Design Thinking in the Classroom What's the Problem?

Designing School for Play…. Not the Rules

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AT ST. ANDREW'S EPISCOPAL SCHOOL

THE CENTER *for* TRANSFORMATIVE TEACHING & LEARNING™
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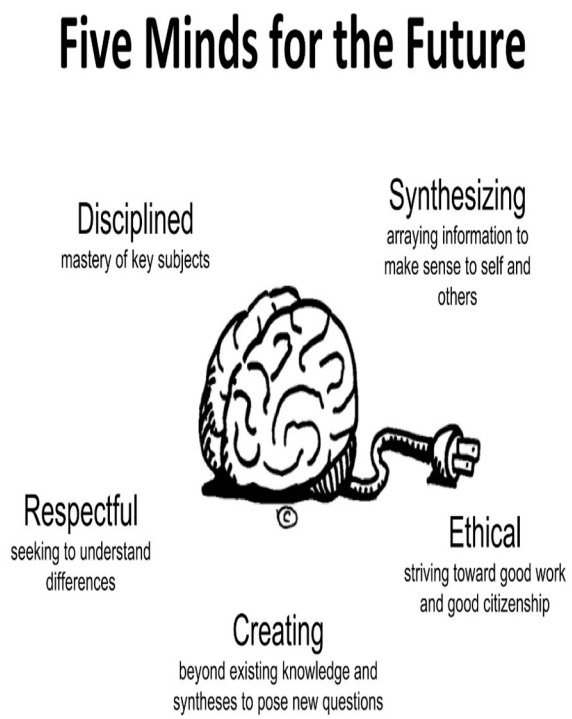
Making School More Like A Game We Play… Rather Than the Rules We Follow….

