



**Building K-8
Maker Culture**

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Slides available tonight
on STL in STL site
or <http://bit.ly/fontblog>

STL in STL
Tues., 6/7/2016, 9:15am - noon

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Abstract

Makerspaces – informal networks and communities of people who tinker, invent, make stuff, and collaborate – are popping up all over the United States. One may be coming to a school near you! In physical, virtual, and hybrid spaces some of the very students who are disengaged in school are wildly active in collaboratively developing and sharing ideas and projects about hacking, programming, building, and prototyping. We'll look at some easy ways that you can engage students as creators, not just users. What does it mean to have a culture of "making" in your school? Learn some strategies to envision, design, and engage students in problem-solving, critical thinking, and revision -- by using their hands to program, build board games, control robots, make jewelry, hack fashion, and more.

What is making?

Setting your purpose/
mission/spine

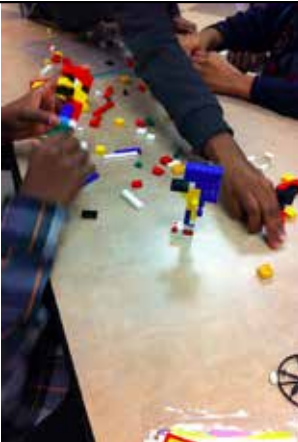
Planning learning
activities

Design activity

Assessment


If time, another design
activity

Nap.



Today's Agenda

Richard Serra: Verb List, 1967-1968



*Richard Serra, Verb List, 1967-68. Graphite on paper, 2 sheets, each 10 x 8" (25.4 x 20.3 cm). The Museum of Modern Art, New York. Gift of the artist in honor of Wynn Kramarsky. © 2011 Richard Serra/Artists Rights Society (ARS), New York
<http://www.moma.org/learn/arts/inside/out/2011/06/20/16-060811>
H/T Nick Tobler

Serra-Like Introductions

- | | |
|---------------------------------|----------|
| 1. First Name | VERBS |
| 2. Grade (or role) | Iterate |
| 3. A verb that describes making | Innovate |
| | Create |
| | Create |
| | Invent |
| | Imagine |
| | Forage |
| | Hack |
| | Explore |
| | Discover |



So ... we see that making can mean many things ...



Makers
Make
Stuff.



Makers
Transform
Stuff.



MAKE

Making is fundamental to what it means to be human. We must make, create, and express ourselves to feel whole. There is something unique about making physical things. These things are like little pieces of us and seem to embody portions of our souls.

LEARN

You must learn to make. You must always seek to learn more about your making. You may become a journeyman or master craftsman, but you will still learn, want to learn, and push yourself to learn new techniques, materials, and processes. Building a lifelong learning path ensures a rich and rewarding making life and, importantly, enables one to share.

http://bit.ly/makermanifestochapter

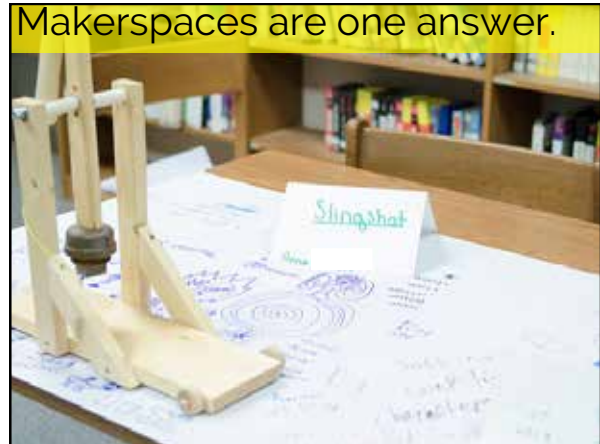
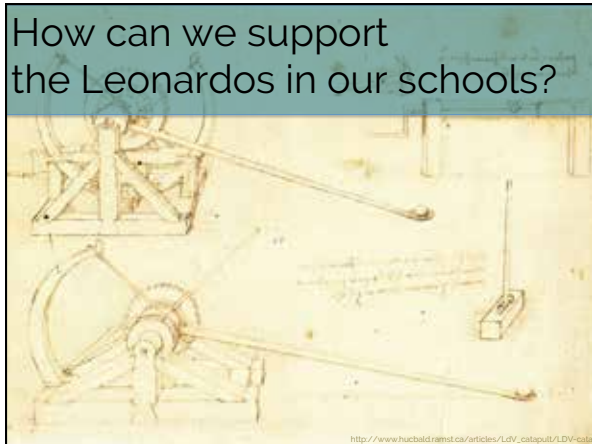




