

LAB 5: FOSSIL PRESERVATION AND DESCRIPTION

Note: For this lab, sample images are available in the online Lab Manual. This worksheet is intended to help you organize your answers only. Refer to the Lab Manual for important additional details and context to answer the questions. This worksheet includes sample handling guidelines for in-person labs.

EXERCISE 5.1. (SAMPLE SET 1): Unaltered and Re-Formed Preservation

Examine the specimens in Sample Set 1 and answer questions (a) to (r) below.

Unaltered Preservation

A. Sample 121-21: Insects in Amber - This sample can be picked up but please treat it with care.

These insects got stuck in soft tree sap and over time, the tree sap has hardened to amber. (No question for marks.)

Permineralization

B. Sample FXA17E: Bone Cross-Section - This sample can be picked up but please treat it with care.

Look first at the unpolished side of the sample. Observe the dense material on the outer edges of the sample that originally gave the bone its strength. Now find the porous parts.

- a. What used to occupy the spaces in the porous parts of Sample FXA17E?

Replacement

C. Sample 121-22: Fossilized Wood - These samples can be picked up but please treat them with care.

- b. Part of the fossilized wood sample includes the bark of the tree. Find the bark on the outside of the tree. Aside from being on the outside of the tree, how else can the bark be distinguished?
- c. Find the layering within the fossil. What does the layering represent?
- d. Compare the petrified wood to non-fossilized wood. How well preserved is the petrified wood? Can you see any internal structures, cells, etc.? Can you easily identify it as wood? Explain your answer.

D. Sample L22: Pyrite Replacement of Shells - this sample is very fragile, please do not handle it or touch it.

- e. Give a full sedimentary description of this rock as you learned in Lab 1. *NOTE: This rock fizzes vigorously in contact with acid, but **do not** conduct an acid test yourself.*

- f. Name one sedimentary environment where you might find a rock like this.

- g. What common name would you give to these fossils, based on modern animals they resemble?

Recrystallization

E. Sample GCS: Crinoids in Carbonate - This sample can be picked up, but please handle it with care.

- h. Determine which parts are rock and which parts are fossil. How did you distinguish between the two?

- i. Both the rock and the fossils will fizz with acid. Describe and name this sedimentary rock.

- j. Based on the nature of the fossils in the pyrite sample (**L22** previously) and this sample, which do you think was formed in a higher energy environment? Explain your answer.

Carbonization

F. Sample J1 Graptolites - This sample is very fragile, please do not handle it or touch it.

- k. Is this rock fissile?

- l. Describe this sedimentary rock.

- m. What type of depositional environment did this rock likely form in? (Note the grain size.)

- n. Use two or three common words to describe an individual fossil.

- o. Is the preservation complete and unaltered? Explain your answer.

G. Sample F32: Assorted Plant Fossils - This sample is very fragile, please do not handle it or touch it.

- p. Name this clastic sedimentary rock.

- q. Is this considered high, moderate or low maturity for a clastic rock?

- r. Explain how you might determine whether this sample formed in a terrestrial/aquatic/marine environment, and the energy (low, high) of that environment.

EXERCISE 5.2. (SAMPLE SET 2): Indirect Preservation

Examine the specimens in Sample Set 2 and answer questions (a) to (l) below.

Trace Fossils

A. Sample SC11GA: Worm Burrows in Cross-Section - This sample can be picked up.

- a. What sedimentary structures are visible in this sample?

- b. Based on the location of the burrows, did the darker sediments deposit on top of the grey sediments or the opposite? Explain your answer.

- c. Looking at a single sequence of light to dark sediments, do you see fining or coarsening upwards?

Molds, Casts and Imprints

B. 121-23: Shell Molds and Casts - This sample can be picked up, but please treat it with care.

This sample shows two ways that a mold can be filled. (No question for marks.)

C. SB2J: Shell Molds and Casts - This sample can be picked up, but please treat it with care.

This sample is a mixture of molds and casts of a shelled organism.