Howard Gardner's 5 Minds for the Future

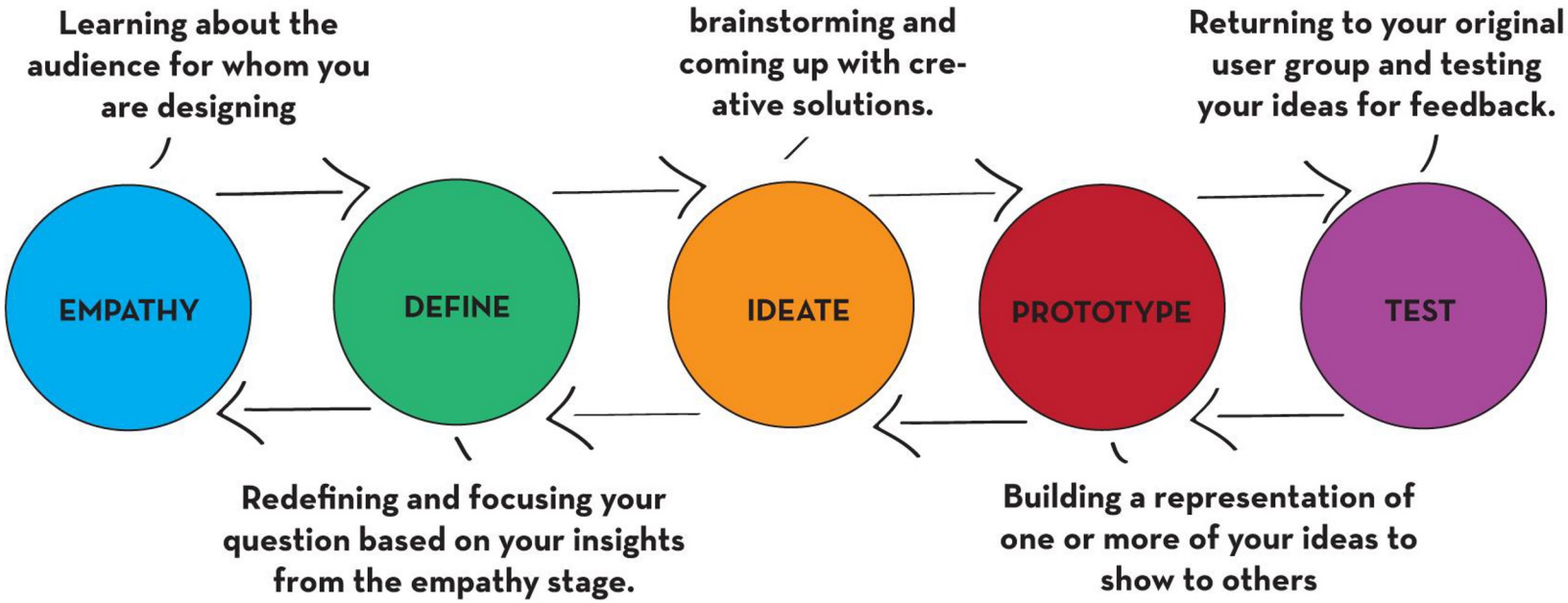


- Choice
- Challenge
- Control
- Collaboration
- Construction of Meaning
- Consequence

Learning vs. teaching

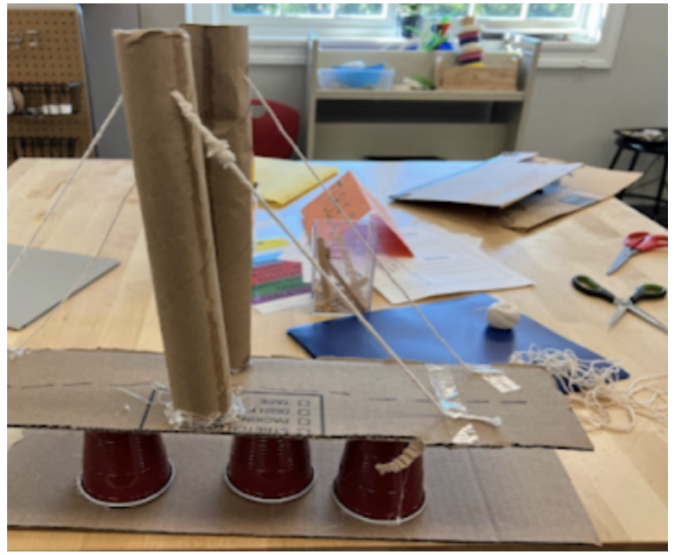
- *Teaching does not produce learning. Successful repetitive attempts by a learner to practice and use what they know in order to achieve a goal causes learning.*

Design Thinking Toolkit



4 useful Q's to ask yourself….

- What am I teaching?
- Why am I teaching it?
- How does what I teach help the student understand what matters?
- What unique, personal, and unscripted product must the student produce as evidence of their learning?



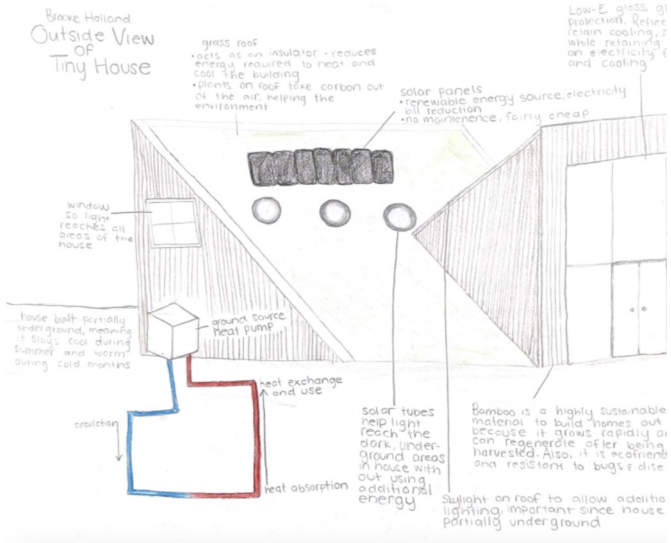
Backward Design:

I want my 3rd graders to learn about how a bridge supports weight.

so that, in the long run, they will be able, on their own

Apply an understanding of how bridges support the weight of cars and truck. [a long-term desired accomplishment, involving important transfer or extension of learning]

So, I asked the students to design a new bridge that would span the Potomac River from Virginia to Washington, DC.



