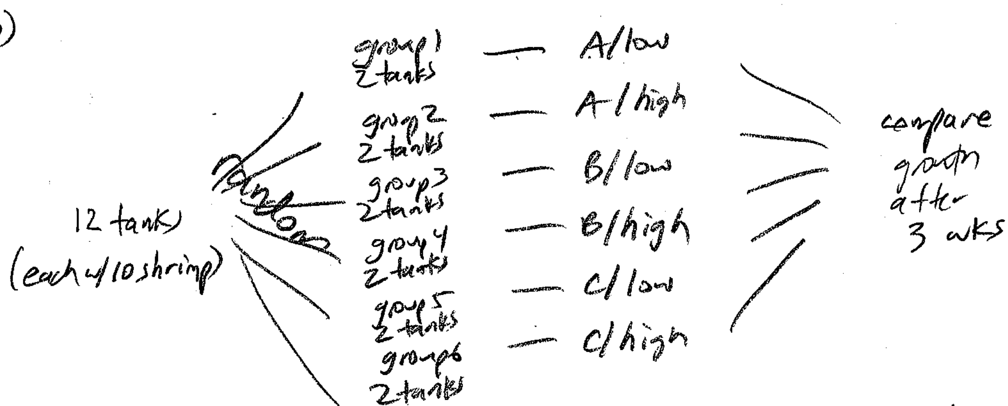
2006Q5

(a)

treatment	nutrient	salinity
1	A	low
2	A	high
3	B	low
4	B	high
5	C	low
6	C	high

(6 treatments)

(b)



10 tiger shrimp are randomly placed in each of 12 tanks and then the 12 tanks are randomly assigned to 6 groups (2 tanks in each group). One method we could use is to number each tank and write corresponding numbers on identical slips of paper, then put the 12 paper slips in a box and randomly draw out slips, without replacement. The first 2 slips drawn, those tanks are placed in group 1, the next 2 slips drawn into group 2, and so on until groups 1–5 are selected. The 2 remaining tanks form group 6.

For each group, remove the shrimp from the 2 tanks and weigh all the shrimp to get a total "before treatment" weight, then replace the shrimp in the tanks. Do this for each group of 2 tanks. Then, fill each tank with the appropriate treatment solution and wait 3 weeks. We need to control all other factors to be identical between the tanks (same room temperature, same lighting, etc)

After 3 weeks, for each group of 2 tanks weigh all the shrimp to obtain a total "after treatment" weight, then compute the growth (increase in weight) for each treatment group.

(c) If we use only tiger shrimp, this would variation in the weights due to variations between different species of shrimp, and anything which reduces variability in the results makes it easier to see smaller changes due to nutrients and/or salinity as statistically significant (increases the power of the test). This is a statistical advantage.

(d) The main statistical disadvantage in only using tiger shrimp is that we can only generalize our results of inference to the population of tiger shrimp, not all shrimp. Usually, researchers would want results of research to be as widely applicable as possible.