PPDAC Introduction Questions

1. Determine the phase of PPDAC that each when each of the following would occur. (A: Problem, B: Plan, C: Data, D: Analysis, E: Conclusions)

a) Choose a sampling technique.
b) Run the experiment many times.
c) Calculate median
d) Calculate the r2 value for your data.
e) Write up your findings.
f) Make a histogram graph.
g) Decide on your thesis.
h) Evaluate your errors and the impact on your subject.
i) Create a scatterplot
j) Design the experiment
k) Record your observations.
l) Decide if you should conduct a causal or descriptive experiment.
m) Choose the variables that you wish to measure.
n) Divide the test subjects into control and test groups.
o) Suggest areas for further study.
p) Create an Excel spreadsheet.

2. Why is PPDAC important in the creation of statistics? (2 marks)

3. Water Testing: The water testing board of Manitoba wanted to measure the amount of lead in the water in a Winnipeg apartment in 2002. They went to every 4th apartment after starting in a random place and took a water sample from the kitchen (total of 25 apartments). The amount of lead in the water was below detection level in all but 2 apartments. In this scenario, identify the following items.

a) Is the experiment Causal or Descriptive?
b) What is the Thesis?
c) Identify the Problem Unit
d) Identify the Plan Unit
e) How much Replication occurred

f) What is the Sampling Technique?
g) What are the Diversity Limitations?
h) Identify any Random Assignment.
i) Identify the variables data was collected about.
j) Identify the calculation that occurred.

4. Mall Survey: In 1989, a researcher in Alabama wanted to see the effect of question wording. People in a mall were stopped and were randomly asked one of two questions: (1) would they consider having surgery with a 90% success rate or (2) Would they consider surgery with a 10% failure rate. People were 5X as likely to say yes to the 90% success rate than to the 10% failure rate.

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5. Fishing Ban: Experimenters were doing a poll to determine the number of people in North Bay who support fishing restrictions at Lake Watanaki. Eighty people were selected by picking a random starting point in the phone book and choosing every 8th person afterward. They found that 35% of citizens favoured a ban.

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6. For each of the following experiments find:

I. problem unit - *one thing you want your results to apply to*
II. problem population - *the entire group you want your results to apply to*
III. plan unit - *one thing that you will study. (consider who, when, where)*
IV. plan population - *the entire group you will study. (consider who, when, where)*
V. variables - *a category that you will gather information about for each of your units*
VI. population attributes - *a calculation you will make on your data*

(a) **Handedness in Babies**: Psychologists know that about 10% of the population is left handed. They wanted to find out it this was learned after birth by watching their parents. In 1990, a series of researchers randomly sampled ultrasound pictures of 1000 pregnant women in the Chicago area. In these pictures, they found that a number of babies were sucking their thumb. Of the thumb sucking babies, about 9 out of 10 babies were sucking their right thumb. They have concluded that handedness is programmed before birth.

(b) **Brain Development**: Scientists wanted to know the effect of experience on human brain development. In 1972, two researchers raised 16 sets of baby rats in two environments: (a) an impoverished environment - one baby rat alone in its cage with only water and food (b) an enriched environment - 3 baby rats living together with many play things that were changed daily. In 14 out of the 16 sets of rats, the rats in the enriched environment had significantly more cerebral cortex than the impoverished rats. Scientists concluded that early exposure matters in the brain development of humans.

(c) **Literacy Rates**: Historians wanted to find the number of people who could read in Europe in the 1600s. They were fortunate because in England during this period there was a lot of civil unrest and a series of proclamations that every man in England was required to sign. One of these was the 1641 Protestation Oath, an oath of allegiance to the "true" religion - at that time in England, Protestantism. About 30% of the men signing the Oath signed their own names instead of an 'x'. Historians have concluded that about 30% of men in Europe were literate.

(d) **Babies Counting**: Psychologists wanted to know if infants can count. In 1992, a researcher showed 5 month old infants in Chicago 3 teddy bears. Then she hid the teddy bears behind an screen, reached her hand in and removed one bear in so that the babies could see that she had removed one bear. For randomly chosen babies, a confederate hidden under the table put a bear back via a trap door in such a way that the baby couldn't see the bear being returned. When the screen was lowered, the babies who saw 3 bears stared longer at the teddies than the babies who saw the 2 bears they expected. The 5 month old babies were surprised when the bears didn't add up to the amount they had expected. Clearly then, even babies can do simple counting, addition and subtraction.

Solutions

1. a) Plan   g) Problem   m) Problem, maybe Plan
   b) Data   h) Conclusions   n) Data
   c) Analysis   i) Analysis   o) Conclusions
   d) Analysis   j) Plan   p) Data, maybe Analysis
   e) Conclusions   k) Data
   f) Analysis   l) Problem

2. PPDAC ensures that the entire process is well planned. Especially with its emphasis on Randomized Sampling, Random Assignment and Replication, it helps to ensure that statistics are accurate and that causation has been established.

3. Water Testing

a) Descriptive
b) How much lead is in the water?
c) An Winnipeg Apartment's water
d) Water in the kitchen in an Winnipeg Apartment in 2002
e) 25 apartments
f) Random, Systematic Sample

g) Only the one apartment (may have been all that was needed), Only the kitchen (maybe bathrooms are worse), Only after the random start point (maybe lower levels have more problems)
h) No random assignment
i) Amount of lead in water, Apartment number
j) Average amount of lead. Amount of lead over legal limits.

4. Mall Survey

a) Causal
b) How does the question wording effect acceptance?
c) Person
d) Person in Mall in 1989 in Alabama
e) Doesn't say
f) Convenience Sampling, not Random

g) One mall (other may have different demographic), only in Alabama, only in 1989 (maybe people are smarter now)
h) No random assignment
i) Which question: success or failure wording; Whether or not would have surgery
j) Average acceptance of surgery in each case (success or failure). How many times more likely success wording was to failure.

5. Fishing Ban

a) Descriptive
b) How many people favour a fishing ban in Lake Watanaki?
c) Person
d) Person in North Bay with a phone number in the phone book
e) 80 people
f) Random, Systematic Sample

g) Only people in North Bay (maybe the Lake District is slightly outside of town), only people in phone book (unlisted numbers, cell phones), people who weren't home at that time (didn't answer phones), bias to older people (adults tend to answer phone, not children)
h) No random assignment
i) Whether or not they favoured a fishing ban
j) % of population that favoured fishing ban