ALL LEARNERS NETWORK

Math for Every Student

Middle School Tasks

Fran Huntoon and Jonathan Bender
franhuntoonvt@gmail.com mdislander@gmail.com

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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.

Interlocking Gears

Three gears are connected. One turn of the first wheel turns the second wheel three times. One turn of the second wheel turns the third wheel twice.

a) Draw a picture of the three gears.

a) If you turn the first wheel three times, how many times will the third wheel turn?

a) How many times must you turn the first wheel in order to make the third wheel turn nine times?

Menu

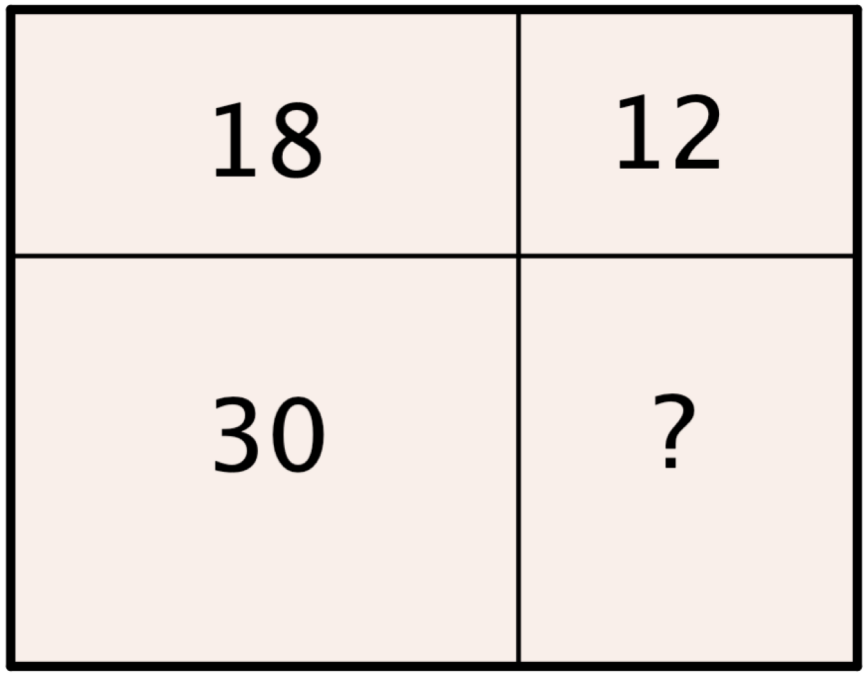
- Look at the Menu Tasks
- Examine the:
  - Choice of numbers
  - Questions

Rectangle Areas

The rectangle shown at right has been broken into four smaller rectangles.

The areas of three of the smaller rectangles are shown in the diagram.

Find the area of the fourth one.



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