

National Council of Teachers of Mathematics
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#35 – You Better Wurk! How to be a Super Model-ing Teacher



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Brian Shay

- Mathematics Teacher and ToSA
- Teaching Mathematics for 15 years
- Common Core Crusader
- Park City Math Institute Attendee
- Not a Supermodel...yet



Session Goals

- Discuss what Modeling is *and* is not
- Explore the world of online resources
- Wurk tasks and activities
 - Geometry
 - Linear
 - Quadratic
 - Polynomial
 - Calculus

LINDA
EVANGELISTA

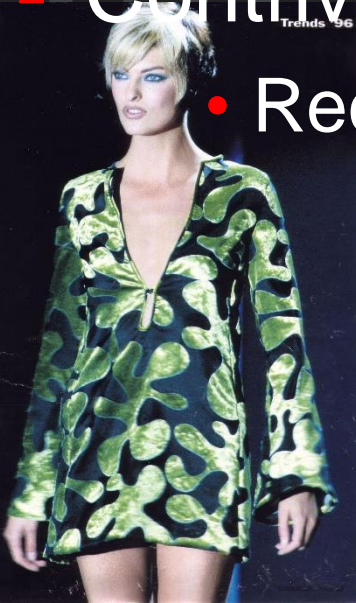
SUPERMODEL



What is Not Modeling?

- “I do, We do, You do”
- “Let me model that for you”
- Contrived word problems

- Rectangles with side lengths $x-4$ and $x+4$
- Etc.



What is Modeling?

- Describing the world with mathematics, in order to make reasoned predictions and decisions
- Take the world and turn it into mathematical structures, then to operate on those mathematical structures, and then to take the results of those operations and turn them back into the world



Super Model-ing Teachers

- Michael Fenton
- Robert Kaplinsky
- Geoff Krall
- Andrew Stadel
- Dan Meyer
- Fawn Nguyen



Super Model-ing Resources



- [Desmos.com](https://www.desmos.com)
- [OpenMiddle.com](https://www.openmiddle.com)
- Twitter: #MTBoS
- [VisualPatterns.org](https://www.visualpatterns.org)
- [IllustrativeMathematics.org](https://www.illustrativemathematics.org)
- [MathematicsVisionProject.org](https://www.mathematicsvisionproject.org)
- [InquiryMaths.com](https://www.inquirymaths.com)
- [nRich.Maths.org](https://www.nrich.maths.org)
- [Mathalicious.com](https://www.mathalicious.com)



What do you Notice & Wonder?



Notices and Wonderings

Inspired from a task on Illustrative Mathematics



Important Facts

- Density of Gold: about 19.32 g/cm^3 (at room temperature at sea level)
- Density of Sand: varies based on composition, but an estimate is 2.5 g/cm^3
- Size of Statue: about 7.5" tall, 4.25" wide, and 5" deep
- 1 inch ~ 2.54 cm, 1 lb ~ .45 kg
- A grown man can easily lift about 30 – 40 pounds in one hand (13.6 – 18.1 kg)
- Why don't we use Metric all the time?!

