Fluency with Functions through Multiple Representations

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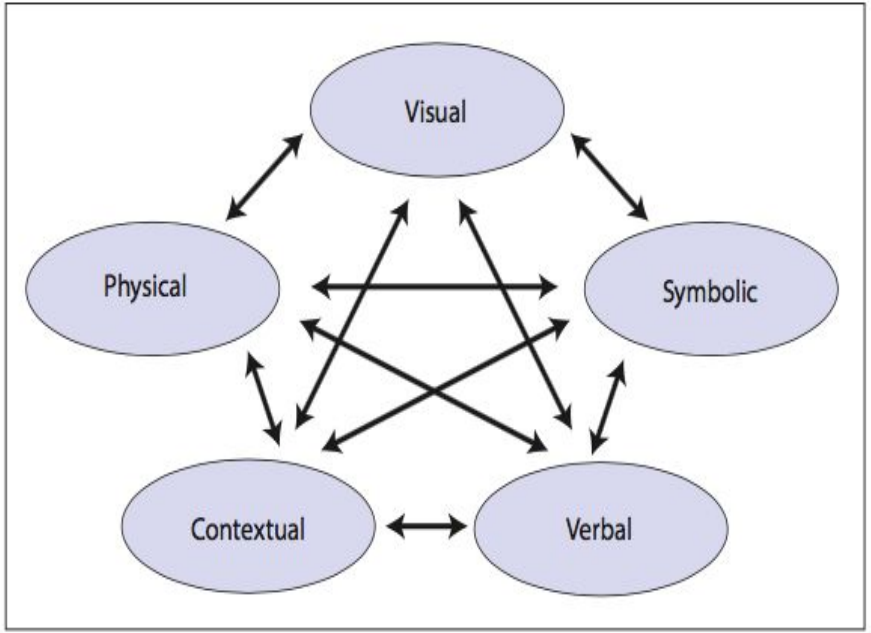
Effective
Mathematics Teaching Practices

1. Establish mathematics goals to focus learning.
2. Implement tasks that promote reasoning and problem solving.
3. Use and connect mathematical representations.
4. Facilitate meaningful mathematical discourse.
5. Pose purposeful questions.
6. Build procedural fluency from conceptual understanding.
7. Support productive struggle in learning mathematics.
8. Elicit and use evidence of student thinking.

Use and Connect Mathematical Representations

"Effective teaching of mathematics engages students in making connections among mathematical representations to deepen understanding of mathematics concepts and procedures and as tools for problem solving."

- NCTM's Principles to Action, 2014



Agenda of Activities

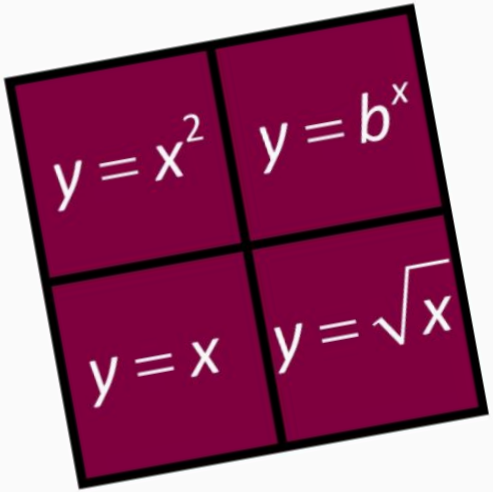
1. Opening Problem
2. WODB Math Talk
3. Rule of Four Stations
4. What’s My Rule? ala Desmos
5. Function Girl

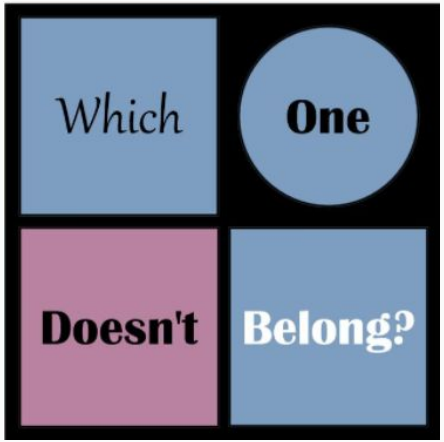
1. Opening Problem

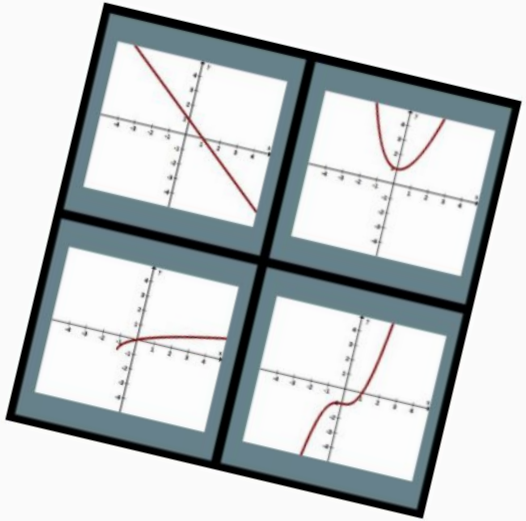
A car is priced at $6000, and the price is being reduced each week by 10%. Sherri wants to buy the car. She has $3500 and earns $150 a week in income. If Sherri sets aside each week's income toward the car, how many weeks will it take Sherri to have the money to buy the car?

