ACID PREPARATION WORKFLOW

PICKING A SPECIMEN

Acid Preparation works best on fossil concretions. Choosing the right specimen will ensure that acid preparation is the best method for your intended work.

MECHANICAL PREP

Most specimens will require a combination of mechanical preparation techniques in addition to acid prep.

PROTECTING THE FOSSIL

The acid will eat away at matrix and fossil indiscriminately. It is important to protect your fossil before it goes into your acid.

PREPARING THE ACID

This section will discuss the steps of ensuring the resources are ready for use.

ACID PREPARATION

How to utilize the acid solution to remove matrix from your fossil.

By Ben Rotenberg, Master's of Arts in Museology 2025

PICKING A SPECIMEN

HOW TO FIND THE RIGHT SPECIMEN FOR ACID PREPARATION

There is a good chance that appropriate specimens have already been pulled from the collections and are ready to begin the acid preparation journey. Check the prep lab for a drawer labeled ACID PREPARATION. If there are no concretions available, talk to the Prep Lab Manager or the Collections Manager.

Examples of some fossil concretions from the PNW.

Acid preparation works best on fossil concretions from marine sediments. These come from all along the coastline here in the Pacific Northwest. Some of the formations known for these fossil concretions are the Pysht, the Blakeley and the Astoria formations.

MECHANICAL PREP

FINDING THAT PERFECT BALANCE OF ACID AND MECHANICAL WILL MAKE YOUR WORK FLY BY

Acid preparation is not a miracle cure. All work done in the acid lab will need to be supplemented by mechanical preparation. This is best done using large pneumatic tools such as the CP 9361. Using these large pneumatic tools will help you to remove the excess bulk matrix, leaving just thin layers of matrix on the bone. Using this technique will let your acid work more efficiently.

A large concretion with prep marks from a pneumatic air scribe,

SAFETY ALERT: Pneumatic tools can be dangerous to work with for long periods of time. Limit your usage to 2 hours a day, taking breaks every 20 minutes, to ensure safety and minimize harm.

Collections Alert: Make sure to keep specimen information, such as tags and documents with the appropriate specimen.

PROTECTING THE FOSSIL

KEEP ACID FROM EATING AWAY AT YOUR SPECIMEN

Acetic acid will eat away at matrix and bone alike, which is why it is very important that the necessary steps are taken to protect your fossil from its acid bath. This is best done using the same adhesives and consolidants that we use to stabilize our fossils.

Mixing 10% paraloid B-72 in acetone with a 30% solution, and then painting this solution onto the exposed fossil creates a protective barrier between your fossil and the acid.

Paraloid B-72 diluted in acetone is the best way of protecting your fossil from the acid. Using a paint brush, coat any and all exposed bone in several layers of Paraloid B-72. A 10% solution of paraloid will achieve the perfect coating. Repeat this process several times, adding multiple layers of Paraloid to your exposed fossil. This protective shell will keep your bone safe from the acid. This step must be repeated before every acid bath. To remove this coating, all you need to do is add acetone.

DON YOUR PPE

SETTING UP THE WET LAB FOR SUCCESS

Safety Alert: Before removing any chemicals - be sure to put on the appropriate PPE.

Nitrile Gloves - first put on a pair of nitrile gloves found in the PPE Cupboard

Lab Coat - Put on a black lab coat from the Acid Prep Cupboard - make sure to button it up all the way so that no skin is showing.

Acid Prep Apron: Place this apron on over your black acid prep lab coat as another layer of defense against acid.

Safety Goggles - Safety goggles can be found in the PPE Cupboard - make sure they fit snugly.

Neoprene Gloves - These gloves should be worn over your nitrile gloves when handling the acid - make sure that they go up over the sleeve of your lab coat.

CHECK THE FUME HOOD

STAY FUME FREE!

Before moving forward, make sure you have completed all required EH&S Trainings. If you have not completed the trainings, talk to the prep lab manager about recieving a UW NetID.

Check the flow of the fume hood by looking at the screen on the right hand side of the hood. The fume hood can be lifted or closed to regulate flow.

SAFETY ALERT: If the fume hood is not working, do not proceed. Make sure the hood is closed and find the lab manager or collections manager.

