AP Statistics – Unit 3 Additional Review

#1) A coed youth sports league includes 10 teams and each team includes 10 players. For advertising purposes, the organization which manages the league wants to produce a brochure which contains a picture taken by a professional photographer of a 'typical' team – which represents the youth league's participants well. The photograph is tasked with selecting which players should appear in the photograph. She is considering three sampling strategies: a Simple Random Sample (SRS), a cluster sample, and a stratified random sample. The photographer has determined that she should include 20 players in the photograph she takes.

(a) Describe a process for randomly selecting the sample of 20 players if a **Simple Random Sample (SRS)** method is used. *You do not need to actually conduct the sample, but your description must be detailed enough for me to use your process to conduct the sample.*

Number all 100 players from all the teams #1 – #100, then use a calculator randInt (1,100) 20 times to select 20 players from the 100 players (ignore repeats)

(could instead do random digit table, slips of paper w/ player names, etc.)

(b) Describe a process for randomly selecting the sample of 20 players if a **cluster** sampling method is used. *You do not need to actually conduct the sample, but your description must be detailed enough for me to use your process to conduct the sample.* cluster = all of some subgroup

Define the 10 teams as 10 clusters and since we need 20 in the sample randomly select 2 of the teams and include all the players on those 2 teams in the sample. To select the 2 teams number the teams from #1 – #10, use randInt (1,10) twice to select the 2 teams, the put all 10 player on these 2 teams into the sample.

(c) In your cluster sampling method from part (b)…

…how many teams contribute players to the sample for the photograph?   2

…for the teams which contribute players, how many players from these teams are in the sample?   10 from each team

(d) If a **stratified random sampling** method is used to select the players, give one example of an effective variable on which to stratify. Explain your reasoning.

We could stratify on the teams, because players on a team might be similar to each other, but there might differences between the teams.

(teams is best answer because we know how many there are, but it isn't wrong to suggest stratifying on age, or gender, etc)

(e) Describe the process you would use to randomly selecting the sample of 20 players if a **stratified random** sampling method is used, stratifying on the variable you specified in (d). *You do not need to actually conduct the sample, but your description must be detailed enough for me to use your process to conduct the sample.*

Define the teams as the strata.
There are 10 teams and we need a sample of 20, so we will select 2 players from each team at random. Within each team, number the players from #1–#10 and run randInt(1, 10) twice to pick 2 players from that team for the sample. Repeat this for each of the remaining 9 teams.

(f) In your stratified sampling method from part (e)…

…how many teams contribute players to the sample for the photograph?   all 10 teams

…for the teams which contribute players, how many players from these teams are in the sample?

2 players from each team

#2) One-hundred 3rd grade students have been selected to participate in an experiment to evaluate the effectiveness of a new reading curriculum compared to the existing reading curriculum.

(a) Identify the treatments, experimental units and response variable for this experiment.

Treatments: the 2 curriculums; old and new

Experimental Units: the 100 students

Response variable some measure of ability to read or improvement in reading ability

(b) Design the experiment to compare the effectiveness of the different reading curriculums. Be sure to explain how the groups will be randomly assigned, and include a design diagram.

group 1
50 students — old reading curriculum

100 3rd grade students
random

group 2
50 students — new reading curriculum

Compare average improvement in reading ability
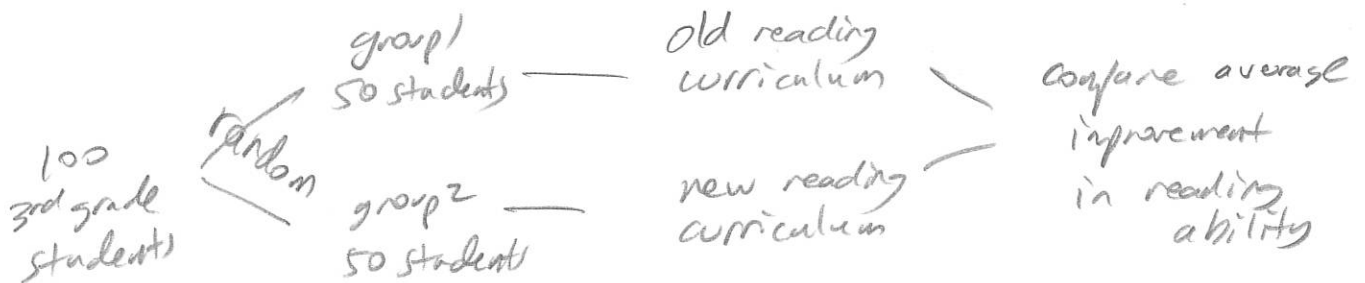
To assign the 100 students to the 2 groups, write the names of all 100 students on identical slips of paper, put the slips in a box and mix, then draw 50 slips out randomly one at a time (without replacement). The students on the slips drawn out form group 1 and the remaining students from group 2.