

Traits and How They Change

Underlined words and phrases are to be filled in by students on the Note-taking Worksheet.

Section 1 Traits and the Environment

- A. **Traits**—features an organism inherits from its parents
1. Hereditary materials include **genes**, part of the DNA code on a chromosome.
 2. An organism's genetic makeup is its **genotype**.
 3. A **phenotype** is an organism's visible genetic makeup and the environment's influence on that makeup.
- B. Environmental effects of phenotypes vary; some influences are internal while others are external.
1. Competition for environmental factors has significant effects on a population.
 2. An organism's appearance can change based on the environment.
 3. Some fish species can change gender in response to the ratio of males and females available in the population.

Discussion Question

What are some of the phenotypes which can vary due to the environment? *growth, appearance, gender in certain fish species*

END

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Section 2 Genetics

- A. Genetics—study of heredity.
- B. Gregor Mendel developed principles of genetics by experimenting with pea plants.
1. Different forms of a gene are each called an allele.
 2. Dominant alleles show in an organism's phenotype whenever present in its genotype.
 3. Recessive alleles show their effect in an organism's phenotype only when two are present in the genotype.
 4. Principle of segregation—each parent passes only one allele for a trait to its offspring.
 5. Principle of independent assortment—the alleles for one trait do not influence the alleles for another trait.
- C. Predicting genetic outcomes—Mendel used probability to make predictions.
1. Reginald G. Punnett developed the Punnett square 50 years after Mendel's work was published.
 2. When the parent's genotypes are known, a Punnett square is used to predict possible offspring.

Discussion Question

What does the principle of independent assortment state? *Alleles for one trait do not influence alleles for another trait.*

END

Section 3 Environmental Impact over Time

- A. Over long time periods, the environment impacts a species' ability to survive.
1. Nonliving influences include temperature, rainfall, fire, elevation, volcanic eruptions, periodic flooding, and pollution.
 2. Availability of food, predators, and the number of species living in an area affect a species' survival.
- B. Darwin and Wallace explained evolution—over time environmental factors can change the genetics of a species.
1. Natural selection—organisms best adapted to their environment have a higher rate of survival and reproduction than organisms less well adapted.
 2. Mutation—process in which DNA changes to form new alleles
 3. Selective breeding involves human choice in the traits desired in offspring.
 4. Adaptive radiation occurs when one ancestral species produces several new species over time.
 5. Extinction, the end of a species, can occur for many reasons, including destruction of an organism's habitat and the introduction of a new species into an environment.

Discussion Question

How can a mutation influence evolution? *Offspring with a new, highly desirable trait could survive and reproduce more readily than offspring without the new trait; eventually a new species could evolve from the mutated offspring with the desirable trait.*

END