

BIOL 1114 Exam #3 (Star or NoStar Form) November 17, 2014

Use a #2 pencil to fill in the information on your [NCS answer sheet](#). Put your **O-Key Account Username** in the boxes indicated for **LAST NAME** and darken the appropriate circles. Write your **Name (Last, First)** and **"Star" or "NoStar"** in the space above the boxes containing your **O-Key Account Username**. Darken the **(S)** or **(N)** in the last column of the name circles. Enter the number **1433** and **darken the corresponding circles** in the **first 4 columns** of the **"Student ID."** Failure to perform this correctly will incur a - **10pt handling fee**. Read all questions and answers **carefully** before choosing the **single BEST response** for each question. Feel free to ask the instructor for clarification.

Use the following formulas and chart as needed.

$$r = \frac{\# \text{ of births} - \# \text{ of deaths}}{N}$$

$$G = rN$$

$$G = rN \left( \frac{K - N}{K} \right)$$

mRNA-Codon-to-Amino-Acid Decoder Chart									
1 <sup>st</sup> Letter	U	2 <sup>nd</sup> Letter						3 <sup>rd</sup> Letter	
		C		A		G			
U	UUU	Phenylalanine	UCU	Serine	UAU	Tyrosine	UGU	Cysteine	U
	UUC		UCC		UAC		UGC		C
	UUA	Leucine	UCA		UAA	STOP	UGA	STOP	A
	UUG		UCG		UAG		UGG	Tryptophan	G
C	CUU	Leucine	CCU	Proline	CAU	Histidine	CGU	Arginine	U
	CUC		CCC		CAC		CGC		C
	CUA		CCA		CAA	CGA	A		
	CUG		CCG		CAG	CGG	G		
A	AUU	Isoleucine	ACU	Threonine	AAU	Asparagine	AGU	Serine	U
	AUC		ACC		AAC		AGC		C
	AUA	Methionine; START	ACA		AAA	Lysine	AGA	Arginine	A
	AUG		ACG		AAG		AGG	G	
G	GUU	Valine	GCU	Alanine	GAU	Aspartate	GGU	Glycine	U
	GUC		GCC		GAC		GGC		C
	GUA		GCA		GAA	GGA	A		
	GUG		GCG		GAG	GGG	G		

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Summer squash can be grown in a variety of shapes and colors. Unlike most animals, plants can fertilize their own egg cells (self-pollinate). A gardener grew four different plants as described in the table below, then crossed them in many ways to see what offspring would be produced. Squash bugs are a major pest for summer squash.

Plant	Fruit Color (white dominant to yellow)	Fruit Shape (disk dominant to sphere)	Notes
1	White	Sphere	
2	Yellow	Disk	If this plant self-pollinates, 100% of offspring have disk shaped fruit.
3	Yellow	Sphere	
4	White	Disk	If this plant self-pollinates, it produces a 3 white to 1 yellow colored fruit ratio.

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Giant Pandas *Ailuropoda melanoleuca* are cute herbivores that are threatened by habitat destruction. It is estimated that in 2012 approximately 200 pandas live in one reserve in Sichuan province in China that has a size of 200,000 hectares.

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**Harding ataxia** is a **recessive autosomal disease**, persons afflicted with Harding ataxia have poor reflexes and balance. Peter and Mary are a married couple and do not show any signs of the disease. They have two children, a son and a daughter. The son has Harding ataxia but their daughter has no symptoms.

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**Duchenne muscular dystrophy (DMD)** is a **recessive X-linked form** of muscular dystrophy, which results in muscle degeneration and early death. The disorder is caused by a mutation in the dystrophin gene, the largest gene located on the human X chromosome. Paul and Sue are a healthy married couple, neither Paul nor Sue show any signs of the disease. They have a boy who at age 4 is showing early symptoms of DMD.

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The Ebola epidemic in West Africa is a dramatic example of an emerging infectious disease that has caused worldwide fear. Its victims experience hemorrhaging (excessive bleeding) in various parts of their bodies. Failure of vital organs from internal bleeding is often fatal. The mortality rate (the percentage of those infected who die) for Ebola virus infections is between 50% and 90%. It is spread from one person to another by contact with body fluids (i.e., blood, vomit, urine, feces, semen) from infected people. During the

first nine months of this year, the death toll from Ebola in West Africa has exceeded 4,000. Because they are ineffective against viruses, antibiotics will not prevent Ebola transmission.

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Fatal familial insomnia (FFI) is considered “the worst disease you can get.” It is an **autosomal dominant** prion disease. Sufferers of this disease begin to lose the ability to sleep at about age 40, leading to worsening hallucinations, delirium, dementia and eventually, death. FFI is caused by an amino acid replacement from an **aspartate to asparagine** at site 178 in the PrP protein,. This disease is extremely rare, so it can be assumed that anyone that develops the disease is heterozygous.

Members of the Seven Dwarves have blood types O (Sleepy), A (Dopey), B (Sneezy) and AB (Grumpy). The Royal Red Cross sets up a blood drive at Snow White’s castle.