

# DNA

## Worksheet 1 Teacher's notes

1. When watching a detective film, do you know why the investigators always look for strands of hair or any other material left behind by the suspect?  
*to find DNA material and identify the murderer*
2. Before we learn about DNA let's read about scientist who discovered it. Go online [http://www.bbc.co.uk/history/historic\\_figures/crick\\_and\\_watson.shtml](http://www.bbc.co.uk/history/historic_figures/crick_and_watson.shtml)  
[http://www.ducksters.com/biography/scientists/watson\\_and\\_crick.php](http://www.ducksters.com/biography/scientists/watson_and_crick.php)  
read the information and take notes.  
*students' own information about James Watson and Francis Crick*
3. What is DNA? Let's find out:

What does DNA mean?	<i>DNA is short for deoxyribonucleic acid.</i>
What is DNA made of?	<i>DNA is made of chemical building blocks called nucleotides. These building blocks are made of three parts: a phosphate group, a sugar group and one of four types of nitrogen bases. To form a strand of DNA, nucleotides are linked into chains, with the phosphate and sugar groups alternating. The four types of nitrogen bases found in nucleotides are: adenine (A), thymine (T), guanine (G) and cytosine (C). The order, or sequence, of these bases determines what biological instructions are contained in a strand of DNA. For example, the sequence ATCGTT might instruct for blue eyes, while ATCGCT might instruct for brown. The complete DNA instruction book, or genome, for a human contains about 3 billion bases and about 20,000 genes on 23 pairs of chromosomes.</i>
What is the shape of DNA molecule?	<i>Although DNA looks like very thin long strings under a microscope, it turns out that DNA has a specific shape. This shape is called a double helix. On the outside of the double helix is the backbone which holds the DNA together. There are two sets of backbones that twist together. Between the backbones are the nucleotides represented by the letters A, T, C, and G. A different nucleotide connects to each backbone and then connects to another nucleotide in the center. Only certain sets of nucleotides can fit together. You can think of them like puzzle pieces: A only connects with T and G only connects with C.</i>
What is DNA code?	<i>The DNA code is held by the different letters of the nucleotides. As the cell "reads" the instructions on the DNA the different letters represent instructions. Every three letters makes up a word called a codon. A string of codons may look like this: ATC TGA GGA AAT GAC CAG Even though there are only four different letters, DNA molecules are thousands of letters long. This allows for billions and billions of different combinations.</i>

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What are genes?	<i>Within each string of DNA are sets of instructions called genes. A gene tells a cell how to make a specific protein. Proteins are used by the cell to perform certain functions, to grow, and to survive.</i>
What are chromosomes?	<i>In the nucleus of each cell, the DNA molecule is packaged into thread-like structures called chromosomes. Each chromosome is made up of DNA tightly coiled many times around proteins called histones that support its structure.</i>
What information is in DNA?	<p><i>DNA contains the instructions needed for an organism to develop, survive and reproduce. To carry out these functions, DNA sequences must be converted into messages that can be used to produce proteins, which are the complex molecules that do most of the work in our bodies.</i></p> <p><i>Each DNA sequence that contains instructions to make a protein is known as a gene. The size of a gene may vary greatly, ranging from about 1,000 bases to 1 million bases in humans. Genes only make up about 1 percent of the DNA sequence. DNA sequences outside this 1 percent are involved in regulating when, how and how much of a protein is made.</i></p>
How is information encoded in DNA?	<i>DNA carries all of the information for your physical characteristics, which are essentially determined by proteins. So, DNA contains the instructions for making a protein. In DNA, each protein is encoded by a <b>gene</b> (a specific sequence of DNA nucleotides that specify how a single protein is to be made). Specifically, the order of nucleotides within a gene specifies the order and types of amino acids that must be put together to make a protein.</i>

Go online and watch a video about DNA: <http://www.popsi.com/science/article/2013-03/watch-absolutely-beautiful-animated-explainer-dna>

Sources:

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