

Preview Material

(Exam 3 Spring 2006)

Use the following formulas and chart as needed.

$$r = b - d$$

$$r = \frac{\# \text{ of b's} - \# \text{ of d's}}{N}$$

$$G = rN$$

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

mRNA-Codon-to-Amino-Acid Decoder Chart									
1 st Letter	U	2 nd Letter						3 rd 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	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	Arginine	A
	AUG	Methionine; START	ACG		AAG		AGG		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

Hemophilia is an **X-linked recessive trait** characterized by the inability to properly form blood clots. It is often called the "Royal Disease" because it suddenly cropped up in the children of Great Britain's Queen Victoria (1819 - 1901). Alexis, the son of Tsar Nicholas II and Tsarina Alexandra of Russia and great grandson of Queen Victoria, was born with hemophilia. Neither of Alexis' parents had hemophilia.

The life of a mouse begins with a single fertilized egg cell (called a zygote) containing 70 chromosomes. A mature mouse is made up of an estimated 500 trillion cells.

Kyle has a small ranch in western Oklahoma. He has enough land to support about 110 head of cattle. Last year he had 100 head of black cattle. Twenty-five calves were born, but only 20 survived because of the drought. To pay his expenses, he sold 5 cows to the local meat processing plant.

On June 6 at approximately 1:00 p.m., Mrs. Smith, Mrs. Stevenson, and Mrs. Jones each delivered a healthy baby boy at the General Hospital. At 1:20 p.m., the town's tornado alarms sounded. Nurses and orderlies scrambled to evacuate patients, and the three new babies to safety. After the danger had passed, the hospital staff was distressed to find that in the confusion, they had forgotten which baby was which! Since the babies were moved to safety before receiving their identification bracelets, there was no easy way to identify them.

Couples:	Blood type	Galactosemia
Mr. Stevenson	B	No - heterozygous
Mrs. Stevenson	B	No - heterozygous
Mr. Smith	A	Yes
Mrs. Smith	O	No - heterozygous
Mr. Jones	A	Yes
Mrs. Jones	B	No - homozygous

Galactosemia is an **autosomal recessive** disorder. Babies with galactosemia lack the enzyme that converts galactose (one of two sugars found in lactose) into glucose, a sugar the body is able to use. As a result, milk (including **breast milk**) and other dairy products must be eliminated from the diet. Otherwise, galactose can build up in the system and damage the body's cells and organs, leading to blindness, severe mental retardation, growth deficiency, and even death.

Babies:	Blood type	Galactosemia
Baby Larry	B	Yes
Baby Moe	O	Yes
Baby Curly	A	No

A particular herd of Rocky Mountain Elk in Beaverhead County, Montana, consists of 300 individuals and is restricted by mountains to a range of 100 square miles. Over a year, 200 calves were born and 125 animals died.

Bird flu is a growing concern for health organizations world-wide. It is primarily confined to Asian countries at this time. The disease causing agent (a virus) is easily transmitted from bird to bird; it can also be transmitted from bird to human, but with much lower likelihood. At this time the virus cannot be transmitted from human to human. People have succumbed to the disease only when they have had prolonged direct contact with infected birds, a more common occurrence when large bird and human populations live in close proximity.
