Two independent samples

	Randomization test on $(\bar{Y}_2 - \bar{Y}_1)$	**Two sample t-test**	**Wilcoxon Rank Sum test**	**Levene's test**	**Welch's t-test**
Null hypothesis*	The treatment effect is zero.	The difference in population means is zero. OR The treatment effect is zero.	The difference in population medians is zero. OR The treatment effect is zero.	The difference in populations standard deviations is zero.	The difference in population means is zero. OR The treatment effect is zero.
Assumptions	•Equal population standard deviations •Independence of subjects within and between groups.	•Normal populations •Equal population standard deviations •Independence of subjects within and between groups.	•Equal population standard deviations •Independence of subjects within and between groups.	•Normal populations of deviations •Equal population standard deviations of deviations. •Independence of subjects within and between groups.	•Normal populations •Independence of subjects within and between groups.
Robust to assumptions?	•Robust to inequality of variances if sample sizes are equal.	•Robust to non-Normal populations with large samples. •Robust to inequality of variances if sample sizes are equal.	•Robust to inequality of variances if sample sizes are equal.	Sleuth says it is robust.	•Robust to non-Normal populations with large samples.
Resistant to outliers?	**Not resistant	Not resistant	Resistant	Not resistant	Not resistant
Test statistic	** $(\bar{Y}_2 - \bar{Y}_1)$	$((\bar{Y}_2 - \bar{Y}_1) - (\mu_2 - \mu_1)) / SE_{\bar{Y}_2 - \bar{Y}_1}$	Sum of the ranks in the smaller group	two sample t-statistic on $Z_1 = (Y_1 - \bar{Y}_1)^2$ & $Z_2 = (Y_2 - \bar{Y}_2)^2$	$((\bar{Y}_2 - \bar{Y}_1) - (\mu_2 - \mu_1)) / SE_{\bar{Y}_2 - \bar{Y}_1}$ with different SE to two-sample t-test

*These are abbreviated for space. You should always be specific about what the outcome is and what groups are involved.

** Note: that you can do a randomization test with other test-statistics. What would happen to the resistance if we used difference in sample medians as the test statistic?

Two paired samples

	Paired t-test	Sign test	Wilcoxon Signed Rank test
Null hypothesis*	The population mean of the differences is zero.	The population median of the differences is zero.	The population median of the differences is zero.
Assumptions	•Differences come from a Normal population. •Independence of subjects within groups.	•Independence of subjects within groups.	•Independence of subjects within groups.
Robust?	•Robust to non-Normal population with large samples.		
Resistant to outliers?	Not resistant	Resistant	Resistant
Test statistic	$(\bar{Y} - \mu) / SE_{\bar{Y}}$	Number of positive differences.	Sum of ranks of positive differences.

*These are abbreviated for space. You should always be specific about what the outcome is and what groups are involved.