AP Stats: 5.1 – 5.7

5.1 population: employed adult women
sample: 48 club members who returned the survey

5.2 a) population: all adult U.S. residents
individual: one person (adult, U.S. resident)
b) p: all U.S. households
i: one household
c) p: all the regulators in the last shipment
i: one voltage regulator

5.3 Voluntary Response
Only persons with strong opinions on the topic will respond. (It requires time and money!)

5.4 This is also a voluntary response sample. The 1,128 letters received should not be assumed to be a fair representation of all the congresswoman's constituents.

5.5 starting with 01 number down the columns.
#139 55588 99404 70708 41098 43563 56934
48394 51719 continue 12975 13258 13048 45144
Choose 04 Bonds, 10 Fleming, 17 Liao, 19 Naber,
12 Goel, 13 Gomez

5.6 # down the columns. 01 to 30. Choose 19 Liang, 26 Rodriguez, 06 Castillo, 09 Gonzales.

5.7 # from 001 to 440. Choose 400, 077, 172, 417, 350, 131, 211, 273, 208, 074

AP Stats 5.8 – 5.13

5.8 Assign # 01 to 30 to students in alpha. order
Assign # 0 to 9 to faculty members
Pick any line to start. For example: → line 123
54580 81507 27102 56027 55892 33063
Choose # 08, 15, 07, 27, 10, 25 students
→ line 109: 36009 19365
Choose # 3, 6 faculty (Answers will vary if you use different line #s)

5.9 Midsize accounts # from 001 to 500
Small accounts # from 0001 to 4400
→ line 115: # 417, 494, 322, 247, 097 then continue (4 digits)
3698, 1452, 2605, 2480, 3716

5.10 a) households without telephones or those with unlisted numbers. These could be poor people who can't afford a phone or simply those who choose not to have a phone. Unlisted numbers are just people who choose not to have their phone numbers published.
b) A random dailing plan would include those with unlisted numbers.

5.11 Jan 1 to Easter 21% rna
July 1 to Aug. 31 41.5% rna May be vacation time so more people not at home.
Nonresponse in this case could under represent more affluent households who can afford to travel.

5.12 A: higher negative response because of words like "huge sums of money." (B says "contributing" and giving to "candidates" rather than "campaigns."

B: allows both sides of the issue

5.13 Increasing the sample size gives more accurate information about the population.

AP Stats 5.14-16, 18, 24

5.14 population: words in novels by Tom Wolfe
sample: the first 250 words on the randomly selected page in a randomly selected novel.
variable: length of the word

5.15 a) p: "eating and drinking establishments"
i: a small business
b) p: desired pop. is constituents but voluntary sample does not represent that population
i: an adult
c) p: all auto insurance claims filed in a given month
i: one auto insurance claim

5.16 Questionnaires were distributed through women's groups, and so exclude women who don't belong to such organizations. Voluntary response probably over represents people with strong feelings on the subject. Actual % are likely to be much lower than reported

5.18 During business hours, most people at home would be those who don't work outside the home. The would be more likely to have time to bake.

5.24 Comment on each question.

AP Stats 5.26, 28, 30, 32

5.26 This is <u>not</u> an experiment. The political scientist is merely observing a characteristic (party preference) of the subjects.

explanatory: gender response: party voted for

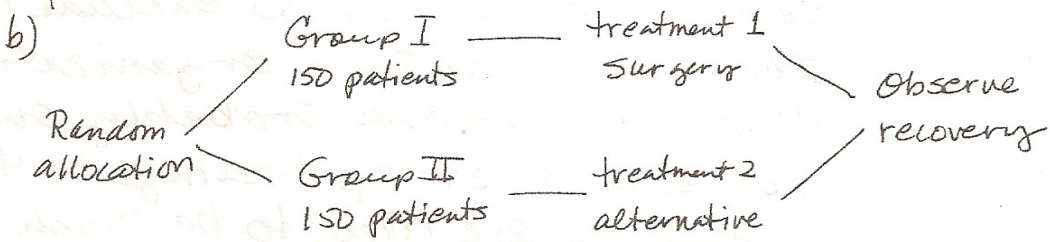
5.28 a) This is an experiment. The teacher imposes treatments (instruction method), and observes results.

