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

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All Learners Lesson Structure

- Launch
- Main Lesson
- Menu
- Closure

Implementing Tasks that Promote Reasoning and Problem Solving

Characteristics of Tasks:

- The mathematics is problematic for students,
- The task connects with student prior knowledge,
- The task engages students in thinking about important mathematics.

Spangler, D. A., Wanko, J. J., & National Council of Teachers of Mathematics. (2017). *Enhancing classroom practice with research behind Principles to actions*.

Problem solving can be understood as a process where previously acquired data are used in a new and unknown situation. (NCSM, 1989)

Benefits of Problem Solving

There are several benefits to having students engage in productive struggle as they solve mathematics problems:

- a sense of accomplishment;
- knowledge and understanding;
- high achievement;
- improved achievement; and
- mastery and long-term retention.

Spangler, D. A., Wanko, J. J., & National Council of Teachers of Mathematics. (2017). *Enhancing classroom practice with research behind Principles to actions*.

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.

After-School Jobs

Alex has an after-school job that pays $8/hr.

Kim has a job that pays $10/hr.

Pat has a job that pays $12/hr.

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Grab a Text Box: Write a question that could be answered with the information: Alex has an after-school job that pays $8/hr. Kim has a job that pays $10/hr. Pat has a job that pays $12/hr.

how much will alex earn at the end of an 8hr day	How much will each person make if they each work for 6 hours?		How long will they each have to work to earn the same amount of money?
How many hours will each person have to work to make $100?	How much money does Pat make after working 5 hours?	Alex and Pat want to each buy a $75.00 video game. How much more time would Alex have to work to earn the same amount as Pat?	How long would it take them to save up $80?
How many hours will they need to work in order to all make the same amount of money?			

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After-School Jobs

Alex has an after-school job that pays $8/hr.

Kim has a job that pays $10/hr.

Pat has a job that pays $12/hr.

a) How long does it take each of the three to earn $120?
b) How long does it take each of the three to earn $50?
c) How long does it take each of the three to earn $1?
d) If Alex and Kim work the same number of hours, how long will it be before Kim has earned $30 more than Alex?
e) If Alex and Pat work the same number of hours, how long will it be before Pat has earned twice as much as Alex?

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Debrief: Write the answers to c, d, and e in the box for your breakout room.

1

C) Alex earns $1.00 in 7 ½ minutes
Kim earns $1.00 in 6 minutes
Pat earns $1.00 in 5 minutes

D) Alex earns $120.00 in 15hrs
Kim earns $150.00 in 15hrs
After working 15 hours, Kim has earned $30.oo more than Alex

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Menu

- Look at the Menu Tasks
- Examine the:
  - Choice of number
  - Questions: What are students being asked to reason about?

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Tapper's Crazy Clearance

Tapper’s Fashion Emporium is holding its annual Crazy Clearance sale. Each day of the week, the price of every item in the store is reduced by the same percentage, and the discounts get better as the week goes on.

1) On Monday, a jacket that usually sells for $60 can be bought with a discount of 10%. What is the price of the jacket?
2) On Tuesday, a hat that usually sells for $25 is discounted 20%. What would be the sale price of a scarf that usually sells for $16?
3) On Wednesday, a hoodie that usually sells for $32 is on sale for ¼ off the regular price. What is the percent discount?
4) On Thursday, with a discount of 30%, a silk tie is on sale for $21. What was the original price?
5) On Friday, the price of a $75 dress is reduced by $30. What is the percent discount? If a pair of jeans is on sale for $36, what is the usual price of the jeans?

