

Decoding DNA: Student Handout

Name: _____


Lab Group: _____

Transcription Instructions

1. Number group members so that there will be an order to transcribe DNA into mRNA.
2. Group member #1 will go to the nucleus with a blank strip of mRNA strand, and choose a gene to transcribe that the group hasn't synthesized yet.
3. Write the number of the gene on the mRNA strand.
4. Transcribe the DNA strand into the complementary base pairs. For example:

C→G G→C A→U T→A

Gene #1	A T A C G T A C G A T C G A T C G A
mRNA # <u>1</u>	U A U G C A U G



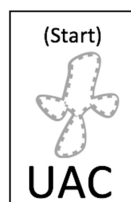
5. Leave the DNA strip in the nucleus and return to the group with mRNA for translation.

Translation Instructions:

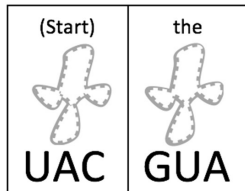
1. Once the mRNA strand has reached the group (ribosome), scan for the first start codon, AUG, and highlight it. This is where you will begin translating the protein sentence.

mRNA # <u>1</u>	U A U G C A U G C U A G C U A G C U
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2. Match the complimentary anticodon from the tRNA cards to the codons and record the word on the other end of the card. This represents an amino acid in the protein that is being built. AUG (Start) is not a word to be included in the sentence, but does indicate the next word should be capitalized.



mRNA # <u>1</u>	U A U G C A U G C U A G C U A G C U
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mRNA # 1 **UAUGCAUGCUAGCUAGCU**

Sentence # 1 *The* _____.



3. Continue until the sentence is complete with punctuation.
4. Group member #2 will move to the nucleus to transcribe another gene.
5. Translate and repeat until all of the group members have transcribed a gene or completed four sentences.

Sentence # _____

Sentence # _____

Sentence # _____

Sentence # _____

Engineered DNA Strand

Reflection and Conclusion:

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?
3. Why can the DNA strand not be brought back to your group?
4. What area of the cell does your table represent?
5. What do the words represent? The completed sentences?
6. What do you think the consequences might be if an error occurred in the cell as it goes through the process of protein synthesis?

Assessment:

1. Transcribe the following DNA strand. **GCTACGGACG**

2. Circle the first start codon in the mRNA strand you transcribed.
3. Write the sequence of the first codon following the start codon. _____
4. What would the anticodon be that would complement the codon in #3? _____