Scott's Workout: IM1

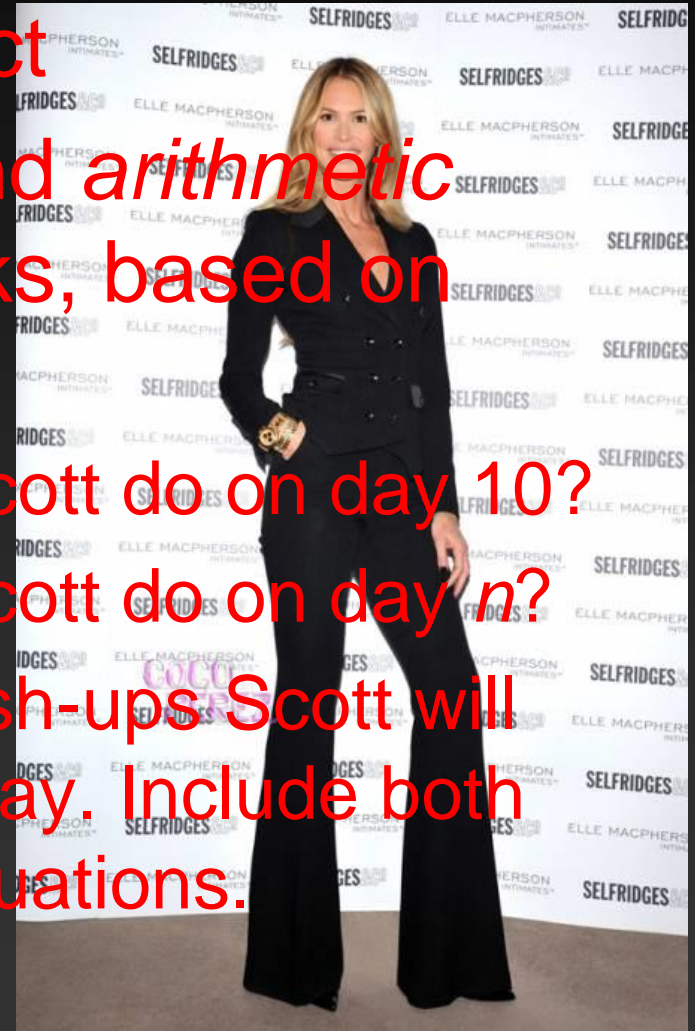
- Mathematics Vision Project

Motivating *linear function* and *arithmetic sequences* through rich tasks, based on modeling

- How many push-ups will Scott do on day 10?
- How many push-ups will Scott do on day n ?



- Model the number of push-ups Scott will complete on any given day. Include both explicit and recursive equations.



Scott's Macho March: IM1/IM2

Motivating quadratic functions

- How many total push-ups will Scott have done after one full week?
- Model the total number of push-ups that Scott has completed on any given day during "Macho March". Include both recursive and explicit equations.
- Will Scott meet his goal and earn the donation for the charity? Will he get a bonus? How much? Explain.

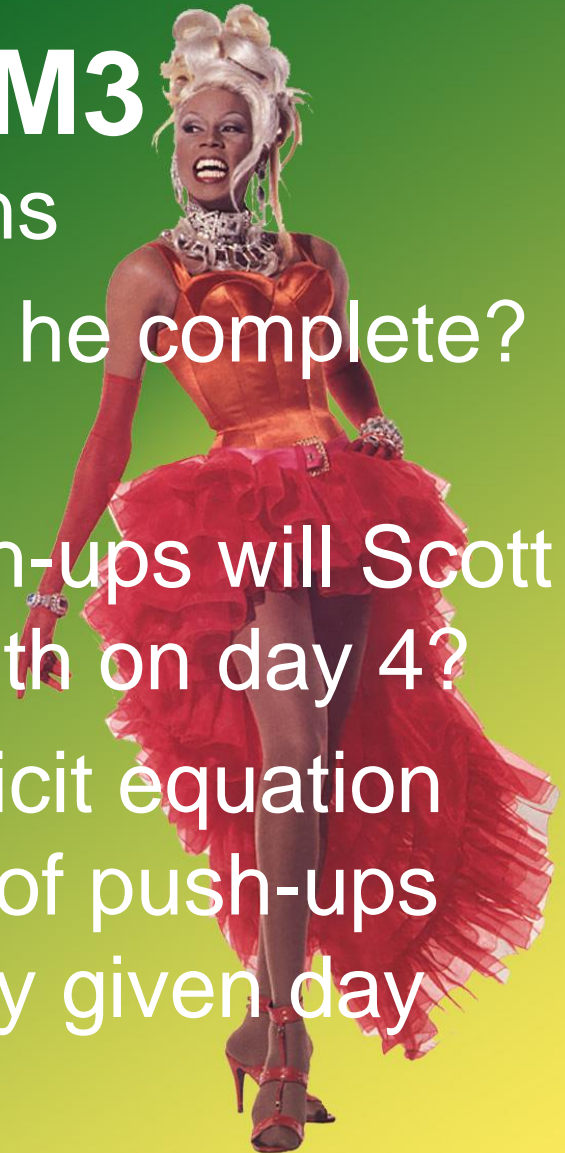


Scott's Macho March

MADNESS: IM3

Motivating polynomial functions

- On day three how many will he complete?
How about on day four?
- How many *cumulative* push-ups will Scott have completed for the month on day 4?
- Create a recursive and explicit equation for the *cumulative* number of push-ups Scott would complete on any given day this year.



Gaming for Parabolas

- Angry Birds
 - Curve fitting
 - Structure



<http://www.10minutemath.com/p/angry.html>

- Super Mario Brothers...a work in progress....
 - Symmetry
 - Curve fitting
 - Structure
 - Physics of a falling body



Gaming for Calculus

- Angry Birds
- Tangent Lines
- Parametric Functions



Thank You!

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