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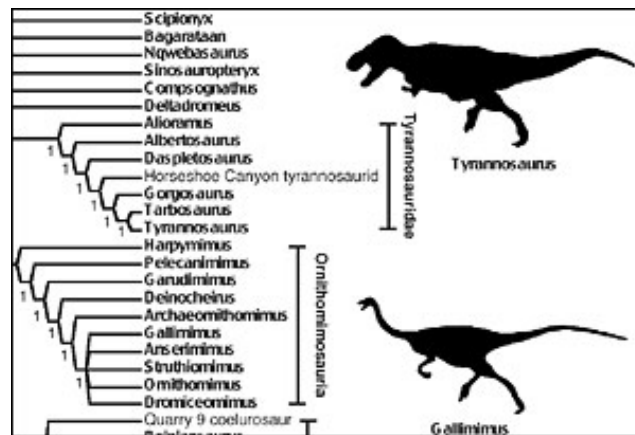
Read this article about the tree of life and answer the questions

## Dino [=dinosaur] family tree shows birds are related

By Dr David Whitehouse  
BBC News Online science editor

Scientists have produced the most detailed family tree of dinosaurs yet, showing how the great beasts were related to each other and how they evolved.

The researchers, from the University of Bristol, UK, took over 150 previously published evolutionary trees of dinosaurs and combined them into a new supertree of 277 dinosaur species.



Similar analysis is being done on other organisms

This new look at dinosaur evolution clearly shows that birds are descended from dinosaurs, a matter of much debate in recent years.

Bristol's Professor Mike Benton said: "It is not complete, but it is the most detailed and comprehensive single evolutionary tree ever produced for the dinosaurs, and indeed for almost any other group."

### 'Objective synopsis'

An evolutionary supertree is compiled from many "source" trees already published in the scientific literature.

Using a lot of computer time, the scientists combined the original evolutionary trees worked out for small families of dinosaurs to produce the "best fit" that allows them all to be combined into a single, big picture.

Bristol researcher Davide Pisani told BBC News Online: "Our tree is an objective synopsis of the status of our knowledge of dinosaurs.

"It is an ideal tool for future studies of dinosaur evolution."

The supertree method is not just being applied to dinosaurs but to plants and microbes as well. It is part of the Tree Of Life initiative to document all species current and extinct.

### **Something new**

Researchers look to the supertree to consolidate what they already understand about the more than 1,000 known species of dinosaurs.

But because it summarises what is already known, some doubt this method of analysis, while interesting, can produce anything new.

However, other scientists disagree, and are keen to point out that supertree analysis is helping to settle a long-running controversy: are birds descended from dinosaurs?

The supertree analysis says "yes". Birds are positioned very close to so-called dromaeosaurids like *Deinonychus* and the *Velociraptor*, made famous by the film Jurassic Park.

Professor Benton said: "We hope this supertree will represent a solid framework for future study of dinosaur evolution and will stimulate further studies towards the less well understood areas of dinosaur classification.

"And knowing that birds are descended from *Velociraptor* will make many look at our feathered friends rather differently from now on."

10 June, 2002

## Questions

1. Describe briefly the purpose (the use) of the tree of life (evolutionary tree)

2. Explain the concept of "common ancestor"

3. Build up the partial tree of life for those four species *A*, *B*, *C*, and *D*:

- *C* is a common ancestor of the rest of species
- *B* is a early mutation of *C*
- *A* is a late mutation of *C*
- *D* is a mutation of *A*

4. Explain the advantage of placing a harmful unknown bacteria into a tree of life

5. Describe what are the computers for in this case (the article)

6. Explain briefly the main discovery / hypothesis described in the article