ALL LEARNERS NETWORK

Math for Every Student

Middle School Tasks

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Goals

- To engage in problem solving
- To explore ways to modify problems for menu

All Learners Lesson Structure

- Launch
- Main Lesson
- Menu
- Closure

Main Lesson: All Means All

- Inclusion
- Grade level lesson that is instruction for all
  - Challenges: contexts, numbers, concepts that all can access.
  - Discourse is essential.
  - What are students doing during the lesson? What are they thinking about? What are they talking about?

The Role of Problem Solving

- Students develop their understanding of concepts by working and solving mathematically rich problems. *Problem solving is not an application of what they have already learned: it is a major vehicle for building new meaning.*

Hyde, A. A. (2009). *Understanding middle school math: Cool problems to get students thinking and connecting*. Portsmouth, NH: Heinemann.

High Quality Tasks….

- Allow entry to the mathematics at a low level (all students can begin the task) but also has a high ceiling (some students can extend the activity to higher-level activities)
- Ask the problem before teaching the method,
- Have the potential to broaden students' skills and/or deepen and broaden mathematical content knowledge,
- Have the potential to reveal underlying principles or make connections between areas of mathematics,
- Engage students in explaining the meaning of the result.

Lannin, J. K., Chval, K. B., & Jones, D. (2013), Boaler, J. (2016), Piggott, J. (2011).

ALN Problem Solving Protocol

- Chorally read the problem.
- Ask, “What is this problem trying to figure out?”
    - This can be written on the board for everyone or each learner can write it on their paper. Have students rephrase into their own words.
- Ask, “What would an answer to this problem look like?” You can also ask, “What would a wrong answer look like?”
    - Identify the correct unit.
    - Probe for reasonableness.
- Brainstorm potential strategies.
- Express encouragement and ambivalence about each suggestion.

Flo's Purple Paint

Flo makes different colors of paint by mixing the primary colors—red, blue and yellow—together in varying amounts. To make her favorite shade of purple, she mixes 3 ounces of blue with 5 ounces of red.

a) In order to make her favorite purple, how much red should Flo mix with 6 ounces of blue?
b) In order to make her favorite purple, how much red should Flo mix with 7 ounces of blue?
c) In order to make her favorite purple, how much blue should Flo mix with 7 ounces of red?
d) In order to make 12 ounces of her favorite purple, how much red and how much blue should Flo use?
e) In order to make 19 ounces of her favorite purple, how much red and how much blue should Flo use?

Menu

- Look at the Menu Tasks
- Examine the:
  - Choice of numbers
  - Questions

Jasmine's Juice Blend

Here is the recipe for Jasmine's Citrus Juice Blend:

Orange Juice	Grapefruit Juice	Tangerine Juice
4 cups	3 cups	2 cups

a) How much grapefruit and tangerine should Jasmine mix with 12 cups of orange juice?

b) How much grapefruit and tangerine should Jasmine mix with 3 cups of orange juice?

c) How much of each juice should Jasmine use to make 12 cups of her citrus blend?

d) How much of each juice should Jasmine use to make 17 cups of her citrus blend?

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