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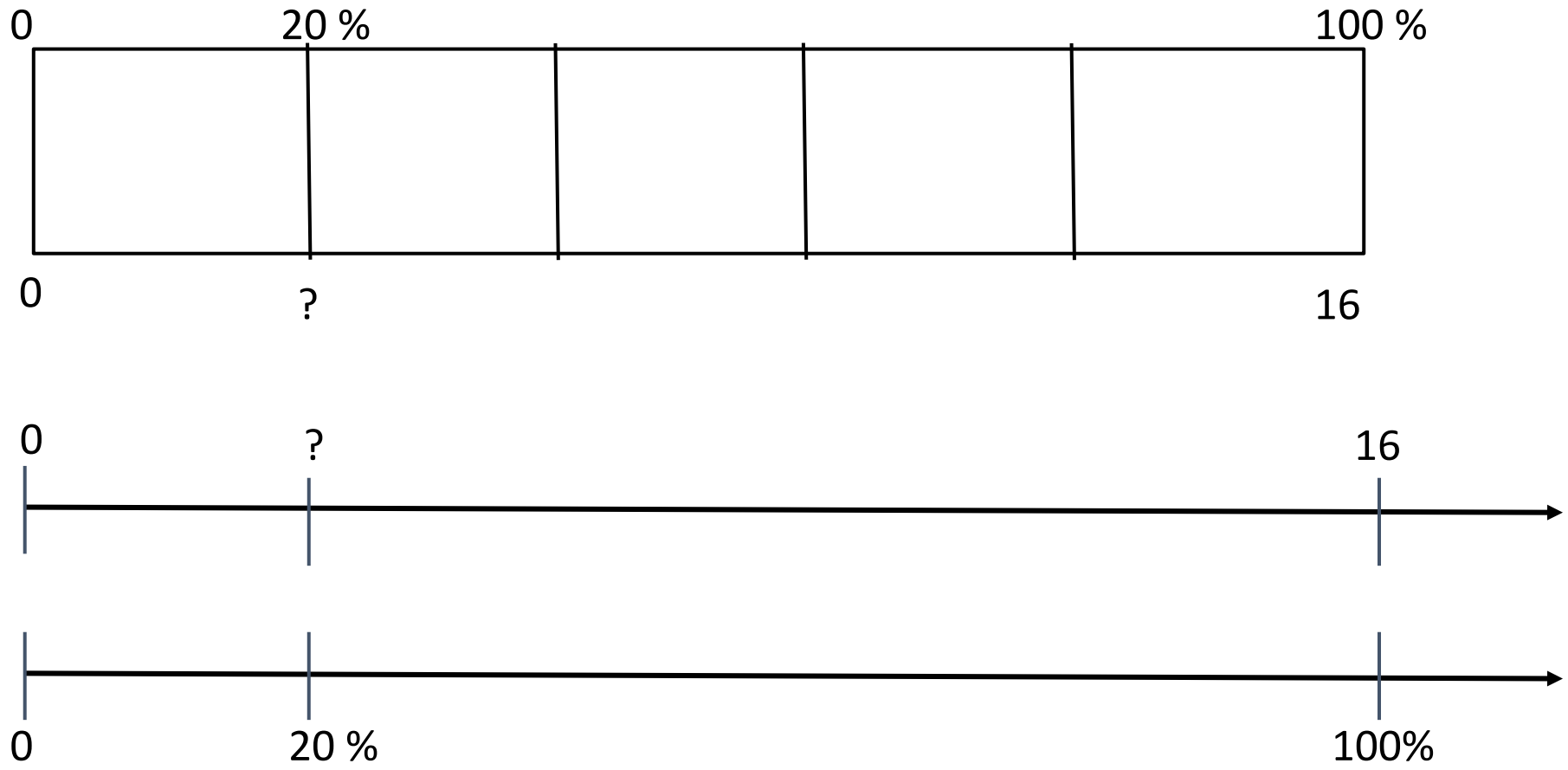
Model



