|  |  |  |
| --- | --- | --- |
| Competency  3d - DOK 2 | Compare and contrast reproduction in terms of the passing of genetic information (DNA) from parent to offspring. (DOK 2) | **Page**  **3** |
| 7th Grade –  Lesson 5.3 | I can define recessive and dominant alleles. I can determine if an organism is homozygous dominant, homozygous recessive, or heterozygous. |

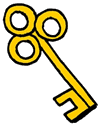
**Unit 5 – Genetics & Reproduction:** Allele Dominance

Quick Review

**A substance turns red litmus paper blue. It also dissociates very easily in water. Use this information to answer questions 1-3.**

1. How could this substance be classified? **base**
2. What is the range of possible pH for the substance? **>7**
3. When the substance is mixed with water, it releases what atom or molecule? **OH-**
4. Section of DNA that determines a specific trait = **gene**
5. Long strand of DNA that is tightly coiled, contains many genes = **chromosome**

Key Points on Allele Dominance:

1. Most traits are determined by **several** **genes** that act together.
2. Some traits such as the ability to **taste** certain substances and the presence or absence of dimples are controlled by a **single** **gene**.
3. Organisms have **two** alleles for each gene; one allele comes from **each** **parent**.
   1. There are two different types of alleles, **dominant** and **recessive** alleles.
      1. The **dominant** allele is usually indicated with a **capital** letter.
      2. The **recessive** allele is usually indicated with a **lower-case** letter.
   2. If either of an organism’s alleles is the **dominant** allele, the trait given by this allele will be seen in the organism’s **phenotype**.
   3. The trait given by the recessive allele will only be seen in the organism’s phenotype if the other allele is also the **recessive** **allele**.
4. We can describe the genotype of an organism based on the alleles that it has.
   1. If the organism has **two** **dominant** alleles, it is called **homozygous** dominant.
      1. Remember, “**homo**” means **same**. It has two of the same alleles and they are dominant.
      2. Its genotype would be given with two **capital** letters.
   2. If the organism has **two** **recessive** alleles, it is called **homozygous** recessive.
      1. Remember, “**homo**” means **same**. It has two of the same alleles and they are recessive.
      2. Its genotype would be given with two **lower-case** letters.
   3. If the organism has one **dominant** allele and one **recessive** allele, it is called **heterozygous**.
      1. Remember, “**hetero**” means **different**. It has two different alleles.
      2. Its genotype would be given with a **capital** and a **lower-case** letter.

|  |  |  |
| --- | --- | --- |
| Competency  3d - DOK 2 | Compare and contrast reproduction in terms of the passing of genetic information (DNA) from parent to offspring. (DOK 2) | **Page**  **2** |
| 7th Grade –  Lesson 5.2 | I can explain heredity. I can define alleles and identify the genotype and phenotype of an organism. |

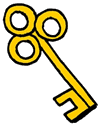
**Unit 5 – Genetics & Reproduction:** Allele Dominance

Quick Review

**A substance turns red litmus paper blue. It also dissociates very easily in water. Use this information to answer the following questions.**

1. How could this substance be classified?
2. What is the range of possible pH for the substance?
3. When the substance is mixed with water, it releases what atom or molecule?
4. Section of DNA that determines a specific trait =
5. Long strand of DNA that is tightly coiled, contains many genes =

Key Points on Allele Dominance:

1. Most traits are determined by **\_\_\_\_\_\_\_\_\_\_\_\_\_\_** **\_\_\_\_\_\_\_\_\_\_** that act together.
2. Some traits such as the ability to **\_\_\_\_\_\_\_\_\_\_** certain substances and the presence or absence of dimples are controlled by a **\_\_\_\_\_\_\_\_\_\_** **\_\_\_\_\_\_\_\_\_\_**.
3. Organisms have **\_\_\_\_\_\_** alleles for each gene; one allele comes from **\_\_\_\_\_\_\_** **\_\_\_\_\_\_\_\_\_\_\_\_**.
   1. There are two different types of alleles, **\_\_\_\_\_\_\_\_\_\_\_\_\_\_** and **\_\_\_\_\_\_\_\_\_\_\_\_\_\_** alleles.
      1. The **\_\_\_\_\_\_\_\_\_\_\_\_\_\_** allele is usually indicated with a **\_\_\_\_\_\_\_\_\_\_\_\_\_\_** letter.
      2. The **\_\_\_\_\_\_\_\_\_\_\_\_\_\_** allele is usually indicated with a **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** letter.
   2. If either of an organism’s alleles is the **\_\_\_\_\_\_\_\_\_\_\_\_\_\_** allele, the trait given by this allele will be seen in the organism’s **\_\_\_\_\_\_\_\_\_\_\_\_\_\_**.
   3. The trait given by the recessive allele will only be seen in the organism’s phenotype if the other allele is also the **\_\_\_\_\_\_\_\_\_\_\_\_\_\_** **\_\_\_\_\_\_\_\_\_\_\_\_\_\_**.
4. We can describe the genotype of an organism based on the alleles that it has.
   1. If the organism has **\_\_\_** **\_\_\_\_\_\_\_\_\_\_\_\_\_** alleles, it is called **\_\_\_\_\_\_\_\_\_\_\_\_\_\_** dominant.
      1. Remember, “**\_\_\_\_\_\_\_\_\_\_**” means **\_\_\_\_\_\_\_\_\_\_\_**. It has two of the same alleles and they are dominant.
      2. Its genotype would be given with two **\_\_\_\_\_\_\_\_\_\_\_\_\_\_** letters.
   2. If the organism has **\_\_\_** **\_\_\_\_\_\_\_\_\_\_\_\_\_\_** alleles, it is called **\_\_\_\_\_\_\_\_\_\_\_\_\_\_** recessive.
      1. Remember, “**\_\_\_\_\_\_\_\_\_**” means **\_\_\_\_\_\_\_\_\_**. It has two of the same alleles and they are recessive.
      2. Its genotype would be given with two **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** letters.
   3. If the organism has one **\_\_\_\_\_\_\_\_\_\_\_\_\_\_** allele and one **\_\_\_\_\_\_\_\_\_\_\_\_\_\_** allele, it is called **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**.
      1. Remember, “**\_\_\_\_\_\_\_\_\_**” means **\_\_\_\_\_\_\_\_\_\_\_\_**. It has two different alleles.
      2. Its genotype would be given with a **\_\_\_\_\_\_\_\_\_\_** and a **\_\_\_\_\_\_\_\_\_\_\_\_\_\_** letter.

**Dominance of Alleles:** Guided Practice

|  |  |  |
| --- | --- | --- |
| tt | Tt |  |
|  |  | Homozygous dominant |

**The allele for dimples in humans is dominant. If an individual has the dominant allele, they will have dimples. If the both alleles are recessive, the individual will not have dimples. For the given genotypes below, give the phenotype.**

|  |  |  |  |
| --- | --- | --- | --- |
| 1. DD |  | 1. Homozygous recessive |  |
| 1. Dd |  | 1. dd |  |
| 1. Homozygous dominant |  | 1. Heterozygous |  |

**Dominance of Alleles:** Independent Practice

**Directions: Answer the following questions in complete sentences.**

1. How many genes control most traits in humans?
2. What are the two different types of alleles and how can they be represented with symbols?

1. For an organism to show a recessive phenotype, what must be true about its genotype?
2. An organism’s genotype is described as being homozygous recessive. If the letter “T” is used to represent this gene, show this genotype.
3. An organism’s genotype is tt. What is another way to describe this organism’s genotype?

**A gene in pea plants determines the location of flowers. The gene is symbolized by the letter “R”. The dominant location is axial, or on the side of the plant. The recessive location is terminal, or at the top of the plant. Use this information to answer the following questions.**

1. Describe the following individual’s phenotypes:
   1. Homozygous dominant:
   2. Homozygous recessive:
   3. Heterozygous:
2. A plant is found with axial flowers. What is/are its possible genotype(s)?
3. A plant is found with terminal flowers. What is/are its possible genotype(s)?