Name ..... Class ..... Date .....

How to read an evolutionary tree

Specification reference:

- B6.4 Classification of living organisms
- WS 1.2

Aims

You will be learning how scientists use models. You will then learn how to use models called evolutionary trees to make predictions about how organisms are related.

Learning outcome

After completing this worksheet, you should be able to:

- use an evolutionary tree in an explanation.

Overview

In science a model is a tool that helps to explain something that is difficult to imagine. For example, it may be:

- Too small, for example, an atom
- Too large, for example, a solar system
- Too complicated, for example, the human circulatory system
- Something that is conceptual rather than an actual object, for example, how particles behave when they are heated (the kinetic model).

Scientists use models to solve problems, make predictions, and develop scientific explanations and understanding.

Models can be improved as new evidence is discovered. They also have their limitations; scientists are aware that they are not a perfect representation.

Context

Many models are used in biology.

The diagrams of human organs you have studied are models. They show the important features that you can use to explain how the organ works or solve problems associated with what happens when they go wrong.

Food webs model the interactions between organisms in an ecosystem. You can use a food web to predict what might happen if the population of an organism changes. The food webs you have used are simplified representations of what is really taking place; some of the interactions and organisms are not included to make the model easier to use.

Evolutionary trees are also models. They represent how organisms are related and are built using evidence from fossils and DNA. They are improved when scientists discover new evidence.

AQA Biology GCSE

B15.10 Student working scientifically

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You should be able to use models in explanations and predictions. You might also be asked to evaluate a model. “Evaluate” means to explain how useful it is, including its limitations.

Task

An evolutionary tree is a bit like a family tree.

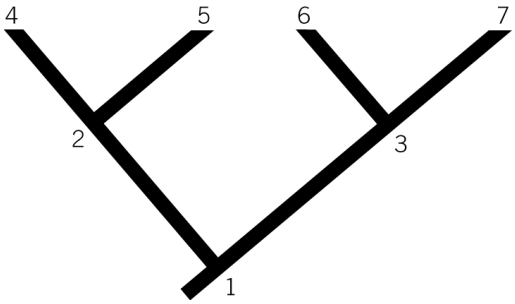
To help you understand what an evolutionary tree shows, place the names of the family on the correct place on the tree.

Rosie has a brother. His name is Tim.

Patrick is Rosie and Tim's father.

Patrick's father is called Robert. Robert also has a daughter called Sheila.

Sheila has two children, Cerys and Becky.



Then answer the questions below.

1 Who shares the most similar DNA with both Rosie and Tim?

2 Who is the common ancestor of all the people mentioned?

3 Which person is Becky most closely related to: Rosie, Tim, or Cerys?

Questions

1 **Figure 1** shows how modern elephants evolved.

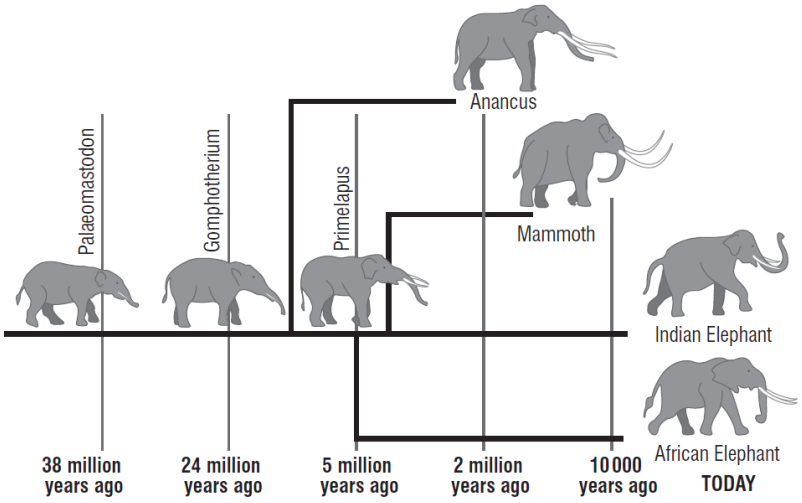


Figure 1

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a How many millions of years ago did *Palaeomastodon* first appear?

..... (*1 mark*)

b Name the common ancestor of Indian and African elephants.

..... (*1 mark*)

c State which elephants alive today is the closest relative of the mammoth.
Give a reason for your answer.

.....

..... (*2 marks*)