<u>**Scavenger Hunt Question Bank:**</u> **Grade 7-8**

<table>
<tr><th colspan="3">Pattern and Number</th></tr>
<tr><td>Question</td><td>Solution</td><td>Extensions/Support</td></tr>
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<td>
1: Measuring Time

You have two sand timers, which can show 4 minutes and 7 minutes respectively. Use both the sand timers(at a time or one after another or any other combination) and measure a time of 9 minutes.
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Answer:

Start the 7 minute sand timer and the 4 minute sand timer.
Once the 4 minute sand timer ends turn it upside down instantly.
Once the 7 minute sand timer ends turn it upside down instantly.
After the 4 minute sand timer ends turn the 7 minute sand timer upside down(it has now minute of sand in it)

So effectively 8 + 1 = 9.
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Ask students if they can find methods to measure other lengths of time (e.g. 10, 11, 12 minutes etc.)
Give students actual sand timers to experiment with
Provide a table or graphic organizer

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2: Hockey Mix-Up
Jamie has sold several custom hockey jerseys through his online company, SportCo. Match each jersey to its player, and determine the size, color and number of each.
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<table>
<tr><th>Sizes</th><th>Players</th><th>Colors</th><th>Numbers</th></tr>
<tr><td>6</td><td></td><td></td><td></td></tr>
<tr><td>7</td><td></td><td></td><td></td></tr>
<tr><td>8</td><td></td><td></td><td></td></tr>
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Can pre-fill some answers
Easier or more difficult logic puzzles can be found at puzzlebaron.com
Consider extending this so that students must use the answers found here as clues to another puzzle (escape room-style)

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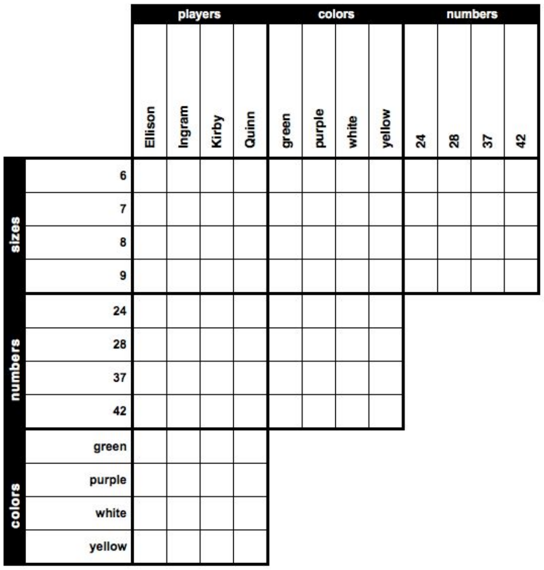

1. Of Kirby's shirt and the size 9 shirt, one is white and the other is number 28.
2. The purple shirt is 1 size smaller than Quinn's jersey.
3. The four jerseys are the size 8 shirt, the purple shirt, number 37 and Ingram's jersey.
4. Number 24 isn't purple.
5. The size 7 shirt is either the green jersey or number 37.
6. Ingram's jersey is either the size 8 shirt or number 28.
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<td>3: Sudoku</td>
<td>418 563 792
237 489 561
569 172 384
925 317 648
346 958 127
871 246 935
652 794 813
183 625 479
794 831 256</td>
<td>This is an intermediate-level puzzle. Can have Easy-Advanced options for students.</td>
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</table>

		8	5		3			2
						5		1
	6						8	
		5						
3	4					1		7
	7							
					4	8		
1		3		2		4		
			8				5	6

4: Complete the Pattern

Write down the next line in the following pattern:

