themselves
can understand" (Prescott's research)

Portfolio Assessment

Electronic Portfolio

- A collection of evidence supporting child's development.



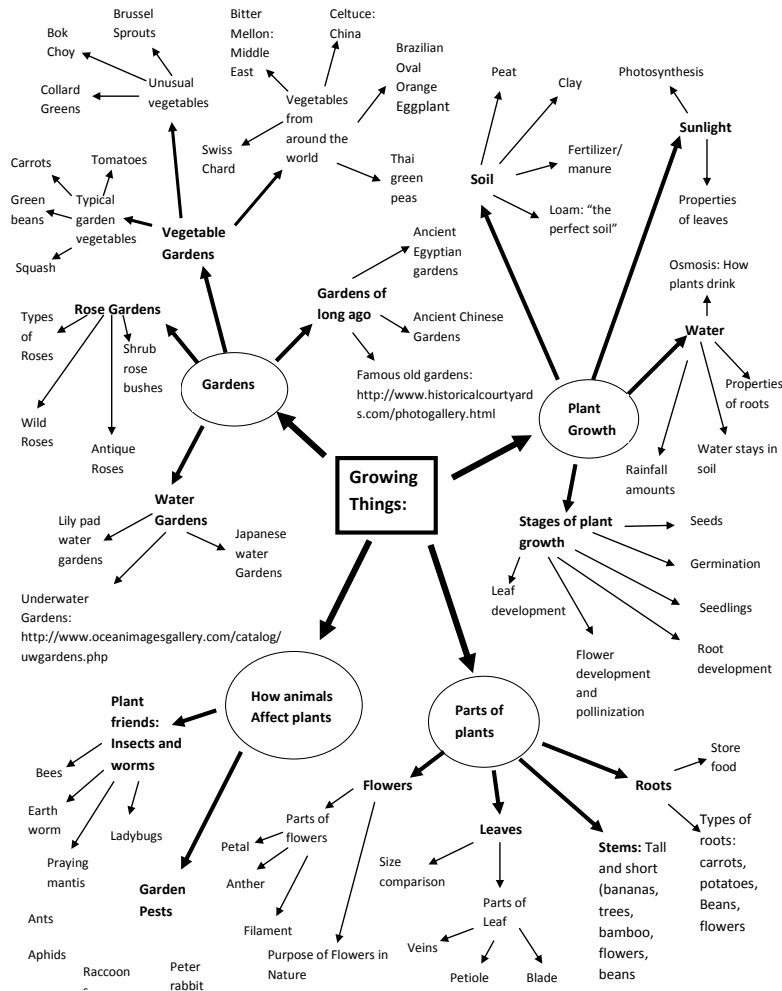
Child-centered Portfolio

- Child participating in own portfolio.



Reflection and goal-setting.

