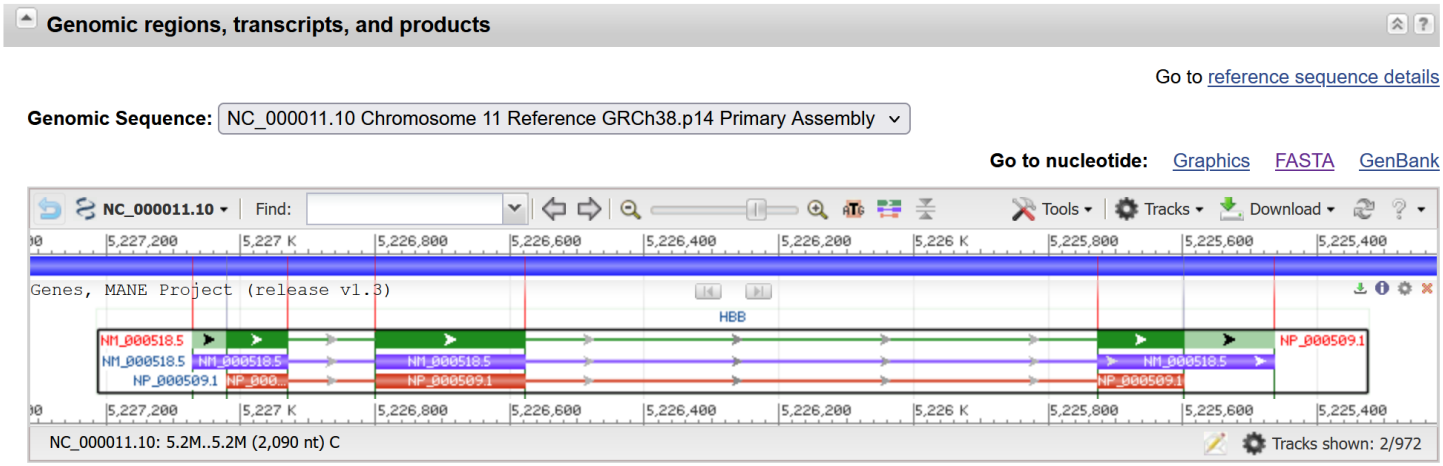
9th/10th Grade Biology
Student Handout

Name: _____ Date: _____ Period: _____

This is a screenshot that shows the accessing of the actual HBB gene using the NCBI databases. These databases are available to the public and contain all kinds of useful information.



DIRECTIONS:

With the segments below, do the following:

1. Use the given DNA codons to transcribe the corresponding mRNA codons.
2. Use the mRNA codons and the codon chart to identify the amino acid sequence for that portion of the gene. (The codon chart is located on the last page)
3. Once you have finished the wild type transcription and translation, complete those processes for all four of the sample sequences.
4. Once the sample segments are completed, you then need to identify the types of mutations present in each sample, as well as identify the result of each mutation.

Wild Type HBB Gene Segment:

DNA:	TAC	CAC	GTA	GAC	TGA	GGA	CTC	CTC	TTC	AGA	CGG	CAA
mRNA:	____	____	____	____	____	____	____	____	____	____	____	____
AA Seq:	____	____	____	____	____	____	____	____	____	____	____	____

Sample 1: Mutation Type: _____

DNA:	TAC	CAC	GTA	GAC	TGA	GGA	CAC	CTC	TTC	AGA	CGG	CAA
mRNA:	____	____	____	____	____	____	____	____	____	____	____	____
AA Seq:	____	____	____	____	____	____	____	____	____	____	____	____

Impact of this mutation: _____

Sample 2: Mutation Type: _____

DNA:	TAC	CAC	GTA	GAC	TGA	GGA	CTC	ATC	TTC	AGA	CGG	CAA
mRNA:	____	____	____	____	____	____	____	____	____	____	____	____
AA Seq:	____	____	____	____	____	____	____	____	____	____	____	____

