

Comparison of Mammalian Skulls

Scientific Investigation

Fossils are one way to investigate common ancestry among species. In this investigation, you will compare illustrations of a prehistoric mammalian skull to two present day mammalian skulls and use the data to evaluate relationships.



Procedure:

In your lab journal, address the following investigation,

Step 1. Question:

Step 2. Relevance:

Step 3. Variables:

Independent variable (also known as the manipulated variable):

Dependent variable (also known as the responding variable):

Constants:

Step 4. Hypothesis

Is a hypothesis needed? If so, what is it?

How will the responding variable change when the manipulated variable changes?

Step 5. Materials:

Step 6. Safety Considerations:

Step 7. Procedures.

Sample Procedure

1. Using the Skull Reference Sheet, measure the boxes length and width to calculate the face area and cranial area (mm^2).
2. Is the cranial area is larger than face area. Answer YES or NO
3. Indicate whether a brow ridge is present or absent.
4. Indicate whether a sagittal crest is present or absent.
5. Are enlarged canine teeth present or absent?
6. Using the skull reference sheet, measure the jaw angle that is represented by the bold lines.
7. Using the Skull Reference Sheet, measure the cranial span represented by the bold square dots. Multiply this number by the cranial area to determine the cranial capacity (mm^3).



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Scientific Investigation, continued

Step 8. Data Collection.

Create data tables similar to the example table below in your lab journal and fill in during your investigation.

Characteristic	Gorilla	<i>Australopethicus africanus</i>	<i>Homo sapien</i>
Face area			
Cranial area			
Cranial area larger than face area			
Brow ridge			
Sagital crest			
Enlarged canine teeth			
Cranial capacity			
Jaw angle			

Step 9. Data Analysis

1. What are the similarities between the gorilla and *Australopethicus africanus*?
2. What are the similarities between the *Australopethicus africanus* and *Homo sapien*?

Step 10. Conclusion and scientific explanation.

Write a scientific explanation explaining how these skull fossils illustrate common ancestry.



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Rubric for writing a scientific explanation

Points Awarded	2	1	0
Claim	Not applicable.	Answers the question and is accurate based on data.	No claim or does not answer the question.
Evidence	Cites data and patterns within the data. Uses labels accurately.	Cites data from the data source, but not within the context of the prompt.	No evidence, or cites changes, but does not use data from data source.
Reasoning	Cites the scientifically accurate reason using correct vocabulary and connects this to the claim. Shows accurate understanding of the concept.	Cites a reason, but it is inaccurate or does not support the claim. Reasoning does not use scientific terminology or uses it inaccurately.	No reasoning or restates the claim, but offers no reasoning.
Rebuttal	Rebuttal provides reasons for different data or outliers in the data. Can also provide relevance to the real world or other uses for the findings.	Rebuttal is not connected to the data or is not accurate.	Does not offer a rebuttal.