

From DNA to proteins- Help a cell to transcribe and translate its genetic information

Clientele: 13 years and up

Type of resource

Online activity to do at school or at home.
Requires Flash software (can be downloaded free of charge).

Description of the activity

This is an online game from the Armand Frappier Museum website that allows players to discover the workings of a cell that allow it to produce a protein from its deoxyribonucleic acid (DNA). The DNA in our cells contains the information necessary for the synthesis of our body's proteins. When a gene is expressed, it allows a molecule called mRNA, which is a replica of the gene, to be synthesized. This process is called transcription. The mRNA then serves in the production of a protein. This is translation.

A cell "have" to produce a protein: the melanin. Melanin is the pigment that gives colour to skin and hair. When we tan, it is actually this protein that becomes present in greater amounts. The sun's ultraviolet rays provoke a chemical reaction in the skin cells and this is what accelerates the production of melanin.

Preparatory questions

- What are the four bases that make up DNA?
Answer: adenine (A), guanine (G), cytosine (C) and thymine (T)
- What are the four bases that make up RNA?
Answer: adenine (A), guanine (G), cytosine (C) and uracil (U)
- What are the enzymes (molecules) that allow DNA to be transcribed into mRNA?
Answer: RNA polymerases
- What are the organelles that allow mRNA to be translated into proteins?
Answer: ribosomes

From DNA to proteins and education programs

Quebec

Quebec education program
Target clientele: secondary

Training areas

Science and technology

General training areas	Cross-curricular competencies	Disciplinary competencies	Universe
Media	Using information and communication technologies	Using scientific and technological knowledge	Living universe: DNA
Environment and consumption	Using the information, solving problems.		

Ontario

Ontario's curriculum, from grade 1 to grade 8 – Science and technology, revised edition, 2007

Grade 8

The cell

Main ideas

The cell is the basic unit of life.
Healthy cells contribute to a healthy body.

Synthesis activity

Crossword on transcription and translation.

Here are the answers to the crossword that you will find on the next page.

		P				C	Y	T	O	P	L	A	S	M
		R		T										E
		O		R	I	B	O	S	O	M	E			S
		T		A										S
T		E		N	U	C	L	E	U	S				E
R		I		S										N
A		N	U	C	L	E	O	T	I	D	E	S		G
N				R										E
S		A	M	I	N	O	A	C	I	D	S			R
F				P										R
E		D		T	R	A	N	S	L	A	T	I	O	N
R		N		I										A
R	N	A	P	O	L	Y	M	E	R	A	S	E		
N				N										
A														

The hidden word is: GENOME

Crossword

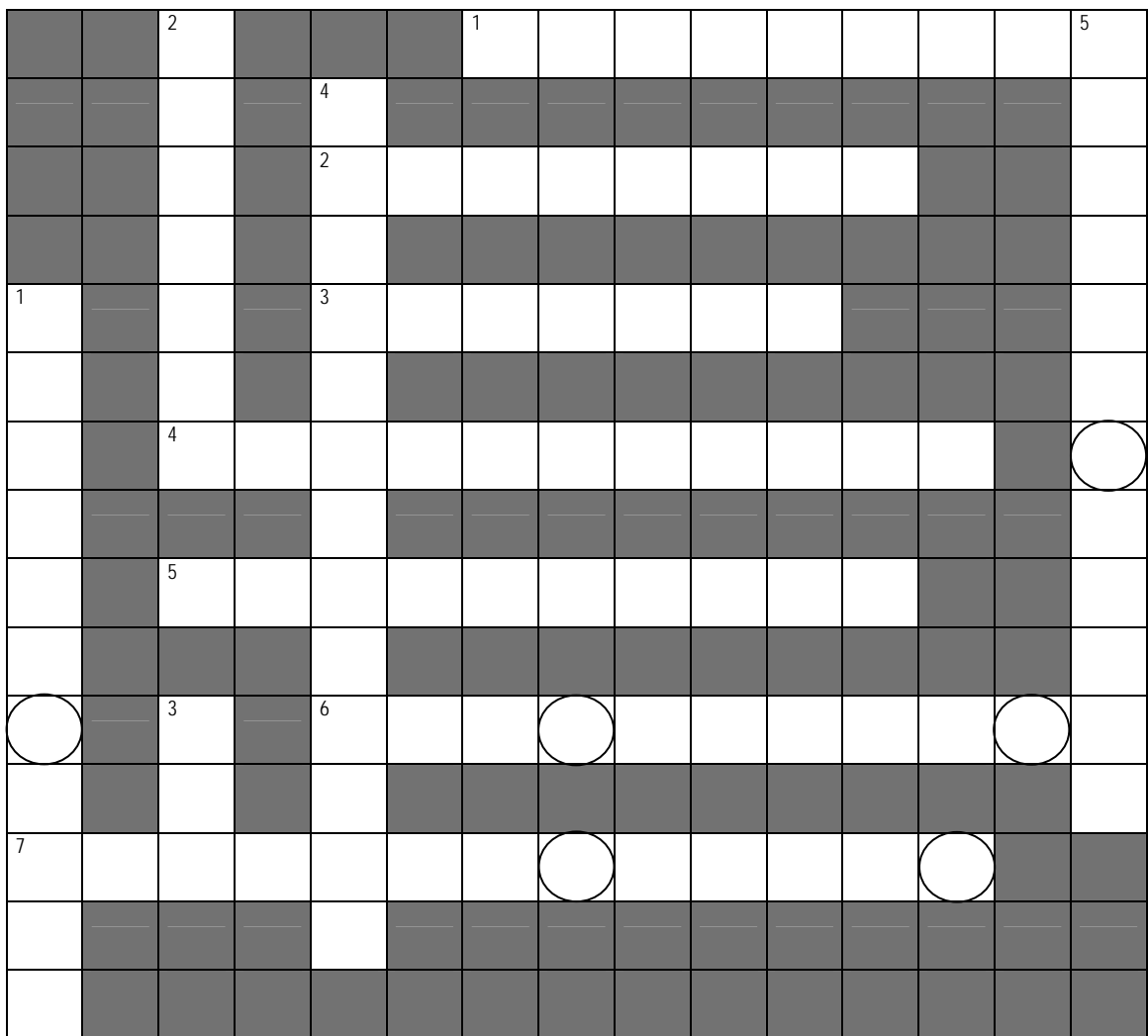
Using the following clues, find the words that go in the grid. Once you have finished, use the words that are in boxes with circles to find the hidden word.

Horizontal

1. I am the site where translation occurs.
2. I am the site where protein synthesis occurs.
3. I am the site where transcription occurs.
4. We are the basic units of DNA and of RNA.
5. We are the basic units of proteins.
6. I am the term for the production of a protein from messenger RNA, in the cytoplasm of a cell.
7. I am the enzyme that decodes DNA to produce messenger RNA.

Vertical

1. I transport an amino acid at one extremity and can recognize a messenger RNA codon (three nucleotides).
2. I am the final product of translation.
3. I am the abbreviation for "deoxyribonucleic acid".
4. I am the term for the production of messenger RNA from DNA, in the nucleus of a cell.
5. I am produced from DNA and am used to produce proteins.



The hidden word is: _ _ _ _ _