Integrated Planning Webs

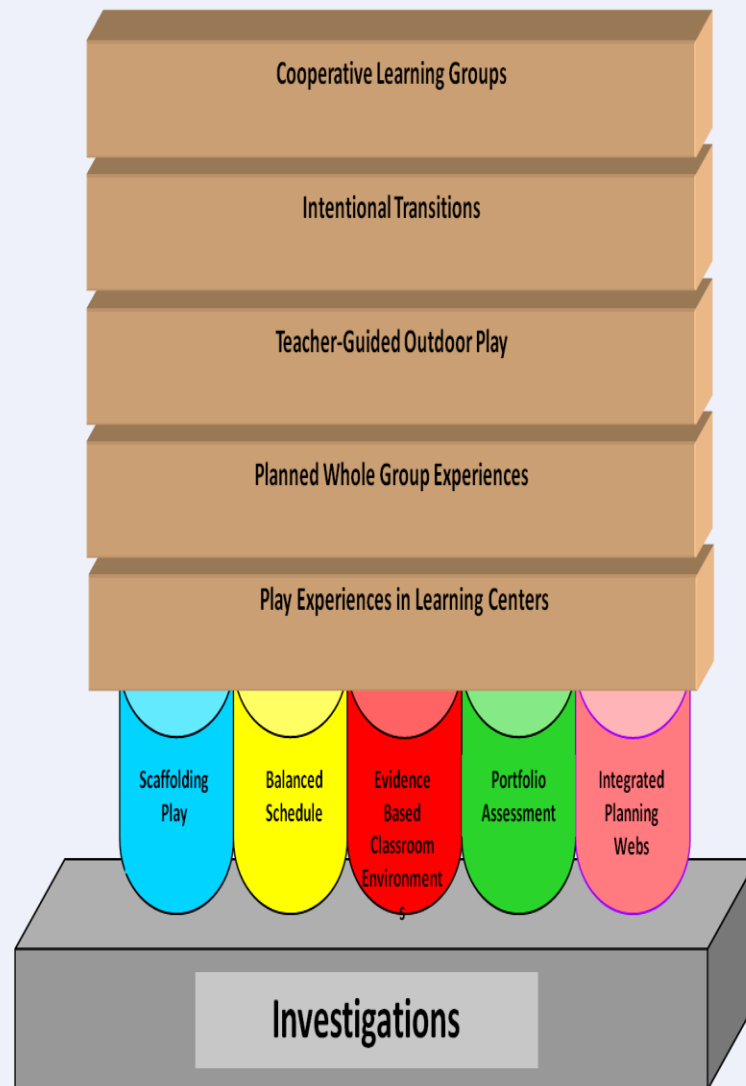




Five Platforms

Supported by these pillars, are five *platforms*—

1. Play experiences in learning centers.
2. Planned whole group experiences
3. Teacher-guided outdoor play
4. Intentional transitions
5. Cooperative learning groups



Unique Features of Platforms



Scaffolding outdoor play with a focus on MVPA and self-regulation

Snack time language interactions focused on investigations

Interactions in play to foster child-to-child conversations

Planned transitions that have a purpose

Cooperative learning that applies all research on grouping and facilitating co-construction of knowledge

What is an Investigation? Underlying Philosophy



❖ Preschool children actively make sense of the world, using **prior knowledge** and skills to **construct** an understanding of things that are of interest to them.

❖ Acquiring **content knowledge** is as important for preschool children as engaging in thinking and learning processes; the two cannot be teased apart.

❖ At a young age, children have a **curiosity** about and interest in the long ago, the far away, the puzzlements of nature, and other fascinating phenomena in the world.

❖ Young children can come to understand **any phenomenon** they have questions about, so long it can be **assimilated into previous knowledge**.

❖ Rich, **novel content** provokes questions, causes puzzlement, prompts exploration, and **stretches children's thinking**, in a way that tired, traditional topics cannot.

❖ Preschool children **co-construct** knowledge with peers and teachers; they are more likely to operate within the **Zone of Proximal Development** when they interact with “expert others.”

Stage 1: Topic Selection, Research, and Planning



Topic Selection:

Topics are selected based on the interest of the child, family, and/or teacher. The topic will be **meaningful, unique, and will stretch children's thinking**. We aim to select topics in which children have **some prior knowledge** to build upon yet not omit topics which children may not directly have experience. An investigations such as Bones, for instance, at first glance may seem challenging for preschoolers as bones are not visible. In *Investigations*, topics are **studied in depth**. Our Bones investigation for example, continued for over 14 weeks allowing ample time for exploration.

Stage 1: Topic Selection, Research, and Planning



Research:

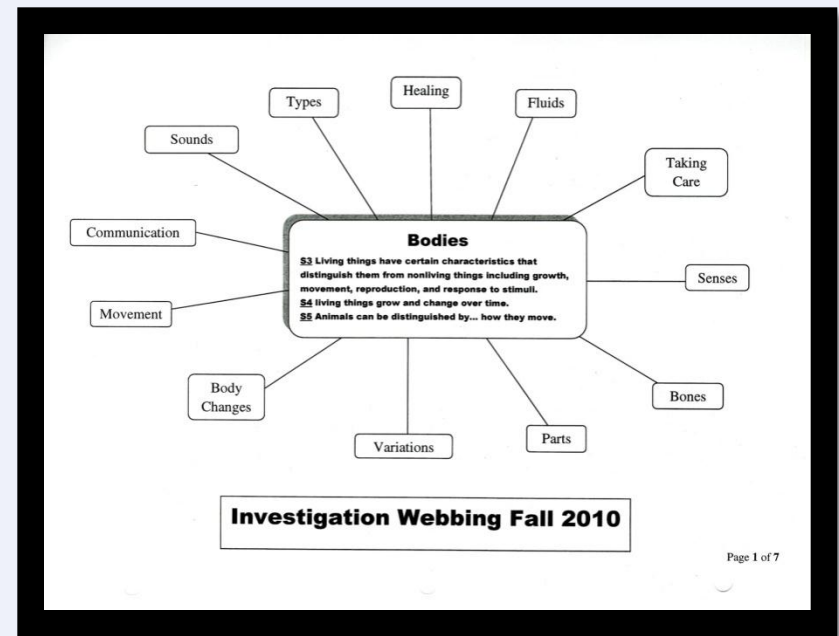
The **research phase** of the *Investigations* Curriculum involves brainstorming ideas (adults, children, families and any combination thereof), webbing of related ideas, and what is referred to as a ‘zooming in’ whereby a branch of the general web takes focus. For example, a **general web** may begin with the broad concept of *Body* and be narrowed down, or ‘zoomed in’, to *Bones*. Teachers then engage in further research to learn about the topic.

