1. What is our independent variable? What is our dependent variable?
Congruent words condition and incongruent words condition, or say words condition is our independent variable.
The time it takes to name the ink colors is our dependent variable.

2. What is an appropriate set of hypotheses for this task? What kind of statistical test do you expect to perform? Justify your choices.
Hypotheses:
Null hypothesis: There is no difference in population means of response time under Incongruent and Congruent conditions
Alternative hypothesis: Congruent words condition spend less time to tell for populations.

H0: $\mu C = \mu I$

HA: $\mu C < \mu I$

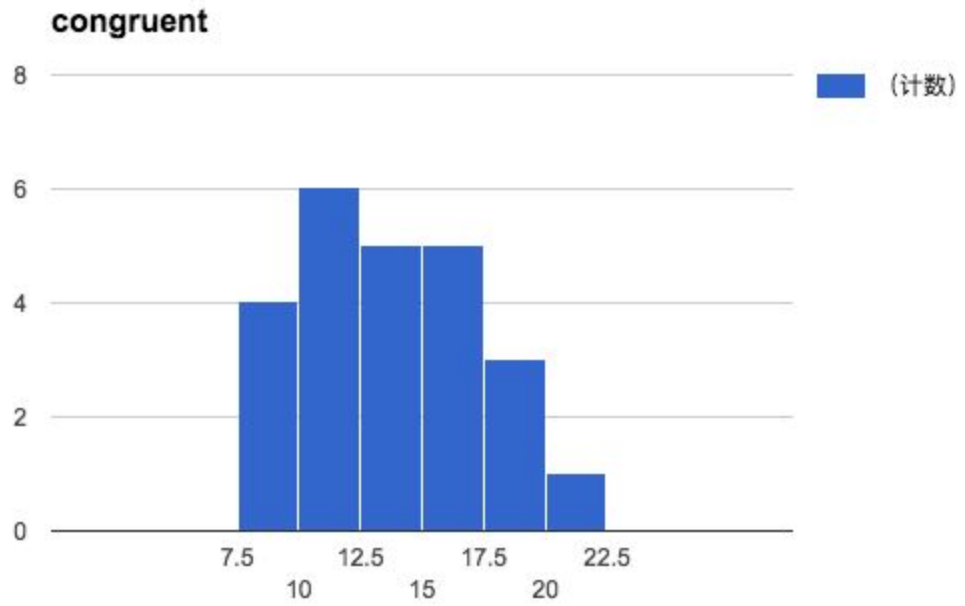
I expect I will reject with null hypothesis.

I'll perform the following tests:
the sample size is less than 30(24 in actual) and we don't know the population standard deviations i will apply a one-tailed t-test. Because our sample took the tests at different times, samples are dependent samples. We can compare the two averages of dependent samples with a one-tailed t-test.

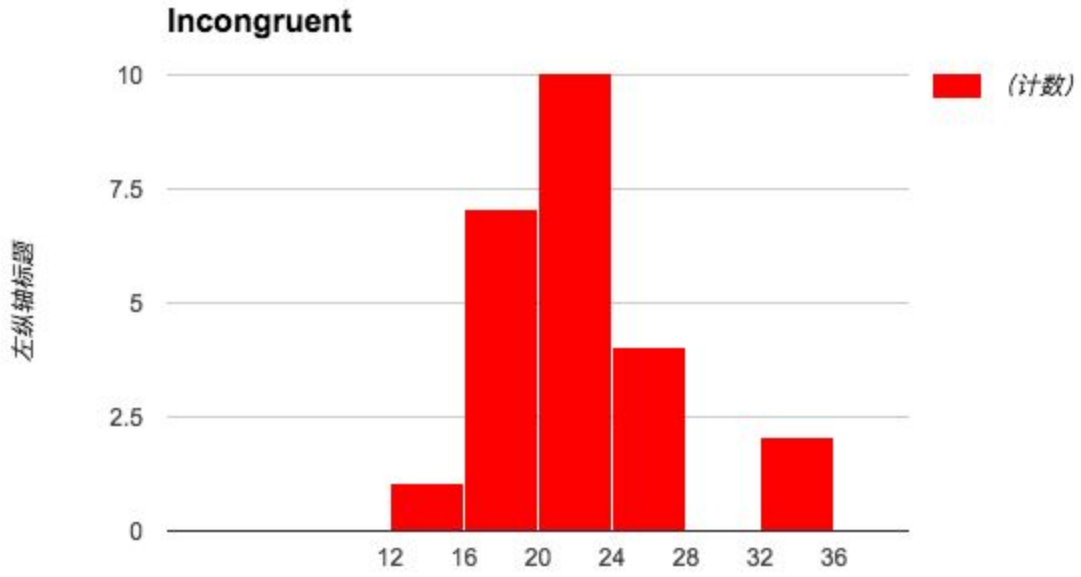
3. Report some descriptive statistics regarding this dataset. Include at least one measure of central tendency and at least one measure of variability.

	Congruent	Incongruent
Number of samples	24	24
Mean	14.05	22.02
Median	14.36	20.2
Standard deviation	3.56	4.80
Variance	12.67	23.02

4. Provide one or two visualizations that show the distribution of the sample data. Write one or two sentences noting what you observe about the plot or plots.
In every tests, Congruent time is less than Incongruent time.



The data is more or less normally distributed. the middle of the data is a little bit less than 15.



There are some data points off the distribution shape on right, other than that, it looks like normally distributed.

5. Now, perform the statistical test and report your results. What is your confidence level and your critical statistic value? Do you reject the null hypothesis or fail to reject it? Come to a conclusion in terms of the experiment task. Did the results match up with your expectations?
For a confidence level of 95% and 2 * 24 - 1 = 47 degrees of freedom, our t-critical value ends up being 1.714
Our point estimate for the difference of the means is: 14.05 - 22.02 = -7.97
Our standard deviation of the differences is 4.86. So that our t-statistic will be: -7.97/(4.86/sqrt(24)) = -8.02.

Our t-statistic is greater than our t - critical value, we can reject the null hypothesis. This means that it does take much less time to do the congruent task than it does to do the incongruent task. This matches up with what we expected.