Goal: To make sense of statistical significance.

Notes:
1. Statistical significance is valued because it points to an effect that is unlikely to occur simply by chance.
2. The purpose of a test of significance is to give a clear statement of the degree of evidence provided by the sample against the null hypothesis. (The P-value does this.)
3. Choosing a level $\alpha$ in advance makes sense if you must make a decision, but not if you wish only to describe the strength of your evidence. (If you do use a fixed level ask how much evidence is required to reject the null hypothesis.)
4. The 5% level is particularly common. There is no sharp border between “significant” and “insignificant” only strong evidence as P-value decreases.
5. Statistical significance is not the same thing as practical significance.

Hawthorne Effect:
Badly designed surveys or experiments often produce invalid results that cannot be corrected by formal statistical inference. Tests of significance and confidence intervals are based on the laws of probability.
For statistical significance to work well you must:
- decide what effect you are seeking
- design a study to search for it
- use a test of significance to weigh the evidence you get

Acceptance Sampling: circumstances that call for a decision or action as the end result of inference. (p.594)

Type I and type II Errors:
- Type I Error – Reject the null hypothesis in favor of the alternative when the null hypothesis is true.
- Type II Error – Accept the null hypothesis when in fact the alternative is true.

Note:
1. Significance Tests with fixed level $\alpha$ give a rule for making decisions, because the test either rejects the null hypothesis or fails to reject it. (Failing to reject means deciding that it is true.)
2. The significance level $\alpha$ of any fixed level test is the probability of a Type I error. That is, $\alpha$ is the probability that the test will reject the null hypothesis when it is in fact true.