Section 1&2 Summaries

The study of how characteristics are transmitted from parents to offspring is called genetics.

The genotype is the genetic makeup of an organism. The phenotype is the appearance of an organism.

Mendel observed seven characteristics of pea plants. Each characteristic occurred in two contrasting traits.

Probability is the likelihood that a specific event will occur. A probability may be expressed as a decimal, a percentage, or a fraction.

Self-pollination, in which pollen is transferred from the anthers of a flower to either the stigma of the same plant, normally occurs in pea plants. Cross-pollination occurs when pollen is transferred between flowers of two different plants.

A Punnett square can be used to predict the outcome of genetic crosses.

Section 1&2 Summaries (cont)

Mendel concluded that inherited characteristics are controlled by factors that occur in pairs. In his experiments on pea plants,one factor in a pair masked the other. The trait that masked the other was called the dominant trait. The trait that was masked was called the recessive trait.

A cross in ehich one characteristic is tracked is a monohybrid cross. The offspring of a monohybrid cross are called monohybrids.

The law of segregation states that a pair of factors is segregated, or separated, during the formation of gametes. Two factors for a characteristic are then combined when fertilization occurs and a new offspring is produced.

A testcross, in ehich an individual of unknown genotype is crossed with a homozygous recessive individual, can be used to determine the genotype of an individual whose phenotype expresses the dominant trait.

Section 1&2 Summaries (cont)

The law of independent assortment states that factors for individual characteristics are distributed to gametes independently. The law of independent assortment is observed only for genes that are located on separate chromosomes or are far apart on the same chromosome.

Complete dominance occurs when heterozygous individuals and dominant homozygous individuals are indistinguishable in phenotype.

We now know that the factors that Mendel studied are alleles, or alternative forms of a gene. Each of two or more alternative forms of a gene is called an allele. One allele for each trait is passed from each parent to the offspring.

Incomplete dominance occurs when two or more alleles influence the phenotype and results in a phenotype intermediate between the dominant and the recessive trait.

Codominance occurs when both alleles for a gene are expressed in a heterozygous offspring. Neither allele is dominant or recessive, nor do the alleles blend in the phenotype as they do in incomplete dominance.

Section 1&2 Summaries (cont)

A cross in which two characteristics are tracked is a dihybrid cross. The offspring of a dihybrid cross are called dihybrids.

Vocabulary

Genetics	The field of biology devoted to understanding how characteristics are transmitted from parents to offspring. Founded by Gregor Johann Mendel.
Heredity	The transmission of characteristics from parents to offspring.
Trait	Genetically determined variant of a characteristic, such as yellow flower color.
Pollination	Occurs when pollen grains produced in the male reproductive parts of a flower are transferred to the female reproductive part of a flower.
Self-Pollination	Occurs when pollen is transferred from the anthers of a flower to the stigma of either that flower or another flower of the same plant.
Cross-Pollination	Occurs between flowers of two plants.
True-breeding	pure
P Generation	True breeding parents

Vocabulary (cont)

F1 Generation	Offspring of the P Generation
F2 Generation	Offspring of the F1 Generation.
Dominant	Masked the factor for the other trait in the pair.
Recessive	Trait that does not appear.
Law of Segregation	States that a pair of factors is segregated, or separated, during the formation of gametes.
Law of Independent Assortment	States that factors separate independently of one another during the formation of gametes.
Molecular Genetics	Study of the structure and function of chromosomes and genes.
Genotype	Organism's genetic makeup
Phenotype	Organism's appearance
Homozygous	Both alleles of a pair are alike
Heterozygous	Two alleles in the pair are different
Probability	Likelihood that a specific event will occur.
Monohybrid Cross	Only one characteristic is tracked.
Punnett Square	Diagram used to aid in predicting the probable distribution of inherited traits in the offspring.

Vocabulary (cont)

Genotypic Ratio	Ratio of the genotypes that appear in the offspring.
Phenotypic Ratio	Ratio of the offspring's phenotype.
Testcross	An individual of unknown genotype is crossed with a homozygous recessive individual.
Complete Dominance	One allele is completely dominant over another.
Incomplete Dominance	Phenotype of a heterozygote is intermediate between the phenotypes determined by the dominant and recessive traits.
Dihybrid Cross	Two characteristics are tracked

Questions

Describe what a true-breeding plant is.