Stage 1: Topic Selection, Research, Webbing, and Planning

Webbing:

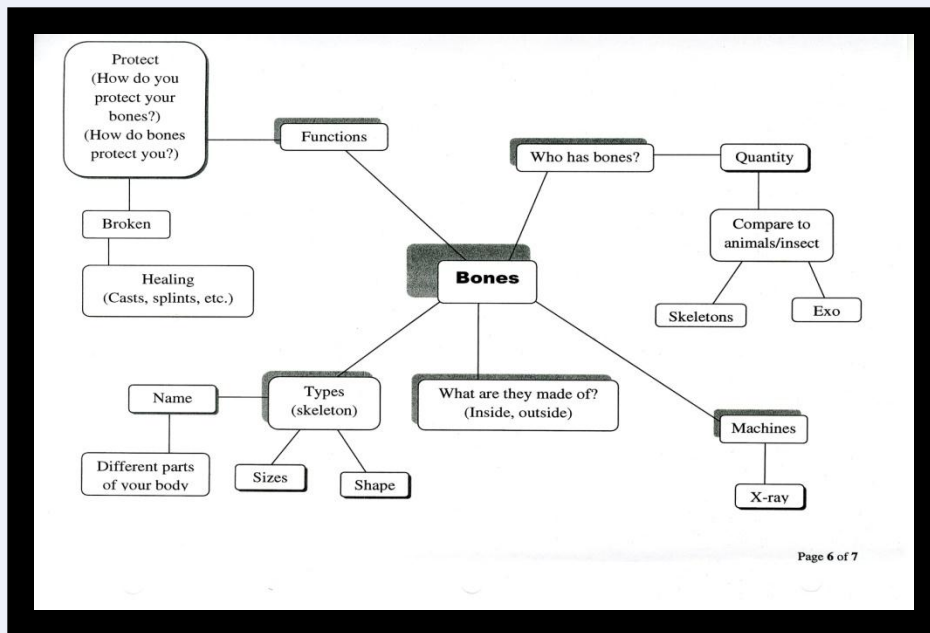


Teachers engaged in an initial webbing sessions (Bodies) before zooming into a more specific area of study (Bones).



Stage 1: Topic Selection, Research, Webbing, and Planning

Webbing: Narrow or 'zoom' in on area



One of many possible 'zoom' webs taken from the general brainstorming web.

Stage 1: Topic Selection, Research, Webbing, and Planning



Planning:

- ✓ Teachers select several **content goals** for the investigation that reflect the information included on the content web. Content goals are related to the recommended standards of national organizations for each academic discipline.
- ✓ Teachers plan **key experiences** related to the topics, content goals, and **performance standards** they have selected. Activities and key experiences are planned for each learning center, curricular platform, and all areas of the curriculum (e.g., math, science, motor play). For each activity entered, **at least one performance standard** is listed. **Assessment methods** are also listed for each curriculum area.

Stage 2: Assessing Prior Knowledge



Prior Knowledge:

Before implementing the investigation, teachers spend time assessing children's **background knowledge** on the topic. For instance, in blocks a teacher might ask "How did you reach that block" or in art "How are you able to pick up that tiny bead?", in literacy, talking about the main character in a *text fell* and broke her arm, for example. Teachers take the background knowledge, different for each child, and build upon it by implementing activities and key experiences and individualized scaffolding.

Stage 3: Initiation

Initiation:

The teacher initiated the investigation by **carefully planning** an engaging, meaningful, and personal lesson during whole group. She shared a gripping letter from her friend, who broke her foot, along with an x-ray explaining why she could not visit. During the week, the class read a variety of fiction and nonfiction books on the topic: Cassie's Cast, by Katherine Lewis, a story about a little girl breaking her arm, was especially captivating. It inspired a great amount of **conversation** about breaking legs, arms, and wearing casts. Teachers note that children, at the time, mention breaking a “leg” or “arm” with little reference to **bones**.



