

Fossil Cleaning and Preparation

Fossil preparation begins in the field:

Loose pieces of a fossil should be immobilized, if at all possible with glue or a plaster cast, or collected in separate mapped and labeled packages. Use foil for the smaller, more delicate pieces and newspaper for larger ones.

Any glues used out in the field should be reversible and compatible with those used in the lab.

Taking a photo or making a drawing before removal of any pieces of the fossil will be a great help in later reconstruction.

Methods of Matrix Removal:

Mechanical and chemical processes are used for matrix removal only. Do no harm to the fossil!

Always practice any technique with less important fossils first!

1. Washing with soap and water,

Always test a small sample first, as water can completely destroy some fossils. This may be all the preparation that some fossils will need.

Note: Never rinse the dirt and clay from your fossils down the sink drain, as these can turn to cement in your drain pipes! Always wash outside or over a bucket that you can then empty outside. (Nancy knows from experience)

2. Scrubbing with a soft bristle brush,

Using a tooth brush or small scrub brush is effective in removing dirt, algae and other surface deposits. As always, be sure that this is removing only the unwanted material and not any of the fossil itself.

3. Removing excess matrix with hand tools,

Hand tools that are frequently used to remove matrix are, hammers and chisels, dental picks, x-acto knives, scribes and rotary tools like a Dremel which include saws and grinders. Decrease tool size as you work closer to the fossil itself and try to avoid touching the fossil with these tools. ** I use a brush to remove loosened matrix as I'm working.

4. Removing matrix with percussion and air-brasive tools,

Pneumatic percussion tools are extremely useful for fine matrix removal. There are hand held trigger models for removing gross quantities of matrix and small pencil like ones for more delicate work.

Using air-brasive tools requires the use of a vacuum chamber and dust collection system. Make sure that the abrasive used is softer than the fossil. Sodium bicarbonate (hardness 1.5) is frequently used.

5. Chemical removal of matrix,

Vinegar (acetic acid) can be used to dissolve carbonates which are a major component of sedimentary rock. The calcium phosphates making up vertebrate fossils are nearly insoluble in this acid, so an acid bath can be used to remove matrix from them. Make an acid bath of 10% glacial acetic acid and water. Adding bone meal will help complete the insolubility. Cover any matrix that you wish to keep or any exposed fossil material with PVA first before soaking. This procedure may take several days and periodic brushing away of softened matrix is recommended. Wear rubber gloves and coat any exposed fossil material with PVA as it appears.

Always test these methods on non-important fossils first!!

Methods for Repairing and Preserving:

1. Gluing broken pieces,

Water soluble glues like Elmers can be used to glue pieces of a broken fossil together. This glue dries clear and can be easily diluted with water if different consistencies are required. Placing the glued specimen on a piece of plastic like a coffee can lid insures that the fossil can be moved once the glue is dry. Also, modeling clay works well as a rest on which to place the fossil while the glue is drying. This is especially useful if the fossil doesn't sit flat.

Cyanoacrylate glues, like Paleobond, are also very versatile and important in the preservation of fossils. They provide some of the strongest bonds of any glue. Paleobond comes in a variety of viscosities from a gel to a liquid and can be used to penetrate cracks and other porous places that need gluing.

Two other very useful consolidates are Polyvinyl acetate (PVA) and Polyvinyl Butyral (PVB, Butvar). These come as spheres or beads and are then dissolved in acetone. They can be used thick or thinned to various consistencies similar to Paleobond for filling cracks and sealing surfaces. They are also extremely useful in preserving the very small fossils where just a drop of this glue applied with an eyedropper is all that is needed.

2. Surface sealing,

Water soluble glues (Elmers) can be diluted to a 50% solution with water and applied as a surface coat to a fossil with a fine bristle brush. Several coats may be applied, but to keep the coat clear and not looking milky, be sure that you are using a dilute mixture.

PVA or Butvar mixtures that have been diluted with acetone to about the consistency of water make excellent top coats for fossils. Multiple coats may be applied where necessary.

Another product that can be used as a topcoat, especially for delicate plant fossils where brushing on a topcoat isn't applicable, is an acrylic fixative by Krylon. This can be found in most craft stores where art supplies are sold or in the paint department at most hardware stores. This also works well for fossils that will be repeatedly handled.

Future Floor Polish is another acrylic based product that can be used as a top coat for shell material when mixed 50/50 with water. This is reversible with ammonia. (from the Coon Creek Research Center)

Note: any fossil showing marcasite invasions should be preserved with something not diluted with water. (Roger found that out)