Next, make sure the fume hood is clear, or that there is enough space in the Fume hood to complete your work.

LOCATE YOUR ACID

FINDING THE APPROPRIATE ACID SOLUTION

Generally, there will be acid mixed up and ready to go inside of the fume hood. Check the fume hood and cabinet for a large vat or small tubs of mixed acid solution labeled with the solution percentage. They should look like the below images.

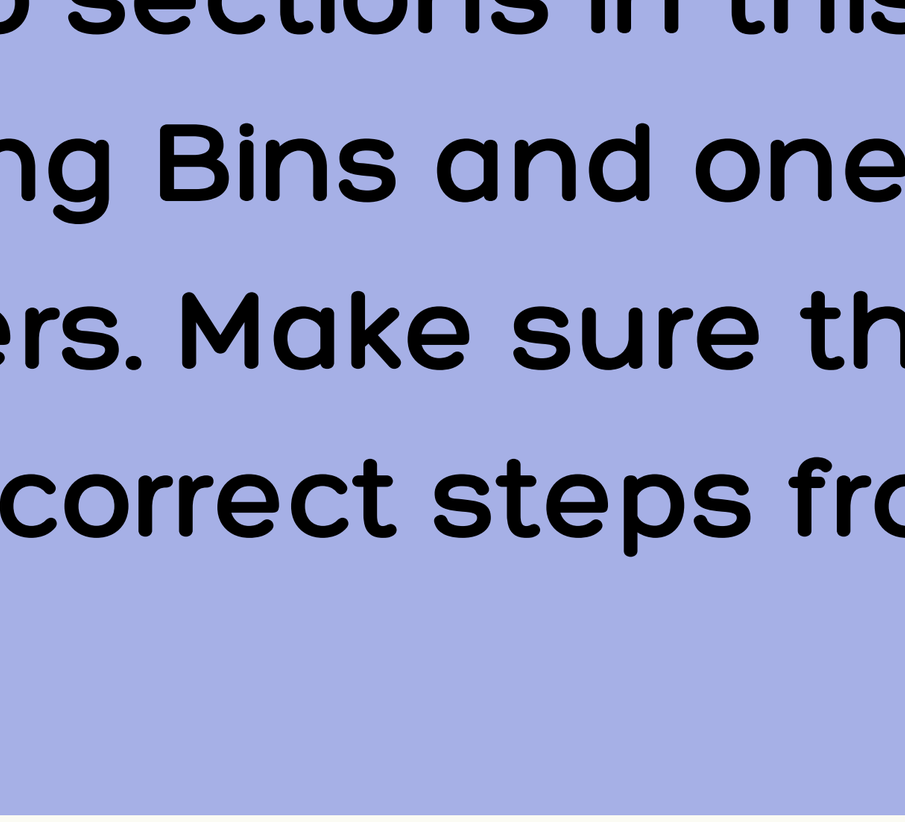
SAFETY ALERT: Make sure that when you move acid bins, and place them into the fume hood, that they sit within a secondary container. This will catch any spills or overflow.

Before placing your specimen in the solution, check the PH of the acid and make sure it is not neutralized. There are PH test strips in the Acid Prep Cabinet. Simply dip the strip into the solution and check the color against the key on the strip dispenser. If the solution is not yet neutral, you should be good to go.

SECTION SPLIT

MAKE SURE TO FOLLOW THE CORRECT STEPS

There are two sections in this workflow. One for Nesting Bins and one for Individual Acid Containers. Make sure that you are following the correct steps from here on out.