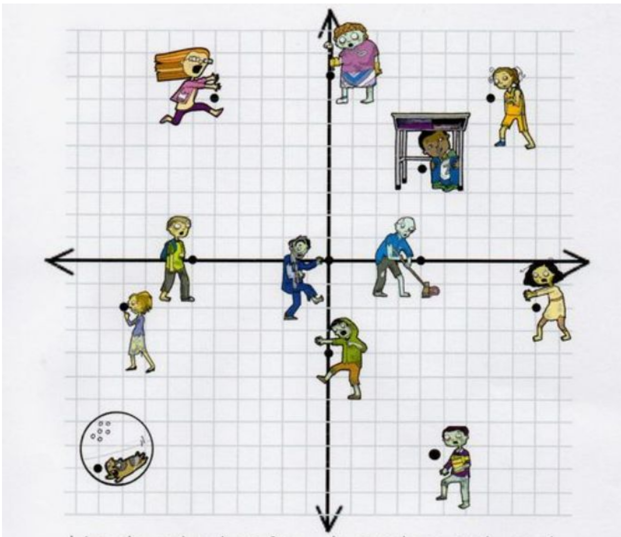
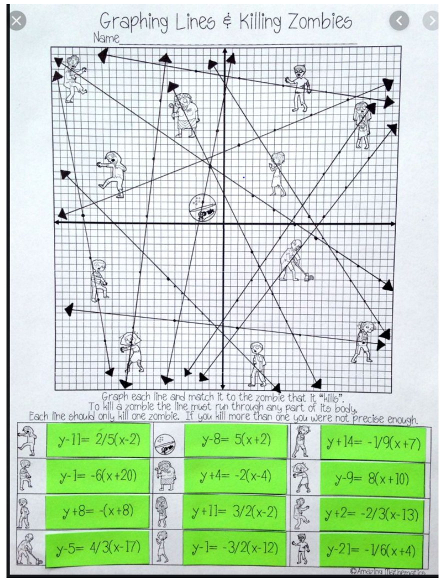
1
11
21
1211
111221
312211
13112221
1113213211
31131211131221
....?

Each row describes the grouping of the digits in the line above.

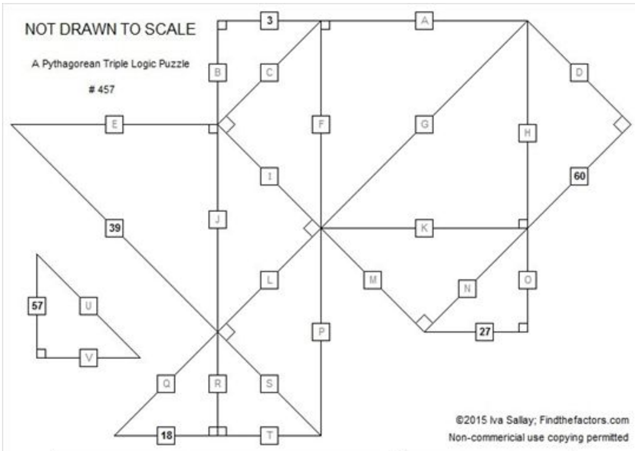
The top row "1" has one one, so we write "11" for the second row.
The second row "11" has two ones, so we write "21" for the third row.
And so on.

To describe the line:
31131211131221
We say: one three, two ones, one three, one one, one two, three ones, one three, one one, two twos and one one.

Which is:
13211311123113112211

5: Zombie Targets  Graph each line and match it to the zombie that it "kills". To kill a zombie the line must run through any part of its body. Each line should only kill one zombie. Y-11 = 2/5 (x-2) Y-1 = 6(x+20) Y+8 = (x+8) Y-5 = 4/3(x-17) Y-8 = 5(x+2) Y+4 = -2(x-4) Y+11 = 3/2(x-12) Y+14 = -1/9(x+7) Y-9 = 8(x+10) Y+2 = -2/3(x-13) Y-21 = 1/6(x+4)	 	

Geometry/Measurement		
Question	Solution	Extensions/Differentiation
1: Missing Angles	A=84 B=4 C=5	• *Hint: consider a triplet you know (e.g. 3, 4, 5)*



Assuming that ALL the triangles in the image are Pythagorean triples, solve for all sides (A-V).

