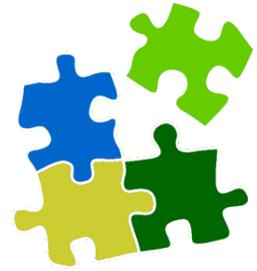## 2018-19 Puzzle Contests
Contest #2

Grades K-5 Puzzle Solutions:

1. A secret passcode is needed to enter the Great Hall of Mysteries this Halloween. It is known that the correct passcode would make true the sentence below:

THERE ARE ….. LETTERS IN THIS PASSCODE
(35 pts.)

Answer: There are two possible answers – either *thirty nine* letters or **29**.
Solution: Note that the number of letters in this sentence must be at least 29. If the number is written in letters (and not digits), then checking the numbers upwards from twenty nine we can see that *thirty nine* is a solution that works. However a more straightforward solution is possible. If the number is written out as 29, and assuming we do not treat digits as letters, 29 is also an acceptable solution.

2. The young witches Bessie, Cassandra and Evanora were making frog oil potion. Each made a potion according to each of their grandmother's recepies. They differed in the number of frogs needed for the potion. Evanora's recipe called for the lowest number of frogs. Cassandra's recipe required more frogs that Bessie's and Evanora's. How many frogs did Bessie and Cassandra put in their potions if Evanora put 4 frogs, and none of the recipes called for more than 5 frogs?
(25 pts.)

Answer: Bessie put in 4 frogs, Cassandra put in 5 frogs
Solution: Note that according to the condition the Cassandra's recipe needed more frogs than Evanora's. Since 5 is the highest by the problem statement, Cassandra had to put in 5 frogs. Since Bessie's number cannot be smaller than Evanoras, it had to also be 4.

Solutions deadline is November 25
Please submit your solutions to anna.charny@metrowestschool.com
or bring them to the office

3. **At the Ghost Halloween parade all participants were**
assigned numbers from 1 to 995. The Chief Warlock
observing the parade was very bored, and so he started
multiplying ghost numbers ending in 5.   When he was
done, he was still bored, so he added all the digits of the
product. And when he got that, the parade was still on and
he was still bored. So he added the digits of the new result
again. And then again, and so on he kept adding the digits
of the result till he got one-digit number. What was that
one-digit number? **(40 pts.)**

Answer: 9

Solution: Note that there is the number 45 among all the numbers the Chief Warlock multiplied
initially. It means that the product is divisible by 9. Then each intermediate sum of digits is
divisible by 9 also. Since the sum of digits of a number is less than the number itself, the single
digit has to be 9

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