- d. What do we call the indentations? What do we call the protrusions? (Casts or molds) The sample has indentations and protrusions. Which (indentation or protrusion) is a cast? Which is a mold?

- e. What does the colour of this rock tell you about the depositional environment?

D. Sample LC1 – This sample can be picked up, but please treat it with care.

- f. Describe the grain size of the rock in this sample

- g. Is the sediment well-, moderately- or poorly-sorted?

- h. What does the dark colour combined with (f) and (g) tell you about the depositional environment?

- i. The imprint on this sample is from the bark of a tree called *Lepidodendron*. Is this consistent with your answer from (h) above? Why or why not?

E. Sample FXA25 – This sample is very fragile, please do not handle it.

- j. What does this organism look like to you (mammal, plant, shell, insect)?
- k. Without touching the sample, describe the clastic sedimentary rock.
- l. What *two* types of preservation are evident in this fossil?

F. 121-25 Coprolite – This sample can be picked up, but please treat it with care.

(No questions for marks.)

EXERCISE 5.3. (SAMPLE SET 3): Life Habit

Examine the specimens in Sample Set 3 and answer questions (a) to (d) below.

A. Sample FL1: Corals – You may handle these small specimens, but please handle them with care.

- a. What type of mineral do these organisms use in their skeletal framework?

B. FL2: *Favosites* Coral – Please do not touch the surface of this sample.

- b. What type of mineral makes up the skeletal framework?
- c. What benefit(s) do individuals gain by being part of a colony?

C. FDA1. Rugose Coral – These samples can be picked up, but please treat them with care.

- d. How is the life habit of this sample different from the previous samples?

EXERCISE 5.4. (SAMPLE SET 4): Symmetry

Examine the specimens in Sample Set 3 and answer questions (a) to (f) below.

A. Sample 10 (tan square block sample): Trilobite model - You may handle this cast.

- a. What kind of symmetry does this cast of a trilobite display?
- b. Where does the plane of symmetry run?

B. Sample 121-24: Trilobite - This sample can be picked up, but please treat it with care.
(No questions for marks.)**C. Sample 9: Shell - This sample can be picked up, but please treat it with care.**

- c. Is Sample 9 bilaterally symmetrical from side to side, or top to bottom?

D. Sample 30: Clam Shells - These samples can be picked up, but please treat them with care.

- d. Is Sample 30 bilaterally symmetrical from side to side, or top to bottom?

E. Sample FDA10 & 10 - These samples can be picked up, but please treat them with care.

- e. What type of symmetry do these samples exhibit?

F. Sample 8: Blastoid - This sample can be picked up, but please treat it with care.

- f. This specimen also displays symmetry that radiates out from the center. What differentiates this type of symmetry from the one above?

EXERCISE 5.5 (SAMPLE SET 5): Coiling and Chambering

Examine the specimens in Sample Set 3 and answer questions (a) to (g) below.

A. Sample 121-38: Cephalopod (Ammonite) - Whole**B. Sample 121-51: Cephalopod (Ammonite) - Cut in half**

These samples can be picked up, but please treat them with care.

- a. What form of coiling does this organism display?
- b. What kind of symmetry does Sample 121-38 exhibit?
- c. Examine Sample 121-51. Notice the individual chambers. The ammonite animal lived inside the last chamber (it has broken off in this specimen). As the animal grew, it added a larger chambers. What were the old chambers used for?
- d. In Sample 121-51, what method of preservation is helping to preserve the inner parts of the coil?

C. Sample 1: Gastropod (Snail) - This sample can be picked up, but please treat it with care.

- e. What kind of coiling is this?
- f. You cannot see it, but the interior is a continuous and unchambered spiral from end to end. If the same animal was living in a straight shell, which would be stronger and why?

D. Sample 121-3: Straight Cephalopod (Nautiloid) – Please do not handle this specimen.

- g. This specimen is not a coiling shell, but notice that it has chambers. What purpose could chambering have for long straight shells?