Early Science Learning - Resources, Tools, and Activities to Help Support Children’s Science Learning

October 20, 2017

1:30-5:30 pm
Early Science Learning - Resources, Tools, and Activities to Help Support Children’s Science Learning

October 20, 2017
1:30-5:30 pm
Introductions and Ice Breaker

- Find 3-5 people you do not know and find
  - Something that is similar about the work you do
  - Something that is different about the work you do
  - A fun fact that you can’t tell by appearances
Overview of the Session

- Background of the Collaborative for Early Science Learning
- Museumtools.org
- Justification and Partnerships, Teacher Trainings, Family Engagement
- Implementation plan overview
- Help us answer the questions posted around the room
Justification

- Why museums?
  - Community Resource and Stakeholder
  - Skilled at engaging adults and children
- What can your institution offer?
  - Professional Development Plans
  - Family Engagement
  - Museum Access Programs
Justification

- Why Science?
  - Science is developmentally valuable for young children
  - Young children are already developing ideas on how the world works through hands-on exploration
  - Young children learn like scientists
  - Process skills vs Content
Justification

How do you see children practice science process skills in your exhibits or programs?
Mind in the Making - Alison Gopnik
Justification

How do you see children practice science process skills in your exhibits or programs?
Why focus on early childhood programs?

- Science and STEM PD is often requested by teachers
- Adults often feel uncomfortable with science
- Low assessment scores from teachers
- Science learning covers literacy and math
- Science process skills align with early childhood standards and assessment goals
Justification

Before Teacher Trainings

After Teacher Trainings
Head Start Early Learning Outcomes Framework

<table>
<thead>
<tr>
<th>CENTRAL DOMAINS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>APPROACHES TO LEARNING</strong></td>
</tr>
<tr>
<td>INFANT/TODDLER DOMAINS</td>
</tr>
<tr>
<td>PRESCHOOLER DOMAINS</td>
</tr>
</tbody>
</table>

## Connecting Process Skills to Assessments

<table>
<thead>
<tr>
<th>Science Process Skill</th>
<th>COR (Child Observation Record) Assessment Items</th>
<th>Teaching Strategies Gold Assessment Items</th>
<th>CLASS Indicators</th>
</tr>
</thead>
</table>
| **Observing**         | • Observing and Classifying  
                        | • Natural and physical world  
                        | • Patterns  | • Shows curiosity and motivation  
                        | • Uses scientific inquiry skills  
                        | • Attends and engages  
                        | • Recognizes and recalls  | • Connects Concepts  
                        | • Integrates with previous knowledge  
                        | • Real world applications  
                        | • Related to students real lives  
                        | • Active participation  
                        | • Focused attention  
                        | • Follows students lead |
| **Predicting**        | • Experimenting, predicting and drawing conclusions  | • Uses scientific inquiry skills  
                        | • Shows curiosity and motivation  
                        | • Shows flexibility and inventiveness in thinking  | • Prediction/Experimentation  
                        | • Brainstorming |
| **Measuring**         | • Measurement  
                        | • Tools and technology  | • Uses scientific inquiry skills  
                        | • Compares and measures  
                        | • Uses tools and other technology to perform tasks  | • Active Participation  
                        | • Focused attention |
| **Experimenting**     | • Experimenting, predicting, and drawing conclusions  
                        | • Data Analysis  | • Uses scientific inquiry skills  
                        | • Shows flexibility and inventiveness in thinking  | • Evaluation  
                        | • Prediction/experimentation |
| **Problem Solving**   | • Problem solving with materials  
                        | • Conflict Resolution  | • Uses scientific inquiry skills  
                        | • Attends and engages  
                        | • Solves problems  
                        | • Persists  | • Problem Solving  
                        | • How and Why Questions  
                        | • Integrates with Previous Knowledge  
                        | • Hints  
                        | • Assistance  
                        | • Focused attention |
| **Using Tools**       | • Measurement  
                        | • Problem Solving with Materials  
                        | • Tools and technology  | • Uses scientific inquiry skills  
                        | • Uses tools and other technology to perform tasks  | • Range of auditory, visual, and movement activities  
                        | • Hands on opportunities  
                        | • Focused attention |
| **Communication**     | • Speaking  
                        | • Listening and Comprehension  
                        | • Reflection  | • Uses an expanding expressive vocabulary  
                        | • Speaks clearly  
                        | • Follows directions  
                        | • Tells about another time or place  | • Peer Conversations  
                        | • Contingent responding  
                        | • Back and forth exchanges  
                        | • Encourages student talk  
                        | • Elicits ideas and/or perspectives  
                        | • Specific Feedback  
                        | • Variety of words |
Getting Started: St Louis Science Center