b) explanatory: method of instruction used (computer software or standard instruction)

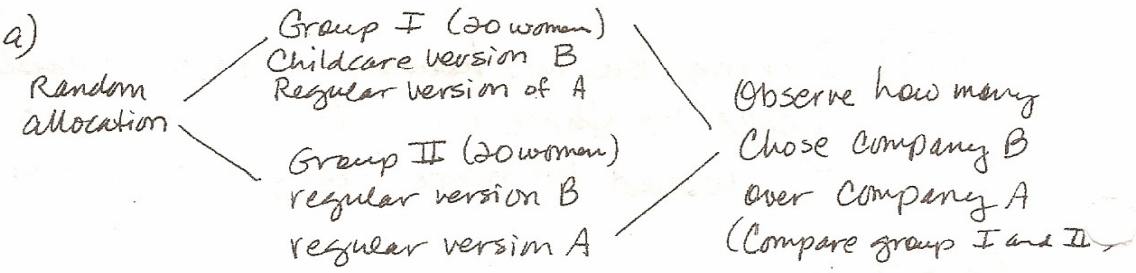
response: the change in reading ability as measured by a reading test.

5.30 a) In a serious case, when the patient has little chance of surviving, surgery might not be suggested. It could be seen as unnecessary, expensive, and painful.

b)



5.32 a)



b) Number from 01 to 40. Group I: 05 Canisco, 32 Roberts, 19 Hwang, 04 Braun, 25 Lippman, 29 Ng, 20, 16, 37, 39, 31, 18, 07, 13, 33, 02, 36, 23, 27, 35

AP Stats 5.36 – 39

5.36 The second design is an experiment – a treatment is imposed on the subjects. The first is a study. It may be confounded by the types of men in each group. Selecting "similar" subjects is difficult – maybe impossible! Those in the first group (the exercisers) coued be different in some significant ways from those in the non-exercising group. We assume that, in the second design, subjects would be assigned randomly to the treatment groups. This randomization would produce groups similar before the treatment is applied.

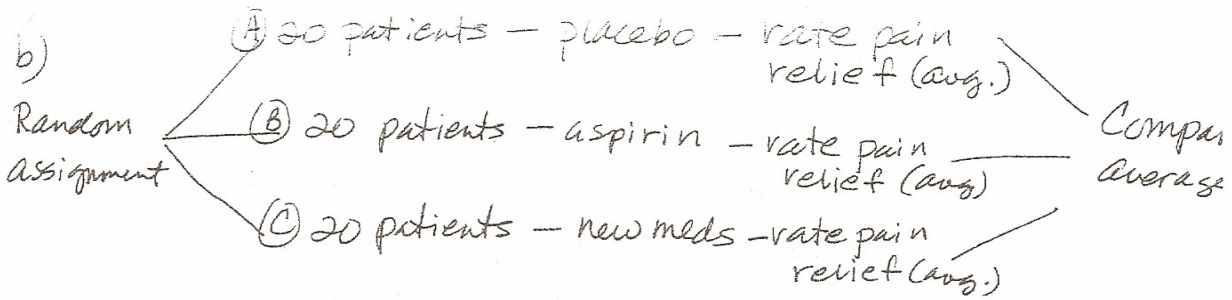
5.37 There probably was <u>some difference</u> between earnings of men and women, blacks and whites. The difference between men and women was too large to be attributed just to chance. The difference between blacks and whites was not large enough to preclude its occurring by chance variation.

5.38 The experimenter knew which subjects had learned meditation techniques (he or she taught them!). He or she may have had certain expectations about the outcome of the experiment – believing that meditation is beneficial. The ratings might consciously or subconsciously be affected by the experimenters point of view.