Impact of this mutation: _____

Sample 3: Mutation Type: _____

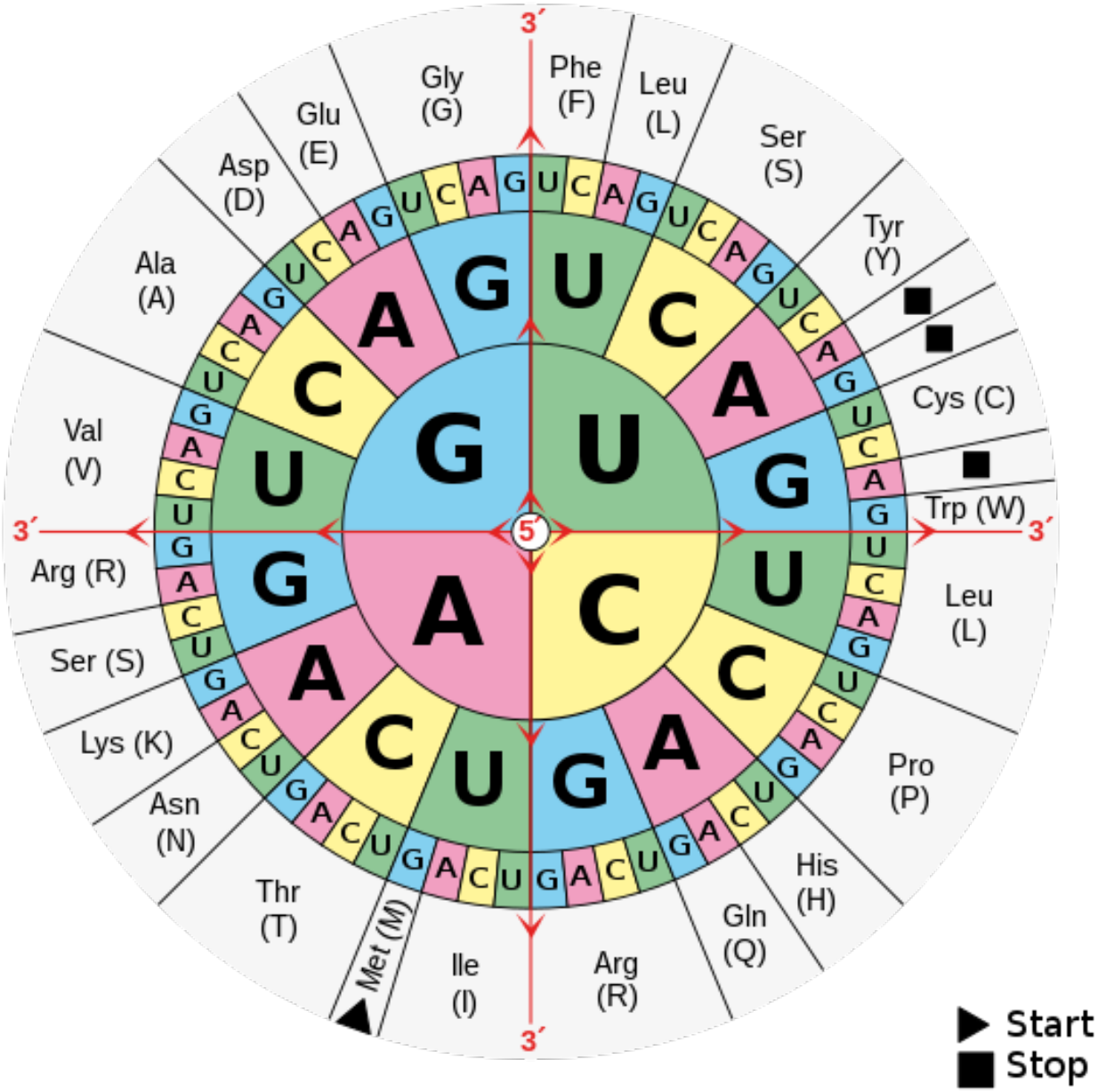
DNA:	TAC	CAC	GTA	GAC	TGA	GGA	CTC	CTC	TTT	AGA	CGG	CAA
mRNA:	____	____	____	____	____	____	____	____	____	____	____	____
AA Seq:	____	____	____	____	____	____	____	____	____	____	____	____

Impact of this mutation: _____

Sample 4: Mutation Type: _____

DNA:	TAC	CAC	GTA	GAC	TGA	GGA	CTC	CTC	TTC	AGA	CGG	CAA
mRNA:	____	____	____	____	____	____	____	____	____	____	____	____
AA Seq:	____	____	____	____	____	____	____	____	____	____	____	____

Impact of this mutation: _____


3´
5´
3´
3´
Phe (F)
Leu (L)
Ser (S)
Tyr (Y)
Cys (C)
Trp (W)
Leu (L)
Pro (P)
His (H)
Gln (Q)
Arg (R)
Ile (I)
Met (M)
Thr (T)
Asn (N)
Lys (K)
Ser (S)
Arg (R)
Val (V)
Ala (A)
Asp (D)
Glu (E)
Gly (G)
Start
Stop