- Why did you want to get started?
  - Contacted by local Head Start initially
  - Growing our early childhood initiative
- What services do you provide?
  - Classroom visits/Field Trips
  - Teacher PD workshops
  - Parent workshops
  - Family experiences
- Funding?
  - Grant funded
  - Fee based
Getting Started: St Louis Science Center

- Who is involved from Head Start?
  - Curriculum Coordinator
  - Site Supervisors
  - HS Director
- Who is involved from your museum organization?
  - Education
  - Development
  - Marketing
Maintaining and Sustaining Partnerships: Maryland Science Center

- Goals of the Partnership
- Communication with your partners
  - Figure out what works for them
- Evaluation
  - Useful for grants - data speaks
- Funding
  - Without our long term commitment to our Head Start Partners, we would have never received an endowment for the program
- Institutional Support
  - Kept the program going for years
Challenges and Solutions

- Who do you initially make contact with?
- Staff turnover
- First year blahs.
- Scheduling
Implementation Guide Questions:
Desired Impacts and Capacity
Break
Planning Teacher Training Programs

- Common Goals
  - Inspire teachers to make science part of their daily routines, activities, and interactions in the classroom
  - Help them to plan and provide developmentally appropriate early learning experiences in science.
  - Engage teachers in hands-on activities that allow them to experience exploration and discovery much the way children do
  - Collaborate with each other to discuss adaptations and extensions to the activities in their own classrooms
  - Encourage teachers to think of themselves as lifelong learners of math and science
Planning Teacher Training Programs

Teacher Training Components

Audience
- Same organization or different?
- Ages participants work with
- Types of programs (home day care, preschool, district, Head Start, etc.)
- Number of Participants
- Funding
Planning Teacher Training Programs

Teacher Training Components

Logistics

- "One shot" workshops or ongoing?
- Frequency of workshops during the year
- Length of workshops
- Content/activities
- Location of training
## Planning Teacher Training Programs

- **Common Components**

<table>
<thead>
<tr>
<th>PD Component</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sign-in and nametags</td>
<td></td>
</tr>
<tr>
<td>Snacks</td>
<td></td>
</tr>
<tr>
<td>Presenter and participant introductions</td>
<td></td>
</tr>
<tr>
<td>Review workshop goals/agenda</td>
<td></td>
</tr>
<tr>
<td>Ice breaker game</td>
<td></td>
</tr>
<tr>
<td>Highlight Science Process Skills</td>
<td></td>
</tr>
<tr>
<td>Hands-on science activities</td>
<td>(modeled and experienced as would be done with children)</td>
</tr>
<tr>
<td>Small group discussions</td>
<td></td>
</tr>
<tr>
<td>Sharing related research</td>
<td></td>
</tr>
<tr>
<td>Connections to state guidelines, Head Start frameworks etc.</td>
<td></td>
</tr>
<tr>
<td>Workshop evaluation/feedback</td>
<td></td>
</tr>
<tr>
<td>Provide curriculum resources and take-home materials</td>
<td></td>
</tr>
<tr>
<td>Other?</td>
<td></td>
</tr>
</tbody>
</table>
Planning Teacher Training Programs

- Hands on Activities!
  - Snails observations
  - Measuring exploration
  - Predictions with chemical reactions
Planning Teacher Training Programs

What questions might you use to guide teacher conversation?

