

Name: \_\_\_\_\_

Biogeography / Homologies  
DIY



**TERMINOLOGY & DEFINITIONS**

**Basic body plan:** Basic components and arrangement of organs or structure based on the grouping.

**Homology:** Describe two things that share a common evolutionary origin. E.g. human hand and flipper of a whale.

**Analogy:** Similarity due to common function but not due to having a common ancestor. E.g. bat's wings and bird's wings.

**Biogeography:** Geographical distribution of animals and plants over space and time.

**Biodiversity:** The diversity (number and variety of species) of plant and animal life within a region.

**Adaptive radiation:** Evolution from a common ancestor of different types of organisms each adapted to its environment

**Ratitites:** Group of flightless birds.

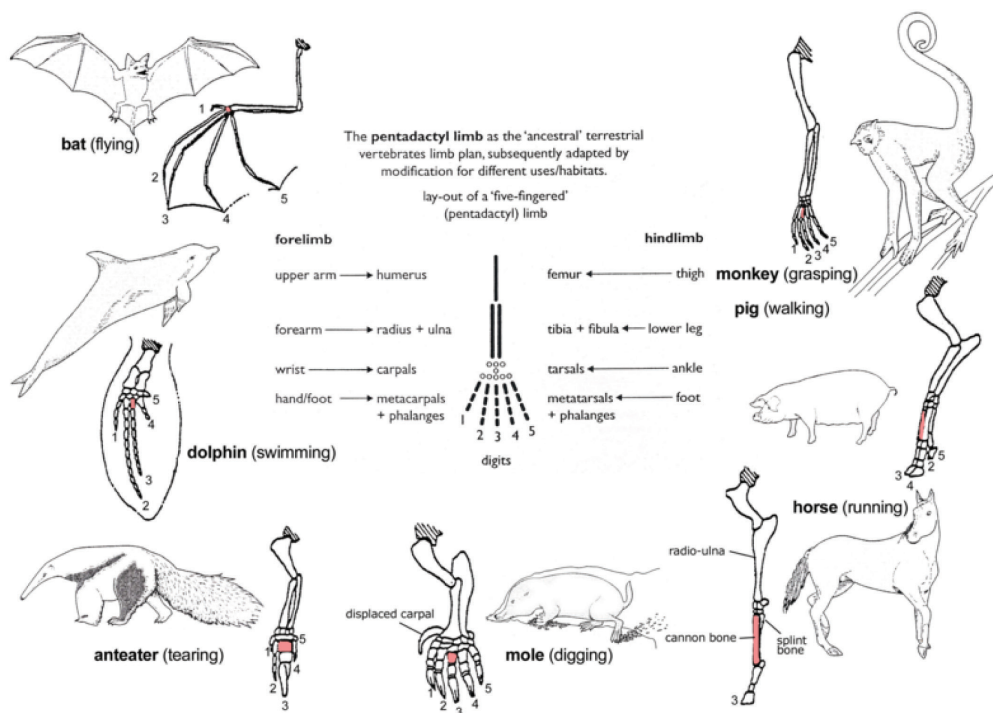
**Extinct:** Organisms are not found on the planet anymore.

**Extant:** Organisms are still found on the planet.

**Continental drift:** Movement of continents across the earth's surface through geological time.

**KEY CONCEPTS / DIAGRAM**

The diagram below summarises the structure of the pentadactyl limb as well as the adaptations of it in different organisms.



**Homologous structures**

The limbs of different organisms illustrated above are examples of homologous structures.

These structures are similar in their fundamental structure as well as their position and development. They are different in superficial structure and may not necessarily perform the same function.