Photo of All Hands Active, Ann Arbor
<http://www.comcast.net/ann-arbor/features/allhandsactive02.aspx>



Ann Arbor Modern Quilt Guild Maker Works, Ann Arbor
<http://www.mqm-works.com/content/ann-arbor-modern-quilt-guild>



<http://www.ann-arbor.com/capitol/walk-through-check-out-358mya>



Parker Thomas,
<http://makezine.com/2013/08/11/key-qualities-for-a-school-makerspace/>

Tools
+
Support
+
Community

People
+
Process
+
Place

Dale Grover, Maker Works, Ann Arbor, Michigan

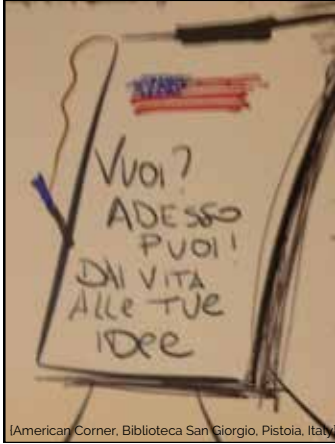
Parker Thomas,
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Tools
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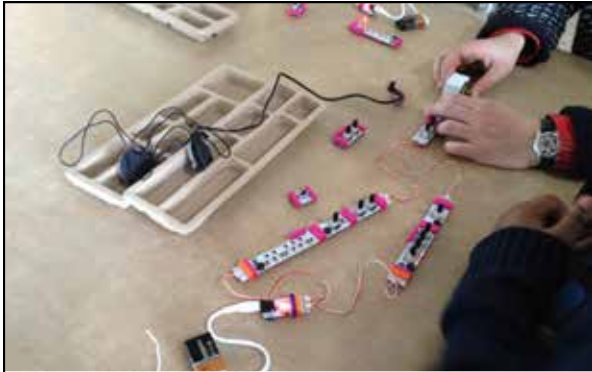
People
+
Process
+
Place

EXPLORATION + FORMAL AND INFORMAL LEARNING +
PEER LEARNING + EXPOSITION + CONTENT?

Dale Grover, Maker Works, Ann Arbor, Michigan

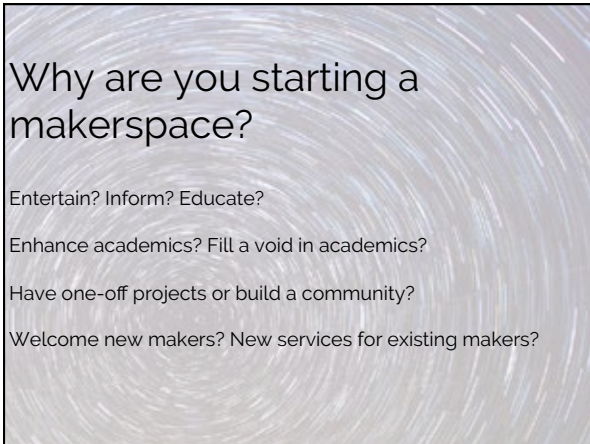
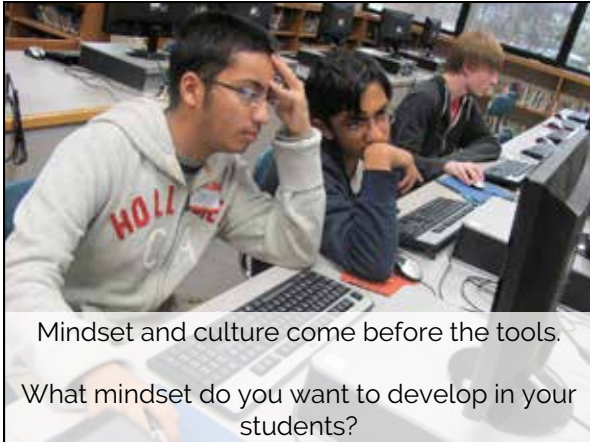


Want to?
 Now you can!
 Give life
 to your ideas



No Two Makerspaces Are The Same.