How would you solve this problem? Show your entry on a post-it note

2. WODB? wodb.ca/



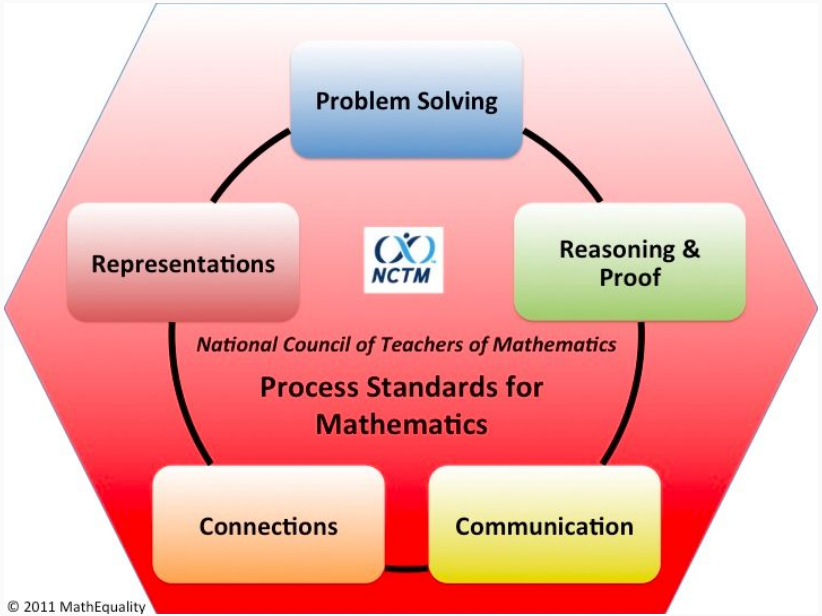




Multiple Representations ~ Not a New Idea

"A major responsibility of teachers is to create a learning environment in which students' use of multiple representations is encouraged, supported, and accepted by their peers and adults so that students see the use of tools as appropriate and helpful."

- NCTM Process Standards, 2000



GRAPH - TABLE - EQUATION - CONTEXT

“Graphing applications can allow students to examine multiple representations of functions and data by generating graphs, tables, and symbolic expressions that are dynamically linked.”
- NCTM Principles to Action, 2014

“Functions describe situations where one quantity determines another.” - CCSSM, HS Functions Introduction

3. Rule of Four Stations

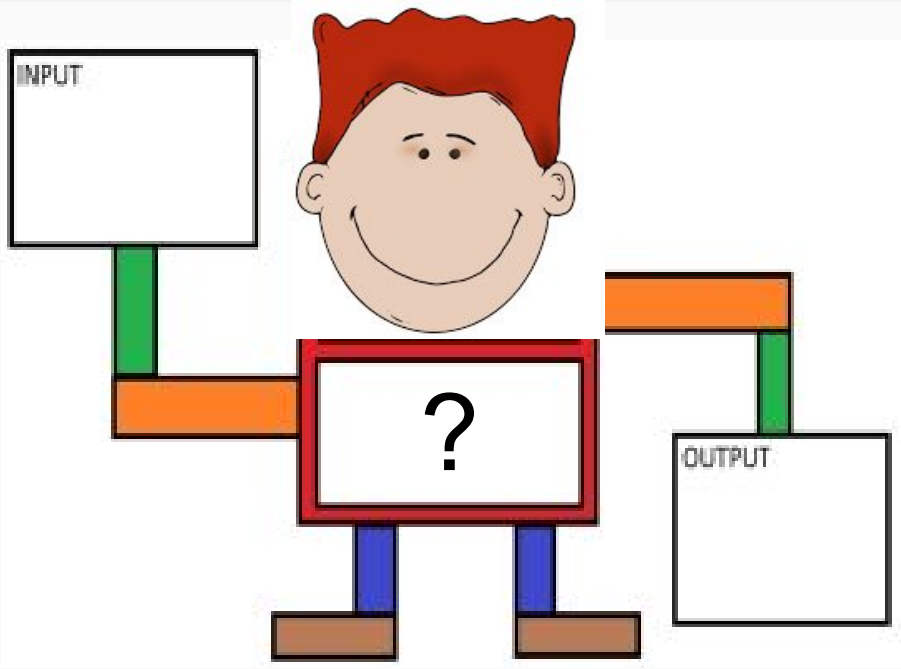
- ❏ Avery’s Paper Folding Problem
- ❏ Toothpick Trains
- ❏ Box Fractal
- ❏ Rule of Four Foldable

Teacher Actions and Student Actions to Promote Flexibility with Multiple Representations

Teacher Actions	Student Actions
- Allocating substantial instructional time for students to use, discuss, and make connections among representations	- Using multiple forms of representations to make sense of and understand mathematics

NCTM's Principles to Action, 2014 Chart on p. 29

4. What’s My Rule? ala Desmos



Fluency with Functions

“Procedural fluency is a critical component of mathematical proficiency and is more than memorizing facts and procedures.”

- NCTM Position Statement, 2014

5. Function Girl

- Function Girl Dances card sort
- Name that function!
- Your turn to dance

Function Girl Source: Christie Bradshaw, http://radical4math.blogspot.com