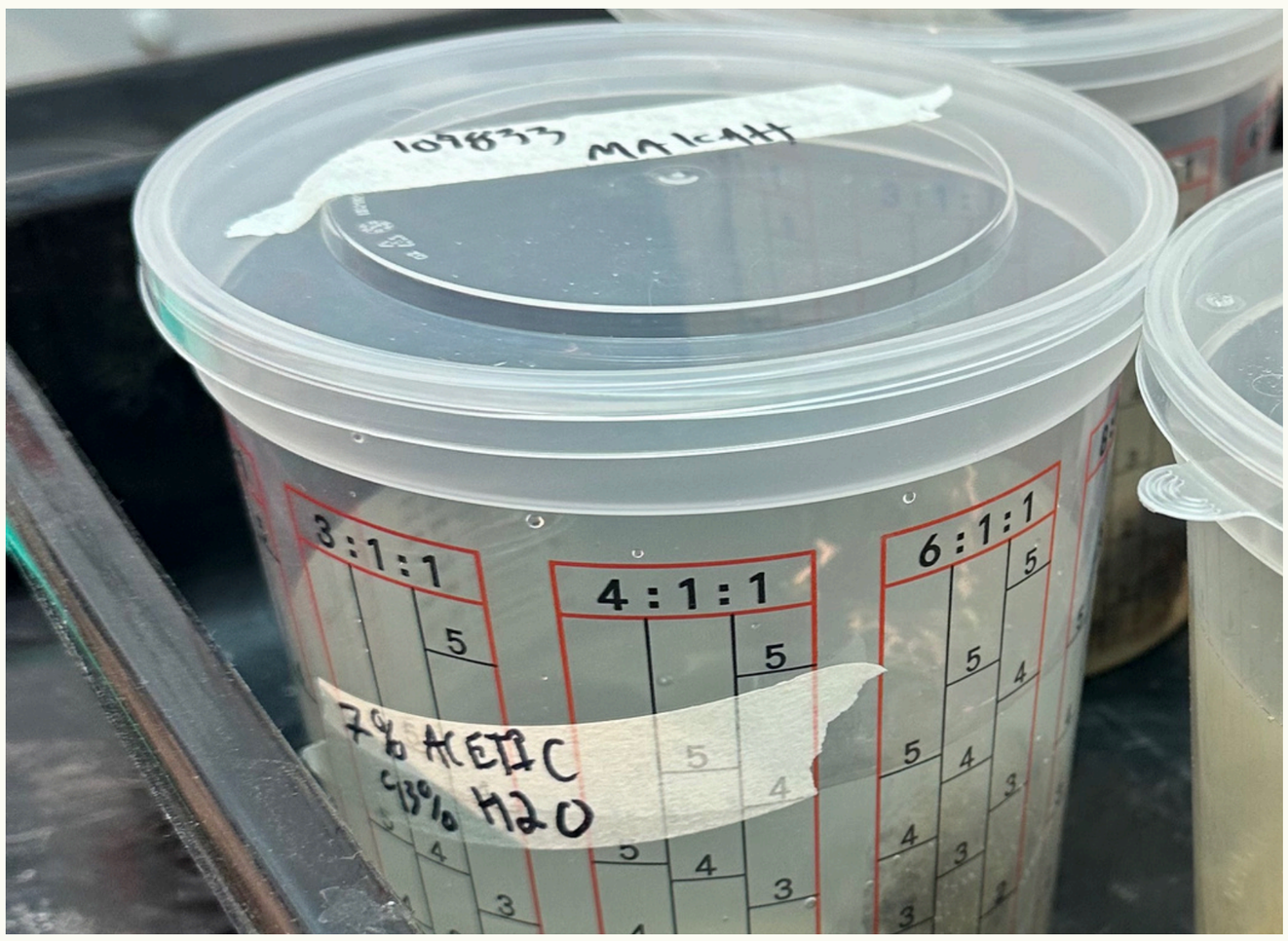


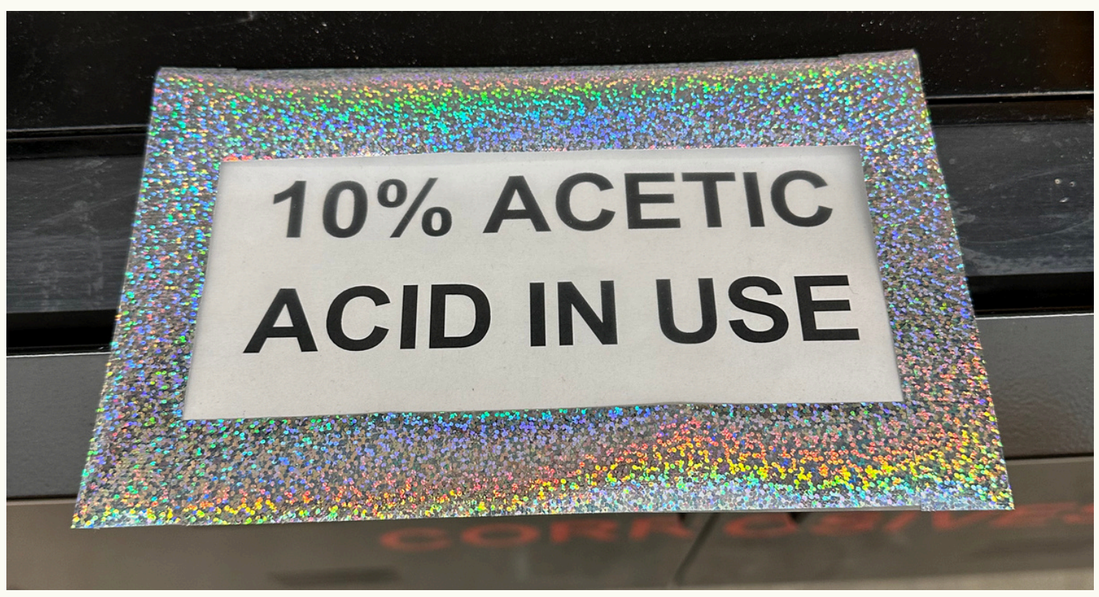
PLACE IN ACID!

FOR INDIVIDUAL CONTAINERS

Now that you have completed all the previous steps, you are ready to place your specimen in your acid solution. This process must be seen through to completion so make sure you budget your time accordingly.

SAFETY ALERT: Do not drop your specimen into the acid solution. Make sure to use either the tongs or the spider strainer to gently place your specimen into the solution to minimize splashing the acid solution.





Place the lid on the solution and set an alarm for your desired acid prep time. The amount of time you keep a specimen in the solution will be determined on a case by case basis.

SAFETY ALERT: Make sure to add a magnetic sign to the front of the fume hood, warning that acid is in use inside of the hood, in case anyone tries to move your specimens.

Collections Alert: Make sure to keep specimen information, such as tags and documents with the appropriate specimen.

REMOVING SPECIMENS FROM ACID

FOR INDIVIDUAL ACID CONTAINERS

Once the specimen has been in the acid solution for the desired amount of time, put your PPE back on and prepare to remove the specimen from the solution. Place the Acid Prep Wash Bin into the fume hood, directly next to the Acid Solution Tubs.

Carefully remove the solution lid, and using the tongs or strainer, lift the specimen out of the solution and into the Acid Prep Wash Bin.

Before returning the lid to the Acid Solution Bins, check the PH level again using the PH test strips to make sure that the solution is not yet neutral.

SAFETY ALERT: Be careful not to drop the specimen into the Acid Solution Tubs, as this can cause overflow and spillage.

