Making STEM Real

Our ordinary is extraordinary.
Disconnection....

• Too often we teach science as a set of disconnected facts with little or no connection to real life.

• Information goes into memory and stays there when a person can make a connection to something they already know or something they care about.
Brain Facts

• Rich, stimulating environments promote greater learning.
• The brain absorbs much that goes on at different levels, often picking up subtle bits of information that complete a larger picture.
• By varying content, presenters, or learning environments for your students, they will learn more (multiple exposures)
Vision and Learning

• Vision is by far our most dominant sense, taking up half of our brain’s resources

• We learn and remember best through pictures, not through written or spoken words
Recall

- Recall is three times better for visual information than oral information
- Recall is six times better when there is both visual and oral
Transfer of Learning  
Multiple exposures and distributed learning

• Knowledge that is taught in a variety of contexts and over time is more likely to support flexible transfer than knowledge that is taught in a single context.

• Information can become “context-bound” when taught with context-specific examples.

• When material is taught in multiple contexts, people are more likely to extract the relevant features of the concepts and develop a more flexible representation of knowledge that can be used more generally.
Who are we?

- Serve 135 children ages 2 months-Kindergarten

- The 19 museums and research facilities of the Smithsonian are a vital piece of our curriculum

- Early childhood teachers and museum educators work collaboratively
Across the years and across our days we encourage important STEM skills....

- Observing through careful looking
- Describing through word or pictures
- Comparing
- Questioning and searching for answers
- Predicting what might happen
- Experimenting
- Reflecting
- Cooperating
Across the years the focus changes...

- Exploring: babies
- Experiencing: toddlers
- Engaging: two year olds
- Examining: three and four year olds
- Experimenting: Kindergarten
Infants: Exploring their world
Toddlers: Experiencing
Twos: Engaging
Threes and Fours: Examining
As part of a month long exploration using Wizard of Oz as a jumping off point they talked about how the Tin Man is pretend, and about what tin is. Sara, one of our museum educators, talked about how there used to be “Tin Men” a long time ago --knights that wore armor. Here she is reading “The Knight and the Dragon” to introduce knights.
At the National Gallery of Art they first stopped outside the room they were going to visit to look at images of the two objects they went to see.
Then they headed into the room designed to look like the inside of a castle and looked at some of the tapestries to see if there was anything that reminded them of what a real tin man might look like.
Making STEM Real

They noticed the helmet on the left looked like a scary animal. They were surprised to learn that this knight wanted it to look like a dolphin. The children didn't think a dolphin was very scary and thought maybe a squid or a shark would have been a better choice.
Then they had a chance to feel some light weight metal and learned that the armor a “tin man” might have worn would have been much heavier and harder to move in as well as stronger than the metal they examined.
A few days later they headed to another museum to see another tin man character....
First they shared observations about her and talked about how she was similar to the Tin Man in the Wizard of Oz.
After observing they divided into two groups. While one read a story about a tin forest the other group classified objects by metal and non-metal. They chose to put the scissors in the middle because half of it was made of metal and half of it wasn't.
The Threes saw the same things but in very different ways....
They read a book as soon as they arrived at the museum to better make the connections in that space.
When they saw the masks they were most interested in the emotions...how the faces looked scary. They decided to make their own scary faces.
Went they went to see Marla they first saw a photo of a knight and a piece of tin.
Then got to hold and feel many items made out of metal before returning to their classroom to make tin suits for the little people in their classroom.
The Fours also begin to experiment and test ideas more often....
Designing and building a birdhouse
Measuring each other and things in the classroom
Kindergarten: Experimenting
Dr. Adamski talks about germs and then each child washes their hands before taking a sample from their own hands.
The next week each child gets their sample back to see how well they washed....
Some found out that they weren’t washing as well as they could be....
While others were pretty happy!
Learning about water across the years...exploring, experiencing, engaging, examining and experimenting
Who Lives Here?

Coral reef organisms have evolved unique adaptations to share limited resources and space.

LOOK! In the tank, FISH live in the reef. They use their fins to swim and to eat. They have adapted to live on a crowded coral reef.

This reef is modeled after those of the Indo-Pacific. Organisms were grown or acquired to have a sustainable environment.

How many different kinds of fish can you see? Can you count them? What kind of fish is this? How many of each kind are there? How do they live together? What kind of fish can you see in the tank?
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