

CESL



— Collaborative for —
Early Science Learning

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?

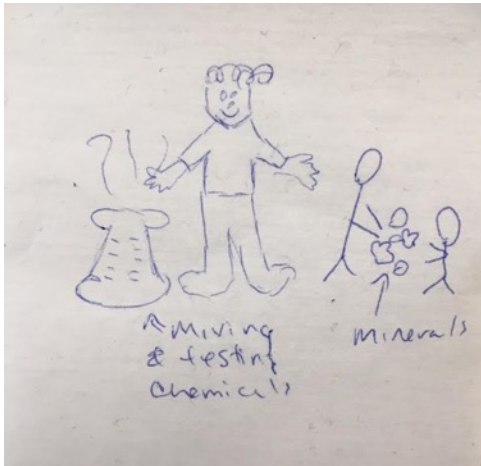
Justification

- ▶ 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

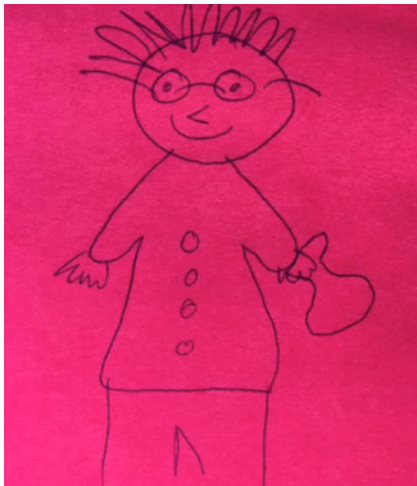


Justification

Before
Teacher
Trainings



After
Teacher
Trainings



Head Start Early Learning Outcomes Framework

CENTRAL DOMAINS					
	APPROACHES TO LEARNING	SOCIAL AND EMOTIONAL DEVELOPMENT	LANGUAGE AND LITERACY	COGNITION	PERCEPTUAL, MOTOR, AND PHYSICAL DEVELOPMENT
▲ INFANT/TODDLER DOMAINS	Approaches to Learning	Social and Emotional Development	Language and Communication	Cognition	Perceptual, Motor, and Physical Development
● PRESCHOOLER DOMAINS	Approaches to Learning	Social and Emotional Development	Language and Communication	Mathematics Development	Perceptual, Motor, and Physical Development
			Literacy	Scientific Reasoning	

<https://eclkc.ohs.acf.hhs.gov/hslc/hs/sr/approach/pdf/ohs-framework.pdf>

Connecting Process Skills to Assessments

Science Process Skill	COR (Child Observation Record) Assessment Items	Teaching Strategies Gold Assessment Items	CLASS Indicators
Observing	<ul style="list-style-type: none"> Observing and Classifying Natural and physical world Patterns 	<ul style="list-style-type: none"> Shows curiosity and motivation Uses scientific inquiry skills Attends and engages Recognizes and recalls 	<ul style="list-style-type: none"> Connects Concepts Integrates with previous knowledge Real world applications Related to students real lives Active participation Focused attention Follows students lead
Predicting	<ul style="list-style-type: none"> Experimenting, predicting and drawing conclusions 	<ul style="list-style-type: none"> Uses scientific inquiry skills Shows curiosity and motivation Shows flexibility and inventiveness in thinking 	<ul style="list-style-type: none"> Prediction/Experimentation Brainstorming
Measuring	<ul style="list-style-type: none"> Measurement Tools and technology 	<ul style="list-style-type: none"> Uses scientific inquiry skills Compares and measures Uses tools and other technology to perform tasks 	<ul style="list-style-type: none"> Active Participation Focused attention
Experimenting	<ul style="list-style-type: none"> Experimenting, predicting, and drawing conclusions Data Analysis 	<ul style="list-style-type: none"> Uses scientific inquiry skills Shows flexibility and inventiveness in thinking 	<ul style="list-style-type: none"> Evaluation Prediction/experimentation
Problem Solving	<ul style="list-style-type: none"> Problem solving with materials Conflict Resolution 	<ul style="list-style-type: none"> Uses scientific inquiry skills Attends and engages Solves problems Persists 	<ul style="list-style-type: none"> Problem Solving How and Why Questions Integrates with Previous Knowledge Hints Assistance Focused attention
Using Tools	<ul style="list-style-type: none"> Measurement Problem Solving with Materials Tools and technology 	<ul style="list-style-type: none"> Uses scientific inquiry skills Uses tools and other technology to perform tasks 	<ul style="list-style-type: none"> Range of auditory, visual, and movement activities Hands on opportunities Focused attention
Communication	<ul style="list-style-type: none"> Speaking Listening and Comprehension Reflection 	<ul style="list-style-type: none"> Uses an expanding expressive vocabulary Speaks clearly Follows directions Tells about another time or place 	<ul style="list-style-type: none"> 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

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Break

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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

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



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?



