Building Insights through Observation: Researching Arts-Based Methods for Teaching and Learning with Data

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What is Building Insights through Observation?

A four-year design-based research process to iteratively develop, test, and refine a cross-disciplinary instructional framework and professional development model with middle school science teachers …

…using their classrooms to examine how these practices support students' data literacy and reasoning skills, and to explore specific areas in which the approach shows greatest promise.

Based on:

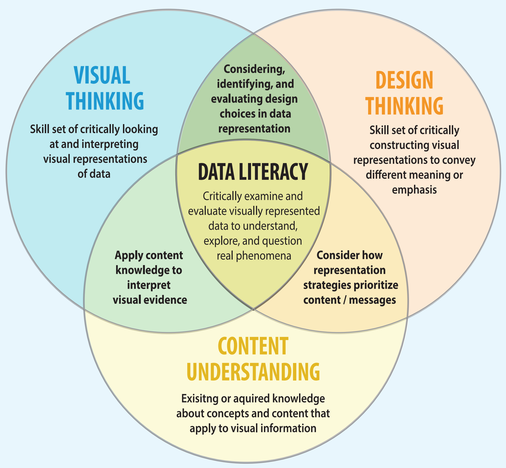
1. Visual Thinking Strategies
Learner-centered facilitation method creating inclusive and thoughtful group discussions.

2. Design Thinking Process
Solution-based approach to solving problems with 5 stages: Empathize, Define, Ideate, Prototype, Test.

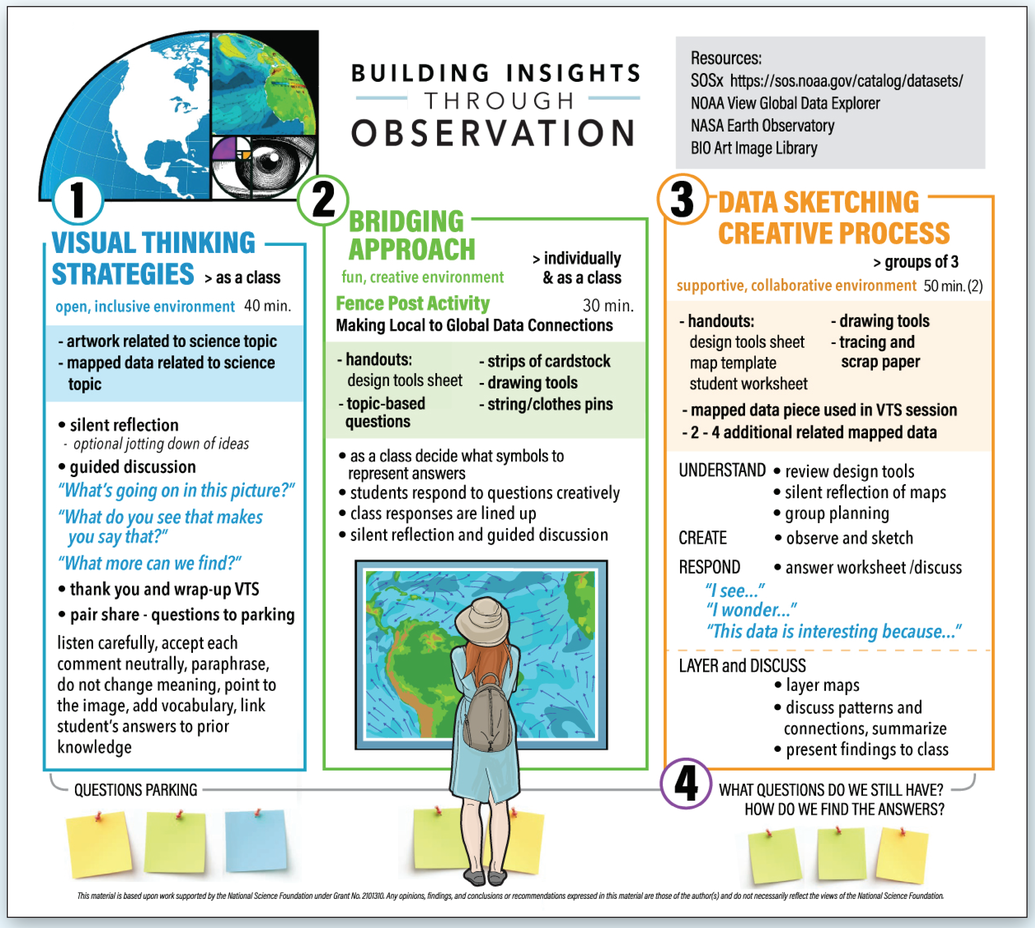
Set the Environment

- This is a safe place for reflection and all voices are welcome
- Everyone's observations are equally important
- Step up, step back
- Be respectful and considerate when others are speaking
- You will be doing most of the work in groups
- It is critical to pay attention (listen!) and work together
- Be open to new experiences and approaches and have patience when you don't understand

Underlying Theoretical Framework



Overview of the Building Insights through Observation Framework:



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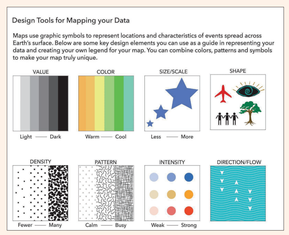
1 Sample artwork and dataset used in (framework component #1- Visual Thinking Strategies)

Thomas Hart Benton - *The Menemsha Hurricane [1954]*

Hurricanes 1950-2020 Cumulative

2 Global to Local Connections (framework component #2 - Fence Post Activity)

3 Sketching of mapped data (framework component #3 - Data Sketches)



Methods

Approach

- 2 Cohorts of 5 middle school science teachers from across the country
- Professional development workshops each summer, followed by teacher-led implementation in classrooms
- Reflections, evaluation, and feedback help refine the approach
- Iterative, adaptive

Critical Components

- Independent looking /silent observation time supports different types of learners and slows the pace.
- Group discussions reinforce learning within the community by hearing others' insights.
- Use of both art and SOS data, with art first. Using art first helps with empathy, confidence.
- Group environment is set as a safe space for open discussion where everyone feels their perspective matters.

Outcomes

- An adaptive toolbox that can be used by educators of STEM disciplines for teaching data visualizations from maps.
- Website that includes video tutorials, a framework outline, repository of example lessons, and an e-book that explains the approach.
- 10 trained middle school science teachers across the country that helped iteratively test and refine the model
- Research findings about the effectiveness of the approach in helping improve data literacy

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