AP BIOLOGY • EXERCISE SHEET

7.7 Common Ancestry

Name: _____ Class: _____ Date: _____ **Total: 10 marks**

Objective

Build the skills to answer exam questions on **common ancestry**.

You must be able to:

- explain evidence for a **common ancestor** 共同祖先 of all life
- cite shared features (DNA, ribosomes, ATP, the genetic code)
- interpret shared traits as descent from a common ancestor

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.

■ Shared core features

All living things share fundamental features, pointing to a **common ancestor**:

- **DNA/RNA** as genetic material;
- the **same genetic code** (codons);
- **ribosomes** that make proteins;
- **ATP** as energy currency.

■ Why this is evidence

It would be a huge coincidence for unrelated origins to share the **same code** and machinery. The simplest explanation is that all life **descended** from a shared ancestor that already had them.

■ Nested similarities

More closely related groups share **more** features (and more similar DNA), forming a nested pattern that maps onto a tree of descent.

■ A worked reasoning

Because a bacterium and a human both use the same genetic code and ribosomes, they most likely inherited these from a distant common ancestor.

2 Practice

Now apply the methods above.

2.1 Name two features shared by all living things. [2]

2.2 What does sharing the same genetic code suggest? [1]

2.3 Do more closely related species share more or fewer features? [1]

3 Exam-style questions

3.1 The universal genetic code is evidence that all organisms [1]

- **A** evolved separately
- **B** share a common ancestor
- **C** are identical
- **D** cannot be related

3.2 A student notes that bacteria and humans both use ATP and ribosomes.

(a) Explain how this supports common ancestry. [2]

(b) State one other shared feature. [1]

3.3 Explain why the pattern of ”more related organisms share more features” fits descent from common ancestors. [2]

4 Go further

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

- work through the **7.7 Common Ancestry** lesson on the **Learn** page;
- read the **Common Ancestry** section of the AP Biology handout on the **Know** page.

Solutions

2.1 Any two: DNA/RNA, the same genetic code, ribosomes, ATP.

2.2 That all organisms share a common ancestor.

2.3 More features.

3.1 B —share a common ancestor.

3.2 (a) Both features are complex and identical in function; the simplest explanation is that both inherited them from a shared ancestor rather than evolving them independently. (b) The same genetic code (or DNA as genetic material).

3.3 Closely related species diverged more recently, so they have had less time to accumulate differences and retain more shared inherited features —exactly what a branching tree of descent predicts.