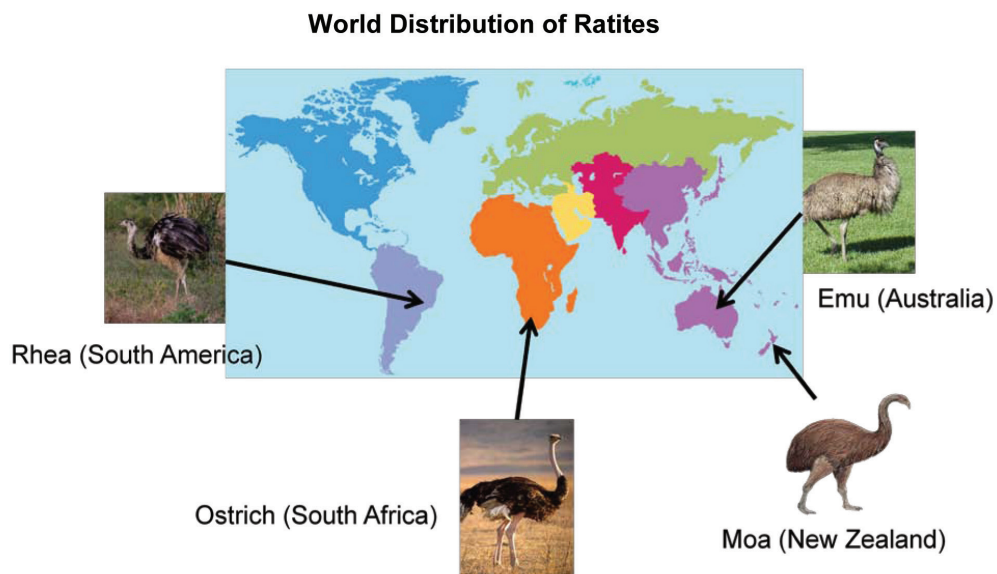
Homologous structures are important because they indicate evolutionary link between groups. These groups diverge from common ancestor through adaptive radiation.

***Flightless birds***

These birds belong to the family of birds called ratites. Included is the largest bird ever on earth, the moa which lived in New Zealand. The moa is extinct. There are 3 other extant species on earth, ostriches in South Africa, emu in Australia and the rhea in South America.

All ratites share the following characteristics:

- Flat sternum
- Small wings
- Large bodies
- Heavy leg bones
- Strong feet
- No opposable first toe



***Question 1***

1.1 What do we call the geographical distribution of animals and plants over space and time?

- A Evolution.
- B Biogeography
- C Continental drift
- D Homology

1.2 Which one of the following is not an example of a pentadactyl limb?

- A Flipper of a seal
- B Wing of a bat
- C Wing of an insect
- D Leg of a horse

1.3 Which one of the following is NOT characteristic of ratites?

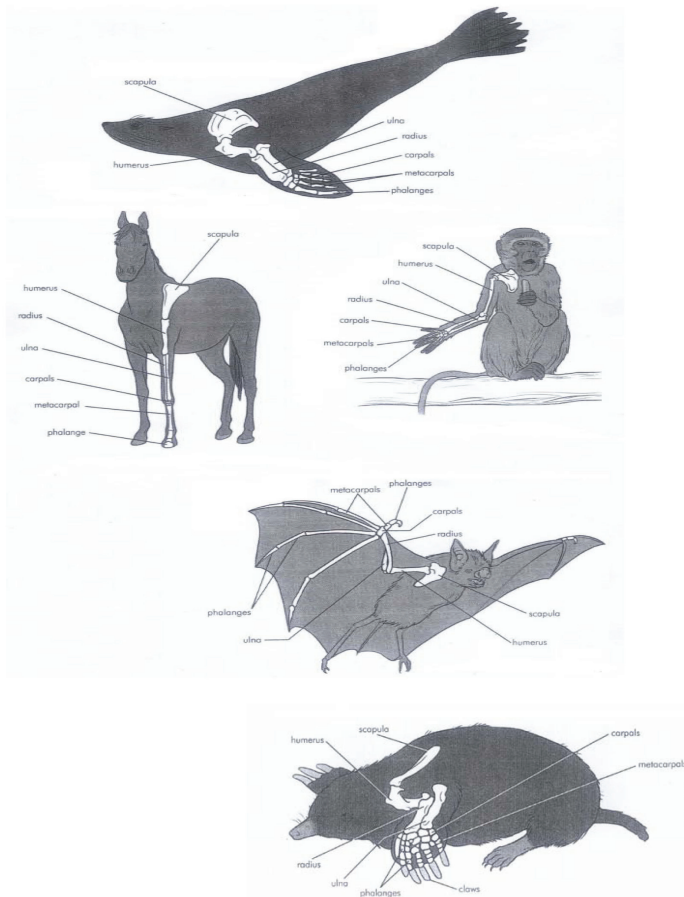
- A Flat sternum
- B Large wings
- C Large bodies
- D Heavy leg bones