Collections Alert: Make sure to keep specimen information, such as tags and documents with the appropriate specimen.

WASHING SPECIMENS

FOR INDIVIDUAL ACID CONTAINERS

SAFETY ALERT: Keep all PPE on for this step to avoid splashing any acid solution on skin or eyes.

Once the specimen has been placed in the wash tub, the wash tub must be moved to the sediment washing sink. Hook the Acid Prep Wash Hose up to the nozzle of the sink and place the other end of the hose into the wash tub. It is helpful to weigh the nozzle of the hose down to prevent it from moving around.

Fill the tub with the hose and then turn the faucet on just enough to create a low trickle of overflow from the Wash Bucket into the sediment sink. This will keep the water circulating.

Make sure to add a magnetic sign to the front of the sink, warning that Acid wash is taking place in the sink. Add the date and time that the specimens should be removed from the sink. Rule of thumb is to wash specimens overnight. This means specimens should be removed from wash in the morning the next day.

Collections Alert: Make sure to keep specimen information, such as tags and documents on the counter end of the sediment sink.

LOCATE YOUR ACID

FOR NESTING BINS

Generally, there will be acid mixed up and ready to go inside of the fume hood. Check the fume hood cabinet for bottles of mixed acid solution labeled with their solution percentage and date of mixture. They should look like the below images.

SAFETY ALERT: Make sure that when you move these bins, and place them into the fume hood, that they sit within a secondary container. This will catch any spills or overflow.

