Modeling a Maker-Space Mindset

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Introductions

http://ichef.bbci.co.uk/news/660/media/images/77220000/jpg/_77220842_77220838.jpg

found in www.automobile-catalog.com

http://home.howstuffworks.com/washer.htm

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Some goals we are striving for... (AKA, This Is A Journey!)

- Raise the bar for all: low floor-high ceiling
- Observe, modify, and re-evaluate cycle
- Personalize and offer choice
- Encourage math talk
- Choose meaningful and open ended tasks
- Allow for productive struggle
- Give way to asking, “what if…”

http://www.gettingsmart.com/2014/05/houston-isd-talent-pipeline-flows-ways/
Is there a way to...

- Visualize it?
- Design think or model it?
- Make it?
- Do it?

https://myplasticfreelife.com/plastic-challenge
First Thoughts: Visualizing Math
Visualizing Math - Geometry and Algebra Tiles
Visualizing Math: creating our own data
Visualizing Math: Building with Paper and Play Dough

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No one uses stairs.

People aren’t the problem.

Can’t redesign elevator fun.

Elevators fill up everytime.

Elevators go to every floor.
Design Thinking in Math: Math Modeling

https://encrypted-tbn0.gstatic.com/images?q=tbn:ANd9GcT3U8LzoDVVmyCvHfYKH6CPIj2Z7Qgt5DTR2U6I_0U3hxWXINm7g

https://www.google.com/search?q=math+modeling+class&source=lnms&tbm=isch&sa=X&ved=0ahUKEwjC0o3NvqHaAhUQU98KHWSVDPUQ_AUICygC&biw=1536&bih=760#imgdii=MWJwKpacVReDwM:&imgrc=ubaj75VZY0LiQM:

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Design Thinking:

A Long Walk to Water
Is it worth the drive across town for less expensive gas?

**Big Idea:** Create a mathematical model that can be used to help understand what conditions make the drive more or less worthwhile.

**Focus:** variables and assumptions. What quantitative data would you want to collect and what assumptions you would want to make?

**Extension:** What community connections could you make as a part of this exercise?

http://www.comap.com/Free/GAIMME
Close or Continue? A Modeling Question from Flu

The 2018 flu season has been noteworthy in its impact on communities including schools.

Assume the role of an administrator in your school system. Develop a mathematical model(s) that triggers appropriate measures to contain the flu.

For this exercise let us focus on variables and assumptions. What quantitative data would you want to collect and what assumptions you would want to make?

What community connections could you make as a part of this exercise?

www tlnt com this flu is a killer dont let anyone come to work sick
An Uplifting Problem (by John Walton and Bob Davidson)

http://www.comap.com/Free/GAIMME

Solving Real Problems with Mathematics, Volume 2
Making Math:
Maker Space and Coding
Making Math:
Maker Space and Coding
Making Games

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Making with Technology
(function family graphing, creating surveys, geometry projects, quadratics coding challenge)

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Doing Math
A FUNCTION ACTIVITY
Doing Math: A Slope Activity
Doing Trigonometry

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Doing Math: A Design Activity
Connections to modeling objectives:

Common Core goals of Modeling Practices

- Identifying variables in the situation and selecting those that represent essential features
- Formulating a model by creating and selecting geometric, graphical, tabular, algebraic, or statistical representations that describe relationships between the variables
- Analyzing and performing operations on these relationships to draw conclusions
- Interpreting the results of the mathematics in terms of the original situation
- Validating the conclusions by comparing them with the situation, and then either improving the model or, if it is acceptable
- Reporting on the conclusions and the reasoning behind them.
Questions
GAIMME:  http://www.siam.org/reports/gaimme-full_color_for_online_viewing.pdf


GAISE:

American Statistical Association - resources for educators:  http://www.amstat.org/education/stew/index.cfm

Desmos “Bundles”:  https://teacher.desmos.com

Interactive Python Anywhere on the Web:  https://trinket.io/python  and  http://www.codeskulptor.org

Doing Math with Python by Amit Saha

Geogebra:  https://www.geogebra

MIT App Inventor:  http://appinventor.mit.edu/explore/

Scratch Programming:  https://scratch.mit.edu/org

VideoNot.es:  http://www.videonot.es/
Makey-Makey resources:  [http://www.makeymakey.com/](http://www.makeymakey.com/)


Colleen Graves maker space resources and programming ideas [https://colleengraves.org/makerspace-resources-and-programming-ideas/](https://colleengraves.org/makerspace-resources-and-programming-ideas/)

3-d Printing [https://www.simonsfoundation.org/multimedia/3-d-printing-of-mathematical-models/](https://www.simonsfoundation.org/multimedia/3-d-printing-of-mathematical-models/)