1.4 Which one of the following flightless birds has become extinct?

- A Moa
- B Rhea
- C Emu
- D Ostrich

### Question 2

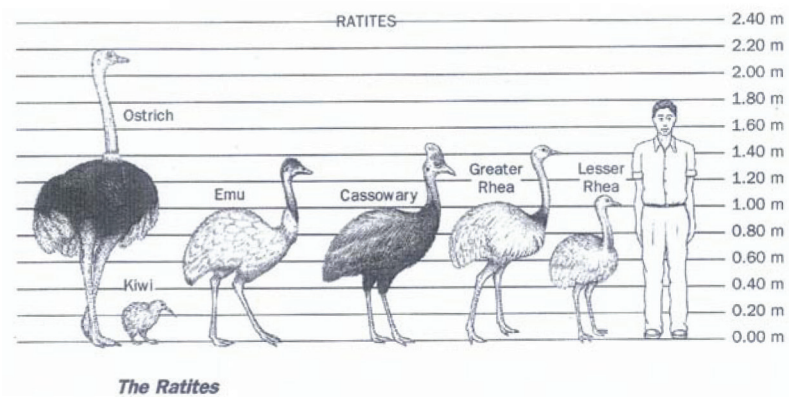
The forelimbs of the mammals below have different functions, even though they are built on the same basic body plan. Study the diagrams and answer the questions.



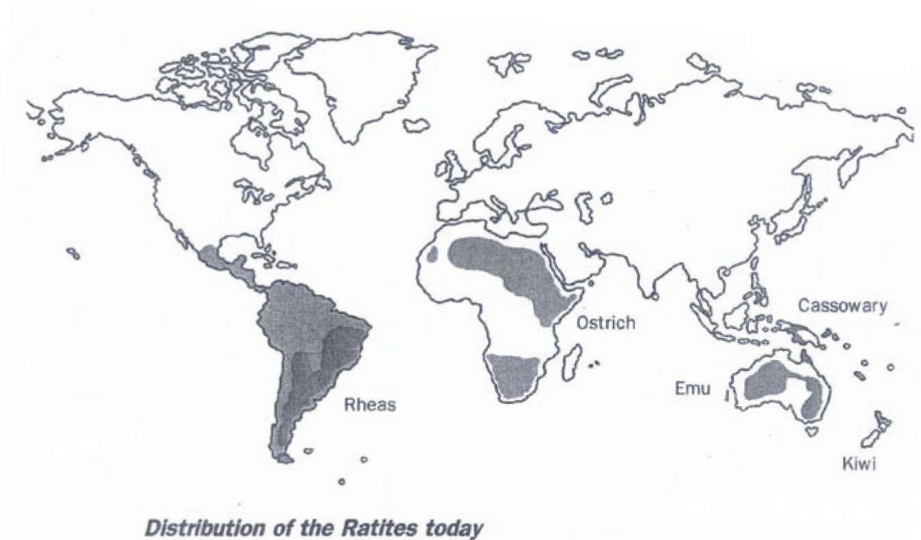
- 2.1 Explain how Darwin used these similarities of the basic body plan of the forelimbs of the different mammals to conclude that they had all evolved from a common ancestor.
- 2.2 The forelimbs became modified for different functions. What are the forelimbs now used for in the mole, horse, bat, monkey and seal respectively?
- 2.3. What do we call structures in different species that are similar to each other because they evolved from a common ancestor?

### Question 3

Ratites are flightless birds and although they can be found widely distributed across the globe, scientists believe that they evolved from a common ancestor as they resemble each other.



- 3.1 List THREE ways in which ratites differ from birds which can fly.
- 3.2 If the ratites did indeed evolve from a common ancestor, explain how it is possible for them to be as widely distributed as the map below indicates.



- 3.3 According to the map, where is the smallest ratite found?