

Genie Guide for Students

Figure 1

The screenshot shows the 'The Gene to Protein Genie™' web application. At the top, three tabs are visible: 'Chromosome 1' (highlighted in green), 'Chromosome 2', and 'X Chromosome'. A black box with a white arrow labeled '1' points to the 'Chromosome 1' tab. On the left, a vertical chromosome bar has a 'Tail' label with an arrow labeled '5' pointing to it. A pull-down menu labeled '6' is open, showing options: 'Metallic alleles:', 'Metallic', 'Non-Metallic', and 'Compare Metallic to Non-Metallic'. The menu is highlighted in blue. A pink vertical bar on the chromosome is labeled '3'. A yellow vertical bar on the chromosome is labeled '4' with a downward arrow. A grayed-out section of the chromosome is labeled '5'. A DNA sequence is displayed on the right, with a specific segment highlighted in yellow and labeled '7'. A speech bubble from a character says 'To get started, select an allele at left.' The bottom of the interface features a 'Wings allele' and 'Horns allele' pull-down menu. The footer text reads 'Supported with funding from the National Science Foundation.'

1. Click to select a chromosome
2. Chromosome being viewed is highlighted green
3. The chromosome
4. Gene locations on the chromosome
5. Grayed out genes are not selectable
6. Selectable genes have pull-down menus
7. DNA sequence along the chromosome (when a gene is selected, the relevant part turns yellow - see Figure 2)