Implementation Guide Questions: Planning a Teacher Training Program

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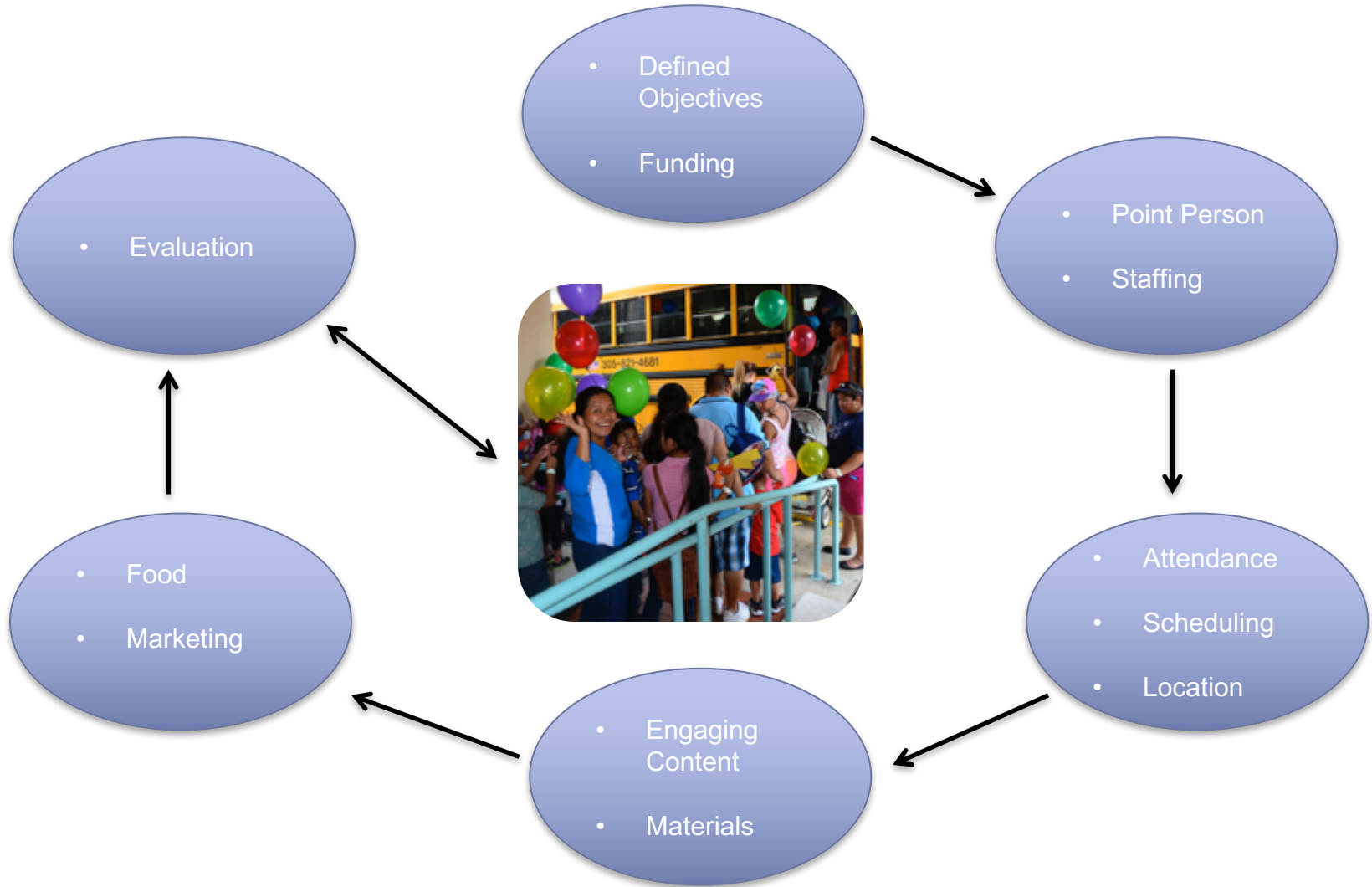


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Planning Family Engagement Programs

- ▶ 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



Connections: Parent Play Workshop - Bay Area Discovery Museum

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

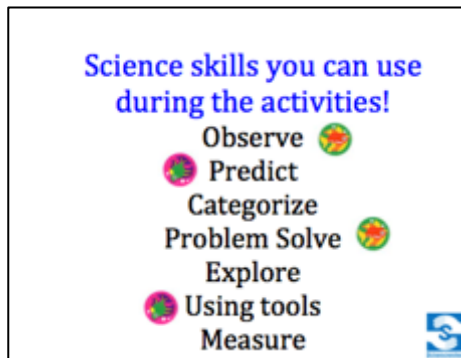
- ▶ Audience
 - ▶ Head Start families (adults & children)
 - ▶ ~100 people
- ▶ Frequency & Length
 - ▶ Nine events a year; 1.5 hours each
- ▶ Location
 - ▶ On-site at museum
 - ▶ Transportation provided
- ▶ Staffing
 - ▶ 2 to 3 educators
- ▶ Funding
 - ▶ IMLS Science From the Start, donors, Tompkins Community Action
- ▶ Food
 - ▶ Dinner provided



