Fun with Functions in Algebra

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LDOE TEACHER LEADER SUMMIT

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ERNEST MORIAL CONVENTION CENTER

NEW ORLEANS, LA

Mathematical Practice Standards

Make sense of problems and persevere in solving them

Reason abstractly and quantitatively

Construct viable arguments and critique the reasoning of others

Model with mathematics

Use appropriate tools strategically

Attend to precision

Look for and make use of structure

Look for and express regularity in repeated reasoning

Content Standards

F.BF.1 - Write a function that describes a relationship between two quantities.

F.BF.3 - Identify the effect on the graph of replacing $f(x)$ by $f(x) + k$, $k\,f(x)$, $f(kx)$, and $f(x + k)$ for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them.

F.LE.1 - Distinguish between situations that can be modeled with linear functions and with exponential functions.

F.LE.2 - Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).

Agenda

- Welcome and Introductions
- Setting Norms
- Growth Mindset
  - The 4 “A’s” Protocol
- Algebra Labs
  - Knot Lab
  - Collecting, Organizing and Modeling Bivariate Data
    - Cost of a Movie Ticket
    - Basketball Math
    - Look Out Below!
- Algebra Games
  - Factoring
- Three Act Task
- Transformations of Functions
- Reflection

Welcome and Introductions

Who Am I? Who Are You?

Setting Workshop Norms

Discuss with your table partners what norms you believe should be adopted for the workshop. Take 5-7 minutes to develop a list. Be prepared to share your list with the whole group.

Adopting a Growth Mindset

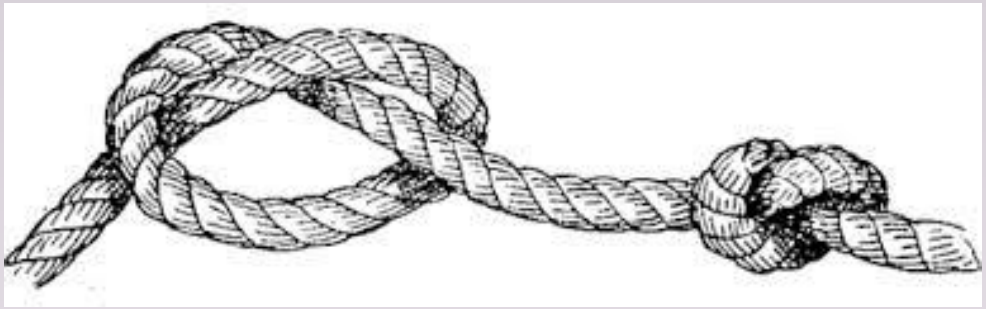
What is a growth mindset?

How does adopting a growth mindset affect teaching and learning?

What is your growth mindset?
https://mindsetonline.com/testyourmindset/step1.php

Knot Lab

Lesson Objective: To solve a system of linear equations by graphing and check the solution in a real world application.



Collecting, Organizing, and Modeling Bivariate Data

- Cost of a Movie Ticket
- Basketball Math
- Look Out Below!

Games in the Algebra Classroom

Factoring Cards

The Three Act Task

3-Act Tasks

Making Sense of Mathematical Stories

A 3-act task is a group participation exercise articulated in three distinct sections or *acts*, using videos and photos to convey information in a visual and engaging format. Each task is a rich mathematics exercise worthy of quality classroom discourse and creative problem solving.

The 3 Acts

Act One -- Introduce the central conflict of your story/task using as few words as possible.

- The problem is introduced.

Act Two -- The student overcomes obstacles, looks for resources, and develops new tools.

- Students ask clarifying questions and work on resolving the problem.

Act Three -- Resolve the conflict and set up a sequel/extension.

- Did students' hard work produce the correct solution?

fry's bank

by Dan Meyer

Act One

http://www.101qs.com/1968-frys-bank

*How much does Fry have in his bank account right now?

*Write down a guess that you know is too high.

*Write down a guess that you know is too low.

fry's bank

by Dan Meyer

Act Two

http://www.101qs.com/1968-frys-bank

*How much does Fry have in his bank account right now?

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Act Three

*Sharing our findings

*The answer: http://www.101qs.com/1968-frys-bank

fry's bank

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Sequel

*When will Fry double his money?

*The inflation average from 2010 to 2016 was 1.75%, how does the amount Fry has 1000 years from now compare to $0.93 in 2017?

*What questions does this activity cause you to think about?

Transformations of Functions

Reflections

Resources

https://www.edutopia.org/discussion/developing-growth-mindset-teachers-and-staff

file:///C:/Users/Robyn/Downloads/Marble_Experiment_Student.pdf

http://www.algebralab.org/activities/activity.aspx?file=Science_AllTiedUpInKnots.xml

http://www.101qs.com/

http://threeacts.mrmeyer.com/frysbank/