The teacher initiated the Bones Investigation by sharing a letter from a friend.



Stage 4: Awareness Phase

As part of the **awareness phase** on bones, children feel the bones in their hands making marks on the gloves. Some did this on a friend, some on themselves, while others chose to do both. The purpose of this activity was to increase children's awareness of where they have bones, where they do not have bones, what bones may feel like, and to foster a sense of wonder about bones.



Itzel pays close attention to the bones in her own hands as they observe using her senses of sight and touch. She carefully draws in the bones. Itzel examines her palm and feels bones on that side of her hand as well.



Sam chooses to trace her teacher's hand. She carefully feels each area, stopped, and made a dot at the area.



Stage 4: Awareness Phase

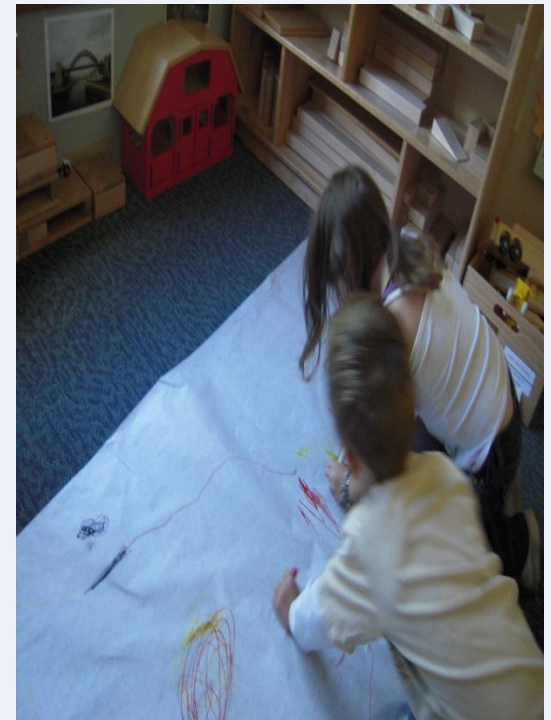
Eternity has a variety of experiences with this activity; she traces her teacher's hand, she allows her teacher to trace her hand, and she traces her own hand. Each experience adds to her awareness of bones in hands in rich ways.





Stage 4: Awareness Phase

As part of the Awareness Phase into Bones, children traced their teacher and decided where she may have bones. They drew in the bones and labeled them. This information, in addition to being a good initiation into an inquiry on Bones, provides valuable information on children's current level of background knowledge in the area. With this information, we can plan accordingly and individualize as needed.



Stage 5: Inquiry across Contexts

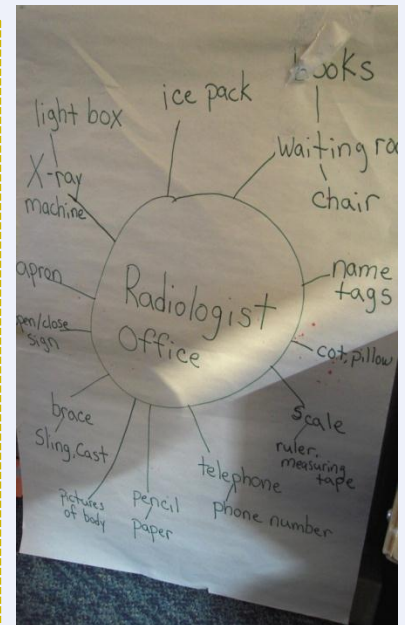


- Dramatic Play: Radiologist Office
- Math
- Science Center: Milk or Soda?
- Cooperative Activity: Building a skeleton part
- Family Connection

Stage 5: Radiologist Office

During the Awareness Phase, several texts inspired interest in broken bones and x-rays. This led to a new **dramatic play center: *The Radiologist Office***. The class creates a web including items needed for the center, different roles available as part of the center, etc. The web serves as a working 'check list' as we set up the center over the course of several days. During the **process**, they continue to acquire knowledge about content while building their background knowledge surrounding the center. They do so by:

- Researching types of x-ray machines
- Learning about roles associated with working/visiting a radiologist's office
- Reading and using language associated with the content area



Stage 5: Radiologist Office



Doing research on the types of x-ray machine.



After the research is complete, children create an x-ray machine with recycled materials.



Creating names tags for radiologists and labeling book basket for radiologist office.