D= 32
E= 36
F= 13
G=85
H=68
I =12
J=15
K=51
L=9
M=24
N=45
O=36
P=41
Q=30
R=24
S=40
T=32
U= 95
V=76

Let n be any integer greater than 1, then 3n, 4n and 5n are also a set of Pythagorean Triple. This is true because:
$(3n)^2 + (4n)^2 = (5n)^2$

- *Give students triangle and square paper manipulatives to work with*

2: Magic Square

Find a 3x3 ***magic square*** that uses 3 Pythagorean triples.

Note: A magic square is a **square** grid (where n is the number of cells on each side) filled with distinct positive integers in the range such that each cell contains a different integer and the sum of the integers in each row, column and diagonal is equal.

For example:

2	7	6	→15
9	5	1	→15
4	3	8	→15

↙15 ↓15 ↓15 ↓15 ↘15

Solution:

3	**6**	**15**
12	**8**	**4**
9	**10**	**5**

"... a semi-magic square, that uses the primitive Pythagorean triple **3-4-5** together with non-primitive Pythagorean triples **6-8-10** and **9-12-15**"

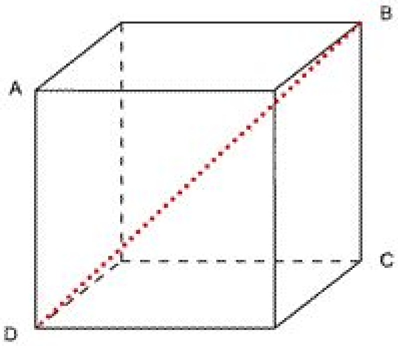
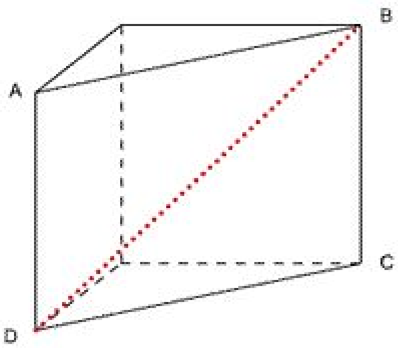
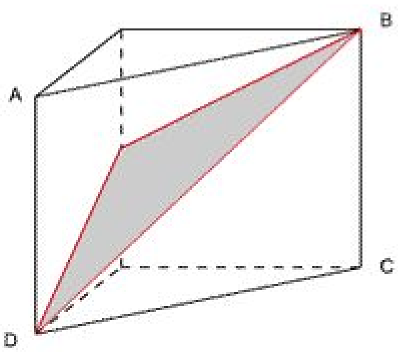
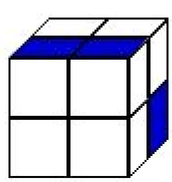
- Ask students to create a 4x4 magic square (not related to Pythagorean triples)

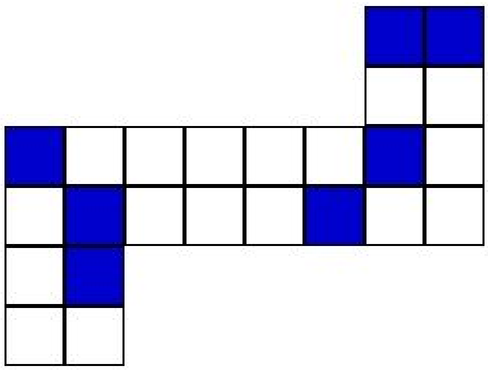
3: Geometric Net

The longest dimension in a cube is the diagonal from top to bottom of opposite vertices. This is shown on this dissection of a cube.