MATERIAL CARBON EMISSIONS BY SECTION		
ootings & Slabs	-390	kg CO_2e
undation Walls	0	kg CO_2e
tructural Elements	0	kg CO_2e
xterior Walls	0	kg CO_2e
arty Walls	0	kg CO_2e
xterior Wall Cladding	10,544	kg CO_2e
indows	0	kg CO_2e
terior Walls	17,780	kg CO_2e
oors	-390	kg CO_2e
eilings	1,211	kg CO_2e
oof	0	kg CO_2e
arage	0	kg CO_2e
ET TOTAL	28,755	kg CO_2e

-5,000

E (kg CO_2e)

Backward Design:

I want my 10th grade students to learn_____ (Concept, Content)

I want my students to learn about sustainable home construction and accurately calculate a carbon footprint profile.

so that, in the now and in the future, they will be able, on their own to _____[a long-term desired accomplishment, involving important transfer or extension of learning].

They will be able to identify practices and processes that have low impact upon our planet's resources.

So, I asked my students to design an earth friendly tiny house that has a low carbon impact during construction and to live in.

Remarks made

Sts need long-term projects

Our classes must have choice… alternate projects… responses to situations… not everyone doing the same…

How can we challenge studens

How can we give them a sense of control.

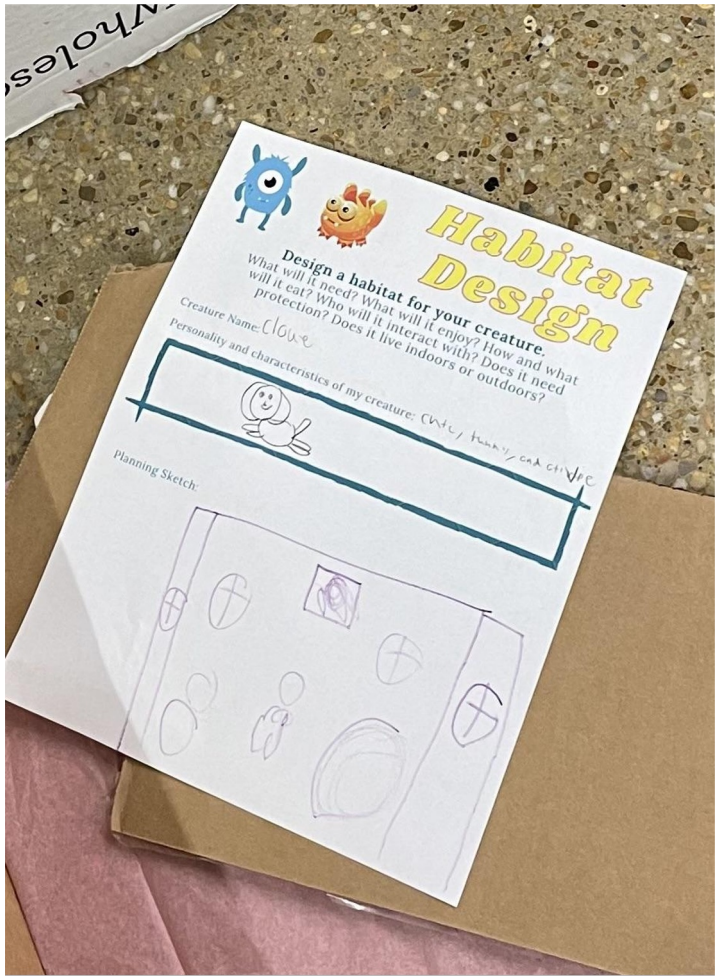
Where do your students find success?

