

Practice Problems For Hypothesis

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1. A teacher in a middle school is interested to see if a new method of teaching reading would improve the literacy rate of their students. So for one year they taught with the new method and then looked at the standardized test scores for their students. From past standardized testing, the teacher knew that the average score would be 82. Please state the Null Hypothesis and Alternative Hypothesis.
2. A light bulb company is trying out a new type of halogen light bulbs which they can produce much cheaper than the old light bulbs. They want their new light bulbs will last roughly the same length of time as the old light bulbs. If the new light bulbs don't last as long people will not buy them. If the light bulbs last too long then people will not buy enough of them for the company to make a profit. So the company runs an experiment with 50 of the new light bulbs running. At the end of 5 months the proportion of light bulbs **still remaining lit** were recorded for the new group. It was known through a prior experiment that the old light bulbs would have 92% still operational. Please state the Null Hypothesis and Alternative Hypothesis.
3. A biologist is interested in the concept of the most fit mice passing along their genes. In particular, they are interested in seeing if there is a only a small handful of "dominant" males or if more males still are able to reproduce. As such, the biologist gathered and recorded the average number of children of 200 male mice. It was conjectured in biological papers that dominant male mice would reproduce with 20 "kids". Please state the Null Hypothesis and Alternative Hypothesis.
4. There is a professor at the University of Maine¹ who is infamous for having his classes run over time.

¹Go Black Bears!!!

In a given semester an average professor would run over time by an average of 15 seconds. Students in his class, after being taught hypothesis testing, recorded the time he ran over and then performed a hypothesis test. Please state the Null Hypothesis and Alternative Hypothesis.

5. I happen to drink a lot of tea. About 9 cups in a day actually and usually some coffee to top it off². I get a lot of my tea down in the East Village of Des Moines at Gung Fu Tea. Because of the amount of tea I buy from them I was once concerned they were underfilling the packages of tea. So over the course of a year I recorded the amount of tea in each package I bought (40 in total) on my own scales at home. After the year was over I found the average package was 2.05 oz. Please state the Null Hypothesis and Alternative Hypothesis.
6. A business owner is interested to see if the a new manufacturer of sweatshirts is producing the sweatshirts at a better quality than the old manufacturer. To this end, the owner has a load of sweatshirts inspected to find the number of mistakes in a sweater. The old manufacturer had a defective mean rate of .05 (eg 1 in 20 sweaters). Please state the Null Hypothesis and Alternative Hypothesis.
7. A researcher at a large East Coast university is interested to see if the “science” programs have the same proportion of females as the “engineering” programs. The current enrollment for females in the engineering department is 4000 students out of 10,000. Please state the Null Hypothesis and Alternative Hypothesis.

²Grad students survive on caffeine