

LAB 7: FOSSILS OF THE PALEOZOIC & PALEOECOLOGY

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.

PALEOECOLOGY

- a. Give the terms used for the following life habits:
 - i. a free-swimming organism:
 - ii. a floating organism:
 - iii. a burrowing organism:
 - iv. an animal organism that lives attached to the sea floor:
- b. Index (or guide) fossils are used for time-stratigraphic correlation (see Lab 4). Use your class notes from lecture (or the textbook or the internet) to list the **four** main characteristics of a good index fossil.
- c. What one habit would increase the probability that an organism could be used as an index fossil?
- d. Why are most benthic organisms not useful as index fossils?

FOSSILS OF THE PALEOZOIC: PHYLUM CNIDARIA (THE CORALS)

- a. From your general knowledge, what zone do modern corals live in—photic, bathyal, or abyssal?

- b. Describe their habit using the terms from Figure 7.2.

A. Sample 3: Solitary Rugose Corals- These samples can be picked up but please treat them with care.

- c. Examine the samples from the top and note the radial symmetry of the dividers. Now look at the sample from the side (the view in Slide 3 is a good one) and find the growth rings that represent new parts added from year to year. What do these growth rings tell you about the climate and/or environment of the Paleozoic? *Hint: Think about where corals live today in terms of climate and what conditions within that environment would make for a happy coral.*

B. Sample D11: Colonial Rugose Coral- This sample can be picked up but please treat it with care.

- d. What mineral is the skeleton of this coral constructed with?
- e. Sample D11 is from Phylum Cnidaria, Class Anthozoa, and Order Scleractinia. It has been tentatively identified as *Acrocyathus floriformis*. What is the species-level name of Sample D11?

C. Sample D12 *Favosites* Tabulate Coral - This sample can be picked up but please treat it with care.

No questions for marks.

D. Samples D15 & D16 *Halysites* Tabulate Coral- These samples can be picked up but please treat them with care.

Samples D15 and D16 have been preserved differently.

- f. Which sample has been preserved by permineralization? (For the permineralized sample, the original fossil material is present and infilled by new material.)
- g. Which sample has been preserved by recrystallization? (Note that the sample has not been fully recrystallized.)

E. Sample FL1: Modern Scleractinian Corals- These samples can be picked up but please treat them with care.

- h. What type of symmetry does this sample have? (Focus on the cups.)

- i. What type of preservation is displayed in this sample?

FOSSILS OF THE PALEOZOIC: PHYLUM BRYOZOA (THE BRYOZOANS)

- a. Describe the habit of bryozoans using terms from Figure 7.2.

Sample 12: Branching Bryozoa - These samples can be picked up but please treat them with care.

- b. If you are a suspension feeder—sweeping up food from the water—would it be better to live in very still water or moderately moving water? Why?

- c. The fossils we have are mostly broken pieces. What might this tell you about the energy of the environment that these frameworks eventually ended up in before they were preserved?

- d. Referring to Figure 7.4, what environment ranges do the Bryozoa occupy?

- e. What type of preservation is displayed in these samples? Explain your reasoning.

B. Sample 9: Brachiopod- These samples can be picked up but please treat them with care.

- g. How was Sample 9 preserved? Explain your reasoning.

C. Sample 15: Brachiopod- These samples can be picked up but please treat them with care.

- h. Compare all three brachiopod samples (13, 9, and 15). Which most likely lived in the lowest-energy environment? Explain your reasoning by drawing the sample you chose and labelling any features important for understanding your answer. Draw which ever view of the sample works best to make your argument.

FOSSILS OF THE PALEOZOIC: PHYLUM MOLLUSCA (THE BIVALVES & GASTROPODS)***BIVALVES***

- a. What energy would epifaunal bivalves experience in comparison to infaunal bivalves?
- b. What effect might this have on shell characteristics of the two life habits?

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

- c. If you have access to Sample 30, draw a simple sketch of the sample from (1) the front, (2) the side and (3) the top, and indicate the plane of symmetry on your sketches. If you do not have access to the physical sample to view from all sides, use the link in the Lab Manual to view a 3D model of a clam shell. Note: The clam in this model is animated. Click the pause button on the bottom left just below the model (it's difficult to spot) to make it sit still for a portrait.

B. Sample FFA18: Large Bivalve Shell - This sample can be picked up but please treat it with care.

- d. Identify the growth rings on the shell. What could these rings tell us about the environment in which this animal lived? Think about the environmental conditions that would make a clam happy versus what would stress the animal.
- e. Describe the sedimentary rock which formed inside the shell. (See the last slide for a close-up view, or use a hand lens if you have access to the physical sample).
- f. If the shell weathered away and this brown sedimentary material was left behind, what kind of fossil would this be?

- g. How does this sample's symmetry differ from that of Samples 13, 9, and 15?

GASTROPODS

- h. In what environmental range do gastropods live?

C. Sample 1: Modern Gastropod Shells- These samples can be picked up but please treat them with care.

- i. What type of preservation is displayed in Sample 1? Explain your reasoning.

D. Sample FL3: Pleistocene Gastropod Shells (within the last 1.8 MY) - These samples can be picked up but please treat them with care.

- j. What type of coiling do these samples demonstrate?
- k. Parts of the outer shells of Sample FL3 have been eroded away and the infilled sediment is visible. Are these shells chambered?

E. Sample 21: Gastropod Shell - This sample can be picked up but please treat it with care.

- l. Describe the shell characteristics of Sample 21, then look back at the three brachiopods samples (Samples 13, 9, and 15). Based on shell characteristics, do you think this gastropod lived in a high or low energy environment? Explain your reasoning.