

**PRE-TEST / POST-TEST
OBJECTIVE QUESTIONS**

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- * - Indicates experimental design question given in 2004 and 2005
- ** - Indicates experimental design question given in 2005 only

Correct answer indicated in **bold**.

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*1. You wish to measure the effects of 2 independent variables on a single dependent variable. Which of the following experimental designs are appropriate?

- A. a completely randomized design
- B. a blocked design
- C. factorial design**
- D. a latin squares design

2. Which of these statements is typically true about a graph?

- A. The independent variable is shown on the X-axis**
- B. The independent variable is shown on the Y-axis

*3. A 2X3X2 factorial design that has 6 replicates will require how many experimental units?

- A. 13
- B. 18
- C. 36
- D. 72**

4. You are doing a keyword search in a literature database and you enter the three 3 words – photosynthesis and legume. This search should show you all the references in the database that

- A. contain at least one of the words
- B. contain both of the words**
- C. contain the phrase – photosynthesis and legume
- D. contain neither of the words

5. You have found this reference in one of the library’s databases:

Griffith, A. and I. Forseth. 2002. Primary and secondary seed dispersal of a rare, tidal wetland annual, *Aeschynomene virginica*. *Wetlands* **22**: 696 – 704.

What kind of source does this come from?

- A. an edited book
- B. a chapter in a book
- C. a government publication
- D. a journal article**

6. You have found this reference in one of the library's databases:

Griffith, A. and I. Forseth. 2002. Primary and secondary seed dispersal of a rare, tidal wetland annual, *Aeschynomene virginica*. *Wetlands* **22**: 696 – 704.

What words would you use to most efficiently search Mary Washington's card catalogue to see if they had this reference?

A. Griffith and Forseth

B. Wetlands

C. Primary and secondary seed dispersal of a rare, etc.

D. *Aeschynomene virginica*

*7. For which sampling strategy do you need to know the **least** about the area you are sampling?

A. random sampling

B. systematic sampling

C. stratified sampling

8. Which of these statements is true about size of the error of an estimate for a population parameter?

A. As the sample size increases, the error of an estimate may increase or decrease depending on the variance of the estimate

B. As the sample size increases, the error of an estimate increases

C. As the sample size increases, the error of an estimate decreases

D. There is no relationship between sample size and the error of an estimate

9. In the previous question, which is the dependent variable and which is the independent variable?

A. "Sample size" is the independent variable and "error of the estimate" is the dependent variable

B. "Sample size" is the dependent variable and "error of the estimate" is the independent variable

C. It is not possible to tell which is the dependent variable and which is the independent variable

*10. Which of these statements must be true about each experimental unit in an experiment? Each experimental unit must be

A. manipulated in exactly the same way

B. an individual organism

C. treated with a different treatment level from all other experimental units

D. independent of each other experimental unit

*11. When you use experimental blocks in an experiment, you normally wish to

A. minimize the within block variation

B. minimize the among block variation

C. compare the mean difference between blocks

D. compare the mean difference of independent variables within blocks

12. When the random errors affecting a group of experimental units increase, how will this affect parameter estimates of an independent variable?

A. the mean of an independent variable will change

B. the variability of an independent variable will increase

C. the standard deviation of an independent variable will decrease

D. the mean of an independent variable will be more biased

13. What is a difference between a conceptual hypothesis and a working hypothesis?

A. A conceptual hypothesis does not state an independent variable and a working hypothesis does.

B. A conceptual hypothesis does not state an independent or dependent variable and a working states both

C. All variables in a working hypothesis are measurable and this is not necessarily true of a conceptual hypothesis.

*14. If you were to sample every 2 meters along a line transect going from the edge of the ocean, up the beach and across the dunes, this would be an example of

A. random sampling

B. systematic sampling

C. stratified sampling

*15. Which of these experimental designs would allow you to test for interactions among two or more independent variables on a dependent variable?

A. completely randomized design

B. randomized block design

C. factorial design

*16. You manipulate an experimental unit in some way in an experiment and then you come back and take some measure of the experimental unit.

A. The measurement is a treatment level

B. The manipulation is the dependent variable

C. The measurement is the independent variable

D. The manipulation is the independent variable

**17. Why is it important to use standard experimental designs?

A. The only correct way to do experiments is using standard experimental designs.

B. Standard experimental designs are known to consistently give correct results

C. There is a standard experimental design for most important science questions

D. Standard experimental designs are easy to analyze statistically

**18. When thinking about sampling and sampling designs, what is a difference between a population and a sample?

A. A population is always larger than a sample

B. A population provides information about the groups in a sample

C. A population mean will always be biased and a sample mean will always be unbiased

D. A sample must be as large as a population to be useful