Our makerspaces hit the mark when makers are working from their "center of gravity"

(Dewey 1900)

Consider a charter or manifesto for your makerspace (with colleagues or kids).

A form titled "MAKER VISION" from the "SCHOOL OF INFORMATION". The form contains three sections with blank lines for input: "Based on _____ I see that our students/patrons need opportunities to _____", "Therefore, we'd like to launch a maker program that will give them the chance to _____", and "In this program, we will prioritize _____". The final section says "We will know that we are successful if _____".

Turn and Talk:
What's Your Purpose?



A form titled "MAKER VISION" from the "SCHOOL OF INFORMATION". The form contains several lines of text with blank spaces for input:

MAKER VISION

Based on _____
I see that our students/patrons need opportunities to _____

Therefore, we'd like to launch a maker program that will give them the chance to _____

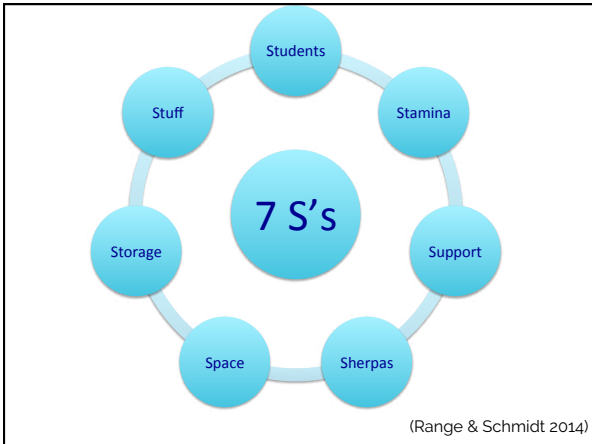
In this program, we will prioritize _____

We will know that we are successful if _____

Now you have purpose.

What else should you think about?

(Hint: too early to think about tools.)



Look for Partners & Sherpas.



Look For Mashups.

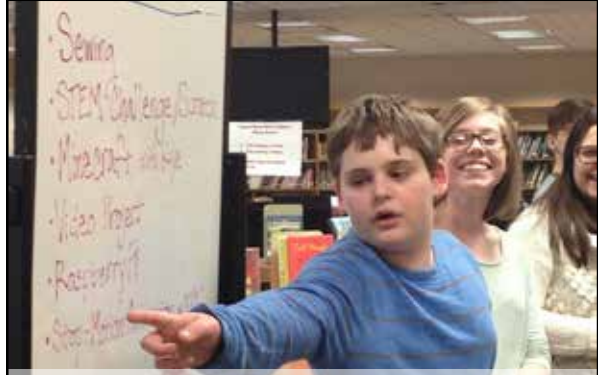


Embrace humor
(and different approaches to getting things done).





Sometimes, making allows for self-soothing and re-centering.



Develop Peer Leadership.



Redefine "Teacher" And "Learner."

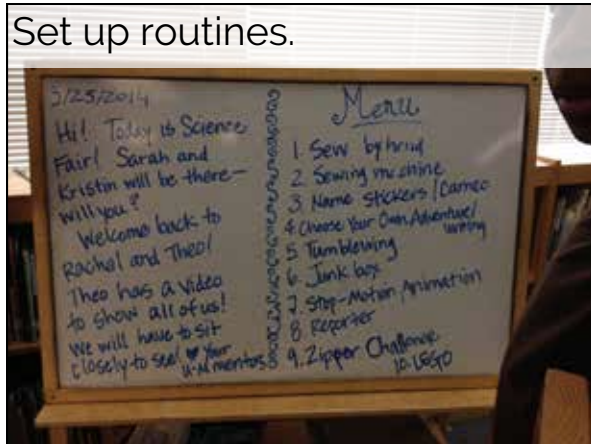


Match Mentors with Learners.