This image is for demonstration purposes only, using water instead of acid. Can you point out three things that are wrong with this picture?

Before placing your specimen in the solution, check the PH of the acid and make sure it is not neutralized. There are PH test strips in the Acid Prep Cabinet. Simply dip the strip into the solution and check the color against the key on the strip dispenser. If the solution is not yet neutral, you should be good to go.

NESTING BINS IN ACID

FOR NESTING BINS

Now that you have completed all the previous steps, you are ready to place your specimen in your acid solution. This process must be seen through to completion so make sure you budget your time accordingly.

Place your specimen into an appropriately sized nesting bin. Larger specimens need the larger bin, whereas smaller specimens may only need a small cup. The nesting bins will be clearly labeled, and will have holes punched into the bottom for proper drainage.

Next, remove the lid from the large acid vat. Place the lid inside of the fume hood with the inner section facing upward, to avoid smearing acid onto the base of the fume hood.

Set an alarm for your desired acid prep time. The amount of time you keep a specimen in the solution will be determined on a case by case basis.

Images for reference only. All work must be done inside of fume hood.

SAFETY ALERT: Do not drop your specimen into the acid solution. Make sure to use either the tongs or the spider strainer to gently place your specimen into the solution.

SAFETY ALERT: Make sure to add a magnetic sign to the front of the fume hood, warning that acid is in use inside of the hood, in case anyone tries to move your specimens.

Collections Alert: Make sure to keep specimen information, such as tags and documents with the appropriate specimen.

PLACE IN ACID!

FOR LARGE SPECIMENS!

Now that you have completed all the previous steps, you are ready to place your specimen in your acid solution. This process must be seen through to completion so make sure you budget your time accordingly.

SAFETY ALERT: Do not drop your specimen into the acid solution. Make sure to use the nesting tubs by gently placing the smaller tub with the specimen inside of the larger acid tub. Be careful that you don't overflow the container.

These images are for demonstration purposes only, using water instead of acid. Can you point out three things that are wrong with these pictures?

SAFETY ALERT: Make sure to add a magnetic sign to the front of the fume hood, warning that acid is in use inside of the hood, in case anyone tries to move your specimens.

Collections Alert: Make sure to keep specimen information, such as tags and documents with the appropriate specimen.

REMOVING SPECIMENS FROM ACID

FOR NESTING BINS

Once the specimen has been in the acid solution for the desired amount of time, put your PPE back on and prepare to remove the specimen from the solution. Place the Acid Prep Wash Bin into the fume hood, directly next to the Acid Solution Tubs.

Carefully lift the smaller nesting tub out of the larger container, allowing the solution to drain. then place the entire nesting tub into the Acid Prep Wash Bin.

Before returning the lid to the Acid Solution Container, check the PH level again using the PH test strips to make sure that the solution is not yet neutral.

SAFETY ALERT: Be careful not to drop the smaller Nesting Tub into the larger container, as this can cause overflow and spillage.

Collections Alert: Make sure to keep specimen information, such as tags and documents with the appropriate specimen.

SAFETY ALERT: These images are for reference using water. Do not lift nesting tubs higher than a few centimeters above acid height while draining.

WASHING SPECIMENS

FOR LARGE SPECIMENS!

SAFETY ALERT: Keep all PPE on for this step to avoid splashing any acid solution on skin or eyes.

Once the specimen and nesting tub have been placed in the wash tub, the wash tub must be moved to the smaller washing sink. Hook the Acid Prep Wash Hose up to the nozzle of the sink and place the other end of the hose into the wash tub. It is helpful to weigh the nozzle of the hose down to prevent it from moving around.

Fill the tub with water from the hose and then turn the faucet on just enough to create a low trickle of overflow from the Wash Bucket into the sink. This will keep the water circulating.

Make sure to add a magnetic sign to the front of the sink, warning that Acid wash is taking place in the sink. Add the date and time that the specimens should be removed from the sink. Rule of thumb is to wash specimens overnight. This means specimens should be removed from wash in the morning the next day.

Collections Alert: Make sure to keep specimen information, such as tags and documents on the counter end of the sediment sink.

DRYING SPECIMENS

FOR ALL SPECIMENS

After the specimen has been in the wash overnight, it must be removed and set to dry thoroughly. Carefully turn off the hose and pour the liquid contents of the wash tub down the sediment sink.