Part of teaching is exposing sts to our world from creative perspectives…

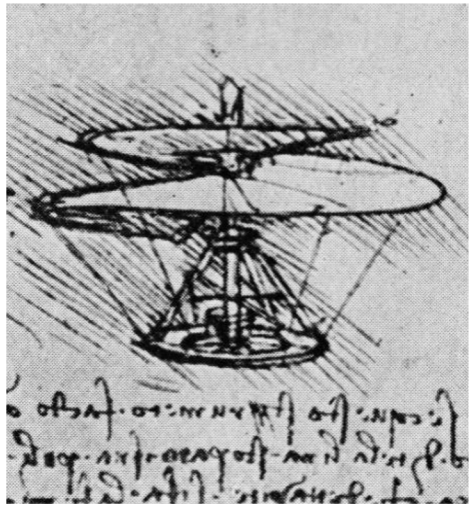
What is our obstacle to working like this? How can we set time aside to address these barriers and remove them?

It’s important we learn about assessment tools that honour our methodology and guide our most valued goals…

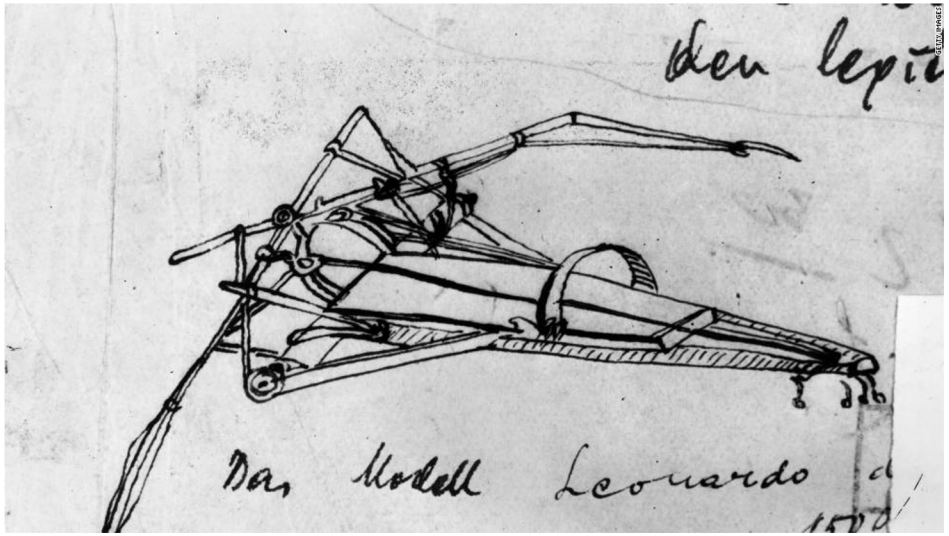
Early Childhood- Grounded in content, Unique, individual, and unscripted.



Innovation: A design-based approach



Leonardo Da Vinci: Ideas for Flight came from butterflies.



What do art and design have in common with engineering? What is different between the fields?

Reverse engineering is looking at a functional form and engineering an efficient way to design an object with a similar function. For example, air foils are designed in part with inspiration from a birds' wing.

Developing a design

http://www.cityfarmer.info/2014/08/19/proposed-floating-vertical-farms-for-singapore/

Compare the existing technology on the left with the artist's model on the right. What did the artist do to create a unique design from an existing technology?

Reverse engineering:

Wooly Pocket is one British company which has engineered and sells containers for vertical planters. Each design is modular; the example on the right shows the structure underneath the wall on the left. The principle is related to the multicellular design of a honeycomb. Planters can be moved around and rearranged to the designer's or client's liking.