Marshmallow Towers

Egg Drop Challenge

Set up routines.



Think Windows And Mirrors.

There is something missing in our definition, vision, of a human being: the need to make.

We are creatures who need to make.

Because existence is willy-nilly thrust into our hands, our fate is to make something--if nothing else, the shape cut by the arc of our lives ...

Making is the mirror in which we see ourselves ...

Frank Biedart, "Advice to the Players," <https://harvardmagazine.com/1999/09/poetry.html>



Celebrate Daily Progress.



Celebrate Long-term Progress.





Bring in your community to make.



REMEMBER: Mindset, skills and culture come before the tools.
What mindset do you want to develop in your learners?

What do we want kids to *do* with the stuff we buy?



Some context!
For us, making prioritizes:

- Process over product
- Agency over teacher-directed work
- Choice over following directions
- Experimental mindset over "failure if it doesn't work the first time"

PACE: Process Over Product

- Minimize direct instruction except when needed to impart specific skills (e.g., how to solder, how to run the Silhouette Cameo)
- Focus more on pathfinders, mentors, marination, and peers to guide moment-to-moment decision-making

Process - Agency - Choice - Experimental Mindset

PACE: Agency Over Teacher-Directed Work

- Who's supposed to be learning, anyway?
- Who's supposed to untangle the complicated stuff and figure it out?
- Kits can build skills but don't substitute from the design thinking / prototyping practice of designing from scratch

Process - Agency - Choice - Experimental Mindset

PACE: Choice Over Following Directions

- Give students options within reasonable limits (age of student impacts amount/range of choice)
- Differentiate what everybody-needs-to-know from interest-driven possibilities

Process - Agency - Choice - Experimental Mindset

PACE: Experimentation Over Failure

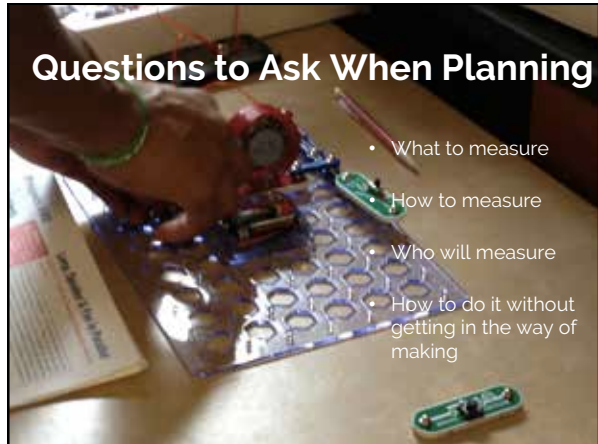
- Making is *iterative* design (think Dyson vacuum, Edison light bulb)
- Many of the kids you teach have been taught over time not to persevere beyond first attempt
- Need to build mental muscles for this new flexible way of working

Process - Agency - Choice - Experimental Mindset

Planning for Making

- Backwards Design (Wiggins & McTighe)
 - “What do you want your students to know and be able to do as a result of this?”
 - Academic (content)
 - What holds content back (teamwork, hanging out)
 - Dispositions/Habits of mind (perseverance, flex. Thinking)
 - Economic (budgeting for materials)
 - Etc.
 - Measure success against these goals

Questions to Ask When Planning

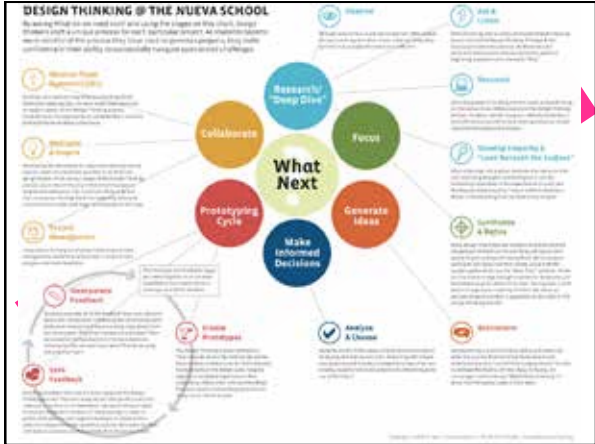


- What to measure
- How to measure
- Who will measure
- How to do it without getting in the way of making