Stage 5: Radiologist Office



Radiologist comparing bones

Patient at radiologist's Office





Stage 5:

Radiologist Office

Sadie looks at an x-ray of a foot.



**“IT LOOKS
LIKE YOU BROKE YOUR
BIG TOE.”**

SADIE



Stage 5: Does it bend?

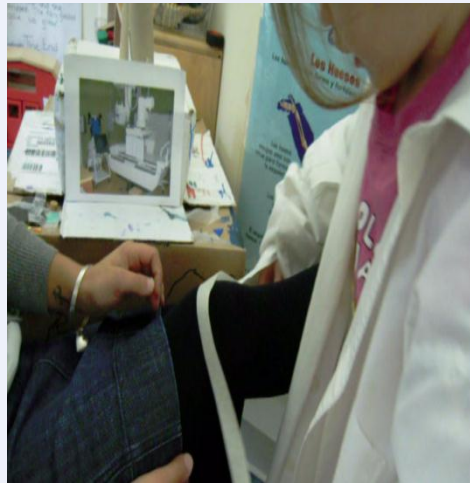
Skylar attempts to write with a splint on her fingers. Her teachers asked her to describe what it feels like

This activity was designed for a purpose; to highlight that joints help our fingers bend and this is what makes it easier for us to do things like write. It also highlights challenges people with limited use of fingers may confront.



Stage 5: Literacy Meets Numeracy

Dramatic play offers opportunities for numeracy as well as literacy. With the appropriate materials and teacher scaffolding, children begin to think mathematically and use **math talk** such as “It’s not long enough.” or “It’s too big.” In the radiologist office, such opportunities to foster math talk can be abundant. Children, while measuring patients for casts, often problem-solve as they used a variety of strategies to determine the length of a bandage. Children engage in trial and error as they roll a piece of bandage or tape, determined the size and then either cut or rolled the excess back.



Left: The radiologist determines the patient needs a cast. She asks for tape to use as a cast and begins to roll it around her patient’s knee demonstrating **problem-solving**.

Right: The doctor determines how much bandage is required to wrap her patient's leg: **“This is long enough”** she states using **math talk**.

Stage 5: Math in the Blocks



Alex uses **blocks** to **build a skeleton**. He begins this project after realizing that a certain block looked like “**the pelvis.**” He begins with that block, adds legs, and continues on to make the whole skeleton. He puts black blocks inside the circle that was the head. When asked what those blocks are, he replies, “They are the head bone and, and, and the brain stuff.” Afterwards, he decides to make a “baby skeleton.” He chooses smaller blocks “**cause babies are smaller than big people.**” He finds another block similar to the pelvis-shaped block and again, begins there. He measures the big skeleton and little skeleton with links to see which is larger. He **counts** to see how many blocks it took him to make the big skeleton. He counts 24 and “records” it in his notes.



Stage 5: Milk or Soda?

Experiment

After reading books about bones, and examining chicken bones closely, children predict which is better for bones; milk or soda. After reviewing HOW we would find out, children suggest placing [sanitized] chicken bones in each liquid and see what happens. They predict that the milk would be 'better' (meaning "the bone can't break in milk").

This experiment demonstrates children engaging the **process of inquiry**: making a **prediction** and designing the experiment while the teacher provides the background information and the materials.



"I can't do it. The milk is good. You broke the one in soda and I can't break this. Can you try?"
Alex



Stage 5: Milk or Soda?



