Making Sentences of DNA

Summary

In this activity students will model protein synthesis using sentences for DNA/RNA codes and words for amino acids. They will transcribe and translate the DNA into a sentence.

Time Frame

1 class periods of 60 minutes each

Group Size

Small Groups

Materials

- Anti-Codon Cards
  (attached) These will be taped to the wall around your room.
- DNA template cards
  (attached) These will be kept on your desk (the "nucleus") at all times. After all, DNA cannot leave the nucleus.
- student worksheet
  (attached)
  paper: to write down the mRNA strand and the tRNA molecules and the sentence.
  pen / pencil

Instructional Procedures

Make up all the DNA Template Cards and the Anti-codon/word cards--See below for instructions.
Hang up the Anti-codon word cards, so the anti-codons are showing.
Show the student the cards and tell them what they are.
Tell the students that your desk is the nucleus and the DNA templates cannot leave the area.
A student is to pick up a DNA template card, write down the DNA template card number, and transcribe it into mRNA.
With the mRNA sequence, s/he will go back to the group's desk and the ribosomal student will write out the tRNA anti-codon sequence.
The tRNA student will search out the correct anti-codon card and flip the card over revealing the word. S/he will write down the word.
After completing the sentence, a student in the group will tell you his/her group sentence. If not correct, have the group go over the same DNA template. If correct, have the students pick another card. To make a contest, see which group can do the most sentences.

Note:

Students may work alone or in groups (it is better to assign one student to be the mRNA, another student to write down the anticodons (ribosome) and the third student to search out the proper words (tRNA). Every sentence must have a start (ATG) and a stop (TAG) codon.

Keys for making cards:

*Key to tRNA Cards with Words (Note: write the anticodon on one side of the card, and write the word on the other):

UAG = Stop (period) CCG = is CGC = water
AUG = Initiator (Start) CCU = subject CGG = every
AAA = Your CGA = drink CGU = day

AAC = mother . . . AAG = wears . . . AAU = dresses
ACG = funny . . . ACC = have . . . ACU = dog
ACA = breath . . . AGA = the . . . AGG = are
AGU = Beatles . . . AGC = best . . . AUA = rock
AUC = band . . . AUU = an . . . CAA = old
CAC = rubber . . . CAG = breaks . . . CAU = pulled
CCA = when . . . CCC = Biology . . . CUA = I
CUC = love . . . CUG = roll . . . CUU = music
GAA = all . . . GAC = demented . . . GAG = puppies
GAU = and . . . GCA = so . . . GCC = much
GCG = fun . . . GCU = education . . . GGA = door
GGC = to . . . GGG = future . . . GGU = father
GUA = a . . . GUC = dress . . . GUG = brother
GUU = nothing . . . UAA = we . . . UAC = in
UAU = this . . . UCA = together . . . UCC = must
UCG = be . . . UCU = informed . . . UGA = around
UGC = you . . . UGG = read . . . UGU = little
UUA = DNA . . . UUC = code . . . UUG = for
UUU = life

Key to DNA Fragments: (Write these sequences on cards.)

ATGAAAAACAAGGTACACATCTAG
ATGAAAAACAATTGCACGTAG
ATGTAAACCACTACATAG
ATGAGAAGTAGGAGAAGCATAATCTAG
ATGATTCAACACATCCAGCCACATTAG
ATGCCCCCGAGAAGCCCTTAG
ATGCGACGCCGGCGTTAG
ATGCTACTCATAGATCTGCTTTAG
ATGTAAAGGGAAGACGAGTAG
ATGCCCCCGGCAGCCGCGTAG
ATGGCTCCGAGAGGAGGCAGAGGGTAG
ATGAAAGGTAAGGTAGTCTAG
ATGAAAGTGAAGGTTTAG
ATGTAAAGGGAATACTATTCATAG
ATGTAATCCTCGTCTCGGCGTTAG
ATGATAGATCTGCTTCCGAGAAGCTAG
ATGCCCCCGGAATGATGCTAG
ATGTGGGTATGTCGGCGTTAG
ATGTTACCGAGATTCTTGTTTTAG
ATGTTATCCTCGTGGTTGTTTTAG

Key for the sentences: *20 Sentences:

Your mother wears a rubber band.
Your mother dresses you funny.
We have dog breath.
The Beatles are the best rock band.
An old rubber band breaks when pulled.
Biology is the best subject.
Drink water every day.
I love rock and roll music.

We are all demented puppies.
Biology is so much fun.
Education is the door to the future.
Your father wears a dress.
Your brother wears nothing.
We are all in this together.
We must be informed every day.
Rock and roll music is the best.
Biology is all around you.
Read a little every day.
DNA is the code of life.
DNA must be read for life.

Assessment Plan

Scoring Guide:

1. Students complete at least 5 sentences correctly……4
2. Student answer analysis questions correctly……4

Answers:

Answers will vary.
A mutation
DNA carries genetic information from individual to individual and codes rRNA , mRNA carries DNA code to ribosome to code tRNA, tRNA line correct amino acids up to form protein molecules.

Bibliography

Lesson Design by Jordan School District Teachers and Staff.

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