AP BIOLOGY • EXERCISE SHEET

7.6 Evidence of Evolution

Name: _____ Class: _____ Date: _____ **Total: 9 marks**

Objective

Build the skills to answer exam questions on the **evidence of evolution**.

You must be able to:

- describe evidence from **fossils** 化石, **homologous structures** 同源结构, and **molecular** data
- distinguish homologous from **analogous** 同功 structures
- explain how each supports common descent

1 Worked examples

Study these first. Each one shows the method for a question type used later —follow the steps and you can do the Practice and Exam-style questions yourself.

■ Fossil evidence

Fossils show that life has changed over time, and reveal **transitional forms** linking older and newer groups.

■ Homologous structures

Homologous structures have the **same basic plan** but different functions (e.g. the bones of a human arm, whale flipper, and bat wing). They suggest a **common ancestor**.

■ Analogous structures

Analogous structures have the **same function** but **different** underlying structure (e.g. bird wing vs insect wing). They arise from **convergent evolution**, not close common ancestry.

■ Molecular evidence

Similar **DNA and protein sequences** between species indicate how closely related they are —the more similar, the more recent the common ancestor.

2 Practice

Now apply the methods above.

2.1 What do homologous structures suggest? [1]

2.2 Give one type of molecular evidence for evolution. [1]

2.3 What are transitional fossils? [1]

3 Exam-style questions

3.1 The similar bone arrangement in a human arm and a whale flipper is an example of [1]

- **A** analogous structures
- **B** homologous structures
- **C** vestigial organs
- **D** convergent evolution

3.2 A bird's wing and an insect's wing both allow flight but have very different structures.

(a) State whether they are homologous or analogous. [1]

(b) Explain what this tells you about their evolutionary relationship. [2]

3.3 Explain how comparing DNA sequences can show how closely two species are related. [2]

4 Go further

You are now ready for the real exam questions on this subtopic:

- work through the **7.6 Evidence of Evolution** lesson on the **Learn** page;
- read the **Evidence of Evolution** section of the AP Biology handout on the **Know** page.

Solutions

2.1 A common ancestor (shared ancestry).

2.2 Similar DNA or protein sequences between species.

2.3 Fossils showing features intermediate between older and newer groups.

3.1 B —homologous structures.

3.2 (a) Analogous. (b) They evolved independently (convergent evolution) for the same function, so they do **not** indicate a close common ancestor.

3.3 The more similar two species' DNA sequences are, the fewer changes have accumulated since they diverged, so the more recently they shared a common ancestor.