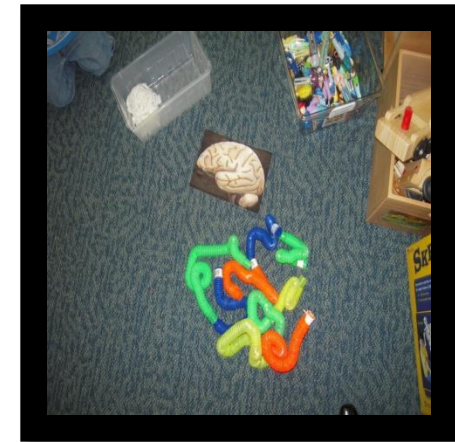
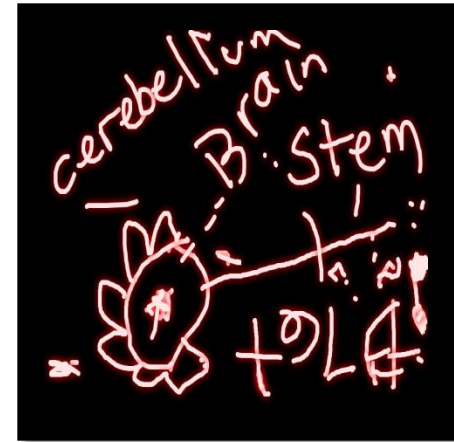
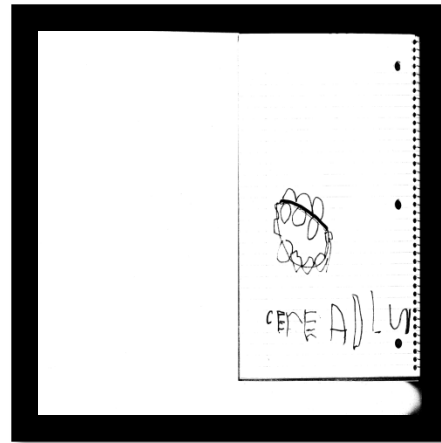
**“This is so hard to
break and bend!”
Skylar**





During our Bone Investigation, we learned about the importance of the brain and, related to the investigation, the importance of bones in protecting such a vital organ. Over the course of a week, one student, Alex, used three different mediums to represent the brain.

The Brain: Three Ways



Stage 5: Cooperative Learning Groups



Cooperative activity, a time set aside daily for small groups to work together towards a **common goal**, is a part of our curriculum. Children, in cooperative groups, make a decision about what body part they would like to create. Together, they sketch the body part and make a list of materials they decide they will need. On subsequent days, they review their sketches, check their materials, review their steps, and make decisions about who would do what part.

Cooperative learning has many benefits to young children's development such as:

- increasing social-emotional competence (negotiating tasks,
- accepting others' views, expressing feelings),
- cognitive development (mathematical reasoning, problem-solving, and language),
- motor development.
- appreciation of differences (working alongside someone they would not typically)
- creativity



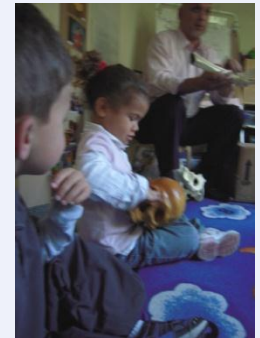
Phase 5: Family Involvement

Special Guest: Helping children further extend knowledge



Inviting a **special visitor** to the classroom can have **positive impact** on expanding children's knowledge. When the specialist is **family**, the child, the experience is that much more significant.

Chris (Dominic's father) works alongside orthopedic doctors as he trains them to repair broken bones. He brings replicas of bones and talks about the different parts of our skeleton. In preparation for the visit, we put together a skeleton in large group, hung it up, and began labeling it with both common terms and medical terms. Chris brought **hands-on materials** for children to explore as they learned about bones adding richness to the experience.



Phase 5: Science Fair

Early Childhood Education Department Interfaces with University Laboratory Preschool



As a **university laboratory preschool**, the CFDRRC is at a great advantage. Interfacing with the early childhood education department has provided countless **opportunities for children, university students, faculty, and teachers**. Collaboration with faculty is so vital as the science fair demonstrates. Each semester, as part of their core requirements for early childhood teacher preparation, students, under the guidance of Dr. Sudha Swaminathan, **plan science experiences** for young children. The process begins with Dr. Swaminathan sharing our investigation with her students. Next, her students devise **lesson plans** pertaining to our investigation, share the plans with the preschool teachers, meet to discuss and modify plans, and finally, execute the science fair. Students conduct the initiation, scaffold, observe, document, and reflect over their lessons. Children benefit greatly as the centers **reinforce concepts** they are exploring in their classrooms.



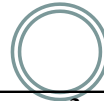
Education students create a variety of activities supporting the investigation including children placing layers of “muscle” and “skin” on a skeleton. Children’s prior knowledge helps them with this and other activities.

Assessment



Anecdotal records, photos, videos, rubrics are part of the **authentic assessment** and data collection model we use. Each child has an electronic portfolio whereby assessments are stored, reviewed, and shared with families. Newsletters, displays and documentation panels are ways we share children's work with families.