 1. Asking questions (for science) and defining problems (for engineering).	 2. Developing and using models .	 3. Planning and carrying out investigations .
 4. Analyzing and interpreting data .	SCIENTIFIC AND ENGINEERING PRACTICES	 5. Using mathematics and computational thinking .
 6. Constructing explanations (science) & designing solutions for engineering).	 7. Engaging in argument from evidence.	 8. Obtaining, evaluating, and communicating information.

how might we frame activities so they go **beyond random puttering** and lead to intentional learning?

Design Thinking, Design Seeds



Design Challenges

- Common challenge for each student
- Open options for completion to give space for agency and choice
- Agreed-upon metrics for success
- Built on curriculum learning
- Preceded by direct instruction and/or interspersed with mini-lessons as needed
- Time limits serve to motivate creativity within constraints

Design Challenge Seeds

- Design an **invention** that would fix _____
- Create a **prototype** that would _____
- Research and identify a **solution** that _____
- Create a **stamp/statue/logo/mascot** for _____ based on what you know about _____

Your challenge: Design a better teacher bag.

- Start by collecting data from group members about what they carry to and from school. What works for them? What doesn't?
- Brainstorm solutions.
- Draw and label a prototype.
- Be prepared to explain the choices you made.

Or ... be a reporter



Gallery Walking, Maker Style

- Guidelines for visitors:
 - Compliment but do not criticize.
 - OK to ask polite questions
- Guidelines for hosts:
 - Talk people through your project.
 - Answer questions.
 - Feel free to ask if you'd like advice.

Gallery Walking: for your classroom

- Consider half-page "Hamburger-style" table tents
 - Possible content:
 - What is the object?
 - What does the creator want the viewer to notice in particular?
 - I am proud of -----.
 - Keep to one sentence
 - In-process or after project completion

Reflection, Elementary Style

- Put a  (or circle in **green**) a part you felt worked well.
- Put a  (or circle in **blue**) something you would like to change.
- Put an **X** (or circle in **red**) something that wasn't working as well as you would like.

Based on the work of B. Sanzenbacher

ok. let's talk
assessment.
yay?



Whose work stood out to you as being great?

What **criteria** did you use to determine whose was "good"?

If we were to **repeat** the exercise and **share** those criteria, what do you think might happen to the **range** of ideas we saw?

It's really **hard** to compare
open-ended work, isn't it?

But what gets assessed gets
attention, right?

So how do we **assess** in our maker efforts?

Maybe we **don't** measure what they **make**.

Maybe we measure their **thinking** instead.

Seven Strategies

1. **Process Journals**
2. **Stand-Up Meetings**
3. **Title:Subtitle**
4. **Gallery Walking**
5. **Artist Statements**
6. **Portfolios**
7. **Documentation**

Process Journals

- Today I ...
- Tomorrow I will ...
- For older students: blog or Instagram feed?

Stand-Up Meetings

- Get a daily check-in from each individual or group at start of day
- Stay standing – it keeps the meeting *short!*

Title: Subtitle

artistic: explanatory

creative: factual

Taking Flight: Paper Airplane
MonkeyMatic: A New Toy Using Centrifugal Force
Origami Leia: A New Star Wars Toy

Title: Subtitle

(artistic: explanatory)

(creative: factual)

Tweet a photo of prototype.

1. Title & subtitle it.
2. #stlinstl



Artist Statements



Leivick, Joel. *The Face of the City*. Series of photographs. Thomas Welton, Stanford Art Collection, Stanford.

