

# DNA sentences

<b>Focus question</b>	How are proteins coded for by DNA?
<b>Vocabulary</b>	Deoxyribonucleic acid (DNA), messenger RNA (mRNA), transfer RNA (tRNA), CRISPR, transcription, translation, codons, anticodons, introns, exons

**Deoxyribonucleic acid** (DNA) is the molecule of life. DNA is one of the most recognizable nucleic acids, a double-stranded helix. The process by which DNA codes for proteins involves enzymes and additional single-stranded nucleic acids, specifically **messenger ribonucleic acid** (mRNA) and **transfer ribonucleic acid** (tRNA). The steps in protein synthesis, **transcription** from DNA to mRNA, and **translation** from mRNA to tRNA can be demonstrated by modeling. In this activity, each triplet code of DNA will represent a word in a sentence rather than a code for an amino acid. Introns and exons are omitted. The words can be found by transcribing the DNA into mRNA, then translating mRNA into tRNA.

## Procedure

1. Choose one person to be the transcriber. Find the DNA strand assigned to your group located at the table in the center of the room. (This)  
*Note: The first triplet code is a "start" code, which in eukaryotes, represents the amino acid methionine. For this activity, it is the same triplet code for all and is denoted by the word "START." Each punctuation symbol is represented by a different "stop" anticodon.*
2. On the data sheet provided, transcribe the mRNA codons from the DNA strand (without moving the DNA).
3. At your group's table, choose a different person to translate the mRNA codons to tRNA anticodons.
4. Write these anticodons on your data sheet.
5. Choose two people to go find the tRNA anticodons around the room. Turn over the anticodons to find the words of the sentence and write the words on your data sheet.
6. Write your sentence in large print/script on the large sheet or white board at your table.
7. Switch roles and repeat for each additional DNA strand you are assigned.

## Extension

After your group has translated your assigned sentences, research each statement to find evidence to support or refute the statement. Create a new "sentence" (protein) using DNA triplets to create a different set of words (amino acids).

## Reflection

1. How are chromosomes, DNA, genes, and proteins related?
2. What area of the cell does the table holding DNA represent in this modeling activity? Why can't the DNA strand be brought back to your group?
3. What area of the cell does your table represent?
4. What do the words represent? The completed sentences?
5. What do you think the consequences might be if an error occurred in the cell as it goes through the process of protein synthesis?

## Rubric for self-assessment

Skill	Yes	No	Unsure
I participated in each role during the DNA activity.			
I can explain the function of DNA and the roles of DNA, mRNA, and tRNA in transcription and translation of DNA into proteins.			
I created a new "sentence" (protein) using DNA triplets to create a different set of words (amino acids)			
We divided up the work fairly.			