Design Thinking as Beauty and Function

Jason deCaires Taylor , Silent Evolution, Cancun National Marine Park, MX

Environmental Restoration:

Coral Reef created from sunken statue installation, 400 life sized human statues to protect the Mesoamerican Reef

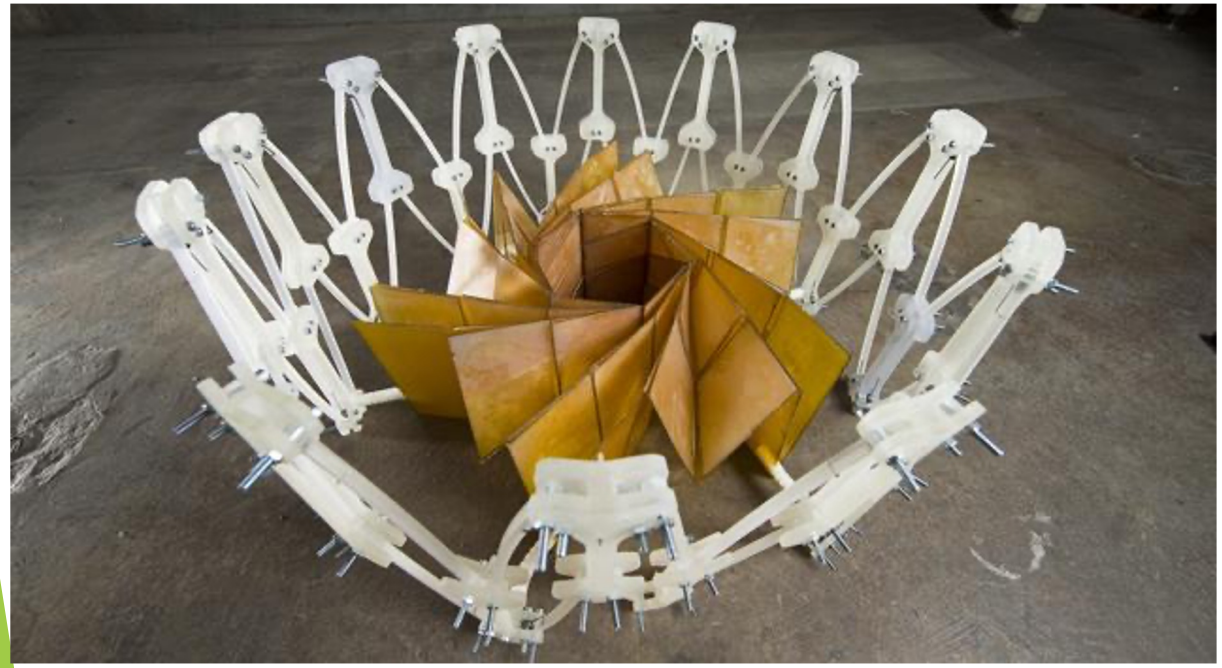
Is this design thinking? What paradigm did Sze apply?

"Still Life with Landscape: Study for a Habitat," NYC High Line
Sarah Sze, 2013

Sarah Sze's "Still Life with Landscape: Study for a Habitat," created a functional habitat on the High Line public park, while the exaggerated perspective of the sculpture created an implied depth of field.

Origami: Modelling FORMS and FUNCTIONS.

Solar array, NASA satellite



White elephant, life-sized single sheet origami sculpture, Sipho Mabona - Materials exploration, not design innovation

