Work I present today came out of my own interest in art/science integration, my collaboration with colleagues at the museum, and with others at my home institution of Salem State University.

Why I am interested in art/science integration as well as science. Drawn to science by the sublime in nature. I also have a performing arts side. Without the arts in my scholarship and teaching, I was feeling incomplete.

What do I talk about when I when a friend or colleague engages me on the topic of STEAM? What parts of STEAM are most useful, effective, practical and inspiring? Artists have a perspective and knowledge base that critical to the development of knowledge and ideas in science. The type of integrative thinking that comes from a STEAM approach is increasingly recognized as essential to solving complex twenty-first century problems.

I've chosen three big ideas to explore today. The first is Close Looking or Observation.
ACKNOWLEDGEMENTS & REFERENCES

Peabody Essex Museum: Janey Winchell, Gavin Andrews, Martine Malengret-Bardosh

Salem State University: Dr. Rebecca Rohloff, Nancy Dennis


Wikimedia Images

Before I continue
- collaborators
- references, but there are many more, chose the ones that best exemplify a couple of main ideas
Recently Scientist-In-Residence at the Peabody Essex Museum.
Drawn to this opportunity by the need to be my whole self in my life, my science, and my teaching.
What the Birds Know - Patrick Doherty - Part of a Series called Stickworks
Last summer, with the curator of the Art&Nature Center,
Work I present today came out of my own interest in art/science integration, my collaboration with colleagues at the museum, and with others at my home institution of Salem State University.
Why I am interested in art/science integration as well as science. Drawn to science by the sublime in nature. I also have a performing arts side. Without the arts in my scholarship and teaching, I was feeling incomplete.
What do I talk about when I when a friend or colleague engages me on the topic of STEAM? What parts of STEAM are most useful, effective, practical and inspiring?
Artists have a perspective and knowledge base that critical to the development of knowledge and ideas in science. The type of integrative thinking that comes from a STEAM approach is increasingly recognized as essential to solving complex twenty-first century problems.
I've chosen three big ideas to explore today. The first is Close Looking or Observation.
1. Close Looking
Take 10 minutes to draw/describe.
I wanted my students to see and represent identifying characteristics, have drawings clear enough that the parts of plants could be properly labeled Not tiny, crumpled-looking illustrations in the corner of the page These concepts sound a bit foreign to a scientist
As you can see
What did you draw? What did you see? What was your process?

**Visual Qualities** - Line, shape, texture, color, value - Used to make an identification

**Other Sensory Qualities** - warm sun; smooth, fuzzy, squishy textures

**Perspectives** - Plant's perspective - looking at wavelengths of light with all its pigments, making decisions about positions of leaves to maximize photosynthesis, flowers to maximize visibility, making decisions about how to grow to shade out near neighbors; Lizard's perspective: looking for yummy bugs?

**Materials** - plant and animal bodies, physiology

**Connecting to Meaning: Memories and Metaphor** It reminds me of my nephew's pet and flowers we have in this region. Does the lizard like the flowers?

**Context, Function, Purpose**

*classification*: Kingdom Animalia, Phylum Chordata, Class Reptilia, morphology can be used to identify it. How long are the legs relative to the body? Number of stripes on back, legs.

Kingdom Plantae, Division Angiosperm, Asteraceacea Family (sunflower, daisy, mums)- Composite flower - ray and disk flowers, trap-lining - not native to any place I've ever been.

*function*: roles in ecosystem

*purpose*: What is this skink doing here?
DePaw University
Introduction to Research class for year one and two undergrads in the Science Research Fellows Program
Goal: emphasize the importance of imagination and metaphor in understanding and communicating modern science
- crash course protein structure
- intro to sculpture course, students were able to learn fundamental concepts of technique and design and how to critique visual art
Later the students and faculty teamed up with a professional artist to create a sculpture inspired by protein folding research
**Outcomes:** Asked good scientific questions that would not have been asked if they had not integrated art. It gave them the time to think deeply, and have that tactile experience with their subject. How do we know how they fold? What color should it be? Added benefit of a public exhibition = education of the public about science and art.
about 1800 students from 9 universities
Leads to more varied approaches to problem solving
“All 95 super-creative students are hypo double majors (spanners); in other words, not a single student chose two majors in the same cluster (deepeners). 63% of super-creatives feel “creative thinking” is greatly enhanced and 57% feel like they are more intellectually curious because of their double major, compared to only 24% and 40% respectively for the full sample.”
Climate Change Impacts/History of Botanical Exploration in Essex County

Specimens with the most aesthetic value tend to have the highest scientific value.

The science informs the beauty.
Thank You!