Ensuring Fidelity



5	4	3	2	1
All adults in the classroom regularly interact with children in play to promote child-to-child conversation and greater peer interaction.	Most adults in the classroom exhibit some play interaction strategies that promote child-to-child conversation and interaction.	Some adults in the classroom implement at least one strategy per day to promote child-to-child interactions and communication in play.	Only one or two such strategies are evident during an observation period, across all adults in the classroom.	There is no evidence of such strategies during an observation period, across all adults in the classroom.
All adults engage children regularly in “shared sustained thinking,” as prescribed by the curriculum, during play, in which they encourage children to think in deeper ways, solve new problems, or learn a new concept.	Most adults engage in “shared sustained thinking,” however, some do more telling than guiding when implementing this strategy.	Some adults engage in “shared sustained thinking,” although more of these interactions involve direct teaching, rather than guiding children in thinking on their own or solving their own problems.	Only one or two thinking and learning strategies are observed, across adults, during an observation; these are most often telling than guiding approaches.	There is no evidence of “shared sustained thinking” of any kind during play.
All adults regularly help children learn new words and extend/recast their statements , when interacting with them during play, as prescribed by the curriculum.	Most adults show they are helping children learn words and are expanding and extending their utterances.	Some adults in the class use at least two such language strategy—word learning or recasting/expanding—on each observation period.	Recasts and word learning strategies are rare in adults’ play interactions with children.	There is no evidence of recasting and word teaching, across all staff during an observation period.
All adults show clearly (e.g., watching from a distance, taking notes) that they observe the outcomes of their play interactions, after they exit the play area.	Most adults show evidence that they observe outcomes of some adult-child play interactions after they leave the play area.	Some adults show periodic effort to observe the outcomes of their play interventions after they have left the play area.	Most adults make only momentary, cursory glances at children’s on-going play after they intervene and leave the play area.	There is no evidence that adults thoughtfully study the impact of their play interventions after they have ended.

Ensuring Fidelity



Advanced Implementation 5	4	Emerging Implementation 3	2	Poor Implementation 1
<p>Transitions are brief and involve little or no waiting (e.g., standing in line, waiting to be served or for all children to arrive at group time); transitions are kept simple and to a minimum; no unnecessary transition steps are included.</p>	<p>Most transitions are brief, and minimal waiting is observed; few unnecessary transitions or transition steps are observed.</p>	<p>Many transitions are brief; some appear to be unnecessarily long or not to be needed at all.</p>	<p>Most transitions are too long or involve steps that are unnecessary; many do not seem to be necessary at all.</p>	<p>Transitions are too slow, require children to wait long periods, and/or have no clear purpose; too many transitions steps challenge children's abilities to maintain self-control.</p>
<p>All transitions are smooth; children have a clear sense of what they are to do and show self-regulation; disruption, conduct problems, and non-compliance are rare.</p>	<p>Most transitions proceed smoothly; children appear to know what they are to do; challenging behaviors are infrequent, some children need adult reminders or guidance to follow transition steps.</p>	<p>Many transitions are smooth; some children appear self-directed; some individuals do not and require reminders and guidance to follow transition steps.</p>	<p>Most transitions are rough; wandering, overly-active behavior, disruption, and conduct problems are common; many children need guidance in order to follow transition steps.</p>	<p>Transitions are chaotic, loud, overly-active, and involve much misbehavior and/or anxiety among children; most children do not appear to understand transition steps; adults sometimes resort to controlling and harsh behaviors to maintain control.</p>
<p>Children learn new concepts, language, or skills during each transition; literacy is frequently used to guide children's behavior.</p>	<p>Many transitions teacher children concepts, language, or skills; literacy is periodically used to guide children.</p>	<p>Several transitions per week teach children specific concepts, words, or abilities; literacy is rarely used as part of transitions.</p>	<p>Transitions rarely teach children particular content or skills; transition activities appear to be designed primarily to move children from point A to B.</p>	<p>Transitions do not appear to teach children any new knowledge and skills.</p>