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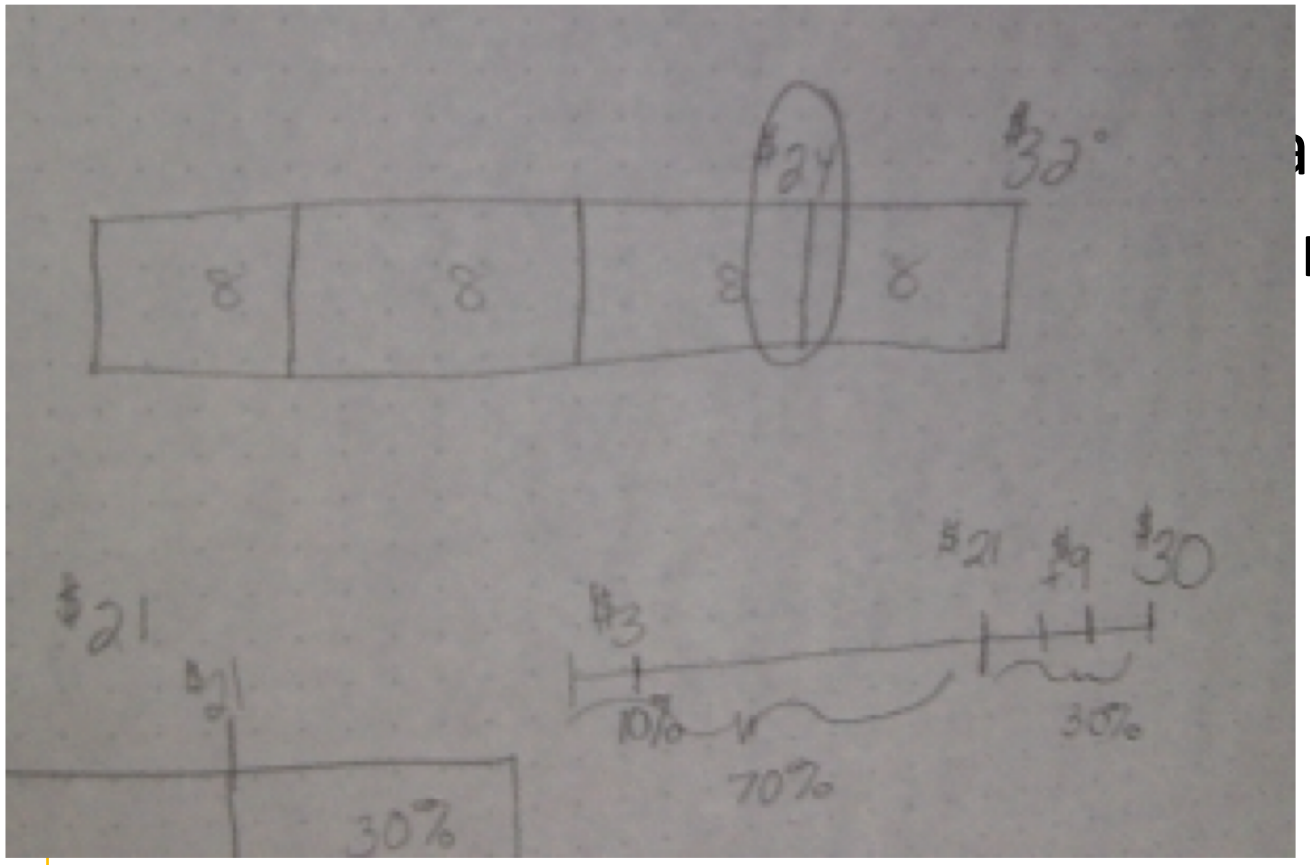
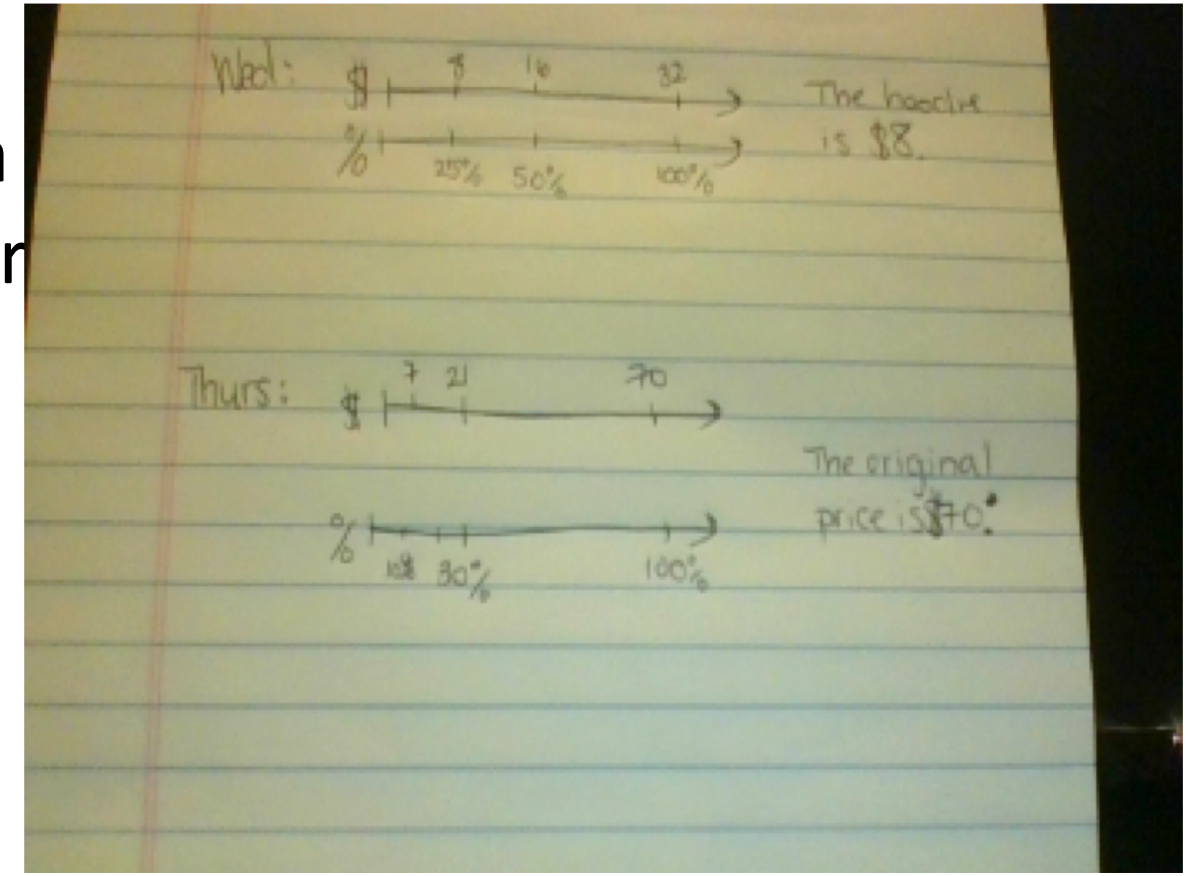
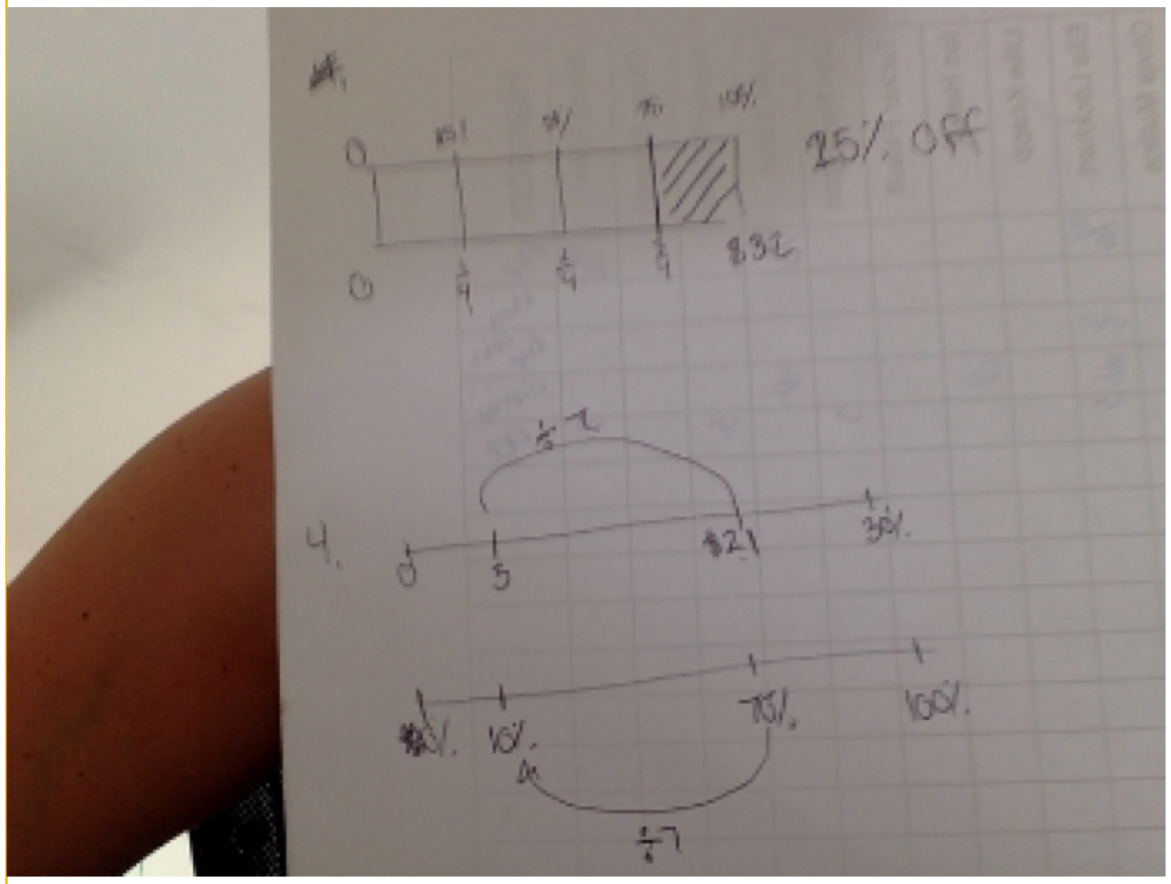
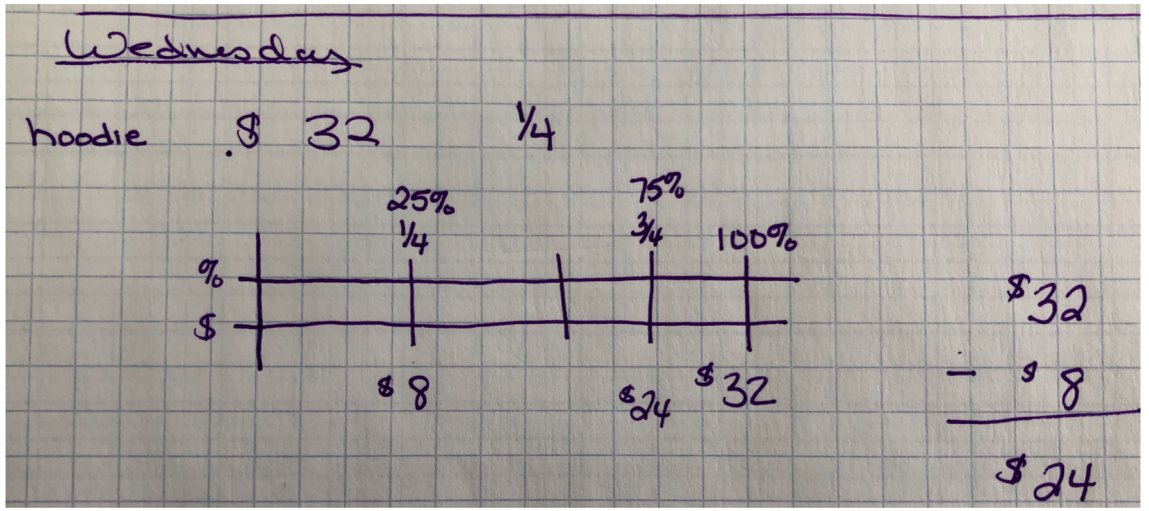
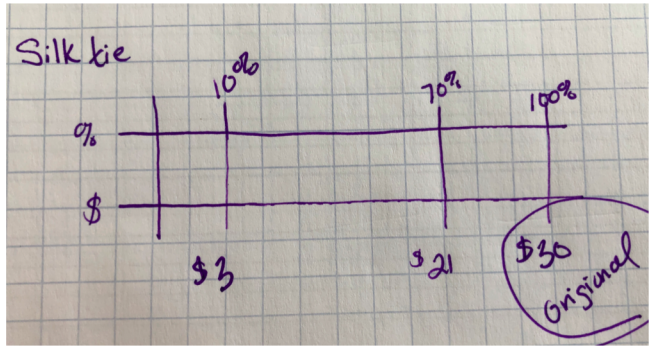

$24
$32
8
8
8
8
$21
$21
30%
$3
10%
70%
$21
$9
$30
30%


Wed:
$
%
3
12
25%
50%
100%
The baseline is $8.
Thurs:
$
%
7
21
70
10%
30%
100%
The original price is $70.

Breakout Room 2: Insert a picture of the models for the solutions to Wednesday and Thursday







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Menu

- Look at the Menu Tasks
- Examine the:
  - Choice of numbers
  - Questions: How are these question different from the main lesson task?

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Feedback

Please click on the title to give feedback.

Thank you for participating!