Which Organism is Most Closely Related to a Dinosaur?

Order the following organisms #1-7, with a 1 next to the organism that you think is the *most* related to a Tyrannosaurus rex and a 7 next to the one that you think is the *least* related.

Human (Homo sapiens) _____



Salamander (Cynops)



Chicken (Gallus gallus) ____



Rat (Rattus norvegicus)



Cow (Bos taurus)____



Mouse (Mus musculus)



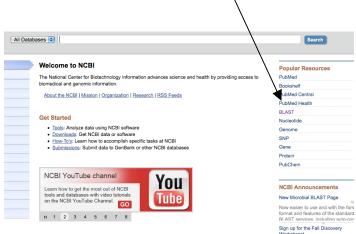
Dog (Canis lupus familiarus)



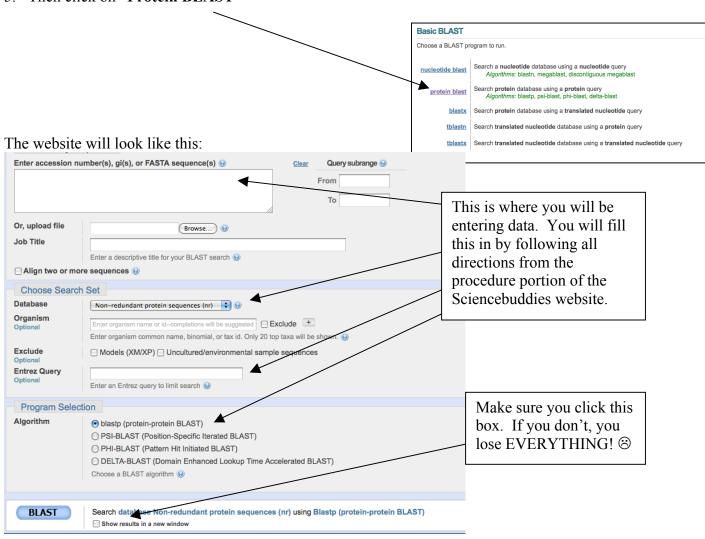
PREDICTION: Which organisms did you choose to be #1?			
Why?			
In the space below, explain why you ordered the remaining organisms the way you did. Why is your #2 ahead of your #3? Why is your #7 last? What are you basing your decisions on?!			

Protein BLAST Experiment Help Sheet.

- 1. Go to: http://www.sciencebuddies.org/science-fair-projects/project_ideas/Genom_p018.shtml
- 2. Scroll down to the **Procedures** section.
- 3. Open up another tab or window and go to this website: http://www.ncbi.nlm.nih.gov/
 [Do NOT close either window until you are done with everything!]
- 4. Once on the NCBI website, click on "BLAST" in the right column.



5. Then click on "Protein BLAST"



>Tyrannosaurus rex, collagen type I, alpha 1
- 17 annionated Tenny Contraged Type Type Type Type Type Type Type Type
GATGAPGIAGAPGFPGARGAPGPQGPSGAPGPK
GVQGPPGPQGPR
GSAGPPGATGFPGAAGR
GVVGLPGQR

copy the entire *T-rex* amino acid sequence! It should look like this:

7. Click the BLAST button on the NCBI website. This sometimes takes a couple of minutes. Once finished, use the data that is generated to fill out the following chart:

6. Look back at the Sciencebuddies website and continue with the procedure. During step 2, be careful to

Organism (common name)*	Max Score**	E-Value***	

^{*}If you are having trouble determining which species each organism is, go to the chart in the section titled "descriptions." For each row of the chart, click on the link in the first column of the chart labeled "accession." Scroll down to the "source organism." This gives you the Latin name and the common name of each organism.

^{**}Genes with the highest max score are the most closely related to the *T. rex* query sequence.

^{***}The E value is an estimate of the chance that the sequences are *not* related. The lower the E value, the more certain the sequences are related. (Remember: "e" is a scientific notation symbol that represents " $\times 10$ " raised to the power of the number that follows... for example, 4e-6 is the same as 4×10^{-6} , or 0.000004) (NCBI, 2008.)

^{8.} Which organism appears to be the most closely related to T-Rex? Does that support your hypothesis? Explain!

WIRED Reading Guide: How To Hatch a Dinosaur by Thomas Hayden Can be accessed from: http://www.wired.com/magazine/2011/09/ff_chickensaurus/

1.	Who is Jack Horner?
2.	What are his 4 crazy ideas about dinosaurs?
3.	What is the evidence he has that dinosaurs are related to birds? Did your BLAST experiment support his hypothesis?
4.	What is an atavism? Give one example in humans.
5.	List the 5 atavistic traits Horner is working on. On the back of this page, draw your interpretation of what a chicken would look like with these traits turned on.
6.	After reading this article, do you think Horner <i>should</i> or <i>should not</i> 'create' a dinosaur? List two pieces of evidence from the article to support your answer.
7.	The article mentions the wooly mammoth being closely related to elephants. Can you think of other modern day animals (or plants) that might be related to organisms that have gone extinct?