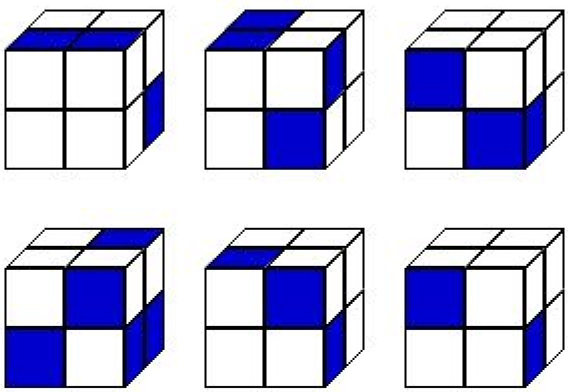
They are identical

- Create a new net question for another group
- *Provide paper and blocks as manipulatives for*

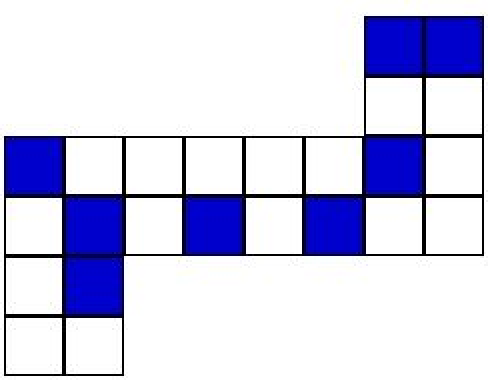
   The half-cube is cut into two pieces by a plane through the long diagonal and at right angles to it. Can you draw a net of these pieces? Are they identical?		*students to work with* • *Ask students to construct the two halves of the cube first*
4: Imagining Nets		



Which of the following cubes can be made from the net above?



Is it possible to shade one more section of the net of the cube (perhaps like in the diagram below) and be able to give the same answer? Convince me.



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5: Figuring the Folds

The following brain puzzles are a bit different. No dissection is needed.
Divide a paper into 8 sections and write numbers on it according to the picture. Your job is to fold it where the lines are so that the numbers are sorted (number 1 will be on the top, 2 under it,..., and the last one will be 8).

<table>
<tr><td>1</td><td>8</td><td>7</td><td>4</td></tr>
<tr><td>2</td><td>3</td><td>6</td><td>5</td></tr>
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Here is a representation of the solution:

fold-1to8.jpg[/attachment:3679e]

1) fold on the diagonal of 5-7, to put 4 under 6

2) fold 5, and manage to fold it inside the previous fold

3) fold 6-7 under 8-3

4) fold 1-8 under 2-3

5) fold 2 under 3.

All the numbers are ordered, but some of them are fold in 2 on their diagonal (7 and 5).

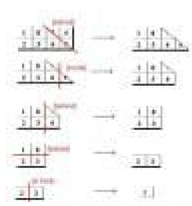
For the second one, this is the solution (without drawing):

1) Fold 1-4 under 2-3 (5-8 are fold in the middle, so you now see only half of 8 and half of 5)

2) Fold 8-2-7 over 5-3-6

3) Fold 8 under 1

4) Fold 6 and 7 between 5 and 8



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- *Provide students with multiple sheets of paper for trial and error*

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(optional) 6: Fused Vision

Several identical cubes are fused together to form a solid object. Given the following five external views of such an object, draw the sixth external view. Clockwise or counterclockwise rotations of the sixth view are acceptable, but a mirror image (the sixth side as viewed from inside the solid) is not acceptable.

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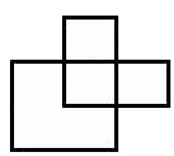

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- What other number alignments are possible?
- *Provide students with paper and scissors for manipulatives*

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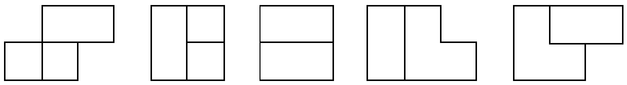
		