Artist's Statement

This group of pictures was completely unexpected. I arrived in Italy last autumn as a Visiting Artist at the American Academy in Rome, with plans for a project involving fascist era beachfront architecture in Ostia, and perhaps something centered on gardens in the funky postwar outskirts of Rome. But on our first day there I made my own pilgrimage to the Pantheon, one of my favorite places to be in Rome, and usually a primary destination.

A constant stream of visitors enters and exits the Pantheon all day. For the most part, they have their recording devices held high over head as they enter, forgoing the old-fashioned step of looking at something first, then photographing it. No, these pilgrims have their memories immediately handed out to digital data storage, safely enclosed for retrieval at some later date. There was something charming about it, something universal and soothing, not cynical exactly but focused and intense, a hint of the divine in an otherwise mechanized world. Everyone gazing vicariously into the oculus, the eye of God. I fell into a rut, studying the screen of my own camera and waiting for the moments of rapture and deep concentration, missing invisibly from one subject to the next. I was lost in my own rapture, my mind quiet but for the occasional visit from the ghost of Walter Evans, whose pictures of subway riders during the early 1940s were never far from my thoughts.

The 43 photographs in the exhibition were made on four days in October 2012 with the Sony NEX-7 digital camera. I want to thank my wife Terry Hagan for her love and thoughtfulness, Carol Leivick for his advice and assistance in many aspects of this exhibition, Liz Calvert, Craig Weiss, Elizabeth Jurek, Gail Wright, the Stanford University Department of Art and Art History, and the American Academy in Rome.

Joel Leivick, Robert and Ruth Halperin Professor in Photography, Department of Art & Art History, Stanford University.

Dedicated to my friend Richard Gordon.

Author's Purpose/Artist's Statement

Formative Assessment	Summative Assessment
<ul style="list-style-type: none"> • "Ticket out the door" • Index card • A few sentences 	<ul style="list-style-type: none"> • Paragraph or two • Extended thought • Reflects on the finished product and on the process

Cloze sentences:

- "The visuals I chose are meant to"
- "I chose this medium because"
- "The visuals in my slide deck are meant to"
- "I'm including this primary source image because"

Artist Statements Can Convey

- Purpose/intent
- Process (if succinct)
- Inspirations
- Unpacking of your thinking about the product you made

Great resource for your teaching:
<http://www.artbusiness.com/artstate.html>

Portfolios



Niguidula, David. 2010. "Digital portfolios and curriculum maps : linking teacher and student work." in Curriculum 21: Essential Education for a Changing World. Alexandria, VA: ASCD.



Documentation

- Plimpton = "participatory journalism"
 - You = "participatory researcher"
- Photos
- Videos
 - Peer interviews
 - Pitches
 - "What are you working on?"
 - Reality TV confessionals
- Journals, progress diaries, surveys (caveat emptor!)

one. last. activity?

Design a Board Game

an activity designed by Scott Nicholson, Syracuse iSchool
As described by Brian Mayer here:
<http://www.americanlibrariesmagazine.org/blog/make-game> and simplified for elementary students

Choose something to be your playing piece.

Take turn spinning the die and moving the correct number of spaces. First to the end wins.

Sound boring? Hack it!

Add a few rules as situations arise ...

- Do any spaces on the game board have special attributes or cause anything to happen if you land on them? Do you need more/different places/paths on the board?
- What happens if you land on a space already occupied by another player?
- What happens if you roll a certain number on the die?
- Do you need to role the exact number on your die that it takes to reach the end?
- What's the point of the game?

Gallery Walk: Possible Prompts for Elementary Students to Try

- What inspired you to make this game?
- What was your biggest challenge? How did you overcome it?
- Would you enjoy continuing to work on developing this game?
- What would you change about this game if you had more time?



On Material Provocations

Recap

- Prioritize mindset over tools
- Think about your purpose
- Choose provocative materials or create provocative challenges
- Bake in process, agency, choice, and experimentation
- Evaluate reflective pieces, not products, to maximize risk-taking
- Use title:subtitle, artist statements, journals, Instagram process diaries, etc., to track student thinking

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