Answer Key to Examples Section

1. There are several possible answers. One is to look at the percent likelihood of getting an A for the band students versus the percent likelihood of getting an a for the non-band students. In which case, the appropriate test is to use the two sample test for percentage likelihood. One could also divide the students up into two large categories: band and non-band, and then their grades: A, B, C, D, F. Then, it would be possible to test for independence between grades and whether the students are in band or not (independence test).

2. One way to test would be to look at the overall average grade on all of the tests. It would then be possible for each color to do a one sample test for the mean score for that color being higher or lower than the overall mean. For example, testing whether the mean score of kids who had blue paper would be higher than the mean overall score, then testing whether the students with red paper had an average that was higher tha mean overall score. The null hypothesis for each color is that the average will be the same as the overall average versus the alternate hypothesis that the average will be different or higher.

3. The most appropriate test is the two sample test for the mean, assuming there are more than 30 plants in each group. Otherwise, the small sample test for the mean for two groups of data or the median test for two groups of data must be used. The null hypothesis is that the means or medians are the same versus the alternate hypothesis that the plants with access to extra $CO_2$ will have more mass.

4. The students can use the percentage likelihood test for two samples to test whether students who eat breakfast have a higher chance of being in the normal BMI range. The null hypothesis is that there is no differenc in likelihood of being in the normal range versus the alternate hypothesis that students who eat breakfast are more likely to fall in the normal BMI range.

5. Divide into two types of data (extra sunlight vs. normal light) and assume that 50% of the baby guppies will be in each category. Use the goodness of fit test for the two categories.

6. They should use the two sample test for the mean with the null hypothesis that they will travel the same distance on average versus the alternate hypothesis that the more expensive bearings will lead to a farther distance travelled.

7. The most appropriate test would be the two sample test for the mean, where the student measures the mean area of the zone of inhibition. The null hypothesis would be that there will be no difference in the mean areas, while the alternate hypothesis would be that the zone of inhibition would be larger for the garlic infused petri dishes.

8. The student should test for correlation between the variables amount of video game playing and amount of time required to complete the tasks. The student would expect to find a negative correlation (i.e., more time spent playing video games the less time it would take to do the tasks.

9. The student should use the one-sample test for the mean where he measures the difference in times for the same student wearing the newer suit and the older suit. The null hypothesis would be that the mean difference in times will be zero versus the alternate hypothesis that the newer suits lead to faster times.

10. A two sample test for the mean would be appropriate, assuming the student has 30 students donate alone and 30 donate with a friend. Otherwise, if the data are approximately normal, use the two sample small test. If the data are not normal, use the two sample test for the median. The null hypothesis would be that the mean or median is the same for each group versus the alternate hypothesis that the students who are alone will donate less money.