BIO 5099

Homework Assignment #1

Name_____

Due start of class, **Tuesday August 27th**
Late assignments are not accepted
Assignments may be e-mailed to: christiaan@xiaan.com or rbaror@dmibio.com anytime, or faxed to (303) 556-2889 between 3:00 and 4:00 p.m. on Tuesday.

Define:

1.(1pt) Polymer

2.(1pt) Cell

3.(1pt) Biomolecule

4.(3pts) _____ are the macromolecules that contain and transmit information about how to construct _____, which are macromolecules that accomplish most of the functions of a cell. This statement is the _____ of molecular biology.

5.(2pts) What are two examples of human traits?
_____,
_____

6.(2pts) What are two characteristics of human beings that are not traits?
_____,
_____

7.(2pt) The _____ is the complete set of inheritable traits, and the _____ is the complete set of characteristics of an organism.

8.(2pts) _____is the process of creating messenger RNA which in turn goes through _____to become a protein.

9.(2pts) Two examples of small molecules are: _____ and _____ .

10.(1pt) The most important feature of proteins' function is their (circle correct choice):

a.shape / structure
b.sequence
c.both a and b are equally important

11.(1pt) The most important feature of nucleic acids function is their (circle correct choice):

a.shape / structure
b.sequence
c.both a and b are equally important

12.(2pts) Write a sentence that demonstrates your understanding using at least two of the following terms: fitness, niche, adaptation, selection.

13.(5pts) List the three necessary ingredients for evolution to be possible.

14. (5pts) Suppose that hair color is a trait that follows simple Mendelian genetics. We denote the dominant allele *A* which corresponds to brown hair and the recessive allele *a* which corresponds to red hair.

    a. Suppose a male has a genotype of AA, what color is his hair?

    b. Suppose a female has a genotype aa, what color is her hair?

    c. If the above people were to produce offspring what hair colors are feasible in the children and in what proportions?

    d. Suppose that the male has a genotype of Aa how does that change the possible hair colors and proportions in the children?

    e. Is it possible to find parent genotypes that guarantee a red-haired child, if so what are they?

15. (10pts) Select a trait along which organisms vary (e.g. longevity). Find at least two organisms which exhibit opposite extremes of that trait (e.g. the mayfly and the tortoise). See if you can identify any selective pressures that may have influenced the fixation of those characteristics. You may not use the example in the question.