BIOLOGY 300 - ASSIGNMENT #10

Note: This assignment is due Friday November 26th.

1. In a study of lettuce growth, 19 seedlings were randomly allocated to receive low, medium, or high light levels. Plants were raised at 20°C in the greenhouse. After 4 weeks of growth, the dry mass of above-ground tissue of individual plants was measured, in grams, producing the following data:

Dry Mass (g)

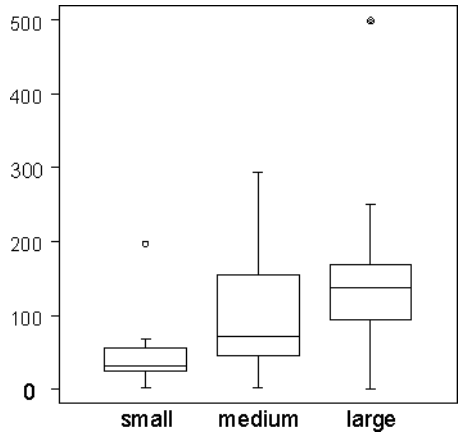
Low Light	Medium Light	High Light
26	30	29
23	28	31
20	29	35
23	26	29
	32	31

(a) Test for an effect of light levels on plant growth using the most powerful test available. Make all necessary assumptions.
(b) Use multiple comparisons to help determine which light level(s) produced different lettuce growth. Use underlines to visualize the results.

2. In smallmouth bass, as in many other fish, males build nests and attract females to spawn in them. The males then care for the accumulated eggs and young. A behavioral study of mate choice and nest defense measured the number of eggs in the nests of males of different body size. A random sample of eleven males from each of three sizes was obtained. The results (# eggs) are given below:

Male size											
small	1	5	25	26	30	34	54	56	67	197	17
medium	2	31	45	49	50	93	100	155	181	294	28
large	0	48	94	101	124	150	166	168	250	499	106

These data were first examined using boxplots:



(a) On the basis of the boxplots shown, decide on an appropriate method for testing whether mean egg number differs between the three size classes of males. Explain your choice.

(b) Carry out the appropriate test.

(c) Is this a random-effects or fixed-effects design?

3. In a study of habitat selection of juvenile salmon, a researcher placed individuals of two species into 5 experimental stream channels. Each channel contained two habitat types, "pool" and "riffle". 20 juvenile coho and 20 juvenile steelhead were added to each channel. The researcher subsequently measured the proportion of time each individual fish spent in one habitat or the other. Results (percent use of "pool" habitat) are given below. With these data, test whether the two species differ in habitat use. Make (and state) all necessary assumptions.

Channel	Coho	Steelhead
1	n =20, $\overline{X}$ =24, s=3.6	n=20, $\overline{X}$ =55, s=4.1
2	n=20, $\overline{X}$ =33, s=3.3	n=20, $\overline{X}$ =69, s=3.9
3	n=20, $\overline{X}$ =48, s=4.0	n=20, $\overline{X}$ =60, s=3.2
4	n=20, $\overline{X}$ =35, s=2.8	n=20, $\overline{X}$ =77, s=3.5
5	n=20, $\overline{X}$ =28, s=2.2	n=20, $\overline{X}$ =72, s=3.1