

Heredity

By Cindy Grigg

¹ What makes children look like their parents? Sometimes people who are related look very much alike. For example, parents who are tall and red-headed will have children who are tall and red-headed. It's no accident.

² **Heredity** is the process by which parents pass characteristics or traits on to their children. Traits that are passed from parents to children include eye color, hair color, and body build. Unfortunately, another trait that can be passed on is the tendency to get certain diseases or disorders. Some examples of these are hemophilia, which is a blood-clotting disorder, and cystic fibrosis, a breathing disorder. The tendency to get certain cancers also can be inherited.



³ Genes are segments of DNA that carry instructions for the traits of an offspring. Offspring are the children of two parent organisms. These organisms may be people, animals, plants, or insects. Remember, when we talk of heredity, it's true of plants and all these other organisms as well as people.

⁴ Gregor Mendel is often called the "Father of Genetics." Mendel was a monk who lived in the 1800's in Austria. He was the first person to trace the characteristics of successive generations of a living thing. Mendel was not a scientist, but he taught high-school science at the monastery. He was interested in nature and keenly observed the world around him.

⁵ In 1865 he published a paper describing experiments he did with garden pea plants. He noticed that certain traits in the parent plants could be predicted to occur in a certain percentage of the offspring. Traits like plant height, blossom color, color of peas, and whether the peas were wrinkled or smooth appeared to be passed down from the parent plant to the offspring. Mendel did not know about DNA or chromosomes, and he could not explain how these traits were passed down. His work was mostly ignored for many years. Mendel's work became the basis for the field of **genetics**, the study of heredity.

⁶ Every organism has a set of genes that determines its traits. These genes occur in pairs. Each gene in a pair is known as an allele. If one of the alleles masks the effect of the other allele, it is called a dominant allele. The allele that is masked by the dominant allele is called a recessive allele.

⁷ Offspring inherit one allele from each parent. Sometimes an organism inherits two dominant alleles or two recessive alleles for a trait. When this happens, the organism shows the trait carried by the allele. For example, if an organism has two alleles for tallness, it will be tall. If it has two alleles for shortness, it will be short. An organism that carries two dominant or two recessive alleles for a given trait is said to be pure for that trait.

⁸ Sometimes offspring inherit two different alleles for a trait. It may inherit an allele for tallness from one parent and an allele for shortness from the other parent. In this case the dominant allele would hide the trait of the recessive allele. An organism that carries both a dominant allele and a recessive allele for a certain trait is called a hybrid. In people, some dominant traits are curly hair, an unattached or "free" ear lobe, brown eye color, or a widow's peak on the forehead. Some examples of recessive traits are straight hair, an attached ear lobe, blue eye color, or a straight hairline on the forehead.

⁹ In humans, many easily observable traits are inherited. Some of these are hair color, hair texture, eye color, shape of ear lobes, skin type, and height. Traits like height, weight, and the shape of your body and face are the kinds of traits that are inherited, but they can also be greatly influenced by your environment. For example, your diet, state of health, and the amount of exercise you get can change your body size and appearance. Exposure to the sun can change the pigments in skin, making it darker when they "tan." The genes you inherit give you the potential for many traits. But the person you become depends very much on your environment.

¹⁰ In humans, it's sometimes difficult to predict some traits like hair and eye color. The reason is that you may have several different genes that control these traits. One trait that is controlled by a single gene is tongue rolling. You can either roll your tongue into a U-shape or you can't. If one of your parents has the trait (if one of your parents can roll his or her tongue), then you might be able to roll your tongue.

¹¹ Traits are passed down by parents to their offspring. By understanding how traits are passed down from one generation to the next, scientists hope to find cures for many diseases.

Name _____

Science Pd: _____

Heredity

<p>1. Heredity is _____.</p> <p><input type="radio"/> A The process by which parents pass characteristics or traits on to their children</p> <p><input type="radio"/> B True of people, plants, and other organisms where there are parents and offspring</p> <p><input type="radio"/> C A way that some diseases and disorders are passed from parents to offspring</p> <p><input type="radio"/> D All of the above</p>	<p>2. What are genes?</p> <p><input type="radio"/> A Segments of DNA that carry instructions for the traits of an offspring</p> <p><input type="radio"/> B Something that comes in pairs</p> <p><input type="radio"/> C Both A and B are correct.</p> <p><input type="radio"/> D None of the above</p>
<p>3. Gregor Mendel is often called _____.</p> <p><input type="radio"/> A The King of Peas</p> <p><input type="radio"/> B The Father of Heredity</p> <p><input type="radio"/> C The Father of Genetics</p>	<p>4. Mendel was the first person to _____.</p> <p><input type="radio"/> A Learn about DNA and chromosomes</p> <p><input type="radio"/> B Keep a record of traits that were passed down from parents to offspring</p> <p><input type="radio"/> C Study science</p>
<p>5. A dominant allele _____.</p> <p><input type="radio"/> A Masks the effect of the other allele</p> <p><input type="radio"/> B Is never passed from parent to offspring</p> <p><input type="radio"/> C Is masked by the other allele</p>	<p>6. If one allele is masked by the other allele in the pair, the masked allele is said to be _____.</p> <p><input type="radio"/> A Dominant</p> <p><input type="radio"/> B Hidden</p> <p><input type="radio"/> C Recessive</p>
<p>7. A plant, for instance, that carries both a dominant and a recessive allele for a certain trait is said to be _____.</p> <p><input type="radio"/> A Pure</p> <p><input type="radio"/> B Hybrid</p> <p><input type="radio"/> C Recessive</p> <p><input type="radio"/> D Dominant</p>	<p>8. Your body weight and your skin color are two traits that are _____.</p> <p><input type="radio"/> A Inherited</p> <p><input type="radio"/> B Influenced by your environment</p> <p><input type="radio"/> C Both A and B</p> <p><input type="radio"/> D None of the above</p>