Ensuring Fidelity

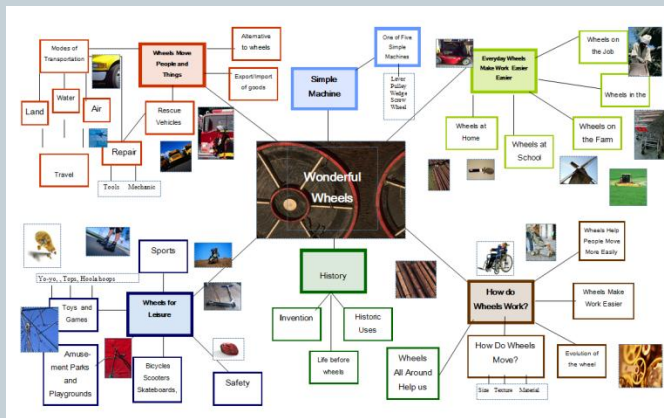


Advanced Implementation 5	4	Emerging Implementation 3	2	Poor Implementation 1
Each group time has an effective introduction that grabs children’s attention and gives an advance overview of what will be discussed, and a closure that summarizes or synthesizes what has been learned; a highly creative, “cognitively-oriented” send-off activity has been planned that transitions children to the next activity.	An introduction and closure are planned for each group time activity; the former effectively captures children’s attention and introduces the topics to be discussed; the closure summarizes what has transpired in the group; send off activities are less creative and cognitively-oriented; the same closure is repeated without variation.	Introduction and closure activities are clearly planned; the introduction is effective in capturing children’s attention, but does not always “set the stage” for upcoming activities of the group time; a closure signals the end of group time, but does not always summarize the activities or learning that occurred; send off techniques are less creative and often repeated.	Introduction and closure activities are planned, though they lack the effectiveness to capture children’s interest or summarize all that has been learned in group time; send-off techniques are not effective in achieving smooth transitions to the next activity.	An introduction and closure, including a send-off strategy, are not found in the plans, nor observed in the structure of each group time, itself; group time simply begins and ends, without these pre- and post-activity elements.
Teachers use positive and effective management techniques in group times that keep individual children involved, draw in children who “drift” or grow restless, and effectively resolve conduct problems or disruptions.	Teachers use a variety of management techniques during group time to maintain children’s attention and positive behavior; many of these strategies are highly effective, though some are less so for individual children.	Teachers use several different management strategies to maintain attention and positive behavior during group time; these are moderately successful, though there are occasional challenging behaviors that interrupt group time activities.	Teachers use only a small number of strategies to engage children or address challenging behaviors at group time; varied approaches are not tried; most group times are disrupted by children’s behavior or lack of attention.	Teachers use only harsh or negative management strategies to quiet or engage children in group time activities; these are relatively ineffective and/or fail to keep children engaged for even short periods of time.
Teachers always use gestures, visual displays, animated voices, and other visual and auditory cues to keep children in involved.	Teachers often use visual or auditory cues to engage children; they assume an animated, engaging style of presentation.	Teachers periodically use auditory and visual cues and an animate voice to keep children engaged; sometimes such cues are lacking and would increase participation and attention.	Teachers rarely provide visual or auditory cues to help children learn; teaching behaviors are somewhat flat, lack enthusiasm, or fail to excite children’	Visual displays, gestures, body language, and animated teaching are not observed.

Webbing WHEELS

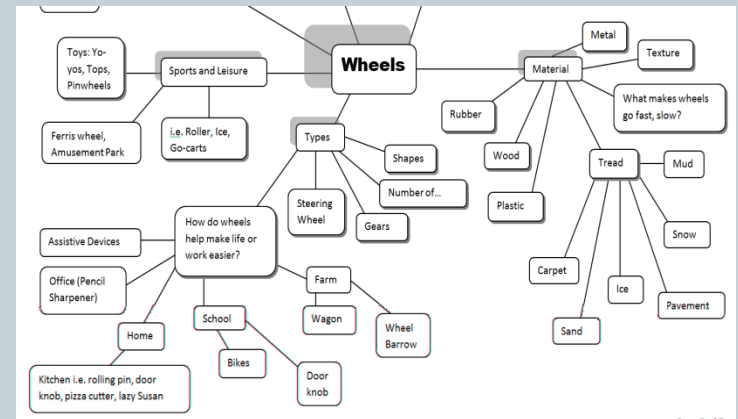
Wheel Web 1

- From class



Wheel Web 2

- Center web



Bones Newsletter



- Sharing with Families**
- Sharing with colleagues**
- Documentation panel**
- Under publication**

Plan Books



- ❑ **Plan books**
- ❑ **Customized to meet the schedule, assessment, individual needs, and other curriculum components.**
- ❑ **Will post**

Conclusion



- ❑ **Math and science** spans across the curriculum
 - ❑ Rich investigations , planning, and scaffolding make it possible!
- ❑ **Unique topics** with preschoolers are not to be feared but rather embraced. If we as teachers take risks, our students will too.
- ❑ **Extended and in-depth studies** provide children with opportunities to explore; it sometimes takes a while for children to ‘warm up’ to the investigation. We need to practice **temporal patience**.