

## 5.5 ENVIRONMENTAL EFFECTS ON PHENOTYPE

A. **ASSIGNMENT #1** VIEW AND TAKE NOTES ON THE FOLLOWING VIDEO :

Genetic Expression.....Bozeman.....7:06

## B. GENETIC ( Genotype/Phenotype) EXPRESSION- MAKING THE CONNECTION

Does this ring a bell? “ THE PHYSICAL AND CHEMICAL MECHANISMS OF PLANET EARTH DICTATE THE DISTRIBUTION AND DISPOSITION OF IT LIFE FORMS.” This Is the Golden Doctrine presented at the onset of the year in our studies in ECOLOGY. In its most basic terms, it defines the ENVIRONMENT as the force (“PHYSICAL AND CHEMICAL MECHANISMS) which drives the Structures, Behaviors and Habitats of every specie of life on Earth. This of course involves the ongoing mechanism of NATURAL SELECTION as per our studies in EVOLUTION. Does an organism have the “RIGHT STUFF” to survive and reproduce in the current environment of the times. Earth has know 5 mass extinctions where 1/3 or more of its life forms became extinct in a short period of time due to massive catastrophic environmental changes on a regular cycle of every 63-65 million years. The dinosaur extinctions at the end of the Mesozoic Era was our last mass extinction event. Because of the superlative nature of the giant reptiles we usually focus on this one mass extinction while the 4 events prior are not so well noted. However, some 444 million years ago at the end of the Ordovician Period in the Paleozoic Era, 86 % of all life forms became extinct in a very short period of time. THIS AND ALL MASS EXTINCTIONS are because of ENVIRONMENTAL changes where the mechanism of NATURAL SELECTION bears its full effect upon life at large.

While our understanding of how the ENVIRONMENT imposes the NATURAL SELECTION process over time, it is important that we understand that this also may sometimes occur on a much smaller time frame; a life time or two of an organism during which they may exhibit an certain appearance due to the presence and effects of some ENVIRONMENTAL factor. The video viewed in ASSIGNMENT #1 presents some examples of how an environmental factor can dictate the appearance of an organism.

**ASSIGNMENT #2** – Using your prior knowledge and notes taken in ASSIGMENT # 1. complete the following paragraph:

As we may recall from our studies in (1)\_\_\_\_\_ genetics, every life form bears a physical appearance known as its (2)\_\_\_\_\_, while also containing a certain collection of alleles within its genetic record which may represent the genetic potential of an organism even though it is not physically visible in the organism itself. This is known as its (3)\_\_\_\_\_. Tall with blue eyes and fair skin tone is a good example of a (4)\_\_\_\_\_ of a person, while **TtbbSs** may be the actual (5)\_\_\_\_\_ of that person. This all relates back to Mendelian Genetics, and the concepts of traits which bear a pair of

(6)\_\_\_\_\_ may be (7)\_\_\_\_\_ or (8)\_\_\_\_\_ (ie B=brown eyes and b= blue eyes). Mendel goes on to state that each of these alleles will be expressed at random, free of the influence of the other. This in essence is the concept behind his(9) \_\_\_\_\_.

However, this is not limited to expressions of genetic factors resulting from reproduction. Some appearances (phenotypes) may be expressed by an organism in its life time because of certain environmental influences. In the film it was noted that the Himalayan Rabbit/Hare that a (10)\_\_\_\_\_ condition of (11)\_\_\_\_\_ stimulated the production of (12)\_\_\_\_\_ which caused the organism to grow (13)\_\_\_\_\_ hair on the areas of its body which were cooler than its main body core. In addition, it was illustrated that the flower of the (14)\_\_\_\_\_ would express a (15)\_\_\_\_\_ difference of either (16)\_\_\_\_\_ or (17)\_\_\_\_\_, depending upon the (18)\_\_\_\_\_ of the soil.

**ASSIGNMENT #2 CHOICE LIST ALL 18 ITEMS. Note: Genotype and Phenotype will be used twice**

COLOR      BLUE      ALLELES      DOMINANT      RECESSIVE      PINK      pH  
 PHENOTYPE      PHENOTYPE      GENOTYPE      GENOTYPE  
 TEMPERATURE      MENDELAIN      LAW OF INDEPENDENT ASSORTMENT \  
 MELANIN      DARKER      COOLER      HYDRANGEAS

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**ASSIGNMENT #3 REVIEW POINT: EXPERIMENTAL DESIGN** In the film it was said that in order to prove that the Himalaya Rabbit's fur color was influenced by temperature. That cooler temperatures influenced the production of melanin, thus yielding dark hair, while warmer temperatures reduced the production of melanin thus yielding lighter hair color.

GIVEN THIS EXAMPLE AS POSTED ABOVE AND VIEWED IN YOUR FILM, AN EXPERIMENT WAS CONDUCTED. BASE UPON THIS INFORMATION, DEFINE THE FOLLOWING:

PROBLEM STATEMENT: \_\_\_\_\_

\_\_\_\_\_

HYPOTHESIS: \_\_\_\_\_

\_\_\_\_\_

EXPERIMENTAL DESIGN: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

CONCLUSION: \_\_\_\_\_

\_\_\_\_\_

**ASSIGNMENT #4** In the film the experiment was explained along with all the factors involve and outcomes gathered in the experiment. What might the data collected look like if it were expressed as a graph? TITLE? X- AXIS? Y – AXIS? LINE/SLOPE/SHAPE?