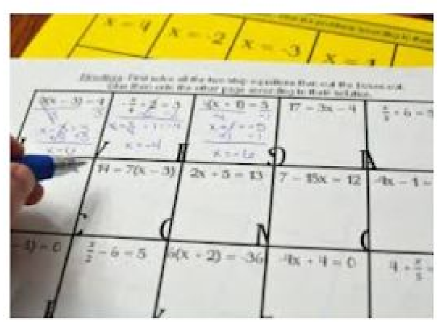
Data Probability		
Question	Solution	Differentiation/Extension
1: Averaging Consider a list of all the ways you could take four distinct digits from 1 to 9 and arrange them to make the sum of two 2-digit numbers. Some numbers might appear several times: 134, for example, is 93 + 41, and also 91 + 43. What are the **mean**, **median** and **mode** of all the numbers on this list?	Mean = 110; median = 110; mode = 99, 110 and 121	• Can you find multiple strategies to solve the problem? • *Ask students to consider what the largest, smallest and middle numbers would be. How would they make these numbers? Why is this relevant?*
2: Mystery Numbers I'm thinking of four numbers. The mode of the numbers is 7; the median is 7.5; the mean is 9. What are the numbers?	7,7,8,14	• *Provide students with a graphic organizer*
3: Card Battle You and one other are playing cards for candy; the winner receives one piece per game from the loser. When it is time for you to go home, you have won three games, while the other has a profit of three pieces of candy.	You ended up playing nine games. The other person had won 6 games (vs 3) for a profit of 3	• Provide students with cards and "candies" (tokens)

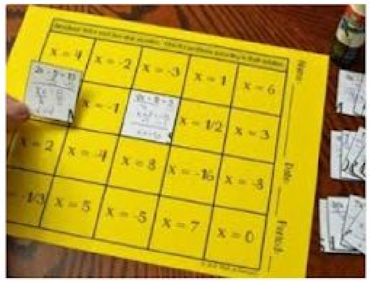
How many individual games have you played?	pieces of candy.	
4: Facing Which Way? A blind-folded person is handed a deck of 52 cards and told that exactly 10 of these cards are facing up. You are asked to divide those cards into two piles, each with the same number of cards facing up. You can't peek, get help, or damage the cards, but may use any strategy that occurs to you to do so. How can you do it?	The blind-folded person divides the cards into two piles with 10 and 42 cards each. They then flip all cards in the smaller pile. Done!	• Provide students with a deck of cards and a blindfold
5: Which Ball? 3 Baskets And 4 Balls Puzzle You have 3 baskets & each one contains exactly 4 balls, each of which is of the same size. Each ball is either red, orange, white, or yellow, & there is one of each color in each basket. If you were blindfolded, and balls are randomly distributed and then took 1 ball from each basket, what chance is there that you would have exactly 2 red balls?	Answer: There are 3 scenarios where exactly 3 balls are red: 1 2 3 ———— R R X R X R X R R X is any ball that is not red.	• Provide students with baskets and balls

	Take the first one, for example: 25% chance the first ball is red, multiplied by a 25% chance the second ball is red, multiplied by a 75% chance the third ball is not red. 1/4*1/4*3/4 = 4.6875%. Because there are 3 scenarios where this outcome occurs, you multiply the 4.6875% chance of any one occurring by 3, & you get 14.0625%.	

Final Option 1: <u>**Final Collaborative Puzzle Inspiration**</u> (best for shorter messages)

- When a group completes a question, they will receive a puzzle piece
- These puzzle pieces fit into a class puzzle
- Each puzzle piece will have a 2-step algebraic question in which the students must solve for x and part of a letter.
- Puzzle pieces are then laid out on a mat according to the x-value; if arranged correctly, the tiles will spell out a message to the whole class.
- This class puzzle mat would be significantly larger than that in the picture below to allow multiple class members to work on it at a time.
- Groups who complete their 3 scavenger hunt questions quickly can work on the class puzzle or help other groups.


Final Option 2: <u>**Coded Message**</u>

- Write a coded message in a visible place
- Teams who complete a question could receive:
    - The chance to guess a letter (hangman-style)
    - A symbol that they can use to decode a letter