SAFETY ALERT: Wear proper PPE when dumping out the Acid Prep Wash Tub.

Remove the specimen from the tub and place it in one of the small cylindrical mesh screens. This screen will not allow moisture to gather underneath the specimen and will allow it to dry properly.

Place the specimen and screen on the counter end of the sediment wash sink. Make sure to place a magnetic sign next to the specimens stating when they were placed to dry and when they will be ready to return to the prep lab. Specimens should dry for at least 48 hours.

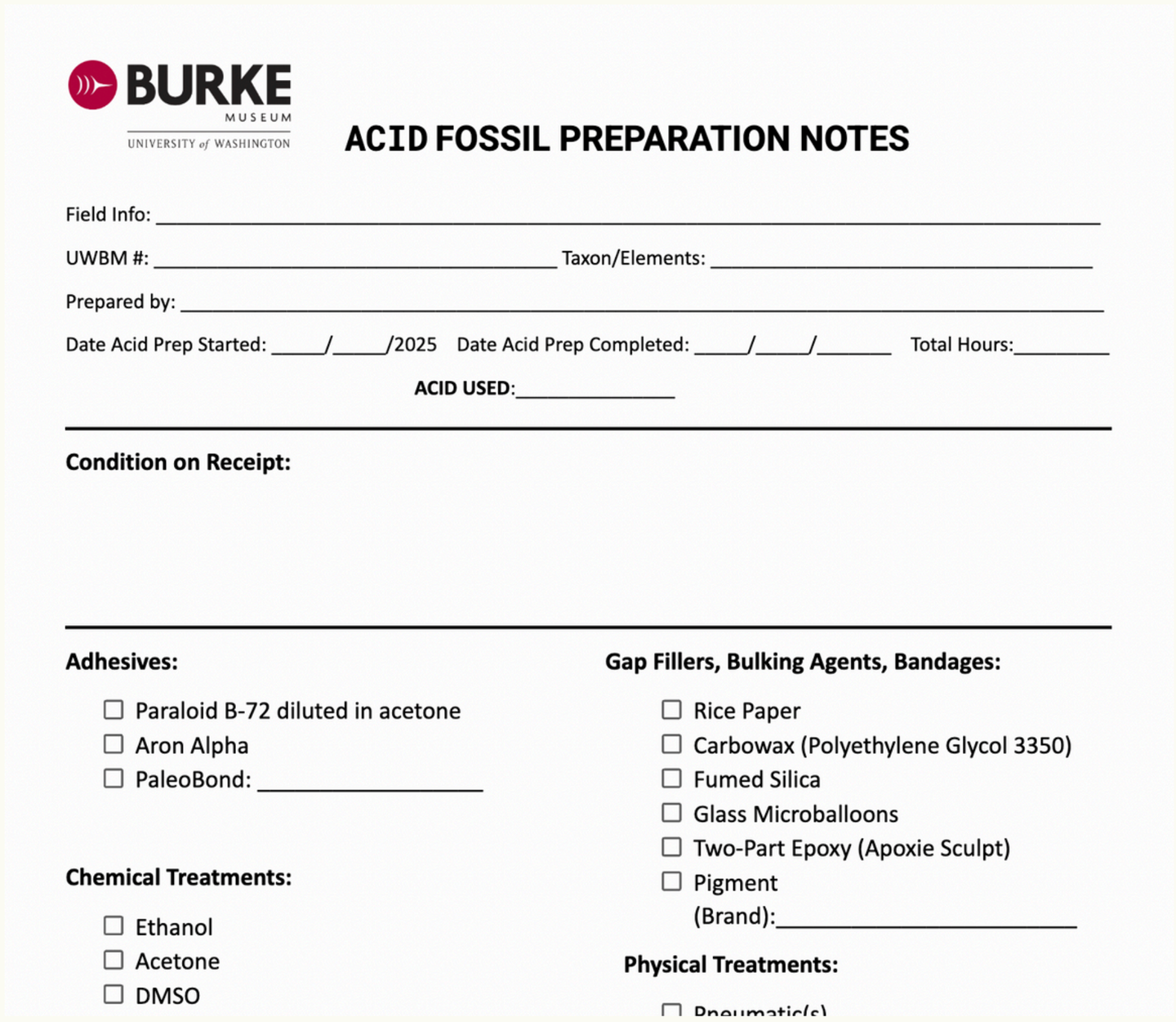
Collections Alert: Make sure to keep specimen information, such as tags and documents with the appropriate specimen.

