

Secret Pseudo-Protein Code

First Base	Second Base			Third Base
	U	C	A	
U	A	h	p	U
	a	I	Q	C
	B	i	!	A
	b	J	?	G
C	C	j	q	U
	c	K	R	C
	D	k	r	A
	d	L	S	G
A	E	I	s	U
	e	M	T	C
	F	m	t	A
	START	N	U	G
G	f	n	u	U
	G	O	V	C
	g	o	v	A
	H	P	W	G

Secret Pseudo-Protein Code Alternative List

UUU	A	U A U	P
UUC	a	U A C	Q
UUA	B	U A A	! stop
UUG	b	U A G	? stop
CUU	C	C A U	q
CYC	c	C A C	R
CUA	D	C A A	r
CUG	d	C A G	S
AUU	E	A A U	s
AUC	e	A A C	T
AUA	F	A A A	t
AUG	START	A A G	U
GUU	f	G A U	u
GUC	G	G A C	v
GUA	g	G A A	v
GUG	H	G A G	W
UCU	h	U G U	w
UCC	I	U G C	X
UCA	i	U G A	• stop
UCG	J	U G G	x
CCU	j	C G U	Y
CCC	K	C G C	y
CCA	k	C G A	Z
CCG	L	C G G	z
ACU	I	A G U	Ñ
ACC	M	A G C	ñ
ACA	m	A G A	t
ACG	N	A G G	ç
GCU	n	G G U	"
GCC	O	G G C	;
GCA	o	G G A	,
GCG	P	G G G	space

Name _____
 Period _____
 Date _____
 Science _____

Name _____

3. Original message:

Mutations by Analogy

Every three bases on the mRNA codes for an amino acid. Every three bases of our "Secret Pseudo-Protein Code" codes for a letter or punctuation mark. Since our "Secret Pseudo-Protein Code" is more familiar, we will use it to examine mutations. Remember the same rules hold for both codes:

1. All messages must begin with START.
2. There are no spaces between three letter words, one simply counts every three letters.

1. Original message:

A U G G U G U U C A C U A C U G C A U A A

Point substitution mutation:

A U G G U G A U C A C U A C U G C A U A A

What was the effect of this mutation?

If this had been an mRNA coding for a protein, what would have been changed?

2. Original message:

A U G A C A U C A U G G A G A U C A A A U C

Point deletion mutation:

A U G A C A U C A U G A A A G A U C A A A U C

What was the effect of this mutation?

If this had been an mRNA coding for a protein, what would have been changed?

Does the size of this mutation's effect surprise you?

3. Original message:

A U G G A G U C U U C A A A U A G U A G A G G
 Point insertion mutation:

A U G G A G U C U U C A A A U A G U A G A G G

What was the effect of this mutation?

If this had been an mRNA coding for a protein, what would have been changed?

4. Original message:

A U G U A U C A A G C A A A A U C U C A G C U
 Point substitution mutation:

G U G U A U C A A G C A A A A U C U C A G C U

What was the effect of this mutation?

If this had been an mRNA coding for a protein, what would have been changed?

5. Original message:

A U G C C G U U C A A A U C C A A U G A G C U
 Point substitution mutation:

A U G C C G U U C A G A A U C C A A U G A G C U

What was the effect of this mutation?

If this had been an mRNA coding for a protein, what would have been changed?

Name _____
Period _____
Date _____
Science _____

6. During this activity you modeled protein synthesis using mRNA. But where did the mutation originally occur?

7. What is a mutation?

8. How can a mutation in the DNA cause a change in an organism's protein?

9. Do all mutations in the DNA coding for mRNA cause a change in an organism? Why or why not?

10. Are mutations helpful or harmful?
