

BIOL 1114 Exam #3 (Preview) November 22, 2010

Remember: 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 **“No Star”** 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 **1033** 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.

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

$$G = rN$$

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

mRNA - Codon - to - Amino - Acid Decoder Chart									
	2 nd Letter								
1 st Letter	U		C		A		G		3 rd Letter
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	Glutamine	CGA		A
	CUG		CCG		CAG		CGG		G
A	AUU	Isoleucine	ACU	Threonine	AAU	Asparagine	AGU	Serine	U
	AUC		ACC		AAC		AGC		C
	AUA		ACA		AAA	Lysine	AGA	A	
	AUG	Methionine; START	ACG		AGG		Arginine	G	
G	GUU	Valine	GCU	Alanine	GAU	Aspartate	GGU	Glycine	U
	GUC		GCC		GAC		GGC		C
	GUA		GCA		GAA	Glutamate	GGA		A
	GUG		GCG		GAG		GGG		G

Human blood type is classified by differences found on red blood cells (RBCs). The American Red Cross estimates that the distribution of blood type in the U.S. consists of: 45% type O; 40% type A; 11% type B; 4% type AB. In Oklahoma, the percentage of type B is higher than the national average. In the recruitment of blood donors, the Red Cross targets more than three times as many type O donors than type A donors.

Hemoglobin is the protein responsible for carrying the oxygen (as well as binding the iron) in red blood cells. A deficiency in either the amount of hemoglobin, iron, or the total number of RBCs is known as anemia. Anemic people tend to be very lethargic and are easily exhausted by physical activity.

Mountain gorillas (*Gorilla beringei beringei*) are critically endangered, with only about 700 gorillas (split into two populations) left in the wild. One mountain gorilla population lives in Bwindi Impenetrable National Park in Uganda. The terrain in the park is rugged, and most of the gorillas are shy around humans, making it difficult to measure population changes. Biologists have turned to indirect observational methods to census the population, including counting the sleeping nests the gorillas make every night as well as measuring the piles of dung (poop) the gorillas leave behind in the morning. (The size of the dung is used to identify unique individuals.) More recently, biologists are using DNA extracted from dung and hair to estimate the number of remaining gorillas. A 1997 nest count study estimated that there were about 300 gorillas in the park. The park's area is 330 km². A DNA study of dung collected in 2006 estimated that there were between 297 and 302 gorillas in the park. Gorillas are herbivores and get most of their daily calories from plants. Gorillas are highly susceptible to human diseases, including measles. The human population density in the area surrounding Bwindi Impenetrable National Park is approximately 300 people/km². Mountain gorillas have dark skin and fur, both of which protect their skin from UV radiation.

The survivors of a shipwreck lived on a deserted island for many years. While on the island, they had children. The children were raised together as one large family and never knew which adults were their genetic parents. These children were miraculously rescued while teenagers, but sadly their parents had already died. . After being rescued, they found their parents' medical records. The following table lists several genetic traits that help the children determine their genetic parents.

Person	Sex	Colorblind (Color-blindness is X-linked recessive)	Blood Type	Lactose tolerant as an adult (Tolerance is Dominant)	Notes
<i>Adults (possible parents)</i>					
Ginger	Female	N	A	N	Her father was colorblind
MaryAnn	Female	Y	AB	Y	Her parents were colorblind
Skipper	Male	Y	O	Y	His mother was lactose intolerant
Gilligan	Male	N	B	N	His parents were lactose tolerant
<i>Rescued Children</i>					
Coco	Female	N	B	Y	Plans to be scientist
Crabman	Male	N	O	Y	Tends to obesity
Wildboy	Male	Y	AB	N	Plans to be movie star
Sunset	Female	Y	A	Y	Prone to accidents