5.39

a) With nothing to compare it to, it would be difficult to rate the pain relief. Each person could be using a different "scale."

b)



c) Don't tell patients what they are receiving. Expectation would certainly affect self-rated pain relief.

d) If the drug company is sponsoring the study they would want their medication to be effective. Their representative might suggest positive responses if they knew who was taking their medication.

AP Stats 5.54 – 59

5.54 a) single digits 0 – 9
odd digits — Democrat
even digits — Republican

b) 0, 1, 2, 3, 4, 5 — Democrat
6, 7, 8, 9 — Republican

c) 0, 1, 2, 3 — Dem.
4, 5, 6, 7 — Rep.
8, 9 — undecided

d) two digit numbers
00, 01, 02, ... 52 — dem.
53, 54, ... 99 — rep.

5.55

a)	D R R R R	R R D R D	3 dem. 7 rep.
b)	R D D R R	R R D R R	3 dem. 7 rep.
c)	R U R D R	U U U D R	2 dem. 4 rep. 4 undec.
d)	R R R D D	D D D D R	6 dem 4 rep.

5.56 a) Obtain an alphabetized list of students and assign consecutive numbers to names. Randomly select 10 numbers (10 students from the list).

b) 0, 1, ... 7 — yes 8, 9 — no

c) 3 6 7 5 9 5 8 9 8 4 6 yes out of 10 60%
Continue 24 more times!
Count how many times you get all 10 "yes".

5.57 a) a single digit represents one shot. With
0, 1, 2, ... 6 — hit 7, 8, 9 — miss
Five consecutive digits in the table represent 5 independent shots.

AP Stats 5.54 – 59

5.54 a) single digits 0 – 9
odd digits — Democrat
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5.55

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d)	R R R D D	D D D D R	6 dem 4 rep.

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Count how many times you get all 10 "yes".

5.57 a) a single digit represents one shot. With
0, 1, 2, ... 6 — hit 7, 8, 9 — miss
Five consecutive digits in the table represent 5 independent shots.

APStats 5.66, 69, 70, 71

5.66 a) population: Ontario residents
sample: 61,239 people interviewed
b) The sample size is large and randomly selected. We could make a safe assumption that the sample accurately reflects the population.

5.69 a) label students from 0001 to 3478
b) line 105: 9559 2940 0769 9719 1481 6077 9537
9117 2975 9335 6841 7350 1315
* 2940, 0769, 1481, 2975, 1315

5.70 Use a stratified sample. We could select 150 randomly faculty members from each level. Or, an alternate selection plan could choose (randomly) 25 (or 50) colleges of each type, then choose 2 (or 1) faculty member from each college.
If the distribution of college types is not uniform in our state we could stratify unevenly. For example: if 50% of California colleges are Class III we could choose half of our sample from two-year colleges.

5.71 a) All students should be included. Get a list from the registrar in the counseling office or from attendance.
b) One possibility is to choose 125 students from each grade. Another is just to randomly select 500 students.
c) Mailed or handed-out questionnaires might have high non-response rates. Face-to-face interviews could be costly and time consuming.

AP Stats 5.80

5.80

a) A single digit represents a free throw.
80% 0, 1, 2, ⋯ 7 hit
8, 9 miss

b) One repetition is 20 free throws (digits).
Count the "run" of hits. Record the longest run for those 20 attempts.

3 trials for example: line 101 [H m H H H m H H H H H H H H H
H m H H H] [m H H H m H H H H H H H H H H m H m H H]
[H H H H H H H H H H m m H H H H H m H H H H H H H]

(run lengths marked above: 3, 10 / 3, 3, 10, 2 / 10, 5, 7)

longest run 1st trial 10
2nd " 10
3rd 10

c) Find the mean of your 100 trials.
min, Q_1, med, Q_3, max

d) Draw a histogram.

or **TI-83** $1 \rightarrow C$

$0 \rightarrow 7$ is a hit

randInt(0,9) $\rightarrow L_1(C)$: ($L_1(C) \geq 0$ and $L_1(C) \leq 7$) $\rightarrow$
$L_2(C)$: $1 + C \rightarrow C$

Repeat 20 times
my 1st trial: runs 5, 9, 4, 4