

Protein Synthesis



Deoxyribonucleic acid is a double-stranded sugar phosphate backbone. On the other hand; ribonucleic acid is a single-stranded sugar phosphate backbone.

DNA has the following nucleobases: Cytosine, Guanine, Adenine, and **Thymine**.

Whereas RNA has the following nucleobases: Cytosine, Guanine, Adenine, and **Uracil**

In both DNA and RNA, Guanine and Cytosine pair together; however, in DNA, **Thymine** and **Adenine** pair together, and in RNA, **Uracil** and **Adenine** complementary base pair together.

How is mRNA different from DNA?

What is the process of transcription?

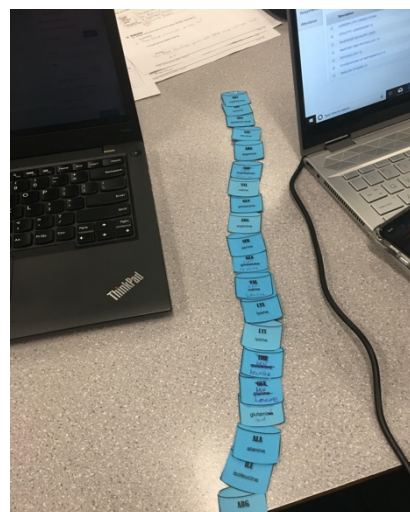
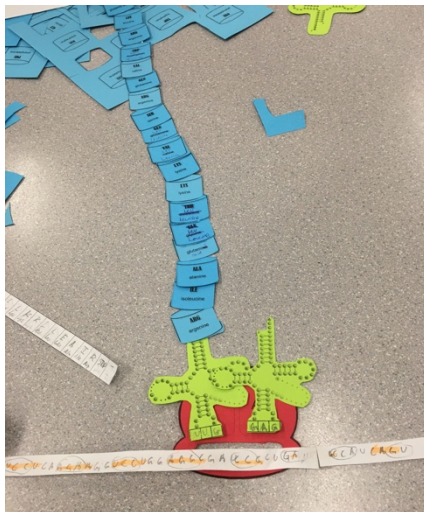
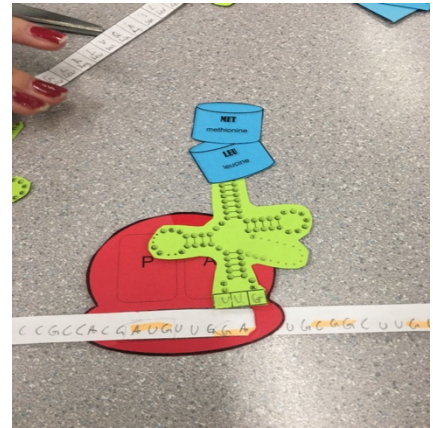
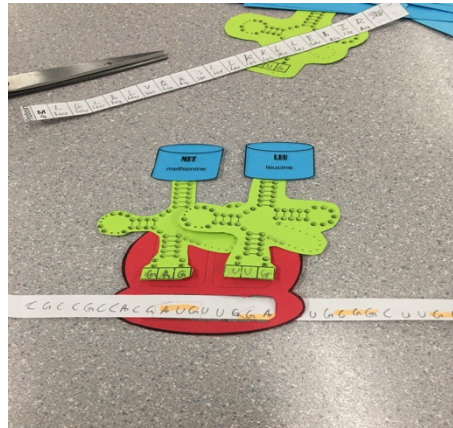
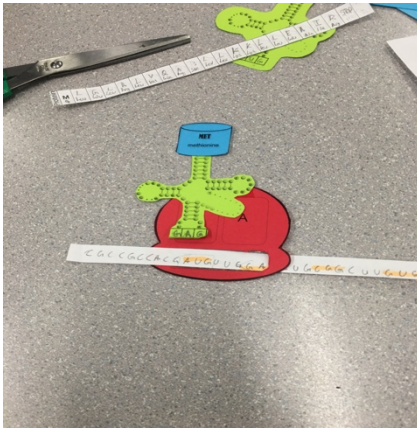


Transcription involves three steps: Initiation, Elongation, and Termination

Initiation is when the enzyme RNA polymerase binds to the promoter area of the gene. The DNA then unwinds so RNA polymerase can read the bases of one half of the DNA. **Elongation** is the addition of nucleotides to the mRNA; the enzyme now makes a strand of mRNA with complementary base pairing. Adenine in the DNA binds to Uracil, Thymine binds to Adenine, and Guanine and Cytosine pair together. **Termination** is the last step and occurs when RNA polymerase hits the stop sequence in the gene. The strand of mRNA is now complete, and it detaches from the DNA. It then leaves the nucleus where it finds a ribosome. Translation then occurs.

This process was slightly more complex than the last pipe cleaner lab; however, I did find it more

During translation the **mRNA** acts as a **code** for a specific protein. Each codon codes for a specific anti-codon, which is carried by a specific tRNA, and each different tRNA is covalently linked to an **amino acid**. There are four bases, and there are 64 different codons. Multiple codons result in the same amino acid. There are special codons: 'AUG' is the start codon, 'UAA' 'UAG' and 'UGA' are the stop codons.



Translation occurs inside the ribosome. It binds to the **mRNA** and the initial **tRNA** with the start codon. The tRNA that codes to the next codon after the start codon, enters the **ribosome**; it carries the corresponding amino acid, which covalently bonds to the initial 'AUG' amino acid. The first tRNA then detaches and leaves the ribosome which shifts over making room for the next tRNA. This specific sequence of codons come from the mRNA. The **polypeptide chain** will grow until it reaches the stop codon. The completed polypeptide chain then detaches.

This was an extremely painful process for my group to figure out; however, after it was all finished I think we have a very strong grasp on what translation is.