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 \((Homo \text{ sapiens})\) ____

Cow \((Bos \text{ taurus})\) ________

Salamander \((Cynops)\) __________

Mouse \((Mus \text{ musculus})\) ____

Chicken \((Gallus \text{ gallus})\) ___

Dog \((Canis \text{ lupus familiarus})\) _____

Rat \((Rattus \text{ norvegicus})\) __________
PREDICTION: Which organisms did you choose to be #1? _______________________

Why? ________________________________________________

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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?!

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Protein BLAST Experiment Help Sheet.

2. Scroll down to the Procedures section.
   [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”

The website will look like this:

This is where you will be entering data. You will fill this in by following all directions from the procedure portion of the Sciencebuddies website.

Make sure you click this box. If you don’t, you lose EVERYTHING! 😞
6. Look back at the Sciencebuddies website and continue with the procedure. During step 2, be careful to copy the entire T-rex amino acid sequence! It should look like this:

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>tyrannosaurus rex, collagen type I, alpha 1
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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:

<table>
<thead>
<tr>
<th>Organism (common name)*</th>
<th>Max Score**</th>
<th>E-Value***</th>
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*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 “×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!
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 should or should not ‘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?