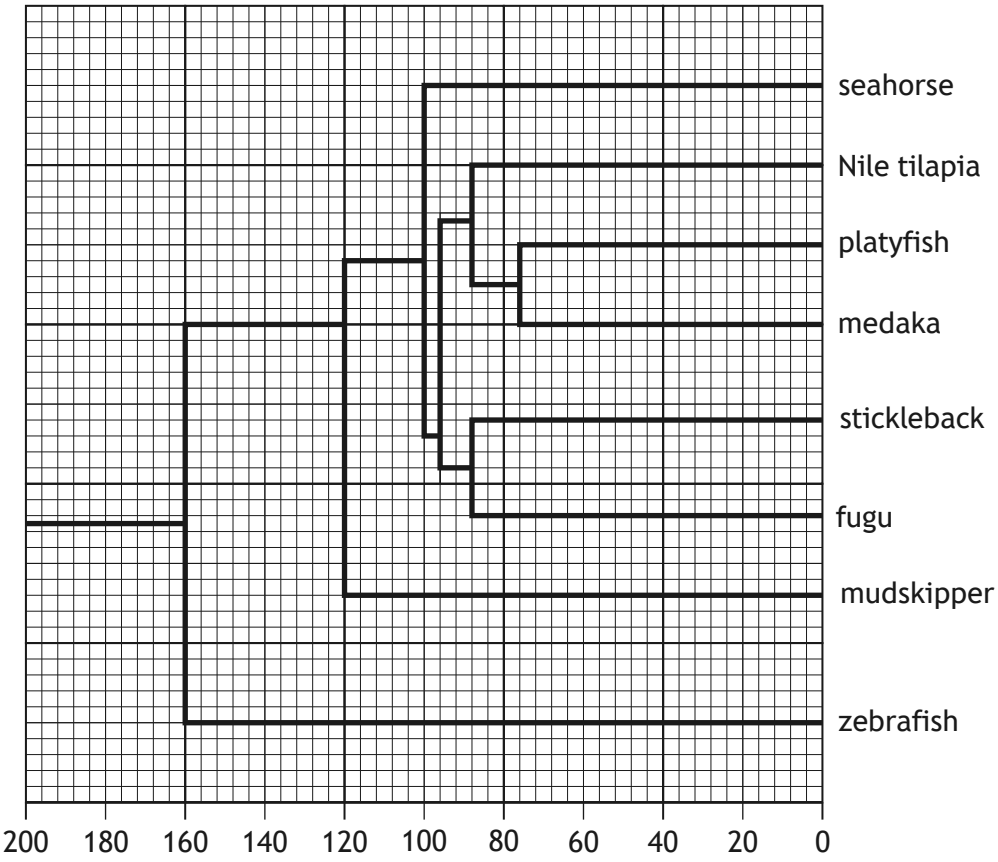
4. The phylogenetic tree shows the evolutionary relatedness of several fish species.



(a) (i) State how many millions of years ago the last common ancestor of Nile tilapia and medaka existed. **1**

_____

(ii) State how many species evolved from a common ancestor 100 million years ago. **1**

_____

(iii) Name the species that is most distantly related to the mudskipper. **1**

_____

4. (continued)

(b) Many fish species have fins on the underside of their bodies called pelvic fins.

Nile tilapia, zebrafish and Atlantic cod have pelvic fins, but seahorses do not.

A series of genes, A – F, is involved in fin development in fish. The genes present and their locations on a chromosome are shown in the diagram.

Nile tilapia	A	B	C	D	E	F
zebrafish	A	B	C	D	E	F
seahorse	A	B	D	E	F	
Atlantic cod	A	E	D	C	B	F

(i) Use the information given to identify the gene responsible for the development of the pelvic fin. **1**

_____

(ii) Name the type of mutation that resulted in the gene sequence found in the Atlantic cod. **1**

_____

[Turn over