Family Engagement Workshops- Sciencenter

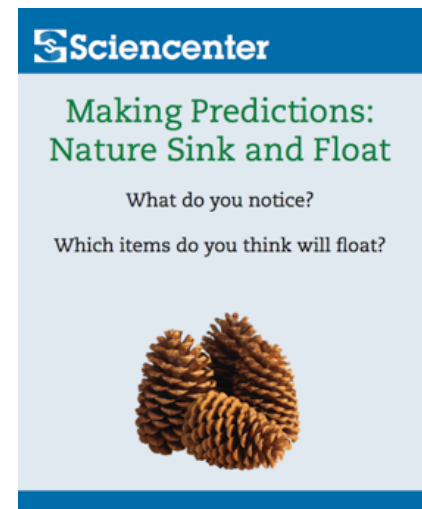
Activities

- ▶ 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

ECHOS®
Busy Buzzing
Bees

Creative Arts iCard
Fingerprint Bee Cards

Children create bee picture cards.

Materials

- black washable finger paint
- crayons
- hand wipes/wet paper towels
- Honeybee photograph

For each child:

- one index card
- one small paper plate

Preparation

1. Pour black, washable finger paint onto each plate.
2. Place the Honeybee photograph in an area visible to the children.

Procedure

1. Say: Today we are going to use our fingers to create bee cards.
2. Give each child an index card and a small plate with a small amount of black finger paint.
3. Model how to make a fingerprint bee by using your index finger to make one fingerprint at a time side by side: one to represent the head, one for the thorax and one for the abdomen.
4. Assist children in using crayons to add legs, wings and antennas to their fingerprint bee. If needed, refer to the bee diagram to create the fingerprint bee card.
5. Provide hand wipes or wet paper towels for the children to clean their fingers following the activity.



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ECHOS®
Abejas
Trabajadoras

Tarjeta de Artes Creativas
Abejas de Huellas Digitales

Los participantes crean tarjetas de abejas hechas con huellas digitales.

Materials

- pintura de dedos negra lavable
- crayones
- toallitas húmedas/papel toalla húmedo
- fotografía de la Abeja de Miel

Para cada participante:


- una ficha
- un plato de papel pequeño

Preparación

1. Eche un poco de pintura en cada plato.
2. Ponga la foto de la Abeja de Miel a la vista de todos los participantes.

Procedimiento

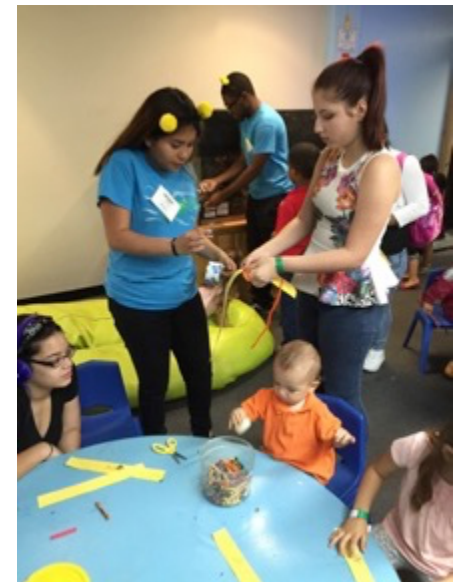
1. Diga: Hoy vamos a usar nuestros dedos para crear tarjetas de abejas.
2. Dé a cada participante una ficha y un plato pequeño con un poquito de pintura de dedos de color negro.
3. Muestreles cómo crear una abeja de huellas digitales con el dedo índice. Haga tres huellas, una para representar la cabeza, una para el tórax y una para el abdomen.
4. Ayude a los participantes a usar los crayones para dibujar las patas, alas y antenas de su abeja de huellas digitales. Si es necesario, consulte el diagrama de la abeja para crear la tarjeta de abeja de huellas digitales.
5. Proporcione toallitas húmedas o pedazos de papel toalla húmedo para que los participantes se limpien los dedos después de la actividad.



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Family Days @ Frost Science

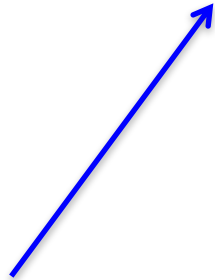
- ▶ Audience
 - ▶ Children and families
- ▶ Frequency & Length
 - ▶ Once a year per center
 - ▶ Half day on Saturday or Sunday
- ▶ Location
 - ▶ Frost Science; bus provided
- ▶ Special Feature
 - ▶ ECHOS ambassadors - high school students from Upward Bound Math/Science program – bilingual, from same communities



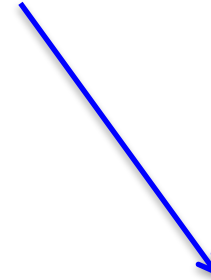
Hands-on Stations

Sciencenter

-Family Engagement Workshops



Frost Science



Bay Area Discovery Museum

-Workshops for parent leaders



-Parent-Play Workshop

-Family Science Days

Implementation Guide Questions: Planning a Family Engagement Program

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Implementation Guide Chart: Next Steps

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RESOURCES & MUSEUM TOOLS

Engage. Educate. Empower.

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