Examples:

- What process skills do you notice?
- What adaptations can you make for specific ages?
- How does this activity support preschool standards?
Planning Teacher Training Programs

- Activity Review
  - What process skills do you notice?
  - What questions would you use to guide teacher conversation?
  - What adaptations can you make for specific ages?
  - How does this connect to preschool standards?
Break
Planning Family Engagement Programs

- Common Goals
  - Engage families in their children’s learning.
  - Teach families about what science looks like for their young children.
  - Help families understand science is simple and already all around us.
  - Teach parents to recognize when their children are doing science.
  - Give families the tools to do science activities with their children.
Program Components

- Defined Objectives
- Funding
- Point Person
- Staffing
- Attendance
- Scheduling
- Location
- Evaluation
- Food
- Marketing
- Engaging Content
- Materials
Connections Program
▶ Currently 43 schools, 90 classrooms, more than 1700 students
▶ Outreach & Field Trips with federally subsidized preschools
▶ Parent Play Workshop (PPW) is within this long term, multi touch point partnership program
▶ Funding: museum raises funds through grants, foundations, and individual donors
Connections: Parent Play Workshop - Bay Area Discovery Museum

**Logistics**

- **Location**
  - At school: in classroom, all purpose room, etc.

- **Audience**
  - Parents/Caregivers as adult learners
  - Anywhere from 5-40 people
  - 1-2 museum staff facilitating, often translated

- **Frequency & Length**
  - Offered to each partner site once a school year
  - 60-90 minutes
Family Engagement Workshops - Sciencenter

Logistics

- **Audience**
  - Head Start families (adults & children)
  - ~100 people

- **Frequency & Length**
  - Nine events a year; 1.5 hours each

- **Location**
  - On-site at museum
  - Transportation provided

- **Staffing**
  - 2 to 3 educators

- **Funding**
  - IMLS Science From the Start, donors, Tompkins Community Action

- **Food**
  - Dinner provided
Family Engagement Workshops - Sciencenter

**Activities**
- Teachers run activities, encourage adults to facilitate for children
- Complement PD curriculum
- Easy, use simple materials

**Wrap Up**
- Gather everyone in amphitheater for story and science experiment
- Helps signify end of event.
Frost Science

- Two primary strategies to engage Head Start families:
  - Workshops for parent leaders
  - Family Science Days

- Based on Early Childhood Hands-On Science (ECHOS®)
Parent Leader Workshops @ Frost Science

- Play is Learning
- Science and Math in Your Pocket
- Parent Café: Conversations to Keep Families Strong
- Learning Resources at the Science Museum
- Parents try out and take home science activities
- Families try out activities during Family Day
Family Days @ Frost Science

- **Audience**
  - Children and families

- **Frequency & Length**
  - Once a year per center
  - Half day on Saturday or Sunday

- **Location**
  - Frost Science; bus provided

- **Special Feature**
  - ECHOS ambassadors - high school students from Upward Bound Math/Science program – bilingual, from same communities
Hands-on Stations

Sciencenter
- Family Engagement Workshops

Frost Science
- Workshops for parent leaders
- Family Science Days

Bay Area Discovery Museum
- Parent-Play Workshop
Implementation Guide Questions: Planning a Family Engagement Program
Implementation Guide Chart: Next Steps

---

CESL
Collaborative for Early Science Learning

---

[Logo and text]

Families, teachers and other professionals are invited to use and share our hands-on activities guides and professional materials. The Sciencenter will continuously add relevant information to this page.

**RESOURCES FOR KIDS & FAMILIES**

- Chemistry Activities

**RESOURCES FOR EDUCATORS**

- Field Trips Supplemental Activities
- Chemistry Activity Lesson Plans

**RESOURCES FOR MUSEUM PROFESSIONALS**

**COLLABORATIVE FOR EARLY SCIENCE LEARNING**

Resources to support museums partnering with local Head Start programs to provide teacher professional development and family engagement focusing on early childhood science.

- Launch a Collaboration
- Working with Head Start Teachers
- Working with Head Start Families
Thank you!

This project was made possible in part by the Institute of Museum and Library Services.