Place any wet tubs and tools alongside the specimens to dry.

PAPERWORK

THE MOST IMPORTANT PART!

Make sure that you properly fill out both the Acid Prep Paperwork as well as the Prep Paperwork for your specimens.



BURKE MUSEUM
UNIVERSITY of WASHINGTON

ACID FOSSIL PREPARATION NOTES

Field Info: _____

UWBM #: _____ Taxon/Elements: _____

Prepared by: _____

Date Acid Prep Started: _____/_____/2025 Date Acid Prep Completed: _____/_____/_____ Total Hours:_____

ACID USED:_____

Condition on Receipt:

Adhesives:

- ☐ Paraloid B-72 diluted in acetone
- ☐ Aron Alpha
- ☐ PaleoBond: _____

Chemical Treatments:

- ☐ Ethanol
- ☐ Acetone
- ☐ DMSO

Gap Fillers, Bulking Agents, Bandages:

- ☐ Rice Paper
- ☐ Carbowax (Polyethylene Glycol 3350)
- ☐ Fumed Silica
- ☐ Glass Microballoons
- ☐ Two-Part Epoxy (Apoxie Sculpt)
- ☐ Pigment (Brand):_____

Physical Treatments:

- ☐ Pneumatic(s)

Be careful to keep your specimens labeled properly, either through proximity, through magnetic signs or by individually labeling bins with tape and marker.

Fill out the white board with info for the next person who will be working.

Finally, be sure to fill out the Acid Prep Logbook that will be displayed in the Wet Lab. This is an important step as it will let the next person know what needs to be done.

Collections Alert: Make sure to keep specimen information, such as tags and documents with specimens at all times.

MIXING ACID

DO NOT ATTEMPT WITHOUT MANAGER SUPERVISION

SAFETY ALERT: DO NOT mix acid without first consulting the fossil prep lab manager. Make sure you have all of your PPE on before completing any of these steps.

IF there is no Acid already mixed, or the acid that is available has become neutral (test with PH strips to determine), then you may need to mix acid yourself.

Carefully remove the container of Acetic acid from the storage space and place it within the fume hood. Always carry large bottles of concentrated acid either in an approved carrier or by firmly grasping the body of the bottle with one hand and placing the other hand underneath the bottle. Do not carry by the neck or lid. Do not rush.
If there are already acid jars made up and the PH is still below 7, you may use one of those. If not, follow the next steps.
Place the ACID PREP 1L beaker inside of the fume hood. Place the ACID PREP Storage Containers inside of the fume hood.
Inspect all containers and beakers for chips or cracks. If any containers or glassware are chipped or broken, halt procedures and alert a supervisor.
CREATING ACID SOLUTION FOR FOSSIL PREPARATION:
Into the ACID PREP Storage Container, place about 900ml of distilled water.
Carefully measure 100 ml of concentrated acetic acid from the storage bottle and into the the ACID PREP 1L Beaker. Keep the label of the acid bottle uppermost when pouring and clean up any spilt liquid from the outside of the bottle using baking soda.

Carefully pour the 100ml of concentrated Acetic acid from the ACID PREP 1L Beaker into the ACID PREP Storage Container which should have 44 oz of distilled water inside. Pour the acid in slowly and carefully while stirring the mixture with a glass stirring rod.

With distilled water, rinse the remaining acid from the ACID PREP 1L Beaker into the solution in the ACID PREP Storage Container.

The solution will heat up. Wait for the solution to return to room temperature and then fill out an ACID PREP LABEL to add directly to the ACID PREP Storage container.

CONGRATULATIONS

YOU HAVE COMPLETED THE WORKFLOW

You now have all the tools you need to set up the Acid Prep Lab for success.

Please direct all questions and concerns to the Fossil Prep Lab Manager.

GO PREP SOME WHALES!! AND REMEMBER, SAFETY FIRST ALWAYS!