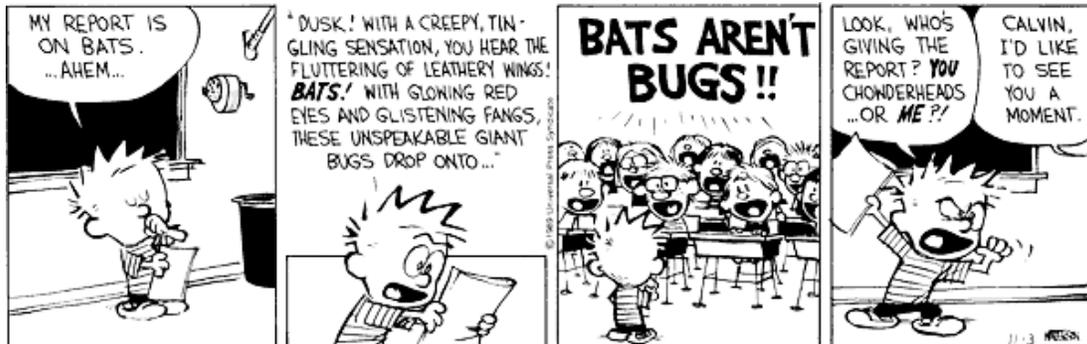| Unit 1	Handout _____	*Classification and Genetics*

Purpose: To see how using genetic information is a more reliable way to classify organisms than by their physical characteristics

Problem: Consider the following comic from Calvin and Hobbes.

Calvin assumes that bats are bugs because they have a similar appearance and behavior: they have wings, can fly, and can bite. He did so much as early scientists did when trying to classify organisms. In another strip, Calvin redoes his report and calls it "Bats are Birds." Is he correct? Are bats birds? Let's find out!

Part One. In part one you shall determine if bats are more genetically similar to bats or other organisms. In addition, you shall find out if bats are more closely related to other organisms, such as humans and whales.

Procedure
1. Login and go to: http://www.uniprot.org/ (Link is on 7bscience.com)
2. Search for: P11758 (this is the system code for a cave bat)
3. A page will load with lots and lots of information. Scroll down until you find a grey bar that says "Sequences." Under that bar you should see a blue link called FASTA. Click it. A page will load with lots of random letters. This is the code that our program needs to analyze genetic information.
4. Select all and copy the information on that page.
5. Open a new tab in your browser and visit: (Link is on 7bscience.com)
http://fasta.bioch.virginia.edu/fasta_www2/fasta_www.cgi?rm=lalign
6. Paste the information in the top box, B.1. NEVER TOUCH THIS BOX AGAIN UNLESS TOLD TO DO SO!
7. Now you will search for the comparison organisms. Go back to http://www.uniprot.org/
8. In the following sections will be the codes you need to search for. Enter the code, click the FASTA link (like you did in step 3), and copy the information.
9. Go to the other tab in your browser and paste the information in the SECOND box on the page, C.1.
10. Click on "Align Sequences."

11. A page will load (it may take a minute or two). Search for something that looks like this: ##.#% identity (##.#% similar) in…
COPY DOWN these numbers into the correct spot.
12. Repeat steps 7-11 until you have made your comparisons. Always put your comparison into the second box on the comparison page. Never put it in the first box unless told to do so!
13. Once you have calculated all the percents, determine the average of the percent identity and percent similarity.

Organism	Code	% Identity	% Similar
Pigeon	P11342		
Goose	C7EM14		
Duck	P02114		
Chicken	P02112		
XXXXXXXXXXXXXXXXX	Average Similarity		

Part Two. Now we shall determine if the bat is more closely related to mammals than birds. Follow the same steps as above (7-11). Do not change the first box on the comparison page!

Organism	Code	% Identity	% Similar
Human	P68871		
Whale	P09905		
Mouse	P02088		
Bovine (Cow)	P02070		
XXXXXXXXXXXXXXXXX	Average Similarity		

Based on your data, is a bat more closely related to birds or mammals? _____

Why is this? _____