

## **Lesson: Introduction to DNA Translation**

### **Learning Goals & Success Criteria:**

Students will be able to describe the process of DNA translation as the reading of codons on mRNA and the attachment of amino acids by tRNA. Students will be able to recognize start and stop codons compared to coding codons. Students will be able to describe the process in three stages, initiation, elongation and termination.

### **Relationship to Unit Structure:**

Students have reviewed DNA and RNA structures, and have extensively gone over DNA replication and transcriptions. Students are familiar with the central dogma of molecular biology and understand this is the final phase before protein.

### **Engage (5 min):**

Code deciphering activity where a secret code is written on the board using codons, without the students formally knowing what they are. It is to introduce them to the concept of reading nucleotides in threes, and then also start a discussion on what happens if I shifted the code by one nucleotide. Parts of the code are given, spy style and some common letters but students have to fill in the rest.

### **Explore (15 min):**

Translation simulation where clicked enzymes demonstrate what each of their roles are in translation, and then dragging amino acids with tRNA and only the ones that line up, work.

### **Explain (40 min):**

[Powerpoint lesson](#) fully describing the process of DNA translation. Students will have opportunities to practice translating strands of DNA and also be introduced to start and stop codons vs codons that code for amino acids.

### **Elaborate (15 min):**

Students are put into groups and asked to translate a strand of mRNA. Each group will have a near identical strand except for one type of error ie) frame shift, nonsense, missense, silent. Students will each report their proteins and then be asked to compare their strands and notice what each change did to the translated protein. This is an introduction to the errors.

### **Evaluate (15 min) :**

Students are given a google forms exit ticket.

### **Exit Card Content:**

1. Translate the following mRNA strand into protein:

**5' - AUCCAGAUGGGUCAUCGUUAGAGUGACU - 3'**

2. Describe the role of tRNA in 3 sentences.

3. This sequence of nucleotides is part of a specific gene:

**5'-AUGAAGAGGGGUGAU-3'**

A mutation changes the sequence to

**5'-AUGAAGAAGGGUGAU-3'**

Which sentence correctly describes what would happen to the protein?

- A. The change would cause the translation to stop suddenly, producing an inefficient protein.
- B. The change could prevent the translation from beginning, producing no protein.
- C. The change would still produce the same protein with no change in its efficiency.
- D. The change could affect the way the protein folds/functions.

4. What is one thing about today's lesson that stuck out, or made perfect sense etc...?

5. What is one thing about today's lesson that didn't make any sense or that you need clarification on?