Applied design

Sea Bin

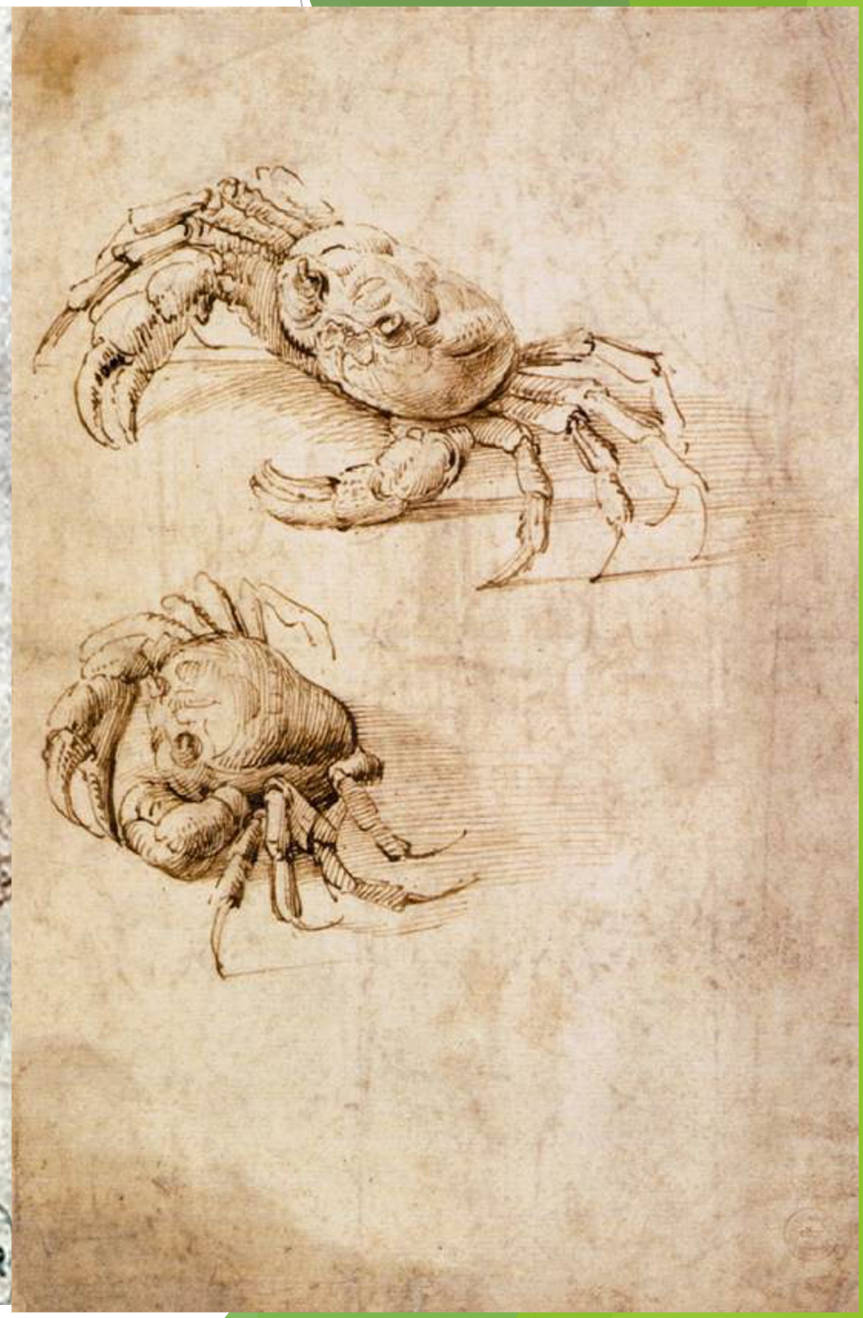
- What paradigm is used?
  What model do you need to draw?
  How can you turn this into a functional design sketch?

Cardboardgami

Cardboard shelter for the homeless by Callison

Observational drawing

What sort of information do you think can be learned from drawing nature?



Create a costume for an environmental citizenship mascot that emerges from discarded trash.

Design Challenge

- Design challenge: use MOSTLY repurposed materials to have zero to low environmental impact
- Outfit must be lightweight and able to **compact/expand.**
- Outfit must be able to be lifted on/off.

Scaffolding into the assignment

- Intro skills: 1) paper folding
- and paper sculpture 2) creating a pattern/scale model 3) presenting your idea.
- Use rubric to evaluate BOTH art and environmental science component.
- Include rationale of TOTAL ENVIRONMENTAL IMPACT of costume design.
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