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Figure 2

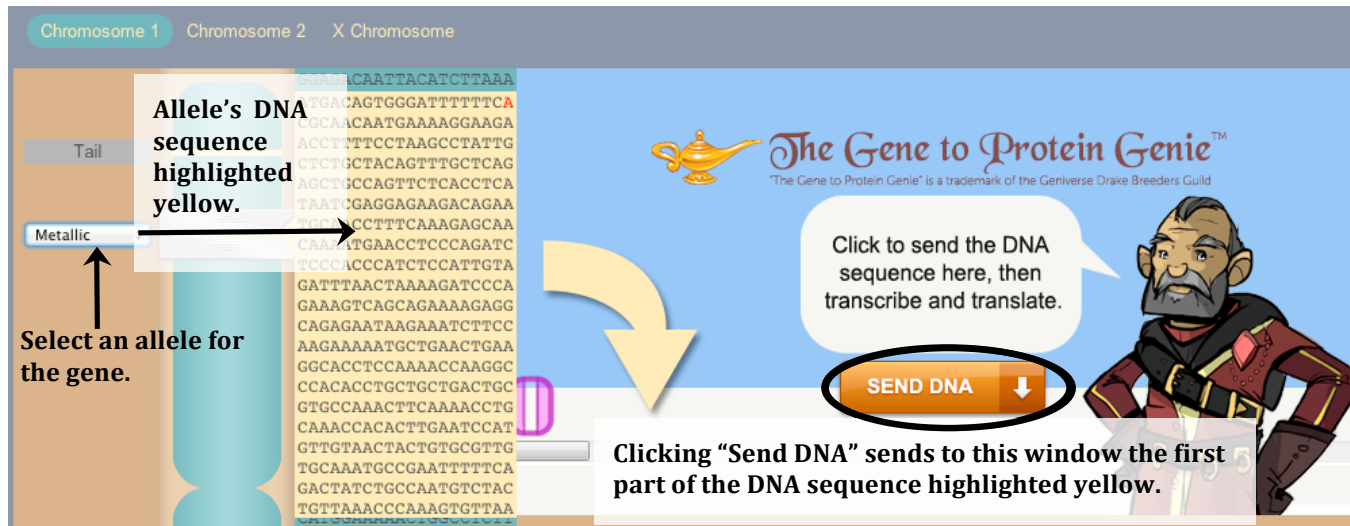


Figure 3

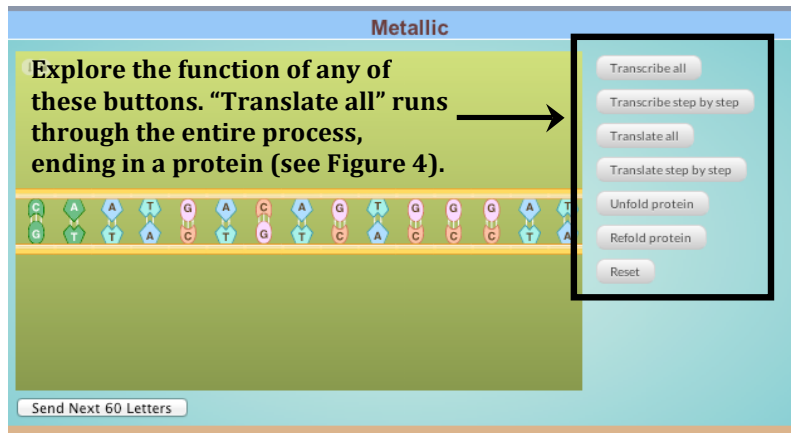
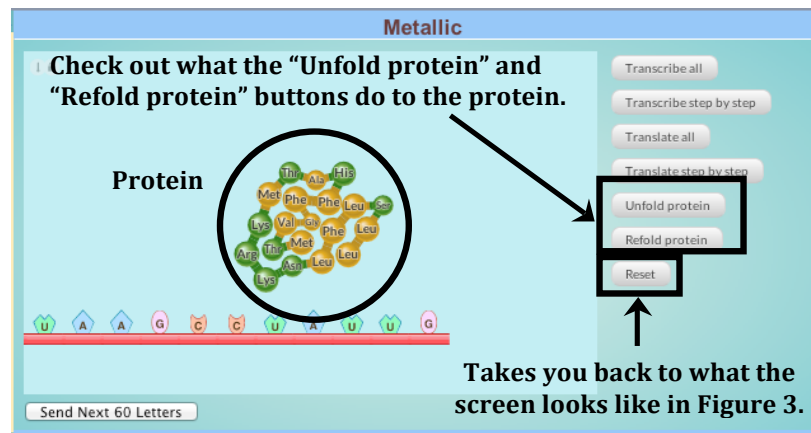


Figure 4



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Figure 5

The screenshot shows the Genie web application interface. On the left, there are tabs for 'Chromosome 1', 'Chromosome 2', and 'X Chromosome'. Below these, there are buttons for 'Metallic alleles:', 'Metallic', 'Non-Metallic', and a checked button 'Compare Metallic to Non-Metallic'. A text box points to the 'Compare' button with the text: 'Use "Compare" to observe two versions of the gene (alleles) at once.' The main area displays two DNA sequences side-by-side. A text box points to a red 'C' in the top sequence with the text: 'Place in the DNA sequence where each allele differs. Check each allele separately to see how.' Below the DNA sequences, there are two protein structure visualizations. A text box points to the top protein structure with the text: 'Compare the proteins' amino acid sequences.' Another text box points to the bottom protein structure with the text: 'Amino acids'. On the right side, there are buttons for 'Transcribe all', 'Transcribe step by step', 'Translate all', 'Translate step by step', 'Unfold protein', 'Refold protein', and 'Reset'.

Figure 6

The screenshot shows the Genie web application interface. On the left, there are two dragon illustrations. Below them, there are buttons for 'Wings allele:' and 'Horns allele:'. A text box points to the dragons with the text: 'Shows how each allele affects a drake's appearance.' On the right, there is a text box with the following text: 'Metallic The drake "Asip" gene codes for a signaling protein that controls the production of the color pigment melanin. Drake scales have an upper and a lower layer. When melanin is present in both scale layers, drake colors appear dull, not shiny. When melanin is present only in the lower scale layer, drakes appear as a shiny, metallic color. Metallic colored scales occur in drakes that have inherited a mutation in the Asip gene.' A text box points to this text with the text: 'Describes job of protein and how it differs by allele.'