It's Time to Solve Hogwarts Mysteries!

For each of the following Hogwarts mysteries, identify the correct statistical test to solve them. You can work with your housemates AS LONG AS you work together to solve them. If you simply put down what others tell you to, this is cheating, and you will be banished to Azkaban!

#1

Hermione is convinced that a magic potion could be developed that would convert muggles to wizards. She creates three different potions; Gryphon's Blood, Scorpion Sting, and Bat Wings Tonic. Sixty muggles are randomly assigned to one of the three potions. Two weeks after taking the potions, they are given a battery of tests to measure their magical powers. The mean score for each group is calculated to see if one potion is more effective than the others.

a. single-sample t-test
b. independent t-test
c. dependent t-test
d. one-way independent ANOVA
e. one-way repeated ANOVA
f. two-way independent ANOVA
g. two-way repeated ANOVA
h. two-way mixed ANOVA (the first factor mentioned in the write-up is between-subjects)
i. two-way mixed ANOVA (the first factor mentioned in the write-up is within-subjects)
j. Pearson's Correlation
k. Chi-Square Goodness of Fit
l. Chi-Square Test of Independence

Mystery **#2**

Do male, female, or nonbinary wizards reach their full wizard potential earlier? Fifty wizards in each gender category are followed from 12 years of age until 30. The age at which they reach full strength was recorded, and the means are calculated for each gender category.

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b. independent t-test
c. dependent t-test
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e. one-way repeated ANOVA
f. two-way independent ANOVA
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Mystery **#3**

Is there a relationship between the age of a child and how scary they perceive Hagrid to be? Five hundred muggle children are shown a life size poster of Hagrid. The researcher records each child's age and how scary they thought Hagrid was on a 1-10 scale (1 not scary – 10 extremely scary)

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Mystery

#4

All students at Hogwarts are allowed to bring one pet; an owl, cat, or toad. Does choice of pet depend on whether the student is pure blood or muggle born? Pet choice for 100 Muggle born and 100 Pure bloods is recorded to see if any relationship exists.

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b. independent t-test
c. dependent t-test
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e. one-way repeated ANOVA
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Mystery

#5

Ron Weasley wants to play the quidditch game. But which position: chaser, beater, keeper, or seeker? He plays each position 15 times. The number of points earned each time in each position is recorded, and the mean number of points earned in each position is calculated.

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b. independent t-test
c. dependent t-test
d. one-way independent ANOVA
e. one-way repeated ANOVA
f. two-way independent ANOVA
g. two-way repeated ANOVA
h. two-way mixed ANOVA (the first factor mentioned in the write-up is between-subjects)
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Mystery

#6

Mandrake Root cries can kill a person, especially if you pluck it from the nutrients it loves. But what does it love? Soil fertilized with frog warts, or soil fertilized with the expelled blood from troll bloodsuckers? To find out, 25 mandrakes are potted in the frog warts soil, and 25 are potted in the troll blood soil. After 1 week, they are violently pulled from their respective soils. The volume of the mandrakes' cries is recorded in decibels. The louder their cries, the more they loved their soil. Which group of mandrakes cried louder?

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b. independent t-test
c. dependent t-test
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Mystery

#7

Ron Weasley and Dobby are both pretty high stress individuals. Is one generally more stressed than the other? Is one more freaked out by a sudden stressor? To find out, Ron and Dobby are each exposed suddenly and unexpectedly to a dementor 20x over the course of one week. Skin conductance (SC) and heart rate (HR) are secretly recorded from a ring on their finger, both before and after the dementor appears. The change in HR and SC is calculated for each exposure to a dementor.

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b. independent t-test
c. dependent t-test
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e. one-way repeated ANOVA
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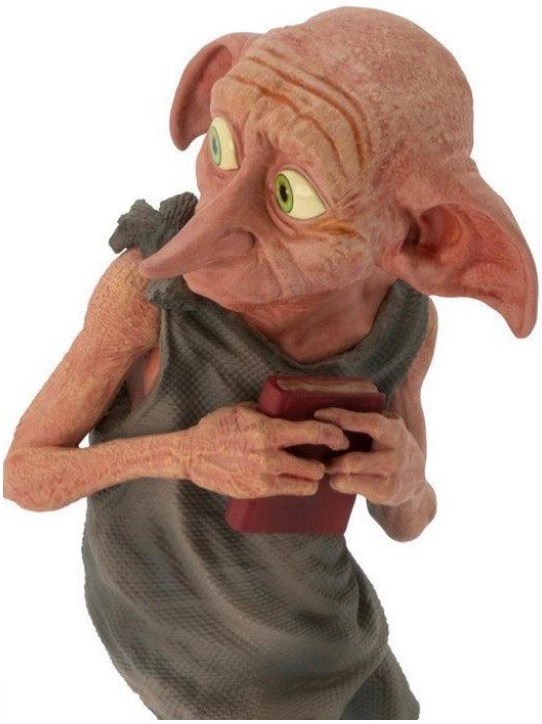

8.

Mystery

#8

What does it take to let Buckbeak fly him? Raw meat? Brutal force? Kindness & respect? To find out, 20 wizards give him raw meat, 20 use brutal force, and 20 use kindness and respect. Within each condition, whether Buckbeak let each wizard fly or not is recorded to see if there is any relationship between how he is treated and whether or not he lets himself be flown.

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b. independent t-test
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Mystery

#9

Who stole the fat lady? Did one of Hogwarts' houses conspire to commit the crime? To find out, every student in each house takes a polygraph test. Their peak skin conductance (SC) level is recorded. The assumption is that the higher the SC, the more likely they are lying. The mean SC for each house is then calculated.

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b. independent t-test
c. dependent t-test
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e. one-way repeated ANOVA
f. two-way independent ANOVA
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Mystery

#10

In the Triwizard Tournament game there are 6 paths to the snitches circle. The facilitators and hazards appear at different locations. Is one path easier than the other? The number of times each path produced a winner by the end of the semester was recorded.

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b. independent t-test
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