> Plants that are true-breeding, or pure, for a trait always produce offspring with that trait when they self-pollinate. For example, pea plants that are true-breeding for the trait of yellow pods self-pollinate to produce offspring that have yellow pods.

Outline how Mendel produced plants that had genes contrasting traits of a characteristic.

> Mendel cross-pollinated pairs of plants that were true-breeding for contrasting traits of a single characteristic. True-breeding parents are called P generation, or F1 generation. He cross-pollinated by transferring pollen from the authors of one plant to the stigma of another plant. When the plant matured, he recorded the number of each type of offspring produced by each cross.

Questions (cont)

Define the terms dominant and recessive.

> In genetics, dominant describes an allele that is fully expressed whenever the allele is present in an individual while recessive describes an allele that is expressed only when no dominant allele is present in an individual.

State in modern terminology the two laws of heredity that resulted from Mendel's work.

> The law of segregation states that a pair of factors is segregated, or separated, during the formation of gametes. The law of independent assortment states that factors separate independently of one another during the formation of gametes.

Differentiate Genes from alleles.

> A gene is the segment of DNA on a chromosome that controls a particular hereditary trait. Because chromosomes occur in pairs, genes also occur in pairs.

How did Mendel's F1 Generation plants differ from his F2 Generation plants?

> The F1 generation was the result of cross-pollination. It was controlled by a dominant factor. The F2 generation was the result of self-pollination of the F1 generation. The trait (recessive factor) reappeared in a ratio of about 3:1 in the F2 generation. This pattern emerged in thousands of crosses and led Mendel to conclude that one factor in a pair may prevent the other from having an effect

Many inherited disorders of humans appear in children of parents who do not have the disorder. How can you explain this?

> A trait controlled by a recessive factor had no observable effect on an organism's appearance when that trait was paired with a trait controlled by a dominant factor. An affected child inherits a recessive allele from each parent

Questions (cont)

During meiosis, what allows genes located on the same chromosome to separate independently of one another?

> Crossing-over during synopsis allows genes located on the same chromosome to separate independently of one another.

Explain why a phenotype might not always indicate genotype.

> An organism's appearance is its phenotype. A phenotype does not always indicates genotype as the phenotype of a PP or a Pp pea plant is purple flowers whereas of a pp pea plant is white flowers. In addition to recessive alleles, certain environmental factors can affect phenotype.

Identify the equation used to determine probability.

> Probability= number of times an event is expected to happen divides number of times an event could happen - may be expressed as a decimal, a percentage, or a fraction

Explain how you might go about determining the genotype of a purple-flowering plant.

> A pea plant homozygous for purple flowers that is crossed with a pea plant homozygous for white flowers will produce only purple-flowering offspring. All of the offspring, called monohybrids, are heterozygous for flower color

Illustrate in the form of a punnett square the results of crossing a pink-flowering four o'clock with a white-flowering four o'clock.

> 50% pink flowering, 50% white flowering

Questions (cont)

Explain the difference between a monohybrid cross and a dihybrid cross and give and example of each.

> A monohybrid cross is a cross in which only one characteristic is tracked. An example of a monohybrid cross is between a pea plant that is true-b-reeding for producing purple flowers and one that is true-breeding for producing white flowers. A Punnett square is used to predict the probable distribution of inherited traits in the offspring. On the other hand, a dihybrid is a cross in which two characteristics are tracked. Predicting the results of a dihybrid cross is more complicated than predicting the results of a monohybrid cross because more combinations of alleles are possible. Both seed texture and seed color can be used to track

The offspring of two short-tailed cats have 25 percent chance of having no tail, a 25 percent chance of having a long tail, and a 50 percent chance of having a short tail. Using this information, what can you hypothesize about the genotypes of the parents and all the way in which tail length is inherited?

> The genotype consists of the alleles that the organism inherits from its parents.P-arents have alleles that are dominant. Their own short-tailed offspring give away equally chance of being either a long tail or no tail.

Questions (cont)

If you crossed two purple-flowering pea plants and all of the F1 offspring were purple-flowering, what could you say about the genotypes of the parents? If some of the F1 offspring were white-flowering, what could you say about the genotypes of the parents?

> The genotype of the two purple-flowering pea plant may be either PP or Pp, which means they can be homozygous dominant or homozygous recessive. In the second case, the parents are hetero-zygous for their characteristic. They have a genotype of Pp.

By **julialuke5**
cheatography.com/julialuke5/

Not published yet.
Last updated 18th January, 2017.